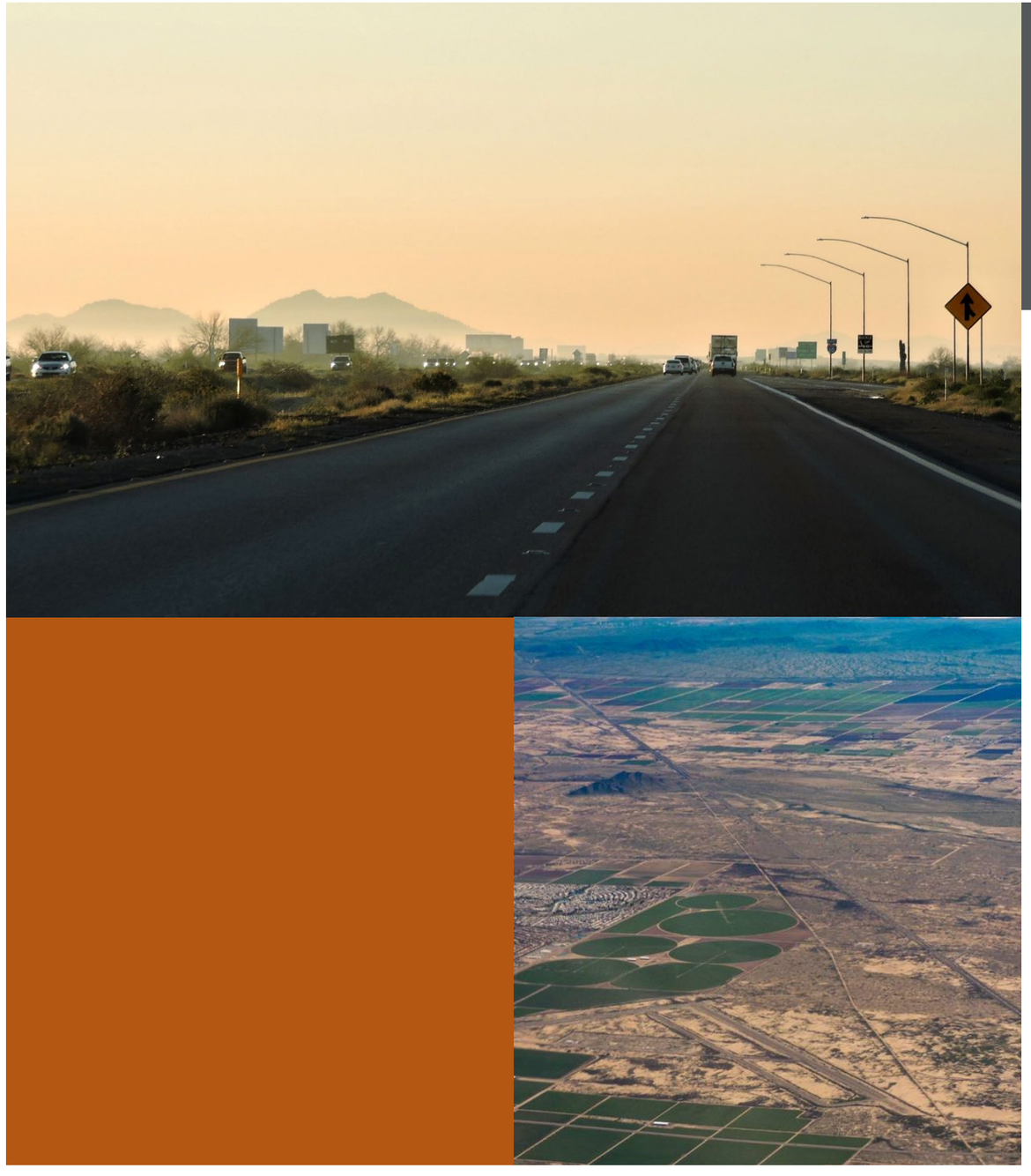

I-10 | LOOP 202 TO SR-387
WILD HORSE PASS CORRIDOR

Design Concept Report

Interstate 10 Corridor: State Route 202L
to State Route 387

Maricopa and Pinal Counties, Arizona

ADOT Project Nos. F0252 01L and F0252 02L
Federal Aid No. 010-C(222)S

October 2023

ADOT

Registered Professional Engineer (Civil)
30002
BRIAN W. BOMBARDIER
Date Signed 10-1-2023
ARIZONA, U.S.A.
EXPIRES 3-31-2026

ADOT
Infrastructure Delivery and Operations

PROJECT DETERMINATION FORM

Project Number	County and ADOT District	Project Name and Highway	Final Design Concept Report Date
F0252 01L & F0252 02L	Maricopa and Pinal Counties	I-10; SR 202L to SR 387	October 2023
010-C(222)S	Central and Southcentral	Phoenix-Casa Grande Highway	

Project Description:	Interstate widening and pavement preservation, interchange construction and reconstructions, underpass reconstructions, and fiber optic conduit.

Existing Program	
Yes	No
X	

Program Year	Programmed Budget
2019, 2020, 2021, 2022, 2023, 2024, 2025	$801,140,000 (Multiple FY)
	DCR Construction Cost Estimate
	$778,592,300 (FY 23$) $886,900,000 (Yr of Expenditure $)

Operating Partnership Category					
S	F	T	D	Z	N/A
X					

Public Hearing: In the Highway Development Process, at least one public hearing or the opportunity for a hearing will be offered for any project that:

	Requires a significant amount of new right-of-way:
X	Substantially changes the layout or function of connecting roadway or the facility being improved;
	Has a significant adverse impact on abutting real property;

	Otherwise has a significant social, economic, environmental or other effect
	Is controversial on environmental grounds;
	Or has significant floodplain encroachment
	None of the above conditions apply

Recommends

Yes:	No:		Environmental Category		
X		Public Forum			
	X	Offer a combined Location / Design Hearing	Class 1	Class II	Class III
	X	Offer Separate Location/Design Hearing			X
X		Hold a Design Public Hearing			

Carlos Lopez — Oct 19, 2023
Carlos Lopez — Project Manager, Alternative Delivery/Major Projects — Date

Paul O'Brien — Oct 19, 2023
Paul O'Brien (Oct 19, 2023 PDT)
Paul O'Brien — Manager, Environmental Planning — Date

Concur:

H.B.Shah — Oct 19, 2023
Hiren Shah — Manager, Roadway Predesign & Standard Section — Date

Randy Everett — Oct 20, 2023
Randy Everett (Oct 20, 2023 PDT)
Randy Everett — Sr. Division Administrator, Central District — Date

Roderick Lane — Oct 25, 2023
Roderick Lane (Oct 25, 2023 PDT)
Rod Lane — District Engineer, Southcentral District — Date

Approved:

Michael DenBleyker — Oct 26, 2023
Michael DenBleyker (Oct 26, 2023 PDT)
Michael DenBleyker — Roadway Group Manager, Roadway Engineering Group — Date

Oct 26, 2023
David Benton — State Bridge Engineer, Bridge Group — Date

Comments:

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1 Introduction

1.1 Foreword

This Interstate 10 (I-10): State Route (SR) 202L to SR 387 Design Concept Report (DCR) discusses the proposed I-10 improvements from SR 202L (milepost 161) to about 1.7 miles south of SR 387 (milepost 187) but excludes the Gila River Bridge replacement project between mileposts 172.75 and 173.75—the latter being the subject of a separate study by the Arizona Department of Transportation (ADOT). See Figure 1-1.

This 26-mile segment of the interstate is part of the major interstate freeway connection between Phoenix and Tucson (known as the Sun Corridor), with the vast majority of this segment falling within the limits of the Gila River Indian Community (the Community). I-10 is one of the five primary transcontinental east-to-west interstate corridors that run across the United States. I-10 is the southernmost route between the Pacific Ocean in Santa Monica, California, and the Atlantic Ocean in Jacksonville, Florida, with many connections to the south into Mexico. Consequently, this corridor is a major local, regional, national, and international freight corridor. This portion of I-10 is the last segment between Phoenix and Tucson with only two lanes in each direction, so enhancing the capacity of this part of I-10 by adding a third lane in each direction will greatly benefit the corridor's numerous users.

While this study has several goals for I-10 (see Section 1.2), the primary focus of the study is to improve the capacity of I-10 in a manner that is compatible with the adjacent I-10 freeway segments. This document summarizes the existing and projected physical and operating conditions, describes the build and no-build alternatives for the I-10 main line and the build and no-build options for the 10 crossroads, outlines the consensus-based process used to develop various alternatives and select a preferred alternative, and describes the design features and cost estimate of the preferred alternative. Other items in this DCR include an implementation strategy and other supporting engineering evaluations developed for the study process.

ADOT has assigned two project numbers for this study: F0252 01L (for the segment in Maricopa County) and F0252 02L (for the segment in Pinal County). The Maricopa-Pinal County line is at milepost 168.68. The Federal Aid number for this project is 010-C(222)S.

1.2 Purpose and Need for the Project

To accommodate the growth occurring in Maricopa, Pinal, and Pima Counties, ADOT has been expanding and modernizing I-10 between Phoenix and Tucson for the last 20 years. This 26-mile segment is the last remaining piece of ADOT's overall vision for expanding I-10's capacity and improving and modernizing the I-10 route through the Sun Corridor between the state's two major metropolitan areas of Phoenix and Tucson.

In general, the Sun Corridor is expected to experience rapid population and employment growth. While the growth is expected to be moderate to high in the northern end of the project near Phoenix and Chandler, the growth in the southern end of the corridor near Casa Grande is expected to proceed aggressively between now and 2040. Growth in the Community will be slower, by comparison, through 2040. When employment growth is factored in for each city, the study area is expected to experience substantial growth by 2040, including a projected 25 percent increase in the Community. Along with the population and employment growth, traffic in the study area is expected to grow rapidly for passenger and freight traffic, as well as seasonal residents and visitors, and overall regional urbanization.

Figure 1-1. Project vicinity

The purpose of the I-10: SR 202L to SR 387 study is to address current and future travel demand, congestion, capacity, traffic operations, access, and infrastructure issues in this section of the existing I-10 corridor by achieving the following:

- meet current and projected future travel demand and congestion on I-10 by 2040 that is being driven by population and employment growth in Maricopa, Pinal, and Pima Counties
- improve I-10 passenger and freight traffic capacity, traffic operations, and incidents of traffic detouring off the I-10 main line
- improve the travel time reliability for regional and international freight transportation
- address design standards and end-of-service-life elements in the I-10 corridor to be consistent with current interstate highway standards—includes addressing deficiencies of the portions of local roadways and structures crossing over I-10 as traffic interchanges (TIs) or grade-separated roads and structures

The project need identifies the specific and measurable transportation problems that exist today or will exist by 2040. The conditions driving the inadequacies or deficiencies that need to be remedied are:

- substantial current and projected future travel demand on I-10 that is being driven by population and employment growth in Maricopa, Pinal, and Pima Counties
- substantial traffic congestion resulting from inadequate roadway capacity on I-10 that continues to worsen, adversely affecting travel time and levels of service (LOS)
- substantial I-10 traffic operation issues caused by passenger and freight traffic volumes, major crashes, emergencies, and weather-related incidents, with subsequent diversion of traffic onto local Community roads and land
- crash statistics that indicate a higher-than-average number and/or severity of crashes than the Arizona statewide average for similar roadways
- elements of the I-10 study area that fall short of today's interstate highway design standards and/or have degraded and become deficient because of age or use, including degrading bridge decks, outdated bridge barriers, narrow or nonexistent shoulders, and poor pavement condition

1.3 Description of the Project

1.3.1 Roadway

I-10 was initially constructed in the 1960s and has had numerous upgrades and additions in the years since. As-built record drawings used to develop the alternatives and options are summarized in Table 1-1.

The existing I-10 horizontal alignment for this project begins at milepost 161.00 and station 841+25.79 and extends to milepost 186.95 and station 2206+49.89. There is an existing station equation just south of Wild Horse Pass Boulevard, where back 925+43.08 equals ahead 920+49.94 at milepost 162.597 using this project's reestablished stationing. When the current Wild Horse Pass Boulevard TI was constructed in 2005, new localized I-10 stationing was established for that project. However, for this study that localized stationing will not be used and instead will be superseded by the original I-10 centerline and stationing that extends for the limits of the study area. With the exception of one horizontal curve on I-10 near the SR 202L connection, the balance of the 26-mile corridor is on a horizontal tangent, although the two directions of I-10 do bifurcate through the rock cut section of the corridor between the rest areas and the SR 387/Pinal Avenue TI.

Table 1-1. Interstate 10 as-built summary

As-built project number	Date	Description of work	Begin station	End station	Begin milepost	End milepost
I-10-3(53)	1967	Warner Rd to Pecos Rd	720+00.00	877+00.00	158.71	161.68
I-10-3(36)	1969	Pecos Rd to County Line	877+00.00	1241+46.21	161.68	168.68
I-10-3(38)	1967	County Line to Gila River Bridge	1241+46.21	1475+00.00	168.68	173.10
I-10-3(47)	1964	Gila River Bridge	1475+00.00	1493+00.00	173.10	173.44
I-10-3(40)	1967	Gila River Bridge to Dirk Lay Rd	1493+00.00	1910+00.00	173.44	181.34
I-10-3(42)	1968	Dirk Lay Rd to Val Vista Blvd	1910+00.00	2267+00.00	181.34	188.10
I-10-3(58)	1967	Casa Blanca-SR 187	1605+00.00	2267+00.00	175.56	188.10
I-10-3(80)	1980	Sacaton Rest Area	1930+35.00	2025+30.00	181.72	183.52
I-10-3(126)	1975	Goodyear to Val Vista	1300+00.00	2267+00.00	169.85	188.11
IR-10-3(142)	1984	Chandler to Riggs	812+44.10	1158+28.10	160.55	167.10
IM-NH-10-C(204)T	2015	Wild Horse to Riggs	8572+96.00	1157+12.70	162.56	167.10
IR-10-3(325)	1992	Queen Creek TI	984+13.92	1049+75.00	163.81	165.06
ACIR-10-3(264)	1992	Riggs to Gila River	1156+68.69	1477+43.62	167.10	173.15
IM 010-C(006)A	2005	Riggs to Gila River	1156+68.69	1477+43.62	167.10	173.15
I-10-3-513	1992	Riggs Rd TI	1183+60.70	1224+78.30	167.58	168.36
IR-10-3(228)	1990	Pecos to Casa Blanca Mill Overlay	788+27.00	1733+45.00	160.00	178.00
I-10-3(57)	1967	County Line to Casa Blanca	1241+46.21	1605+00.00	172.09	175.56
I-10-3(126)	1975	Goodyear to Val Vista Blvd	1300+00.00	2267+00.00	169.85	188.11
IM-10-3(271)	1995	Gila River to Casa Blanca	1490+27.29	1616+57.00	173.40	175.79
NH-10-C(214)T	2018	Gila River to Casa Blanca	1490+27.37	1645+2491	173.39	176.15
I-10-3-946	1984	Nelson Rd Underpass	1556+05.28	—	174.63	—
AC-IM-010-C(4)P	2003	Casa Blanca to Seed Farm Rd	1617+29.00	1839+05.00	175.80	180.00
ACIR-10-3(242)	1989	Casa Blanca to SR 187	1730+89.00	2102+92.00	178.00	185.00
I-10-3-506	1995	Sacaton Eastbound Rest Area	1930+35.00	2025+30.00	181.81	183.52
I-10-3-535	2003	Sacaton Rest Area Rehab	1930+35.00	2025+30.00	181.81	183.52
FIR-10-3(266)	1995	Sacaton Eastbound Rest Area Rehab	1930+35.00	2025+30.00	181.81	183.52
I-10-3-502	1973	SR 187 TI	2117+11.52	—	185.26	—
IR-10-3(230)	1990	SR 187 to SR 287	2102+92.00	2640+00.00	185.00	195.17
IM-10-3(355)	1999	Seed Farm Rd to Sunland Gin	1839+36.42	2895+36.42	180.00	200.00
I-10-3(57)	1967	County Line to Casa Blanca	1241+46.21	1625+00.00	172.09	175.94
IM-NH-10-C(204)T	2015	Wild Horse Pass to Queen Creek Rd	8572+96.00	1157+12.70	162.56	167.10
STP-202-C(006)B	2005	Wild Horse Pass TI	8545+00.00	8625+40.00	162.09	163.52

The existing I-10 vertical alignment is relatively flat at just a few feet above natural grade for the entire 26 miles, with the main exception being the rock cut section noted above.

Two rest areas exist along the I-10 corridor, one in each direction. The eastbound rest area is at approximately milepost 182.0 and the westbound rest area is at approximately milepost 183.2.

All crossroads and TIs cross over I-10 on elevated embankments. The existing critical vertical alignment and clearances for the crossroads can be found in Table 1-2.

Table 1-2. Existing crossroad horizontal and vertical alignments

Crossroad	I-10 crossing station	I-10 crossing milepost	Controlling vertical curve type	Minimum vertical curve design speed (mph)	Vertical clearance (ft)
Wild Horse Pass Blvd	921+72.39	162.527	Sag	62	16.84
SR 347/Queen Creek Rd	1020+84.69	164.497	Crest	77	16.71
Riggs Rd	1178+48.55	167.483	Crest	57	16.02
Goodyear Rd	1304+29.67	169.866	Sag	53	16.12
Nelson Rd	1556+05.28	174.634	Sag	52	16.15
SR 587/Casa Blanca Rd	1618+00.00	175.807	Sag	51	16.11
Gasline Rd	1720+86.66	177.755	Crest	53	16.23
Seed Farm Rd	1807+68.42	179.400	Sag	52	16.18
Dirk Lay Rd	1915+03.36	181.433	Crest	54	16.26
SR 387/SR 187/Pinal Ave	2117+11.52	185.260	Sag	50	16.61

The existing pavement types, typical sections, and roadway barrier systems present in the corridor are summarized below.

Interstate 10

The existing pavement on I-10 has either been replaced (in the vicinity of the Wild Horse Pass Boulevard TI) or has been milled and overlaid several times throughout the rest of the corridor since its initial construction in the late 1960s. The existing pavement types can be found in Table 1-3. Recent asphalt mill and overlay projects for much of the corridor were completed between 2019 and 2021, so the pavement condition is generally good. Additional mill and overlays will likely be needed in about 10 years.

Table 1-3. I-10 pavement type summary

Existing I-10 pavement type	Begin station	End station	Begin milepost	End milepost
Concrete pavement EB (SB)	841+25.79	967+30.00	161.00	163.48
Asphalt pavement EB (SB)	967+30.00	2206+49.89	163.48	186.95
Concrete pavement WB (NB)	841+25.79	943+70.00	161.00	163.04
Asphalt pavement WB (NB)	943+70	2206+49.89	163.04	186.95

Notes: I-10 traveling eastbound toward Tucson in the study area is generally traveling in a southbound direction. Traveling westbound toward Phoenix, I-10 is generally traveling in a northbound direction.
EB = eastbound, NB = northbound, SB = southbound, WB = westbound

I-10 has several different lane configurations throughout the length of this project. Generally, between SR 202L and SR 347/Queen Creek Road, I-10 has three 12-foot lanes with a 10-foot outside shoulder and a 4- to 8-foot inside shoulder. Auxiliary lanes are present in this section, which in some cases add an additional 12-foot lane. Furthermore, high-occupancy vehicle (HOV) lanes exist in the SR 202L system TI along I-10 going north.

South of SR 347/Queen Creek Road, I-10 includes two 12-foot lanes in each direction, a 10-foot outside shoulder, and a 4-foot inside shoulder extending to the southern end of the project where I-10 widens to three 12-foot lanes and 10-foot inside and outside shoulders in both directions.

An existing median cable barrier exists along I-10 from the SR 202L bridge crossing south to station 968+19, about 1 mile south of Wild Horse Pass Boulevard. No median barrier system exists south of station 968+19. Sand barrel attenuators exist in the median at all bridge piers and sign foundations in the corridor. Guardrail and concrete barrier segments with leading edge attenuator systems exist sporadically along the outside shoulder of I-10 where necessary to protect bridge piers, sign foundations, headwalls, etc. Concrete barrier also exists through the rock cut sections through the Sacaton Mountains along the inside shoulder of I-10.

Interstate 10 currently has no restrictions regarding the transport of hazardous or radioactive materials through the project limits. The Community raised concerns during the scoping phase of this study, asking the study team to evaluate restricting hazardous and radioactive materials over I-10 through the Community limits. This study team subsequently performed this evaluation and documented its findings in a letter to the Community, which recommended no changes to the current policy. After a review period by the Community, the Community responded with no further comments. This letter and the Community's response are documented in Appendix C.

Wild Horse Pass Boulevard Traffic Interchange

The Wild Horse Pass Boulevard TI was constructed around 2004 and replaced the old Maricopa Road TI. This reconstruction reconfigured the TI from its original partial cloverleaf layout to the current urban diamond configuration that directly serves the Wild Horse Pass Development Authority's (WHPDA's) planned development to the west and the Lone Butte Industrial Park to the east—both Community business interests. As such, this TI is the newest and most modern service TI in the project limits, with the two ramp terminal intersections being signal-controlled.

The existing pavement at Wild Horse Pass Boulevard is concrete pavement through the TI itself, but transitions to asphalt outside of the TI. Wild Horse Pass Boulevard generally has two basic 12-foot through lanes in each direction, but an auxiliary lane also exists west of I-10 between the TI and the Winners Way intersection. Variable-width shoulders exist in some places, while raised curbed islands exist in other areas. Single left- and right-turn lanes exist in the TI, but a dual left-turn lane configuration is used eastbound across the TI.

There is bridge railing on the bridge behind the raised sidewalk that extends to the ramp terminal.

Crosswalks, curb ramps, and sidewalk run across the bridge and between the ramp terminals, but do not connect to any pedestrian facilities at either intersection farther to the east and the west. See Appendix D for the Americans with Disabilities Act (ADA) report and more details on these pedestrian facilities.

State Route 347/Queen Creek Road Traffic Interchange

SR 347 is a state highway from I-10 to south of the city of Maricopa and is owned and maintained by ADOT. Queen Creek Road east of I-10 is owned and maintained by the Maricopa County Department of Transportation (MCDOT). It extends about 3 miles until it crosses into the city of Chandler. This TI was reconstructed in 1992 from its late 1960s original construction, but the basic urban diamond TI configuration remained the same. Additional capacity was added at the TI as this became the new primary I-10 access point for Maricopa Road

(now known as SR 347). The two intersections are signal-controlled. This TI can experience a substantial increase in volumes as I-10 traffic can divert east into Chandler should an I-10 closure occur north of this TI.

The existing pavement at Queen Creek Road is concrete pavement through the TI itself, but then transitions to asphalt outside of the TI. SR 347 and Queen Creek Road both use two 12-foot lanes in each direction with right-turn pockets at the bridge. Through the TI, the roadway expands to include two left-turn lanes heading east and one left-turn lane heading west. Shoulder widths are variable but generally include 10-foot outside shoulders on SR 347 and 4-foot outside shoulders on Queen Creek Road. Inside shoulder are variable and nominal.

There is a jersey-style bridge barrier over the bridge that extends and terminates at the ramp terminals. Outside of the ramp terminals, guardrail is used in all four quadrants to protect drivers from the steep side slopes.

Riggs Road Traffic Interchange

Originally called the Superstition TI when it was built with I-10, it was renamed the Riggs Road TI sometime in the 1990s. Other than some maintenance and minor operational upgrades, this rural spread diamond TI is largely unchanged from its late 1960s construction. Riggs Road is owned and maintained by MCDOT within the limits of the Community. The two intersections are signal-controlled. This TI can experience a substantial increase in volumes as I-10 traffic can divert east into Chandler should an I-10 closure occur north of this TI.

The existing pavement at Riggs Road is asphalt pavement. Riggs Road has one 12-foot lane in each direction with pocket left-turn lanes at the ramp terminals. Across the intersection from each pocket left-turn lane is a striped median. The roadway tapers from these pockets down to one lane in each direction when crossing the bridge.

The original bridge barrier transitions into guardrail off the bridge, which terminates before the ramp terminals. Cattle guards cross Riggs Road about 100 feet beyond both ramp terminals.

Goodyear Road

The Goodyear Road crossing was built with the original I-10 construction with the intention to be converted to a TI to access nearby cultural sites that, at that time, were envisioned to be converted to a preservation park where visitors could visit. These plans were eventually abandoned and, as a result, the TI was never built. Today, Goodyear Road operates as a low-volume roadway that is owned and operated by the Community Department of Transportation (Community DOT) and the Bureau of Indian Affairs (BIA).

The existing pavement at Goodyear Road is asphalt pavement within the limits of the ADOT easement, but transitions to a dirt/gravel road outside of the easement. Goodyear Road has one 12-foot lane in each direction with a nominal 1-foot shoulder.

The original bridge barrier transitions into guardrail off the bridge.

Nelson Road

The Nelson Road crossing was built with the original I-10 construction and was designed to keep the community of Bapchule connected to SR 587. Nelson Road is owned and operated by the Community DOT and BIA.

The existing pavement at Nelson Road is concrete pavement within the limits of the ADOT easement, transitioning to asphalt pavement outside of the ADOT easement. Nelson Road has one 12-foot lane in each direction with a nominal 1-foot shoulder.

The original bridge barrier transitions into guardrail off the bridge.

A single cattle guard crosses Nelson Road at the eastern limit of the concrete pavement.

State Route 587/Casa Blanca Road Traffic Interchange

Prior to the construction of I-10, this location was the site of a four-legged intersection that crossed Casa Blanca Road (east and west legs) with SR 587 (north leg) and old Highway 93 (south leg). Remnants of this intersection can still be seen today in the site's aerial photography. The I-10 alignment was ultimately constructed through this intersection, resulting in a six-legged TI. To accommodate this unique configuration, a partial cloverleaf-style TI was used that consolidated the ramp terminals to one side of the crossroad (SR 587 to the east and old Highway 93 to the west). Opposing the ramp terminal at these new intersections was the reconnection of Casa Blanca Road. This TI configuration was an appropriate low-cost solution given the low volumes in the 1960s, but the increased travel demand and the undesirable geometry associated with the hook-style exit ramps have resulted in congestion and safety concerns today. Further complicating operations, this TI experiences a substantial increase in volumes when I-10 must be closed between this TI and SR 202L because I-10 traffic tends to divert along SR 587 into Chandler. Casa Blanca Road and old Highway 93 are roadways owned and maintained by the Community DOT and BIA. SR 587 is owned and maintained by ADOT. The two intersections are stop sign-controlled.

The existing pavement at the SR 587/Casa Blanca Road TI is asphalt pavement. All of the roads at this TI have one 12-foot lane in each direction with variable-width shoulders between 4 and 8 feet wide. This includes Casa Blanca Road, SR 587, old Highway 93, and all four of the ramps. There are no dedicated turn lanes at this TI's intersections.

The bridge uses a jersey-style bridge barrier that transitions into guardrail. The guardrails terminate before the ramp terminals.

Cattle guards cross both legs of Casa Blanca Road, SR 587, and old Highway 93 immediately adjacent to their respective intersections.

Gasline Road

As one of the two north-to-south oriented crossroads, Gasline Road crosses I-10 across the northern limits of the Gila Farms, another of the Community's business entities. When I-10 was constructed, it bisected Gila Farms and, as a result, two bridged crossings were built to keep Gila Farms operating as one entity. Gasline Road is the northern crossing and Seed Farm Road is the southern crossing. This crossing is routinely used by oversized agricultural equipment that takes up both directions of travel across the bridge. While this is a low-volume roadway, this does not create an operational problem, but does present safety concerns. The Gasline Road crossing was built with the original I-10 construction and Gasline Road itself is owned and operated by the Community DOT and BIA. Because of its north-to-south orientation, the bridge uses a five-span configuration that limits I-10 widening options either to the median or to the outside.

The existing pavement at Gasline Road is concrete pavement generally within the limits of the ADOT easement, but then transitions to a dirt/gravel road outside of the ADOT easement. Gasline Road has one 12-foot lane in each direction with a nominal 1-foot shoulder.

The original bridge barrier transitions into guardrail off the bridge.

Seed Farm Road

The Seed Farm Road crossing was built with the original I-10 construction and was designed to keep the bisected Gila Farms connected. Like Gasline Road, this crossing is routinely used by oversized agricultural

equipment that takes up both directions of travel across the bridge. Also, as with Gasline Road, while this is a relatively low-volume roadway, this does not create an operational problem but does present safety concerns. Seed Farm Road is owned and operated by the Community DOT and BIA.

The existing pavement at Seed Farm Road is concrete pavement within the limits of the ADOT easement, but then transitions to a dirt/gravel road outside of the ADOT easement. Seed Farm Road has one 12-foot lane in each direction with a nominal 1-foot shoulder.

The original bridge barrier transitions into guardrail off the bridge.

Dirk Lay Road

The Dirk Lay Road crossing was built with the original I-10 construction and is the second north-to-south oriented crossing over I-10 using the same five-span bridge configuration at Gasline Road, limiting I-10 widening opportunities. The origin and reasoning for constructing this crossing have been lost to time, and today Dirk Lay Road is not a Community DOT or BIA owned or maintained roadway, so it does not connect to anything.

The existing pavement at Dirk Lay Road is asphalt pavement. Dirk Lay Road has one 12-foot lane in each direction with a nominal 1-foot shoulder.

The original bridge barrier transitions into guardrail off the bridge.

State Route 387/State Route 187/Pinal Avenue Traffic Interchange

The Pinal Avenue rural spread diamond TI was built with the original I-10 construction to connect Pinal Avenue, SR 387, and SR 187 to I-10. Except for some minor upgrades since its initial construction, this TI remains largely unchanged. The ramp terminal intersections are currently stop sign-controlled. The SR 387 and SR 187 stop sign-controlled T-intersection is about 500 feet north of the east side ramp terminal. With the growth in Casa Grande over the last 20 years, this TI has seen substantial increases in demand because it used as a primary route for drivers commuting between Casa Grande and Phoenix. Furthermore, this TI experiences a substantial increase in volumes as I-10 traffic tends to divert up SR 187 to SR 87 should an I-10 closure occur north of this TI.

The existing pavement in the TI is asphalt pavement. Pinal Avenue has one 12-foot lane in each direction for most of the TI, except for south of the TI, where two 12-foot lanes exist in each direction. Shoulder widths vary from 2 to 8 feet wide depending on the location in the TI. There is a pocket left-turn lane onto the on ramps on either side of the bridge that tapers down to the one lane in each direction over the bridge.

The bridge uses a jersey-style bridge barrier that transitions into guardrail that terminates before the ramp terminals.

A cattle guard exists on the eastbound entrance ramp near the ramp terminal intersection. Cattle guards used to exist on the other four ramps but were recently removed.

1.3.2 Right-of-way and Access Control

The existing right-of-way (ROW) along I-10 is a perpetual grant of easements from the Community and BIA. The I-10 easement width is generally 300 feet centered on the median centerline, although a notch in the east ROW line exists at station 1525+00, restricting the width to about 260 feet at this location. The ROW widens considerably at the crossroads and TIs and varies depending on the layout of the crossroads and TIs.

The existing I-10 ROW across the Community crosses both tribal owned and allotted (essentially private property) parcels. Approximately 240 allotted parcels exist within the study limits. These allotments start south of Wild Horse Pass Boulevard and extend south nearly to Dirk Lay Road. Table 1-4 summarizes the ADOT ROW plans that were used as references when developing the alternatives and options.

Table 1-4. Right-of-way summary

Right-of-way project no.	Begin station	End station	Begin milepost	End milepost	Right-of-way type	Date
I-10-3(16)155	558+60.23	946+66.31	155.65	163.09	Easement	1966
I-10-3(35)161	946+66.31	1241+46.21	163.09	168.66	Easement	1966
I-10-3(37)168	1241+46.21	1493+07.42	168.66	173.44	Easement	1962
I-10-3(39)172	1493+07.42	1910+00.00	173.44	181.34	Easement	1962
I-10-3(41)180	1910+00.00	2105+00.00	181.34	185.03	Easement	1963
I-10-3(202)	1475+80.00	1513+50.00	173.11	173.83	Easement	1985
010 PN 188 H6905 01R	2065+92.02	2444+49.87	184.30	191.50	Easement	2012

Access control generally follows this I-10 ROW line, although exceptions do exist at the crossroads and TIs as noted in the plans/roll plot accompanying this document.

Outside of the ADOT ROW limits, ROW delineation along the crossroads was collected from a variety of sources of information including survey information provided by the Community, ROW documentation from MCDOT (for Riggs and Queen Creek Roads), and from ADOT for SR 347, SR 587, SR 387, and SR 187.

1.3.3 Drainage and Drainage Structures

The 26-mile segment of I-10 within the study limits was generally constructed using a pass-through drainage system consisting of frequent pipe and concrete box culverts under I-10. The drainage patterns for most of the I-10 corridor can be characterized as undefined overland flows across alluvium soils that result in occasional minor washes, interspersed with a handful of more significant washes. Development and agriculture have altered some of the natural drainage patterns. The southern 5 miles of the corridor pass through the Sacaton Mountains, altering the drainage characteristics, given the surface bedrock features that are prominent in this area. No pavement runoff water quality treatment facilities exist in the corridor.

Many of the culverts under I-10 are corrugated metal pipe (CMP). When the Wild Horse Pass Boulevard TI was reconstructed in 2004, it was discovered during construction that many or all of the CMP culverts under I-10 within that project's limits were heavily corroded or, in some cases, had collapsed completely. As a result, the I-10 culverts within that project's limits were replaced. I-10 was originally built within the limits of this study around the same time frame (late 1960s) using similar materials. Therefore, it is reasonable to assume that all the CMP pipes in the corridor may need to be replaced for the same reason.

A major drainage feature within the project limits is the Gila River itself—the ultimate outfall for all the drainage in this corridor. While the Gila River's crossing of I-10 is not specifically part of this study, its significance as the ultimate outfall cannot be ignored. The watershed of the Gila River upstream of I-10 is essentially the entire southeastern corner of Arizona and a small portion of Mexico.

The following sections discuss drainage issues within three segments of I-10 in the study area.

State Route 202L (Milepost 161.3) to North of the Gila River (Milepost 172.6)

In the segment of I-10 from SR 202L to the north side of the Gila River (milepost 172.6), 85 structures convey on- and off-site flow beneath I-10 from east to west. On-site runoff generated from the westbound lanes flows to the east where it contributes to one of several cross culverts passing flows under I-10. Runoff generated from the eastbound lanes flows to the west. Runoff generated from within the open median is collected by one of several area inlets and conveyed to the west. Table 1-5 lists the culverts found along the segment of I-10 from mileposts 161.3 to 172.6. This summary includes culverts in use for drainage, irrigation, and equipment crossings, although all contribute to drainage flows.

Table 1-5. Existing culvert summary (mileposts 161.3 to 172.6)

I-10 med station	LT/RT	Skew	No. of cells	Size	Length	Type	Maximum capacity (cfs)
915+16	—	0°	3	10’x7’	683’	CBC	2000 (est.)
926+57	—	0°	1	30”	408’	RGRCP	88.00
929+00	—	0°	1	24”	225’	CMP	127.50
937+00	—	0°	1	24”	240’	CMP	127.50
945+10	—	0°	1	30”	233’	CMP	52.80
948+00	—	0°	1	30”	221’	CMP	52.80
954+25	—	0°	1	30”	215’	CMP	52.80
959+00	—	0°	1	30”	227’	CMP	52.80
964+00	—	0°	1	30”	234’	CMP	52.80
984+00	—	0°	1	30”	226’	CMP	113.50
986+00	—	0°	1	30”	226’	CMP	113.50
996+00	—	0°	1	30”	218.1’	CMP	44.00
1002+50	—	0°	1	30”	233.2’	CMP	16.00
1008+10	—	0°	1	30”	289’	CMP	67.00
1014+00	—	0°	1	30”	198’	CMP	5.00
1018+00	—	0°	1	30”	198’	CMP	10.00
1029+00	—	0°	1	36”x22”	193’	CMPA	13.00
1033+00	—	0°	1	30”	415’	CMP	487.00
1041+00	—	0°	1	30”	210.5’	CMP	46.00
1047+00	—	0°	1	36”x22”	198.5’	CMPA	11.00
1050+00	—	0°	1	36”x22”	182’	CMPA	77.00
1061+00	—	0°	1	30”	196’	CMP	31.00
1064+00	—	0°	1	30”	194’	CMP	31.00
1070+00	—	0°	1	30”	205’	CMP	87.00
1077+00	—	0°	1	30”	199’	CMP	33.00
1083+00	—	0°	1	30”	199’	CMP	89.00
1093+00	—	0°	1	30”	197’	CMP	38.50

Table 1-5. Existing culvert summary (mileposts 161.3 to 172.6)

I-10 med station	LT/RT	Skew	No. of cells	Size	Length	Type	Maximum capacity (cfs)
1097+00	—	0°	1	30”	190’	CMP	38.50
1105+50	—	0°	1	30”	214’	CMP	93.00
1109+00	—	0°	1	36”x22”	212’	CMPA	93.00
1117+00	—	0°	1	29”x18”	197’	CMPA	49.50
1124+50	—	0°	1	29”x18”	200’	CMPA	49.50
1127+30	—	0°	3	10’x3’	195’	CBC	49.50
1130+00	—	0°	1	29”x18”	196’	CMPA	49.50
1133+50	—	0°	1	29”x18”	202’	CMPA	49.50
1136+50	—	0°	1	36”x22”	205’	CMPA	49.50
1143+50	—	0°	1	36”x22”	205’	CMPA	49.50
1151+00	—	0°	1	36”x22”	205’	CMPA	49.50
1156+56	—	0°	1	30”	203’	CMP	298.00
1180+00	—	0°	1	30”	185’	CMP	31.00
1198+50	—	0°	1	30”	185’	CMP	57.33
1201+50	—	0°	1	30”	213’	CMP	57.33
1202+02	—	0°	3	10’x3’	195’	CBC	57.33
1208+00	—	0°	1	30”	202’	CMP	19.00
1211+00	—	0°	1	30”	202’	CMP	19.00
1220+00	—	0°	1	36”x22”	200’	CMPA	19.00
1224+00	—	0°	1	36”x22”	200’	CMPA	25.00
1233+00	—	0°	1	36”x22”	205’	CMPA	47.25
1237+00	—	0°	1	29”x18”	200’	CMPA	47.25
1240+33	—	0°	3	10’x3’	195’	CBC	47.25
1243+00	—	0°	2	43”x27”	212’	CMPA	47.25
1244+20	—	0°	3	10’x3’	195’	CBC	10.00
1249+00	—	0°	2	43”x27”	215’	CMPA	10.00
1253+00	—	0°	3	10’x3’	197’	CBC	10.67
1255+00	—	0°	2	43”x27”	210’	CMPA	10.67
1261+00	—	0°	2	43”x27”	210’	CMPA	10.67
1273+00	—	0°	2	43”x27”	215’	CMPA	98.50
1267+00	—	0°	2	43”x27”	200’	CMPA	98.50
1279+00	—	0°	2	43”x27”	210’	CMPA	13.00
1285+00	—	0°	2	43”x27”	210’	CMPA	13.00

Table 1-5. Existing culvert summary (mileposts 161.3 to 172.6)

I-10 med station	LT/RT	Skew	No. of cells	Size	Length	Type	Maximum capacity (cfs)
1291+00	—	0°	2	43”x27”	195’	CMPA	29.00
1297+00	—	0°	2	43”x27”	180’	CMPA	60.00
1305+20	—	0°	2	50”x31”	235’	CMPA	88.60
1311+00	—	0°	2	43”x27”	196’	CMPA	88.60
1317+00	—	0°	2	43”x27”	193’	CMPA	88.60
1323+00	—	0°	2	43”x27”	188’	CMPA	88.60
1329+00	—	0°	2	43”x27”	182’	CMPA	88.60
1335+05	—	0°	3	43”x27”	184’	CMPA	88.60
1341+00	—	0°	2	43”x27”	183’	CMPA	88.60
1347+00	—	0°	2	43”x27”	184’	CMPA	88.60
1353+00	—	0°	2	43”x27”	192’	CMPA	88.60
1359+00	—	0°	2	43”x27”	203’	CMPA	88.60
1371+00	—	0°	2	58”x36”	203’	CMPA	64.11
1378+00	—	0°	2	58”x36”	216’	CMPA	64.11
1383+00	—	0°	2	10’x6’	192’	CBC	64.11
1385+52	—	0°	1	30”	302’	RCP	64.11
1395+00	—	0°	3	43”x27”	197’	CMPA	64.11
1404+47	—	0°	2	48”	463’	CMP	64.11
1411+00	—	0°	2	36”	200’	CMP	64.11
1417+00	—	0°	2	43”x27”	204’	CMPA	64.11
1423+00	—	0°	2	43”x27”	204’	CMPA	64.11
1429+00	—	0°	2	43”x27”	203’	CMPA	72.80
1435+00	—	0°	2	43”x27”	199’	CMPA	72.80
1442+00	—	0°	2	43”x27”	186’	CMPA	72.80
1448+00	—	0°	2	43”x27”	192’	CMPA	72.80
1461+83	—	0°	2	58”x36”	278’	CMPA	72.80

Note: cfs = cubic feet per second

South of the Gila River (Milepost 173.6) to 0.8 Mile South of Gila Farms (Milepost 180.9)

In the segment of I-10 between the Gila River (milepost 173.6) and about 0.8 mile south of Gila Farms (milepost 180.9), 51 drainage structures convey on- and off-site flow beneath I-10 in three different drainage patterns:

- Between mileposts 173.6 and 177.0 (north edge of Gila Farms), runoff flows from east to west beneath I-10 through culverts.
- Across Gila Farms between mileposts 177.0 and 180.2, runoff generally flows along I-10 from south to north. The culverts in this segment convey flow from west to east beneath I-10.
- Between mileposts 180.2 and 180.9, runoff flows from southwest to northeast beneath I-10 through culverts.

Table 1-6 lists the culverts found along I-10 from mileposts 173.6 to 180.9. This summary includes culverts in use for drainage, irrigation, and equipment crossings, although all contribute to drainage flows.

Table 1-6. Existing culvert summary (mileposts 173.6 to 180.9)

I-10 med station	LT/RT	Skew	No. of cells	Size	Length	Type	Maximum capacity (cfs)
1510+00	RT	0°	1	24”	115'	RCP	17.95
1529+00	RT	0°	1	24”	113’	RCP	17.95
1530+50	—	0°	1	24”	225’	RCP	16.9
1545+60	—	29° RT	1	48”	465’	RCP	87.4
1553+90	—	0°	1	10”	353’	CMP Sleeve	—
1555+00	—	0°	1	36"x22"	237’	CMP Arch	14.83
1556+75	—	0°	1	36"x22"	281’	CMP Arch	14.30
1563+00	—	0°	1	36"x22"	245’	CMP Arch	14.72
1569+00	—	0°	1	36"x22"	250’	CMP Arch	14.68
1575+00	—	0°	1	36"x22"	245’	CMP Arch	14.73
1581+00	—	0°	1	36"x22"	220’	CMP Arch	14.97
1588+33	—	0°	1	36”	250’	RCP	45.00
1593+00	—	0°	1	36"x22"	215’	CMP Arch	15.08
1602+05	—	0°	2	36"x22"	335’	CMP Arch	27.50
1605+48	—	0°	1	36"x22"	234’	CMP Arch	14.88
1613+50	—	0°	1	43”x27”	353’	CMP Arch	22.30
1620+82	—	0°	1	36"x22"	311’	CMP Arch	13.97
1627+00	—	0°	1	36"x22"	225’	CMP Arch	14.93
1633+00	—	0°	1	36"x22"	262’	CMP Arch	14.52
1639+70	—	0°	1	36"x22"	271’	CMP Arch	14.42
1645+00	—	0°	1	36"x22"	238’	CMP Arch	14.80
1651+00	—	0°	1	36"x22"	250’	CMP Arch	14.65

Table 1-6. Existing culvert summary (mileposts 173.6 to 180.9)

I-10 med station	LT/RT	Skew	No. of cells	Size	Length	Type	Maximum capacity (cfs)
1657+00	—	0°	1	36"x22"	230’	CMP Arch	14.93
1663+00	—	0°	1	36"x22"	211’	CMP Arch	15.15
1669+00	—	0°	1	36"x22"	211’	CMP Arch	15.15
1674+65	—	0°	1	30”	281’	RCP	29.10
1680+33	—	36°30’ RT	1	10’x8’	440’	Box Culvert	659.00
1682+95	—	0°	1	16’x14’	160’	Box Culvert	2319.85
1696+31	—	0°	1	36"x22"	133’	CMP Arch	16.80
1709+00	—	0°	1	36"x22"	103’	CMP Arch	17.66
1721+93	—	0°	1	36"x22"	388’	CMP Arch	13.40
1738+00	—	0°	1	36"x22"	104’	CMP Arch	17.66
1742+97	—	0°	1	24”	360’	RCP	16.27
1745+50	—	0°	1	36"x22"	227’	CMP Arch	14.93
1751+92	—	0°	1	36"x22"	107’	CMP Arch	17.60
1769+06	—	0°	2	36"x22"	566’	CMP Arch	24.95
1769+90	—	0°	1	24”	590’	RCP	15.62
1776+11	—	0°	1	24”	406’	RCP	16.09
1782+00	LT	0°	1	36"x22"	100’	CMP Arch	17.70
1795+00	LT	0°	1	36"x22"	92’	CMP Arch	18.10
1808+35	—	0°	2	36"x22"	241’	CMP Arch	29.56
1818+51	—	57° RT	1	24”	558’	RCP	15.68
1820+04	—	0°	1	36"x22"	105’	CMP Arch	17.65
1830+31	—	0°	1	36"x22"	97’	CMP Arch	17.86
1845+42	—	45°30’ RT	1	6’x7’	530’	Box Culvert	326.50
1846+79	—	36°25’ RT	1	10’x8’	540’	Box Culvert	659.00
1849+47	—	0°	1	16’x14’	158’	Box Culvert	2319.00
1858+18	—	0°	2	36"x22"	245’	CMP Arch	29.45
1867+03	—	0°	2	36"x22"	245’	CMP Arch	29.45
1874+50	—	0°	1	36"x22"	245’	CMP Arch	14.74
1880+00	—	0°	1	36"x22"	245’	CMP Arch	14.74

0.8 Miles South of Gila Farms (Milepost 180.9) to Southern Project Limits (Milepost 187.0)

In the segment of I-10 between mileposts 180.9 and 187.0, 41 structures convey on- and off-site flow beneath I-10 in two distinct drainage patterns:

- Off-site flow patterns between mileposts 180.9 and 185.4 are generally from southwest to northeast north of the Sacaton Mountains’ ridge line that crosses I-10 just south of the SR 387/SR 187/Pinal Avenue TI (see Figure 1-2).
- South of the Sacaton Mountains’ ridge line, off-site flow patterns between mileposts 185.4 and 187.0 are generally from northeast to southwest.

Median drainage channels exist between mileposts 183.4 and 184.0 where the freeway directions bifurcate and the distances between the eastbound and westbound culverts are large. Table 1-7 lists the three channels that apply.

Table 1-7. Existing median drainage channel summary

I-10 med station	Length
2019+20	153’
2027+30	343’
2050+25	141’

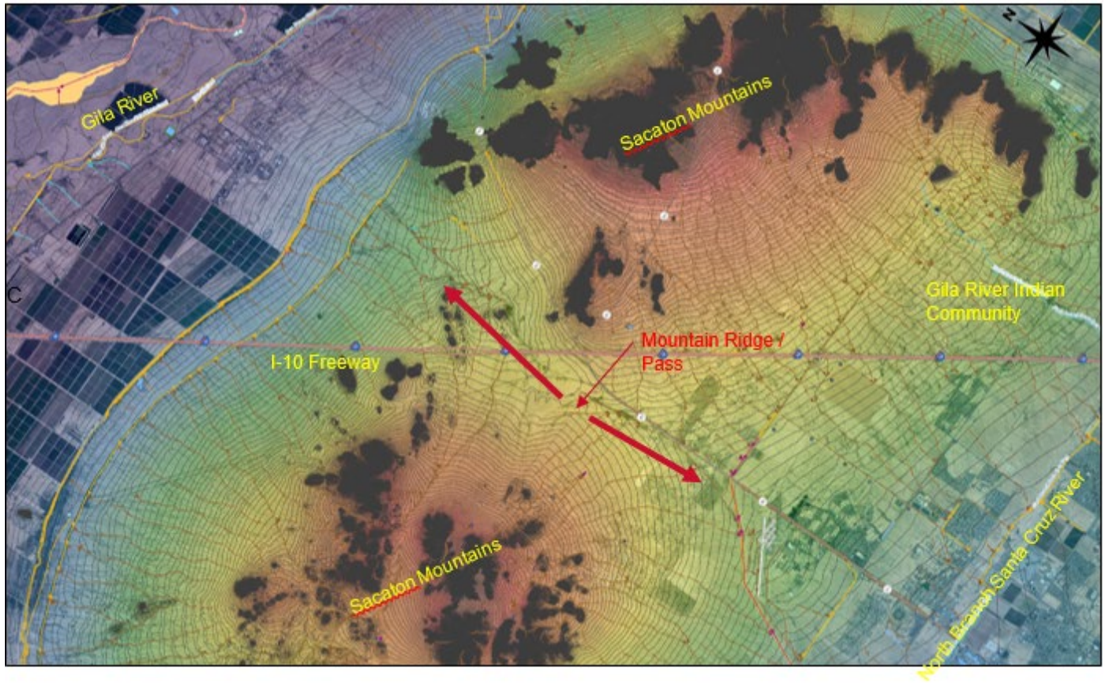

Figure 1-2. Existing terrain and characteristics through the Sacaton Mountains

Drainage culverts are located along the off-site channel systems at crossroad intersections, at locations where an open channel is not feasible because of existing utility features and existing ROW constraints, and at locations where runoff passes beneath I-10. Table 1-8 lists the culverts found along the segment of I-10 from mileposts 180.9 to MP 187.0. This summary includes culverts in use for drainage, irrigation, and equipment crossings, although all contribute to drainage flows.

Table 1-8. Existing culvert summary (mileposts 180.9 to 187.0)

I-10 med station	LT/RT	Skew	No. of cells	Size	Length	Type	Maximum capacity (cfs)
1890+10	LT	60°	6	10'x8'	155'	Box Culvert	6290.64
1889+10	RT	60°	6	10'x8'	156'	Box Culvert	5613.22
1901+20	—	30° LT	1	36"x22"	96'	CMP Arch	19 (est.)
1917+35	—	30° LT	2	48"	261'	CMP	120 (est.)
1921+85	—	30° LT	2	42"	246'	CMP	100 (est.)
1929+48	—	0°	2	10'x4'	197'	Box Culvert	680.50
1934+95	—	15° LT	2	10"x31"	252'	CMP Arch	101.26
1940+45	—	30° LT	2	42"	235'	CMP	94.75
1945+92	—	30° LT	2	42"	233'	CMP	77.77
1951+35	—	30° LT	3	10"x31"	264'	CMP Arch	76.00
1962+55	—	30° LT	2	8'x3'	221'	Box Culvert	372.35
1967+95	—	0°	2	8'x4'	192'	Box Culvert	506.93
1973+95	—	0°	1	10'x8'	191'	Box Culvert	806.93
1979+95	—	0°	1	48"	225'	CMP	67.76
1985+45	—	30° LT	2	50"x31"	237'	CMP Arch	90.57
2005+95	—	0°	2	42"	219'	CMP	104.12
2013+55	—	15° LT	2	42"	309'	CMP	130.64
2018+68	LT	15° LT	1	42"	150'	CMP	55 (est.)
2019+38	RT	15° LT	1	42"	116'	CMP	63.27
2026+15	LT	30° LT	4	10'x5'	148'	Box Culvert	2073.72
2027+90	RT	30° LT	4	10'x5'	78'	Box Culvert	1616.76
2049+80	RT	30° RT	1	10'x5'	97'	Box Culvert	462.04
2050+35	LT	0°	1	10'x5'	80'	Box Culvert	518.51
2062+75	LT	0°	1	24"	112'	CMP	13 (est.)
2065+50	—	0°	3	10'x8'	192'	Box Culvert	2101.78
2074+60	—	15° RT	1	60"	244'	CMP	160.10
2083+00	—	0°	3	10'x7'	193'	Box Culvert	2327.10
2094+25	—	30° RT	1	24"	106'	CMP	13 (est.)
2105+20	—	30° RT	1	24"	116'	CMP	13 (est.)
2119+10	RT	10° LT	1	24"	226'	Pipe Culvert	14.15
2132+00	RT	0°	2	43"x27"	218'	CMP Arch	62.00
2138+45	—	0°	2	43"x27"	212'	CMP Arch	57.99
2144+80	—	0°	2	43"x27"	197'	CMP Arch	59.26
2153+45	—	15° LT	3	50"x31"	206'	CMP Arch	89.50
2160+10	—	0°	2	10'x3'	192'	Box Culvert	480.39
2168+00	—	30° LT	2	10'x3'	220'	Box Culvert	481.46
2173+75	—	15° LT	1	42"	218'	CMP	58.09
2182+65	—	30° LT	2	42"	244'	CMP	104.91
2187+50	—	0°	2	54"	226'	CMP	235.30
2193+95	—	0°	3	10'x3'	235'	Box Culvert	722.21
2200+75	—	0°	2	42"	239'	CMP	118.19

1.3.4 Drainage Models and Studies

State Route 202L (Milepost 161.3) to North of the Gila River (Milepost 172.6)

The Gilbert-Chandler Area Drainage Master Study (ADMS), performed by the Flood Control District of Maricopa County (FCDMC) in July 1993, covers an area of approximately 120 square miles in the East Valley. The study area is bounded by I-10 to the west, the Western Canal and U.S. Route 60 to the north, the Roosevelt Water Conservation District Canal to the east, and Queen Creek Road to the south.

The City of Chandler 1998 Stormwater Master Plan Update, performed by Camp Dresser & McKee Inc. in June 1999, overlaps the Gilbert-Chandler ADMS with additional study area to the south of Queen Creek Road. The study area is bounded by Price Road to the west, the city of Chandler boundary to the east, and Hunt Highway to the south.

The Sun Lakes Master Drainage Plan, performed by B & R Engineering in May 1996, covers the census-designated Sun Lakes to the southwest of Chandler.

Together, these three studies characterize off-site flow to the east of the Community. The Gila River Indian Community Reservation-Wide Drainage Study, completed by Stantec on August 21, 2007, addresses Districts 1, 2, 4, 5, 6, and 7 of the Gila River Reservation. District 4 information pertains to this segment of I-10. No Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) reports or floodplain delineation studies were discovered for the area within the Community boundary.

In 2001, ADOT reconstructed the I-10/Maricopa Road (Wild Horse Pass Boulevard) TI, and a drainage report was prepared by WEST Consultants for the TI project. The report was completed in January 2001 and revised in April 2001.

In 2019, the WHPDA contracted Kimley-Horn and Associates to prepare a Wild Horse Pass Area Drainage Master Study.

South of the Gila River (Milepost 173.6) to 0.8 mile South of Gila Farms (Milepost 180.9)

The Gila River Indian Community Reservation-Wide Drainage Study, performed by Stantec, includes District 5 information pertaining to this segment of I-10. This study highlights a Gila River floodplain that is shown on District 5 mapping, based on a delineation provided on the “Gila Butte NW” and “Pima Butte” quadrangle of the U.S. Geological Survey (USGS) 100-year flood prone areas. No other county or community reports were discovered for the area. No FEMA FIS reports or floodplain delineation studies were discovered for the area within the Community boundary.

In 2017, the Community’s Department of Land Use, Planning, and Zoning contracted J2 to prepare the Casa Blanca Area Drainage Master Study.

0.8 Miles South of Gila Farms (Milepost 180.9) to South Project Limits (Milepost 187.0)

A Community District 3 Area Drainage Master Plan was completed in 2003 and addresses this segment of I-10. No FEMA FIS reports or floodplain delineation studies were discovered for the area within the Community boundary.

In 2007, the Pinal County Public Works Department contracted Entellus to prepare the Pinal County Area Drainage Master Plan Phase B – Sacaton Mountain Watershed.

In 2017, the Lone Butte Industrial Park contracted Holistic Engineering Land Management to prepare the Lone Butte Area Drainage Study.

1.3.5 Utilities

There are several existing and planned utilities within the project limits. Most cross I-10, but some exist longitudinally in the ADOT ROW without crossing I-10. For those that exist longitudinally in the ADOT ROW, they are limited to facilities that directly serve the freeway function (electrical lines for lighting and signals, water lines for rest area service, etc.). All existing utilities in the project limits are listed in Table 1-9 and all proposed utilities in the project limits are provided in Table 1-10. All the information provided in the tables is based on as-built plans, mapping, and ADOT permit logs. Drainage culverts are not included in Table 1-9 because that information is summarized in Section 1.3.3 above.

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Fiber optic telephone	Unknown	865+38.	1373' Lt	879+52.	1230' Lt	161.52	161.79	—	—	No	No	No	—
Fiber optic telephone	Unknown	867+48.	642' Lt	878+21.	523' Lt	161.56	161.77	—	—	No	No	No	—
Power (traffic)	ADOT	872+74.	190' Lt	1002+24.	108' Lt	161.66	164.15	—	10-MA-163	Yes	No	Yes	Lighting
Power (underground)	GRIC Utility Authority (GRICUA)	873+98.	218' Rt	898+82.	1533' Rt	161.69	162.02	—	—	No	No	No	GRICUA plans
Power (overhead)	Arizona Public Service	874+57.	1596' Rt	880+26.	1948' Lt	161.70	161.81	82037	—	Yes	Yes	No	6-wires 230kV
Freeway Management System (FMS)	ADOT	874+68.	91' Rt	976+24.	139' Rt	161.70	163.68	—	—	Yes	No	Yes	3-3" PVC
FMS	ADOT	874+68.	91' Rt	874+77.	90' Lt	161.70	161.70	—	—	Yes	Yes	Yes	—
FMS	ADOT	874+77.	90' Lt	976+32.	142' Lt	161.70	163.68	—	—	Yes	No	Yes	3-3" PVC
Fiber optic telephone	Unknown	874+78.	192' Lt	877+82.	291' Lt	161.70	161.76	—	—	No	No	No	—
Power (overhead)	Salt River Project	874+97.	1603' Rt	880+99.	1919' Lt	161.71	161.82	82037, 95405, 1200870	—	Yes	Yes	No	9-wires 500kV
Fiber optic telephone	Unknown	875+17.	1574' Rt	880+99.	1919' Lt	161.71	161.82	—	—	No	Yes	No	—
Power (underground)	Unknown	875+95.	189' Lt	877+87.	104' Lt	161.73	161.76	—	—	No	No	No	—
Telephone (underground)	Unknown	876+06.	488' Rt	877+79.	144' Rt	161.73	161.76	—	—	No	No	No	—
Power (traffic)	ADOT	876+09.	130' Lt	903+68.	101' Rt	161.73	162.11	—	—	Yes	Yes	Yes	Lighting
Sanitary sewer	City of Phoenix	876+21.	167' Rt	876+20.	488' Rt	161.73	161.73	—	—	No	No	No	24" probably abandoned
Sanitary sewer	City of Phoenix	876+22.	158' Rt	876+29.	490' Rt	161.73	161.73	—	—	No	No	No	24" probably abandoned
Power (overhead)	Salt River Project	877+08.	502' Rt	879+15.	877' Lt	161.75	161.79	82037, 95405, 1200870	—	Yes	Yes	No	3-wires 69kV
Water	City of Phoenix	877+13.	503' Rt	878+35.	420' Lt	161.75	161.77		H5417 01C	Yes	Yes	Unknown	20" RCP
Power (overhead)	Salt River Project	877+24.	505' Rt	880+06.	841' Lt	161.75	161.80	82037		Yes	Yes	No	12kV
Irrigation	Salt River Valley Water Users Association	877+34.	283' Rt	878+04.	155' Lt	161.75	161.76	—	10-MA-185	Yes	Yes	Yes	36" RCP
Petroleum	Kinder Morgan	877+42.	508' Rt	878+59.	217' Lt	161.75	161.78	—	10-MA-185	Yes	Yes	No	6"
Power (underground)	Unknown	877+59.	279' Rt	881+33.	1913' Lt	161.76	161.83	—	—	Yes	Yes	No	—
Telephone (underground)	Unknown	877+66.	196' Lt	878+12.	106' Lt	161.76	161.77	—	—	No	No	No	—
Natural gas	El Paso Natural Gas	877+72.	826' Rt	880+17.	632' Lt	161.76	161.80	80708	10-MA-185, 10-MA-161	Yes	Yes	No	20" STL, portion of old pipe may be abandoned within ADOT ROW
Irrigation	Pima-Maricopa Irrigation Project (PMIP)	879+97.	316' Lt	885+25.	287' Rt	161.80	161.90	—	202L-MA-050 H4314 02C	Yes	Yes	Yes	54" Conc
Irrigation	PMIP	880+11.	335' Lt	899+10.	255' Rt	161.80	162.02	—	202L-MA-050 H4314 02C	Yes	Yes	Yes	84" Conc
FMS	ADOT	892+00.	110' Rt	892+01.	98' Lt	162.03	162.03	—	—	Yes	Yes	Yes	—

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Fiber optic telephone	Gila River Telephone Industry	896+70.	437' Rt	898+28.	213' Lt	162.12	162.01	—	H5417 01C	Yes	Yes	Unknown	Abandoned according to as-builts
Irrigation	Community	897+28.	569' Rt	903+97.	962' Lt	162.13	162.11	—	10-3(36), H4314 02C	Yes	Yes	Yes	36" RCP Broadacres Canal – abandoned per Community scoping comments 20191002
Power (overhead)	San Carlos Irrigation Project	897+83.	1638' Lt	919+45.	357' Lt	162.14	162.41	94130	—	Yes	No	No	12kV, maybe GRICUA
Telephone (underground)	Unknown	900+01.	424' Rt	900+12.	245' Lt	162.04	162.04	—	—	Yes	Yes	No	—
Power (overhead)	Unknown	905+02.	939' Lt	909+70.	1832' Lt	162.13	162.22	—	—	No	No	No	—
Power (traffic)	ADOT	912+43.	108' Rt	1046+18.	94' Rt	162.27	164.99	—	10-MA-163	Yes	No	Yes	Lighting and signals
Irrigation	Salt River Project	915+21.	—	—	—	162.33	—	—	10-MA-163, H5417 01C	Yes	Yes	Yes	3-10'x7' CBC Gila Drain
Sanitary sewer	Lone Butte	918+06.	1047' Lt	927+71.	157' Lt	162.38	162.56	—	—	No	No	No	18" MJ DIP
Power (underground)	San Carlos Irrigation Project	919+45.	357' Lt	924+11.	328' Lt	162.41	162.50	94130	—	Yes	No	Unknown	4-6" PVC, maybe GRICUA
Sanitary sewer	City of Chandler	919+93.	2353' Rt	932+62.	913' Lt	162.42	162.66	—	10-3(36)	Yes	Yes	Yes	30" RGRCP
Natural gas	Unknown	920+51.	1901' Lt	930+10.	1020' Lt	162.43	162.61	—	H5417	No	No	No	—
Natural gas	Southwest Gas	921+42.	1282' Rt	921+99.	1523' Lt	162.44	162.46	—	H5417	Yes	Yes	No	8"
FMS	ADOT	922+01.	304' Rt	922+59.	259' Lt	162.46	162.47	—	—	Yes	Yes	Yes	—
Power (overhead)	Unknown	922+37.	790' Rt	924+61.	1044' Rt	162.46	162.51	—	—	No	No	No	—
Power (overhead)	San Carlos Irrigation Project	922+40.	1835' Lt	924+11.	328' Lt	162.46	162.50	94130	—	Yes	No	No	12kV, maybe GRICUA
Power (traffic)	ADOT	922+67.	261' Lt	923+29.	92' Rt	162.47	162.48	—	—	Yes	Yes	Yes	Lighting and signals
Power (underground)	GRICUA	922+72.	267' Lt	976+40.	144' Lt	162.47	163.69	—	—	No	No	Unknown	Power service to ADOT facilities
Power (underground)	GRICUA	923+05.	231' Lt	924+11.	328' Lt	162.48	162.50	—	—	No	No	Unknown	Power service to ADOT facilities
Natural gas	Unknown	923+07.	738' Lt	927+11.	560' Lt	162.48	162.55	—	H5417	No	No	No	—
Power (overhead)	Unknown	923+84.	1505' Rt	928+52.	374' Rt	162.49	162.58	—	—	No	No	No	—
Power (overhead)	San Carlos Irrigation Project	924+11.	328' Lt	927+93.	167' Lt	162.50	162.57	94130	—	No	No	No	12kV, maybe GRICUA
Telephone (underground)	Gila River Telephone Industry	924+20.	228' Rt	929+92.	169' Rt	162.50	162.61	—	—	No	No	No	—
TV (underground)	Cox Communications	924+21.	562' Rt	921+94.	1526' Lt	162.50	162.45	—	H5417	No	Yes	No	—
Power (underground)	Unknown	924+61.	1044' Rt	924+22.	176' Rt	162.51	162.50	—	—	No	No	Unknown	Possible service line to ADOT facilities
Power (underground)	Unknown	924+61.	1044' Rt	924+22.	176' Rt	162.51	162.50	—	—	No	No	No	—
Power (underground)	Unknown	924+61.	1044' Rt	925+46.	1681' Rt	162.51	162.52	—	—	No	No	No	—
Natural gas	Unknown	927+11.	560' Lt	930+10.	1020' Lt	162.55	162.61	—	H5417	No	No	No	—

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Power (overhead)	San Carlos Irrigation Project	927+93.	167' Lt	928+52.	374' Rt	162.57	162.58	94130	—	Yes	Yes	No	69kV, 3-lines, maybe GRICUA
Power (overhead)	San Carlos Irrigation Project	927+93.	167' Lt	930+37.	551' Lt	162.57	162.61	—	—	No	No	No	69kV and 12kV
Power (underground)	San Carlos Irrigation Project	927+93.	167' Lt	941+73.	156' Lt	162.57	163.03	—	—	No	No	No	Outside ADOT ROW, serves billboards
Power (overhead)	Unknown	928+52.	374' Rt	952+72.	651' Rt	162.58	163.24	—	—	No	No	No	—
Fiber optic telephone	Gila River Telephone Industry	929+00.	592' Rt	929+84.	441' Lt	162.59	162.60	80614	—	Yes	Yes	No	2-DB(120) with FO and T
Power (underground)	GRICUA	940+14.	162' Rt	972+61.	162' Rt	162.80	163.61	—	—	No	No	No	Outside ADOT ROW, serves billboards
Power (overhead)	Unknown	950+96.	954' Rt	952+72.	651' Rt	163.20	163.24	—	—	No	No	No	—
Power (underground)	Unknown	952+72.	651' Rt	953+34.	162' Rt	163.24	163.25	—	—	No	No	No	—
FMS	ADOT	972+59.	132' Lt	972+85.	135' Rt	163.61	163.62	—	—	Yes	Yes	Yes	—
Power (underground)	Unknown	975+59.	1102' Rt	977+94.	1691' Rt	163.67	163.71	—	—	No	No	No	—
Power (traffic)	ADOT	993+50.	100' Lt	993+50.	116' Rt	164.01	164.01	—	H8192 01C, F0113 01C	Yes	Yes	Yes	Weigh in motion
Power (traffic)	ADOT	1002+23.	119' Rt	1002+24.	108' Lt	164.15	164.15	—	10-MA-163	Yes	Yes	Yes	Lighting
Power (overhead)	San Carlos Irrigation Project	1019+10.	1611' Rt	1019+74.	571' Rt	164.47	164.49	—	—	Yes	No	No	Possible GRICUA
Power (underground)	GRICUA	1019+74.	571' Rt	1020+23.	445' Rt	164.49	164.49	—	—	Yes	No	Unknown	1-3" PVC – provide service to ADOT facilities
Power (traffic)	ADOT	1020+05.	434' Lt	1020+30.	454' Rt	164.49	164.50	—	10-MA-163	Yes	Yes	Yes	May include 1-2" PVC and 3-3" PVC for signals and lighting
Power (traffic)	ADOT	1021+39.	440' Lt	2032+58.	592' Rt	164.52	183.65	—	10-MA-163	Yes	Yes	Yes	May include 1-2" PVC and 3-3" PVC for signals and lighting
Power (traffic)	ADOT	1033+55.	141' Lt	1038+86.	105' Lt	164.75	164.85	—	10-MA-163	Yes	No	Yes	Lighting
Power (traffic)	ADOT	1038+69.	107' Lt	1038+69.	111' Rt	164.84	164.84	—	10-MA-163	Yes	Yes	Yes	Lighting
Power (traffic)	ADOT	1159+57.	97' Lt	1196+45.	110' Lt	167.13	167.83	—	10-3(38)	Yes	No	Yes	Lighting and signals
Power (traffic)	ADOT	1160+72.	107' Rt	1176+01.	634' Rt	167.15	167.44	—	10-3(38)	Yes	No	Yes	Lighting and signals
Power (traffic)	ADOT	1163+79.	98' Lt	1163+79.	140' Rt	167.21	167.21	—	10-3(38)	Yes	Yes	Yes	Lighting
Power (traffic)	ADOT	1173+49.	721' Rt	1182+62.	744' Lt	167.39	167.56	—	10-3(38)	Yes	Yes	Yes	Lighting and signals
Power (traffic)	ADOT	1181+18.	657' Lt	1183+71.	676' Lt	167.54	167.59	—	10-3(38)	Yes	No	Yes	Lighting and signals
Natural gas	El Paso Natural Gas	1181+73.	2273' Lt	1632+67.	766' Lt	167.55	176.09	—	—	No	No	No	2-10 3/4"
Power (underground)	GRICUA	1183+68.	687' Lt	1184+40.	823' Lt	167.58	167.60	—	—	Yes	No	Unknown	Provide service to ADOT facilities
Power (underground)	GRICUA	1183+71.	676' Lt	1184+61.	790' Lt	167.59	167.60	—	—	Yes	No	Unknown	Provide service to ADOT facilities
Power (overhead)	Unknown	1184+61.	790' Lt	1192+31.	2047' Lt	167.60	167.75	—	—	Yes	No	No	Possibly GRICUA

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Power (traffic)	ADOT	1192+87.	107' Rt	1194+56.	101' Rt	167.76	167.79	—	10-3(38)	Yes	No	Yes	Lighting
Power (traffic)	ADOT	1193+22.	137' Lt	1193+22.	105' Rt	167.77	167.77	—	10-3(38)	Yes	Yes	Yes	Lighting
Irrigation	PMIP	1291+25.	192' Rt	1293+74.	190' Lt	169.63	169.67	94004	—	Yes	Yes	Unknown	108" Conc Irrigation Siphon
Power (overhead)	GRICUA	1369+07.	1781' Rt	1438+71.	1817' Lt	171.10	172.42	—	—	Yes	Yes	No	—
Irrigation	PMIP	1385+41.	149' Lt	1385+69.	186' Rt	171.41	171.41	—	10-PN-168	Yes	Yes	Yes	30" RGRCP
Power (overhead)	GRICUA	1519+63.	490' Lt	1546+90.	1325' Rt	173.95	174.46	—	—	Yes	Yes	No	—
Natural gas	El Paso Natural Gas	1522+20.	286' Lt	1524+30.	149' Lt	174.00	174.04	—	010-3(40)	No	No	No	As-built show 2-10 3/4" pipe removed within ADOT ROW. Unknown outside ADOT ROW.
Irrigation	PMIP	1523+16.	179' Rt	1529+58.	540' Lt	174.02	174.14	—	010-3(40)	Yes	Yes	Yes	42" RCP Siphon (AATUR protect in place for future use) (Old Canal 13)
Natural gas	El Paso Natural Gas	1528+82.	150' Rt	1530+50.	261' Rt	174.12	174.15	—	010-3(40)	No	No	No	As-built shows 2-10 3/4" pipe removed within ADOT ROW. Unknown outside ADOT ROW.
Power (overhead)	GRICUA	1544+35.	1715' Rt	1568+25.	1765' Lt	174.42	174.87	—	—	Yes	Yes	No	—
Irrigation	PMIP	1544+39.	183' Rt	1546+88.	217' Lt	174.42	174.46	—	—	Yes	Yes	Unknown	54"
Natural gas	El Paso Natural Gas	1548+86.	543' Rt	1552+29.	467' Rt	174.50	174.57	—	010-3(40)	Yes	No	No	As-built shows 2-10 3/4" pipe removed within ADOT ROW. Unknown outside ADOT ROW.
Power (overhead)	GRICUA	1552+11.	1478' Lt	1562+10.	825' Lt	174.56	174.75	—	—	Yes	No	No	—
Sleeve	GRIC	1553+90.				174.60	—	—	10-3(40)	Yes	Yes	Yes	10" CMP sleeve
Natural gas	El Paso Natural Gas	1553+93.	430' Rt	1558+39.	332' Rt	174.60	174.68	—	010-3(40)	No	No	No	As-built shows 2-10 3/4" pipe removed within ADOT ROW. Unknown outside ADOT ROW.
Natural gas	El Paso Natural Gas	1565+48.	208' Rt	1623+33.	672' Lt	174.82	175.91	—	010-3(40)	Yes	Yes	No	As-built shows 2-10 3/4" pipe, unknown if removed or abandoned.
Power (overhead)	GRICUA	1599+46.	1650' Lt	1617+58.	474' Lt	175.46	175.80	—	10-PN-168	Yes	No	No	3-wire 440kV
Power (traffic)	ADOT	1600+49.	111' Lt	1619+32.	88' Lt	175.48	175.84	—	10-PN-168	Yes	No	Yes	Lighting
Power (overhead)	GRICUA	1601+15.	284' Lt	1602+61.	187' Rt	175.49	175.52	1219582	—	Yes	Yes	No	12kV and 69kV
Power (overhead)	GRICUA	1601+15.	284' Lt	1606+91.	1166' Lt	175.49	175.60	—	—	No	No	No	—
Power (overhead)	GRICUA	1602+61.	187' Rt	1609+32.	1528' Rt	175.52	175.65	—	—	No	No	No	—
Telephone (underground)	AT&T	1606+31.	444' Lt	1627+58.	948' Rt	175.59	175.99	—	010-3(40)	Yes	Yes	No	Shows on as-built coaxial cable. May be abandoned or removed.

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Water	Arizona Water Company	1608+67.	1672' Rt	1623+43.	702' Rt	175.63	175.91	—	—	No	No	No	8"
Power (traffic)	ADOT	1610+81.	410' Lt	1613+05.	753' Lt	175.68	175.72	—	10-PN-168	Yes	No	Yes	Lighting
Fiber optic telephone	Gila River Telephone Industry	1612+63.	966' Rt	1630+20.	625' Lt	175.71	176.04	1200312	—	Yes	Yes	No	6" steel casing under I-10
Power (traffic)	ADOT	1613+22.	618' Lt	1616+55.	83' Lt	175.72	175.78	—	10-PN-168	Yes	No	Yes	Lighting
Power (overhead)	GRICUA	1617+58.	474' Lt	1699+20.	1351' Lt	175.80	177.35	—	10-PN-168	No	No	No	69kV
Power (overhead)	GRICUA	1617+58.	474' Lt	1619+33.	159' Lt	175.80	175.84	—	10-PN-168	Yes	No	No	Provide service to ADOT facilities
Power (traffic)	ADOT	1619+31.	91' Rt	1636+86.	109' Rt	175.84	176.17	—	10-PN-168	Yes	No	Yes	Lighting
Power (traffic)	ADOT	1619+33.	159' Lt	1624+75.	577' Rt	175.84	175.94	—	10-PN-168	Yes	Yes	Yes	Lighting
Water	GRIC	1623+43.	702' Rt	1644+67.	1376' Rt	175.91	176.32	92635	—	Yes	No	No	8" PVC
Power (traffic)	ADOT	1624+07.	645' Rt	1624+68.	405' Rt	175.93	175.94	—	10-PN-168	Yes	No	Yes	Lighting
Power (overhead)	Unknown	1636+77.	1532' Rt	1651+19.	1778' Rt	176.17	176.44	—	—	Yes	No	No	—
Power (overhead)	Unknown	1668+57.	1804' Lt	1679+06.	1123' Lt	176.77	176.97	—	—	No	No	No	—
Telephone (underground)	CenturyLink	1677+12.	326' Rt	1678+13.	158' Rt	176.93	176.95	48884	—	No	No	No	GRTI intercepts on both sides of I-10
Power (overhead)	GRICUA	1678+05.	529' Rt	1694+21.	1282' Lt	176.95	177.25	—	—	Yes	Yes	No	125kV
Telephone (underground)	Gila River Telephone Industry	1678+13.	158' Rt	1680+33.	218' Lt	176.95	176.99	48884	—	Yes	Yes	No	Unknown size sleeve and intercepts CL on both sides of I-10. Appears to replace old CL line that crossed I-10.
Irrigation	PMIP	1679+14.	175' Rt	1681+72.	175' Lt	176.97	177.02	—	010-3(40)	Yes	Yes	Yes	10'x8' CBC
Telephone (underground)	CenturyLink	1680+33.	218' Lt	1681+28.	375' Lt	176.99	177.01	48884	—	No	No	No	GRTI intercepts on both sides of I-10
Power (underground)	GRICUA	1683+67.	145' Lt	1697+02.	118' Lt	177.05	177.31	—	—	Yes	No	Unknown	Provide service to ADOT facilities
Natural gas	El Paso Natural Gas	1698+82.	1399' Lt	1772+04.	3350' Rt	177.34	178.73	—	010-3(40)	Yes	Yes	No	2-10 3/4"
Power (overhead)	San Carlos Irrigation Project	1699+20.	1315' Lt	1746+22.	1703' Rt	177.35	178.24	48374	—	Yes	Yes	No	69kV
Power (traffic)	ADOT	1707+10.	—	—	—	177.50	—	—	10-C(4)P	Yes	Yes	Yes	Traffic counter system
Telephone (underground)	CenturyLink	1710+26.	717' Lt	1725+87.	294' Rt	177.56	177.85	37297	010-3(40)	Yes	Yes	No	Permit is for an aerial cable, but not seen in Google Earth. As-builts show an underground line, but only on this one record. Possibly original irrigation line.
Irrigation	Gila River Farms	1712+78.	555' Lt	1728+70.	482' Rt	177.61	177.91	—	010-3(40)	Yes	Yes	Yes	24" relocation of previous facilities with Gas Line Rd Cst (L7-6)
Irrigation	Gila River Farms	1716+37.	222' Lt	1717+04.	326' Lt	177.67	177.69	—	010-3(40)	Yes	No	Yes	24"

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Irrigation	Gila River Farms	1722+17.	180' Lt	1745+34.	182' Lt	177.78	178.22	—	10-PN-178	No	No	Unknown	Outside ADOT ROW, portions may have been included in ADOT project
Irrigation	PMIP	1743+00.	174' Lt	1743+00.	177' Rt	178.18	178.18	—	10-PN-178	Yes	Yes	Yes	24"
Irrigation	Gila River Farms	1766+18.	194' Lt	1767+13.	189' Lt	178.62	178.64	—	10-3(40)	No	No	Yes	24" RCP (L7-5)
Irrigation	Gila River Farms	1767+13.	189' Lt	1774+26.	282' Rt	178.64	178.77	—	10-3(40)	Yes	Yes	Yes	24" RCP
Power (overhead)	Unknown	1774+62.	357' Rt	1784+34.	996' Rt	178.78	178.96	—	—	No	No	No	—
Irrigation	PMIP	1775+19.	150' Rt	1777+39.	189' Lt	178.79	178.83	—	10-3(40)	Yes	Yes	Yes	24" RCP
Power (overhead)	GRICUA	1796+64.	1649' Rt	1819+62.	1891' Lt	179.19	179.63	1219731	—	Yes	Yes	No	—
Natural gas	Southwest Gas	1796+80.	1764' Rt	1819+92.	1796' Lt	179.20	179.64	—	10-PN-175	Yes	Yes	No	4" STL
Irrigation	Gila River Farms	1804+91.	889' Lt	1810+53.	563' Lt	179.35	179.46	—	010-3(40)	Yes	No	Yes	24" RCP (L7-4)
Power (underground)	GRICUA	1805+89.	172' Rt	1806+12.	132' Rt	179.37	179.37	—	—	Yes	No	Unknown	Provide service to ADOT facilities
Irrigation	Gila River Farms	1809+57.	448' Lt	1810+58.	568' Lt	179.44	179.46	—	010-3(40)	Yes	No	Yes	24" RCP
Irrigation	Gila River Farms	1810+53.	563' Lt	1811+43.	466' Lt	179.46	179.47	—	010-3(40)	Yes	No	Yes	24" RCP ties into existing pipes
Irrigation	Gila River Farms	1811+43.	466' Lt	1821+92.	215' Rt	179.47	179.67	—	10-PN-178	Yes	Yes	Yes	24" RCP
Irrigation	GRIC	1842+62.	245' Rt	1847+52.	193' Lt	180.06	180.16	—	10-3(40)	Yes	Yes	Yes	6'x6' CBC (AATUR protect in place for future use)
Irrigation	PMIP	1844+83.	187' Rt	1848+71.	184' Lt	180.11	180.18	—	10-PN-178	Yes	Yes	Yes	10'x8' CBC
Irrigation	Unknown	1846+13.	222' Lt	1846+73.	222' Lt	180.13	180.14	—	10-3(40)	No	No	Yes	30" RCP outside ADOT ROW
Power (traffic)	ADOT	1898+72.	64' Rt	1942+37.	144' Rt	181.15	181.97	—	H8192 01C, F0113 01C	Yes	Yes	Yes	Weigh in motion, conduit, loops and equipment. Crosses EB in several spots into median.
Power (traffic)	ADOT	1932+19.	96' Rt	1946+26.	471' Rt	181.78	182.02	—	—	Yes	No	Yes	Lighting for ramps and rest area
Power (overhead)	San Carlos Irrigation Project	1933+26.	178' Rt	1937+14.	425' Lt	181.80	181.87	27650	—	Yes	Yes	No	12.5kV
Power (overhead)	San Carlos Irrigation Project	1933+26.	178' Rt	1940+50.	668' Rt	181.80	181.94	—	—	No	No	No	—
Sanitary sewer	ADOT	1939+02.	449' Rt	1942+84.	426' Rt	181.91	181.98	—	010-3(80)	Yes	No	Yes	EB rest area
Power (underground)	San Carlos Irrigation Project	1940+50.	668' Rt	1941+20.	645' Rt	181.94	181.95	—	—	Yes	No	No	Provide service to ADOT facilities
Power (traffic)	ADOT	1941+21.	640' Rt	1942+37.	144' Rt	181.95	181.97	—	H8192 01C, F0113 01C	Yes	Yes	Yes	Weigh in motion, conduit, loops and equipment. Crosses EB in several spots into median
Power (traffic)	ADOT	1941+21.	640' Rt	1950+55.	364' Rt	181.95	182.10	—	—	Yes	No	Yes	Power to caretaker residence

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Power (traffic)	ADOT	1942+62.	246' Rt	1951+15.	121' Rt	181.98	182.11	—	—	Yes	No	Yes	Lighting for ramps and rest area
Water	ADOT	1945+22.	134' Lt	1945+58.	315' Rt	182.00	182.01	—	—	Yes	Yes	Yes	ADOT water to rest area, connects to AZW line.
Water	Arizona Water Company	1945+22.	134' Lt	2014+70.	538' Lt	182.00	183.32	32331	—	Yes	No	No	6" ACP provide service to ADOT facilities
Water	ADOT	1945+80.	250' Rt	1950+15.	289' Rt	182.01	182.10	—	—	Yes	No	Yes	ADOT water to caretaker residence
Sanitary sewer	ADOT	1949+65.	365' Rt	1950+12.	340' Rt	182.09	182.10	—	010-3(80)	Yes	No	Yes	EB rest area caretaker
Power (traffic)	ADOT	1999+07.	109' Lt	2022+19.	202' Lt	183.02	183.46	—	—	Yes	No	Yes	Lighting for ramps and rest area
Power (overhead)	GRIC	2001+82.	579' Lt	2003+75.	453' Lt	183.07	183.11	—	—	No	No	No	—
Power (underground)	GRIC	2003+75.	453' Lt	2005+06.	522' Lt	183.11	183.13	—	—	Yes	No	No	Provide service to ADOT facilities
Sanitary sewer	ADOT	2004+04.	302' Lt	2013+96.	503' Lt	183.11	183.30	—	010-3(80)	Yes	No	Yes	8" VCP for WB rest area and caretaker residence
Power (traffic)	ADOT	2005+06.	522' Lt	2059+51.	72' Lt	183.13	184.17	—	H8192 01C, F0113 01C	Yes	Yes	Yes	Weigh in motion, conduit, loops and equipment. Crosses WB in several spots into median.
Water	Arizona Water Company	2014+70.	538' Lt	2110+92.	910' Lt	183.32	185.20	32331	—	Yes	No	No	6" ACP provide service to ADOT facilities
Power (traffic)	ADOT	2100+64.	109' Lt	2106+84.	111' Rt	185.00	185.12	—	010-3(58)	Yes	Yes	Yes	Lighting
Fiber optic telephone	CenturyLink	2102+95.	427' Lt	2102+95.	350' Lt	185.04	185.04	28754		Yes	Yes	No	12" STL sleeve
Power (traffic)	ADOT	2105+05.	98' Rt	2122+11.	84' Rt	185.08	185.41	—	010-3(58)	Yes	No	Yes	Lighting
Power (traffic)	ADOT	2110+69.	1106' Lt	2113+69.	529' Lt	185.19	185.25	—	10-PN-182	Yes	No	Yes	Lighting
Irrigation	ADOT	2112+02.	5' Rt	2114+59.	7' Rt	185.22	185.26	—	10-3(184)	Yes	No	Yes	2" PVC irrigation main
Power (underground)	ADOT	2112+07.	722' Lt	2123+07.	134' Lt	185.22	185.43	—	10-3(184)	Yes	No	Yes	Irrigation
Water	Arizona Water Company	2112+47.	632' Lt	2114+11.	728' Lt	185.22	185.26	32331	—	Yes	No	No	6" ACP provide service to ADOT facilities
Water	Arizona Water Company	2112+58.	1003' Lt	2208+00.	156' Lt	185.23	186.98	32331	—	Yes	No	No	PVC outside ADOT ROW
Irrigation	ADOT	2112+69.	104' Rt	2121+11.	544' Rt	185.23	185.39	—	10-3(184)	Yes	No	Yes	2" PVC irrigation main
Irrigation	ADOT	2112+78.	624' Lt	2114+59.	104' Rt	185.23	185.26	—	10-3(184)	Yes	Yes	Yes	2" PVC irrigation main
Power (traffic)	ADOT	2113+31.	614' Lt	2134+02.	109' Rt	185.24	185.63	—	010-3(58)	Yes	Yes	Yes	Lighting
Irrigation	ADOT	2113+49.	495' Lt	2120+92.	145' Lt	185.24	185.38	—	10-3(184)	Yes	No	Yes	1.5" PVC irrigation main
Power (traffic)	ADOT	2122+43.	782' Rt	2123+11.	128' Lt	185.41	185.43	—	010-3(58)	Yes	Yes	Yes	Lighting
Power (traffic)	ADOT	2122+43.	782' Rt	2122+64.	1130' Rt	185.41	185.42	—	010-3-502	Yes	No	Yes	1.5" to 2" PVC conduit for lighting

Table 1-9. Existing utility summary

Utility type	Ownership	Begin station	Begin offset	End station	End offset	Begin milepost	End milepost	ADOT permit no.	As-built or record drawing no.	Inside ADOT ROW	Crossing I-10	ADOT constructed	Notes
Power (overhead)	GRIC	2122+43.	782' Rt	2131+56.	2060' Rt	185.41	185.59	—	—	Yes	No	No	240/480V 60-amp ADOT service on pole at 2122+43
Power (underground)	ADOT	2122+46.	778' Rt	2123+07.	134' Lt	185.41	185.43	—	010-3(184)	Yes	Yes	Yes	Irrigation
Power (overhead)	Western Area Power Authority	2134+28.	1629' Rt	2158+35.	1911' Lt	185.64	186.04	48003	—	Yes	No	No	230kV
Fiber optic telephone	Unknown	2150+24.	567' Lt	2195+00.	1359' Lt	185.94	186.74	—	—	No	No	No	Outside ADOT ROW. May be GRTI.
FMS	ADOT	2189+02.	145' Rt	2209+15.	144' Rt	186.62	187.01	—	—	Yes	No	Yes	—
Fiber optic telephone	Unknown	2204+94.	861' Rt	2218+04.	1240' Lt	186.93	187.17	—	—	Yes	Yes	No	May be GRTI.
Power (overhead)	Unknown	2207+52.	261' Rt	2210+76.	250' Lt	186.97	187.04	—	—	Yes	Yes	No	—
Water	Arizona Water Company	2208+00.	197' Lt	2208+00.	348' Rt	186.98	186.98	31201	—	Yes	Yes	No	12" STL sleeve
Fiber optic telephone	Unknown	2261+58.	1596' Rt	2285+14.	1868' Lt	188.00	188.45	—	—	Yes	Yes	No	May be GRTI.

Table 1-10. Proposed utility summary

Station	Milepost	Utility type	Ownership	Size	Material	Skew	Description
1024+40.35, 1894' Rt to 1304+48.80, 1810' Lt	164.66 to 169.82	Irrigation	PMIP	—	CBC at crossing	122°58'17" @ 1292+50.08	Future Westside VE Reach and Future Westside VB Canal
1156+19.94, 1015' Rt to 1148+98.61, 2121' Rt	167.00	Irrigation	PMIP	—	—	Not available	—

1.3.6 Traffic Features

Signing

Main Line Guide Signs

Guide signing consists of overhead and ground-mounted signs along the corridor to convey navigational information to drivers. Fourteen overhead sign structures exist between the SR 202L TI to just north of SR 347/Queen Creek Road (milepost 164.5) and consist of both tubular and truss type structures. Truss type cantilever sign structures are used at the SR 587/Casa Blanca Road TI (milepost 175.8) for both eastbound and westbound exit ramps. With the exception of the SR 587/Casa Blanca Road cantilever signs, all of the guide signs between milepost 164.5 and milepost 187 are ground-mounted. Apart from the cantilever sign structures at SR 587/Casa Blanca Road, there is no existing sign lighting on the overhead sign structures.

Grand Canyon State Logo Signs

There are Grand Canyon State logo signs on both the main line and exit ramps within the project limits. These are located within the urban and fringe-urban areas (approximately mileposts 161 to 164).

Crossroad Guide Signs

Crossroad guide signs mainly consists of control city signage for Phoenix and Tucson. See Table 1-11 for a summary of the crossroad guide signs.

Table 1-11. Crossroad guide sign summary

Milepost	Interchange	Overhead sign structure	Sign lighting	Comment
162.5	Wild Horse Pass Blvd/Sundust Rd	Yes	No	Overhead sign structure on eastbound and westbound approaches.
164.5	SR 347/Queen Creek Rd	Yes	Yes	Overhead sign structure only on eastbound approach
167.5	Riggs Rd	No	No	—
175.8	SR 587/Casa Blanca Rd	No	No	—
185.3	SR 387/SR 187/Pinal Ave	No	No	—

Pavement Marking

The existing pavement marking within the project limits consists of thermoplastic pavement marking material, Type C raised pavement markers on the lane lines and Type E raised pavement markers on the inside shoulder lines. The median and outside shoulders along I-10 also have ground in rumble strips.

Signals

Traffic signal equipment exists at the TIs of Wild Horse Pass Blvd/Sundust Road, SR 347/Queen Creek Road, and Riggs Road. At the SR 347/Queen Creek Road and Riggs Road TIs, there are existing wireless radios, although it is unclear whether this communication equipment is being used, and for what purpose. All three signal systems are owned and operated by ADOT. Table 1-12 summarizes the traffic signal equipment.

Table 1-12. Traffic signal equipment summary

Milepost	Interchange	Controller cabinet location	Meter pedestal	Battery backup	Vehicle detection	ADA-compliant pedestrian push buttons	Additional information
162.5	Wild Horse Pass Blvd/ Sundust Rd	East side, northwest corner	Yes	Yes	Loops	No	—
164.5	SR 347/ Queen Creek Rd	West side, northwest corner	Yes	Yes	Video	N/A	There are existing wireless radios mounted on the west side, northwest corner signal pole.
167.5	Riggs Rd	West side, northwest corner; and east side, southeast corner	Yes	Yes	Video	N/A	There are existing wireless radios mounted on the west and east side, northwest corner and southwest corner signal poles, respectively
175.8	SR 587/Casa Blanca Rd	—	—	—	—	—	Stop sign-controlled
185.3	SR 387/ SR 187/Pinal Ave	—	—	—	—	—	Stop sign-controlled

Freeway Management System

Fiber Optic Trunk Line

The existing FMS fiber optic infrastructure consists of a 144 single-mode fiber optic (SMFO) cable on the west side of I-10 from the northern end of the study area at milepost 161.0 extending south to milepost 163.7. The SMFO cable is likely in a concrete-encased high-density polyethylene (HDPE) conduit installed with the Wild Horse Pass Boulevard TI project around 2004. Concrete-encased HDPE conduit is installed along both sides of I-10 between mileposts 161.0 and 163.7. No conduit exists between mileposts 163.7 and 186.6, but from milepost 186.6 south, a single direct bury conduit is installed along the west ROW line of I-10.

Dynamic Messages Signs

Five dynamic message sign (DMS) structures are within the project limits. Four locations have the DMS panel on an overhead sign structure. One location along eastbound I-10 has the DMS panel mounted on a butterfly style structure but was placed behind the guardrail on the right shoulder side of the interstate, as shown in Figure 1-3. For those DMSs not connected to the fiber optic trunk line, their communication is via cellular communications. Table 1-13 summarizes the DMS locations in the project limits.

Figure 1-3. Dynamic message sign along eastbound I-10, Sta 1805+60, on butterfly structure approaching Seed Farm Road

Table 1-13. Dynamic message sign structure summary

I-10 med station	EB/WB	DMS no.	Structure type	Description
913+05	WB	——	——	Overhead DMS Sign Bridge. Skyline Walk-in DMS.
973+00	WB	112	4F	Overhead DMS Sign Bridge. Skyline Walk-in DMS.
976+25	EB	113	4F	Overhead DMS Sign Bridge. Skyline Walk-in DMS.
1694+39	WB	——	——	Overhead DMS Sign Bridge. Skyline Walk-in DMS.
1805+60	EB	458	Butterfly	Overhead DMS Sign (Butterfly Style) Structure. Daktronics Walk-in DMS.

Ramp Meters

Ramp meter conduits, pull boxes, and loops have been installed at the Wild Horse Pass Boulevard TI entrance ramps for future use; however, the ramp meter equipment has never been installed. No other ramp meter accommodations or equipment exists at other TIs in the corridor. Table 1-14 provides the ramp meter summary.

Table 1-14. Ramp meter summary

I-10 med station	EB/WB	Description
909+00	WB	Existing conduits, pull boxes, and loops for westbound I-10 entrance ramp meter from Wild Horse Pass Blvd/Sundust Rd TI. Ramp metering equipment has never been installed.
927+79	EB	Existing conduits, pull boxes, and loops for eastbound I-10 entrance ramp meter from Wild Horse Pass Blvd/Sundust Rd TI. Ramp metering equipment has never been installed.

Truck Screening and Monitoring System

Truck screening and monitoring equipment exists along both eastbound and westbound I-10. The system consists of automated license plate reader (ALPR) cameras, automated USDOT number reader (AUR) cameras, closed-circuit television (CCTV) cameras for an overview of the vehicle, and an illumination panel mounted on an ADOT Type F pole. The system also uses variable waveform identification sensors, weigh-in-motion scale sensors, and loop detectors. The truck screening and monitoring system is not connected to the fiber optic trunk line, so its communication is via cellular communications. Table 1-15 summarizes the truck screening and monitoring equipment.

Table 1-15. Truck screening and monitoring equipment summary

I-10 med station	EB/WB	Description
1899+15	EB	Cameras, variable waveform identification sensors, weigh-in-motion scale sensors, and loop detectors
1913+09	EB	Weigh-in-motion variable message sign
1913+65	EB	Weigh-in-motion controller cabinet
1914+62	EB	Weigh-in-motion variable message sign
2043+16	WB	Weigh-in-motion variable message sign
2043+99	WB	Weigh-in-motion controller cabinet
2044+82	WB	Weigh-in-motion variable message sign
2059+00	WB	Cameras, variable waveform identification sensors, weigh-in-motion scale sensors, and loop detectors

Closed-circuit Television Cameras

Five CCTV cameras exist in the project limits. The cameras monitor traffic and confirm messaging on the DMSs. All cameras have lowering devices. The three northern CCTV cameras are connected to the fiber optic truckline, but the two southern CCTV cameras communicate via cellular communications. Table 1-16 summarizes the CCTV camera locations.

Table 1-16. Closed-circuit television summary

I-10 med station	LT/RT	Description	Lowering device
923+64	RT	West side of the Wild Horse Pass Blvd TI, southeast corner	Yes
963+14	RT	Placed halfway between the Wild Horse Pass Blvd and Queen Creek Rd TIs; DMS message confirmation	Yes
976+38	LT	Placed halfway between the Wild Horse Pass Blvd and Queen Creek Rd TIs; DMS message confirmation.	Yes
1697+00	LT	Located south of the SR 587/Casa Blanca Rd TI; DMS message confirmation	Yes
1803+19	RT	Located north of Seed Farm Road; DMS message confirmation	Yes

Traffic Counter Stations and Loop Detection/Classifier Systems

Two traffic counter station locations exist in the project limits. The cabinets are both located on the west side of I-10. Table 1-17 provides details of the traffic counter stations and the number of lanes being counted.

Table 1-17. Traffic counter and detection/classifier station equipment summary

Milepost	Existing traffic count station type	Equipment type	Comment
161.4	FMS	C-Loops	ADOT Transportation Systems Management and Operations owned equipment
164.0	SB	SA	—
164.9	C-Loops	C-Loops	—
172.0	SA	SA	—
177.5	WIM	WIM	ADOT Enforcement and Compliance Division owned equipment

Lighting

Existing lighting consists of high mast, cobra style lighting, and standard Type G poles throughout the project limits. Lighting on I-10 is limited to safety lighting at the ramps. Along the crossroads, there is safety lighting that is provided with the traffic signal equipment. In other locations where traffic signals do not exist, safety lighting is provided with Type G poles. Table 1-18 summarizes the existing lighting equipment.

Table 1-18. Lighting equipment summary

Milepost	Interchange	Lighting on crossroad	Lighting on ramps	Comment
162.5	Wild Horse Pass Blvd/Sundust Rd	High mast	Cobra	—
164.5	SR 347/Queen Creek Rd	At ramp intersections only	Type G w/ 20’ MA	Intersection lighting on traffic signal poles
167.5	Riggs Rd	At ramp intersections only	Type G w/ 20’ MA	Intersection lighting on traffic signal poles
175.8	SR 587/Casa Blanca Rd	At ramp intersections only	Type G w/ 20’ MA	Intersection lighting on Type G poles
182.0	Eastbound rest area	N/A	Type G w/ 20’ MA	—
183.2	Westbound rest area	N/A	Type G w/ 20’ MA	—
185.3	SR 387/SR 187/Pinal Ave	At ramp intersections only	Type G w/ 20’ MA	Intersection lighting on Type G poles; Type G pole lighting found along SR 387/SR 187/Pinal Ave

1.3.7 Structures

Bridge Structures

Twelve bridge structures exist in the project limits. All bridge structures, except the two I-10 bridges over the Gila River, carry crossroads over I-10. These bridges were built between 1964 and 1967, except for the Wild Horse Pass Boulevard TI underpass, which was constructed in 2004, and the Queen Creek Road TI underpass, which was constructed in 1991. All structures were designed for an HS 20 live load vehicle. The ADOT Bridge Inventory indicates that the existing bridges are in fair to good condition with substandard bridge railing on some structures.

Only three of the existing structures have more than 16’-6” vertical clearance over I-10. It is recommended that the vertical clearances shown here and in the bridge inventory and inspection reports be field-verified by survey during final design.

Note that the two bridges over the Gila River are part of another ADOT study (F0270) and not part of this study (F0252). While information is included in this section to make the bridge inventory complete, no additional information or discussion is included in this document regarding those two bridges.

A summary of the existing bridges in the study area is provided in Table 1-19. The information shown is based on the Arizona State Highway System Bridge Inspection Record and as-built drawings.

Retaining Walls

No retaining walls independent of the bridge structures exist in the project limits.

Sound Barriers

No sound barriers exist in the project limits.

Box Culverts

Existing (reinforced concrete) box culvert locations are presented in Table 1-20. As-built stationing data are shown, unless noted otherwise.

Table 1-19. Existing bridge structure summary

Structure name	Str. no.	As-built milepost (F0252 MP)	Original construction project no.	Year built	Structure length (ft)	Structure width (roadway width) (ft)	No. of spans	Superstructure type(s)	Substructure and foundation type(s)	Barrier type Bridge railing/ transition meet standard	Minimum vertical clearance (ft)	Sufficiency rating	Bridge condition	NBI condition ratings (N58, N59, N60)[a]
Wild Horse Pass Blvd TI underpass	02612	162.54 (162.53)	202-C-501	2004	279	105'-5" (92')	2	Prestressed precast concrete continuous girder	Abutments on drilled shafts, and piers on spread footings	Comb. Ped. & Traffic No/Yes	16.84	92.50	Good	N58 Good N59 Good N60 Good
Queen Creek Rd TI underpass	02302	164.50 (164.50)	IR-10-3(325)	1991	264	99'-2" (96')	2	Prestressed precast concrete continuous girder	Abutments on drilled shafts, and piers on spread footings	Type A Barrier & Fence Yes/No	16.71	86.40	Good	N58 Good N59 Good N60 Good
Riggs Rd TI underpass	01148	167.47 (167.48)	I-10-3(36) 161	1967	301	31'-2" (26')	4	Steel girder	Abutments on steel H piles, and piers on spread footings	Conc. Parapet w/ Single Tube Aluminum Railing No/Yes	15.92/16.02[b]	F53.10	Fair	N58 Satisfactory N59 Fair N60 Good
Goodyear Rd TI underpass	01149	169.85 (169.87)	I-10-3(38)	1967	301	31'-2" (26')	4	Steel girder	Abutments on steel H piles, and piers on spread footings	Conc. Parapet w/ Single Tube Aluminum Railing Yes /No	16.06	98.00	Fair	N58 Good N59 Good N60 Satisfactory
Gila River Bridge EB	01085	173.12	I-10-3(47)	1964	1337	35'-2" (30')	17	Prestressed precast concrete girder	Abutments on CIP pipe shell piles, and piers on CIP pipe shell piles	Conc. Parapet w/ Single Tube Aluminum Railing No/No	Not applicable	76.50	Fair	Bridge not in this project scope
Gila River Bridge WB	01085	173.12	I-10-3(47)	1964	1337	35'-2" (30')	17	Prestressed precast concrete girder	Abutments on CIP pipe shell piles, and piers on CIP pipe shell piles	Conc. Parapet w/ Single Tube Aluminum Railing No/No	Not applicable	76.70	Fair	Bridge not in this project scope
Nelson Rd underpass	01213	174.63 (174.63)	I-10-3(40)	1967	292	31'-2" (26')	4	Steel girder	Abutments on steel H piles, and piers on spread footings	Conc. Parapet w/ Single Tube Aluminum Railing No/No	16.15	95.00	Fair	N58 Good N59 Good N60 Satisfactory
Casa Blanca TI underpass	01214	175.81 (175.81)	I-10-3(40)	1967	298	35'-2" (30.7')	4	Steel girder	Abutments on CIP pipe shell piles, and piers on CIP pipe shell piles	Modified F-Shape Yes/Yes	16.14	79.70	Fair	N58 Satisfactory N59 Satisfactory N60 Satisfactory
Gasline Rd underpass	01215	177.76 (177.76)	I-10-3(40)	1967	450	31'-2" (26')	5	Steel girder	Abutments on CIP pipe shell piles, and piers on drilled shafts	Conc. Parapet w/ Single Tube Aluminum Railing No/No	16.16	93.80	Fair	N58 Satisfactory N59 Good N60 Good
Seed Farm Rd underpass	01216	179.39 (179.40)	I-10-3(40)	1967	292	31'-2" (26')	4	Steel girder	Abutments on steel H piles, and piers on drilled shafts	Conc. Parapet w/ Single Tube Aluminum Railing No/No	16.07	85.00	Fair	N58 Satisfactory N59 Fair N60 Satisfactory
Dirk Lay Rd underpass	01150	181.44 (181.43)	I-10-3(42)	1967	470	31'-2" (26')	5	Steel plate girder	Stub abutments on steel H-piles and pier bents on spread footing	Conc. Parapet w/ Single Tube Aluminum Railing No/No	16.27	94.00	Good	N58 Good N59 Good N60 Good
SR 387/SR 187/ Pinal Ave TI underpass	01151	185.26 (185.26)	I-10-3(42)	1967	287	35'-2" (30.2')	4	Steel plate girder	Stub abutments on steel H-piles and pier bents on spread footing	Modified F-Shape Yes/No	16.61	72.80	Fair	N58 Satisfactory N59 Good N60 Good

[a] N58 – deck, N59 – superstructure, N60 – substructure

[b] Final designer to field verify minimum vertical clearance. Bridge in-depth inspection report dated April 4, 2019, shows minimum vertical clearance is 16.02 ft in SI & A sheet item N54 and 16.02' in the clearance diagram. Bridge inspection report dated May 18, 2021, shows minimum vertical clearance is 15.92 ft in SI & A sheet item N54 and 16.02' in the clearance diagram.

Table 1-20. Existing bridge culvert summary

Station	As-built milepost (F0252 MP)	Structure no.	Original construction project no.	Year built (year reconstructed)	Barrels (no.)	Size (ft x ft)	Depth of cover (ft)	Length (ft)	Design flow 'Q' (cfs)	Sufficiency rating	Bridge condition
914+00.00	162.40 (162.34)	6043	I-10-3(36)	1966	3	10 x 7	3	681	—	70.00	Good
1127+00.00	166.52	5422	I-10-3(36)	1967 (1975)	3	10 x 3	2	194	49.50	70.00	Good
1201+98	167.94	5424	I-10-3(36)	1967 (1975)	3	10 x 3	3	194	57.33	70.00	Fair
1240+00.00	168.66	5426	I-10-3(36)	1967 (1976)	3	10 x 3	3	196	47.25	70.00	Fair
1244+00.00	168.74	5428	I-10-3(38)	1967 (1976)	3	10 x 3	2	194	10.00	70.00	Fair
1253+00.00	168.90	6033	I-10-3(38)	1967 (1976)	3	10 x 3	2	194	10.67	70.00	Fair
1383+00.25	171.33	5430	I-10-3(38)	1966 (1975)	2	10 x 6	2	192	64.11	70.00	Good
1890+56.53	180.95 (WB)	5433	I-10-3(40)	1967	6	10 x 8	5	156	6290.64	80.00	Fair
1888+69.47	181.02 (EB)	5432	I-10-3(40)	1967	6	10 x 8	5	156	5613.22	80.00	Fair
1929+51.25	181.70	5434	I-10-3(42)	1967 (1975)	2	10 x 4	2	197	680.50	65.00	Good
2028+40.50	183.58 (EB)	5436	I-10-3(42)	1964 (1974)	4	10 x 5	2	82	1616.76	80.00	Good
2026+22.50	183.58 (WB)	5437	I-10-3(42)	1964 (1974)	4	10 x 5	2	97	2073.72	80.00	Good
2065+59.60	184.28	5438	I-10-3(42)	1967 (1975)	3	10 x 8	2	192	2101.78	65.00	Good
2083+01.67	184.60	5440	I-10-3(42)	1967 (1975)	3	10 x 6	3	192	2327.10	65.00	Good
2160+00.00	186.08	5442	I-10-3(42)	1967 (1975)	2	10 x 3	1	192	480.39	84.80	Good
2168+00.00	186.23	5444	I-10-3(42)	1967 (1975)	2	10 x 3	2	222	481.46	70.00	Good
2193+00.00	186.71	5446	I-10-3(42)	1967 (2011)	3	10 x 3	2	236	722.21	70.00	Good

1.3.8 Geology

The project area is in the Basin and Range physiographic province (Cooley 1967) of the North American Cordillera (Stern et al. 1979) of the southwestern United States. The southern portion of the Basin and Range province is situated along the southwestern flank of the Colorado Plateau and is bounded by the Sierra Nevada Mountains to the west. Formed during middle to late Tertiary time (15 to 100 million years ago), the Basin and Range province is dominated by fault-controlled topography. The topography consists of mountain ranges and relatively flat alluvial valleys. These mountain ranges and valleys have evolved from generally complex movements and associated erosional and depositional processes.

Typically, the mountain ranges in this area are of small areal extent but protrude significantly above adjacent, wide alluvial plains and valleys. The basin rims are formed by the mountain ranges that consist of sedimentary, igneous, and metamorphic materials that have been subjected to recurrent faulting and tilting and, in some places, volcanic and intrusive events. As a result of erosion, the valleys have experienced partial infilling with sedimentary material deposited as alluvial fans. Occasionally, the valleys may become interlocking as a result of coalescing alluvial fans, which are referred to as bajadas.

The mapped surficial geologic conditions (Richard et al. 2000) indicate most of the project alignment traverses Holocene surficial deposits. These Holocene-age surficial deposits generally consist of unconsolidated deposits associated with modern fluvial systems and include fine-grained, well-sorted sediment on alluvial plains, but also include gravelly channel, terrace, and alluvial fan deposits on middle and upper piedmonts (sloped areas extending from the base of the mountains to the alluvial plains). The mapped geologic conditions also indicate a small portion of the project in the southern portion of the alignment extends across an area of Early Tertiary to Late Cretaceous-age granitic rocks consisting of porphyritic to equigranular (uniform particle size) granite to diorite emplaced during the Laramide orogeny of Late Cretaceous to Paleogene time. Larger plutons are characteristically medium-grained, biotite, hornblende granodiorite to granite. Smaller, shallow-level intrusive zones are typically porphyritic, consisting of crystalline particles embedded in a fine-grained groundmass. Most of the large copper deposits in Arizona are associated with porphyritic granitic rocks of this unit and are thus named “porphyry copper deposits.” In addition, the mapped geologic conditions also indicate a small area of Proterozoic-age granitic rocks located adjacent to the eastern side of I-10 in the central portion of the alignment. Further discussion of the subsurface conditions relating to the geotechnical design is included in Chapter 4.

Groundwater

Information regarding depth to groundwater in the study corridor was obtained from the Arizona Department of Water Resources (ADWR) groundwater data website (ADWR 2020). Based on the limited available groundwater information near the I-10 corridor, the depth to groundwater is anticipated to range from about 49 to 102 feet below the ground surface (bgs). One well recorded a groundwater depth of 300 feet but did not include a date of the measurement. The available nearby groundwater data is summarized in Table 1-21.

The groundwater conditions likely will vary with occurrence of seasonal flows near washes, particularly near the Gila River. Additionally, perched groundwater may be encountered in areas with shallow bedrock.

Table 1-21. Groundwater summary

ADWR well registry ID/ Local ID	Depth to groundwater (bgs) (ft)	Groundwater elevation (ft MSL)	Date of last measurement	Approximate location in the corridor
55-626619 D-01-04 32DCC	88	1,071	2/5/2013	I-10/SR 202L TI
55-n/a D-03-04 01AAA	84	1,099	12/30/1991	2 miles southeast of I-10/Riggs Road TI
55-n/a D-03-05 28CBB	94	1,104	1/6/1972	2 miles northwest of I-10/SR 587 TI
55-n/a D-04-05 03CDD	49	1,166	3/5/2003	3 miles northwest of I-10 and Seed Farm Road
55-n/a D-04-05 14DBB	102	1,205	2/21/2003	1/2 mile northwest of I-10 and Seed Farm Road
55-628129 D-04-06 31BDB	97	1,363	3/9/1998	4 miles northwest of I-10/SR 387 TI
55-n/a D-05-06 05BCB	300	1,212	No date	3 miles northwest of I-10/SR 387 TI

Source: ADWR groundwater data website (2020)

Land Subsidence and Earth Fissuring

Land subsidence in the southwestern United States has occurred because of groundwater pumping and withdrawal that has significantly lowered the groundwater level. The lowering of the groundwater increases the effective stress in the subsurface soil and results in consolidation settlement over large land areas. Associated with land subsidence, earth fissures and potential earth fissure features have been identified in Arizona since the late 1980s. Earth fissures are tension cracks that form in deep alluvium-filled basins in response to the land subsidence. The fissures occur primarily at the alluvial basin edges in the vicinity of mountains and hills and in areas where there are significant variations in the basin alluvium thickness over relatively short distances, such as above subsurface bedrock ridges, pinnacles, or knobs. Earth fissures commonly parallel nearby mountain fronts or buried bedrock highs and, therefore, the fissures often bisect surface drainage features.

A review of published maps available from the Arizona Geological Survey (AZGS) (2014) indicates the project corridor is in a broad general area of central Arizona known for historic ground subsidence attributable to groundwater withdrawal. This has historically resulted in the formation of earth fissures in certain parts of the region. AZGS is actively updating its database regarding earth fissuring. Based on review of the available AZGS information, the nearest mapped earth fissure study area is approximately 4.5 miles southwest of I-10 and SR 587. Evidence of earth fissures was not observed on the site during the site reconnaissance. However, continued groundwater withdrawal by pumping in the area may result in additional ground subsidence and the formation of new fissures or the extension of existing fissures. Given the bedrock exposures at the southern end of the project corridor, the development of earth fissures is a possibility. Avoidance of the earth fissures, if possible, or mitigation of the effects of potential earth fissures on the performance of I-10 should be investigated further during later phases of this project.

Engineering Seismology and Estimated Earthquake Effects

Seismic hazard information for the study corridor was obtained from USGS. Interpolated, probabilistic ground-motion values of the acceleration coefficient (A_s) for Site Class B (bedrock), Site Class C (very dense soil), and Site Class D (stiff soil conditions) for the indicated probability of exceedance were obtained for the approximate midpoint of the study corridor (just south of the Gila River) and are presented in Table 1-22. The American Association of State Highway and Transportation Officials (AASHTO) *Guide Specifications for LRFD Seismic Bridge Design* (2009) were used as the basis for estimating the peak ground acceleration and acceleration coefficient.

Table 1-22. Seismic summary

Description	PGA (g)	0.2 sec SA[a]	1.0 sec SA[b]
Bedrock Contact Values; Site Class B Latitude = 33.132122 deg, Longitude = -111.8530806 deg (Approximate midpoint of the project corridor)	0.052	0.118	0.039
Site-adjusted Values[c]; Site Class C	0.062	0.142	0.067
Site-adjusted Values[c]; Site Class D	0.083	0.189	0.095

Notes: PGA = peak ground acceleration, SA = spectral acceleration
[a] Spectral acceleration at 0.2 second period
[b] Spectral acceleration at 1.0 second period
[c] Site-adjusted values based on application of site coefficients for Site Class C and Site Class D. Site Class C corresponds to very dense soil, and Site Class D corresponds to stiff soil

Geotechnical References

Arizona Department of Water Resources (ADWR). 2020. "GWSI – Groundwater Site Inventory." https://gisweb.azwater.gov/waterresourcedata/GWSI.aspx

Arizona Geological Survey (AZGS). 1996. *Geologic Map of the Sacaton Mountains*, Pinal County, Arizona, OFR-96-10, June.

———. 2014. *Earth Fissure Map of Pinal County*, Digital Map Series Earth Fissure Map 21, DM-EF-21.

Cooley, M. E. 1967. *Arizona Highway Geologic Map*. Arizona Geological Society.

Stern, C. W., et al. 1979. *Geological Evolution of North America*. John Wiley & Sons, Santa Barbara, California.

Richard, S. M., et al. 2000. "Geologic Map of Arizona." Map 35.

1.4 Characteristics of the Corridor

The study corridor is 26 miles long and extends from the SR 202L and I-10 TI to just south of the SR 387/SR 187/Pinal Avenue. It is primarily a rural four-lane divided interstate corridor and lies almost entirely on the Community. From north to south, the corridor characteristics can be summarized as follows:

- **SR 202L (milepost 161.0) to Maricopa-Pinal County line (milepost 168.7)**: The northern 7.7 miles of the corridor falls within Maricopa County and can be described as fringe urban in nature because it is adjacent to the Phoenix/Chandler boundary at SR 202L, and parallels the Price Road corridor to the east. The Community's WHPDA area fronts I-10 to the west for the northern 2.5 miles of the corridor. The WHPDA area is a destination-style master-planned area that currently includes a casino, an outlet mall, a motorsports park, a hotel resort, and a golf course, to name just a few, and there are plans to expand dramatically over the next several decades, including sports/concert venues and other related land uses. The Lone Butte Industrial Park fronts I-10 to the east for the northern 1.5 miles. Both are primarily served by the Wild Horse Pass Boulevard TI. The SR 347/Queen Creek Road and Riggs Road TIs are included in this segment, and while they both have the appearance of a rural setting, their operations are more reflective of urban TIs with pronounced peak period congestion. This is due to the commuter traffic that uses the TIs from both the south Chandler/Sun Lakes area to the east, and the city of Maricopa to the southwest.
- **Maricopa-Pinal County line (milepost 168.7) to milepost 177.0**: This 8.3-mile segment is in Pinal County and can be described as rural in nature as it crosses over the natural desert floor. The prominent feature in this segment is the Gila River, which crosses under I-10 at approximately milepost 173, but because the river crossing is not part of this study, this document does not discuss the crossing in detail. Both Goodyear and Nelson Roads cross over I-10 in this segment. The SR 587/Casa Blanca Road TI exists at milepost 175.8 and is an important TI serving I-10, SR 587, Casa Blanca Road, and old Highway 93. This segment ends at milepost 177, which coincides with approximately the northern boundary of Gila Farms.
- **Mileposts 177.0 to 180.1**: This 3.1-mile segment is in Pinal County and falls within the limits of Gila Farms, a Community business enterprise. As such, this segment is also rural in nature but is surrounded by agricultural land uses and irrigation delivery systems rather than open desert. Both the Gasline Road and Seed Farm Road crossings exist in this segment, both to predominantly serve the needs of Gila Farms.
- **Mileposts 180.1 to 187.0**: This southern 6.9-mile segment is in Pinal County and can be described as rural in nature as it crosses over the natural desert floor. Between milepost 183.0 and 184.0, I-10 passes through the Sacaton Mountains, where I-10 cuts through the surface bedrock of these mountains. Both an eastbound and westbound rest area exist within these limits. Dirk Lay Road crosses over I-10 at milepost 181.4 and the SR 387/SR 187/Pinal Avenue TI exists at about milepost 185.3. Like the Riggs Road TI, the SR 387/SR 187/Pinal Avenue TI is also a rural style TI but operates more like an urban TI with its pronounced peak hour volumes serving commuters between Casa Grande and Phoenix. I-10 crosses through the southern limits of the Community at milepost 185.8 and proceeds into the city limits of Casa Grande, where it ends at milepost 187.0 where I-10 currently has three lanes in each direction.

1.5 Agency and Public Scoping Meetings

ADOT, in partnership with the Community and Maricopa Association of Governments (MAG), and while coordinating with the Federal Highway Administration (FHWA) and BIA, hosted a series of agency and public scoping meetings in late September and early October of 2019 as part of the National Environmental Policy Act (NEPA) process for the Draft Environmental Assessment and Initial DCR for I-10 between SR 202L and SR 387. Prior to the public scoping process, the study team collaborated with the Community and MAG to establish meeting plans and strategies, which were subsequently approved by the leadership of the Community, ADOT, and MAG. The scoping meetings provided an opportunity for the Community and other stakeholders to educate the study team about the corridor and share issues or concerns about modifying I-10. The scoping meetings provided an overview of the I-10 corridor, the study's objectives, and the study's schedule. The scoping meetings obtained community feedback on opportunities, issues, and concerns related to the study area and solicited input on how to write the purpose and need and potential corridor improvement alternatives.

A detailed public involvement summary report for the public and agency meetings was developed and was posted to the study website (www.i10wildhorsepasscorridor.com) shortly after the completion of the meetings, but a summary of the meetings is included below.

1.5.1 Agency Scoping Meeting

ADOT held a formal agency scoping meeting on October 2, 2019, to provide information about the study and solicit feedback from agency stakeholders. The meeting was held from 1 p.m. to 3 p.m. at the Shelde Building, 5692 W. North Loop Road, in Chandler. A total of 22 people attended the agency scoping meeting, from the following agencies:

- ADOT
- Chandler Unified School District
- City of Chandler
- City of Maricopa
- City of Phoenix
- Gila River Indian Community
- MAG
- Pinal County
- Sun Corridor Municipal Planning Organization
- FHWA

There were 39 comments received during agency scoping. Agencies that provided comments included the Arizona Department of Public Safety, Arizona Game and Fish Department, Gila River Indian Community, and MCDOT. All comments are recorded in the summary report on the study website.

1.5.2 Public Scoping Meeting

A formal public scoping meeting and open house was held on September 19, 2019, from 6 p.m. to 8 p.m. at the Sacaton Boys and Girls Club, 116 S. Holly Street, in Sacaton. The meeting provided information about the study and solicited feedback from any member of the public. Forty-three people attended the meeting.

1.5.3 Gila River Indian Community Scoping Meetings

Because the study lies almost entirely within the Community, three Community member-only scoping meetings were held the week following the public scoping meeting to supplement the open public meeting:

- District 6 Community Scoping Meeting: September 25, 2019, 6 p.m. to 8 p.m., Komatke Boys and Girls Club, 5047 W. Pecos Road, in Laveen
- District 1 Community Scoping Meeting: September 26, 2019, 6 p.m. to 8 p.m., Uhks Kehl Multi-Purpose Building, 15747 N. Shegoi Road, in Coolidge
- District 4 Community Scoping Meeting: September 28, 2019, 9 a.m. to 11 a.m., 3546 W. Casa Blanca Road, in Bapchule

These meetings were held to solicit specific Community concerns that the Community members may not have been willing to share at the open public meeting. A total of 28 people attended the Community scoping meetings. An informal presentation provided meeting attendees with the study background and purpose of the scoping meeting.

1.5.4 Public and Community Scoping Meeting Comments

Approximately 31 comments were received that overtly expressed support for improvements to I-10 between SR 202L and SR 387, citing reasons that include congestion relief, improved travel times, and improved safety. Twenty-five comments did not express support or opposition, but rather asked the study team to consider landowners, community impacts, and general driver behavior. Several comments inquired about being added to the mailing list, and those requests were accommodated. All comments were recorded in the summary report on the study website.

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2 Traffic and Crash Data Analysis

This chapter describes the current and potential future transportation operational deficiencies associated with I-10 and key TIs at connecting roadways. The analyses performed addressed the existing LOS of the roadway and key TIs, as well as the potential of the roadway and key TIs to support future traffic, based on travel demand forecasts. An analysis of the safety of travel in the study area identified crash locations and characteristics that could potentially be addressed with future improvements in the corridor.

2.1 Study Parameters

I-10 is a major, national east-west travel corridor, linking the West Coast in Santa Monica, California, with Jacksonville, Florida, on the East Coast. In Arizona, I-10 is a key transportation facility serving the megaregion known as the Sun Corridor, which is anchored by Tucson in the south and Phoenix in the north—two metropolitan areas with an estimated combined population of 5.9 million. The portion of I-10 in the study area is the primary north-south axis connecting these two metropolitan areas and is classified as a Principal Interstate with a posted speed limit of 65 miles per hour (mph) north of Riggs Road and 75 mph south of Riggs Road.

The portion of I-10 in the identified study area is completely within the Community, between milepost 161 on the north and milepost 187 on the south. The segment of I-10 between mileposts 172.6 and 173.6, which roughly define the limits of the Gila River Bridge replacement project, was excluded from the LOS analysis because this segment is a separate ADOT project. Milepost 161 is directly north of the I-10 and SR 202L system TI north of the northern reservation boundary. Milepost 187 is near the southern reservation boundary, directly north of the Ghost Ranch Road/Waverly Drive alignment. The study area, shown in Figure 2-1, contains six existing TIs:

1. SR 202L
2. Wild Horse Pass Boulevard
3. SR 347/Queen Creek Road
4. Riggs Road
5. SR 587/Casa Blanca Road
6. SR 387/SR 187/Pinal Avenue

2.2 Regional Travel Demand Data

Relevant mobility outputs reflecting current and future travel through the study area were obtained from the officially adopted regional travel demand model (TDM) developed and maintained by MAG. The MAG TDM estimates traffic volumes based on varying levels of travel demand generated by the region's population and employment. MAG TDM outputs were necessary to ensure consistency of the traffic analyses performed for the study with respect to regional planning activities. The MAG TDM was used to perform operations analysis for existing and future conditions in the study area. Future conditions were analyzed for two alternative scenarios: (1) do nothing to improve the current or existing status of travel through the study area, referred to as the No-Build Alternative; and (2) increase roadway capacity throughout the corridor to improve travel conditions, referred to as the Recommended Build Alternative.

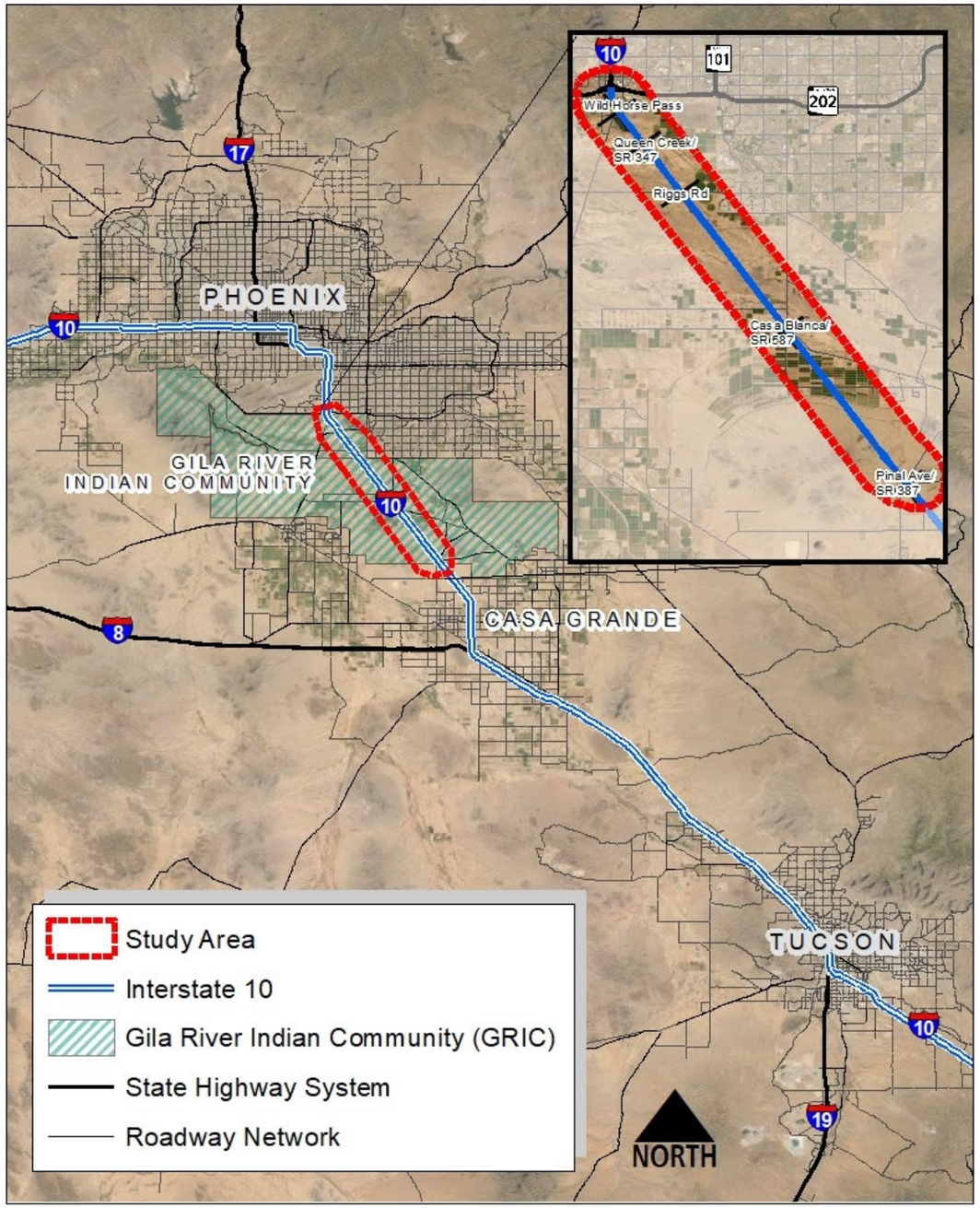


Figure 2-1. Vicinity map

2.3 Existing Year 2019 Traffic Conditions

Traffic along the I-10 main line was strategically assessed using the calibrated TDM volume data maintained by MAG, supplemented with ADOT traffic count data obtained from ADOT's Highway Performance Monitoring System. The use of the MAG TDM ensured consistency between existing and future year datasets and sources and permitted a more detailed analysis of the corridor. ADOT traffic count data were primarily used to validate that the MAG TDM generated sufficient traffic assigned to the I-10 main line in the study area. Figure 2-2 illustrates the existing (2019) bidirectional average daily traffic (ADT) derived from the MAG TDM and verified by ADOT traffic counts. The figure shows traffic volumes are heaviest at the northern end of the corridor between SR 202L and Riggs Road, exhibiting a range of 82,000 to 124,000 vehicles per day (vpd). Traffic volume in the remainder of the corridor is less than 70,000 vpd.

2.3.1 Travel Speed

A key focus of the purpose and need for improvements to the study corridor is the increasing delay encountered by drivers currently traveling on I-10 between the Phoenix metropolitan area and the city of Casa Grande. This delay is anticipated to continue to increase as traffic increases in future years. The morning (AM) and evening (PM) peak periods represent the times of day with the highest traffic congestion and were analyzed to identify average speed and delay throughout the study area. Figures 2-3 and 2-4 show the average speed in the I-10 corridor study area, based on data derived from the MAG TDM.

Existing Year 2019 AM Peak-hour Speed: Figure 2-3 shows an average travel speed greater than 60 mph in the eastbound/southbound direction. The average speed of travel in the westbound/northbound (morning commute) direction is less than 45 mph. However, the average speed does increase to 45 to 55 mph north of milepost 162 as traffic approaches the I-10 and SR 202L system TI and additional travel lanes are available.

Existing Year 2019 PM Peak-hour Speed: Figure 2-4 shows the average travel speed exceeds 60 mph through the length of the corridor in the westbound/northbound direction. Travel speeds in the eastbound/southbound (evening commute) direction varies considerably through the corridor. Generally, an average speed of 45 to 60 mph is experienced south of Riggs Road. However, the average speed drops to between 35 and 45 mph north of Riggs Road.

Travel times were computed using the speed data from the MAG TDM for roadway segments between each of the six TIs and aggregated to provide total travel time for trips traversing the entire length of the study area during peak periods. The peak period travel times were then compared to travel times at free-flow speeds (using posted speed limit data) to approximate the delay associated with peak period travel. Table 2-1 presents the resulting existing year 2019 travel time delay.

Table 2-1. Existing 2019 travel time delay (minutes)

Segment	AM delay		PM delay	
	WB/NB	EB/SB	WB/NB	EB/SB
SR 202L to Wild Horse Pass Boulevard	0.4	0.0	0.0	0.4
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	1.4	0.0	0.0	1.0
SR 347/Queen Creek Road to Riggs Road	4.6	0.1	0.4	2.0
Riggs Road to SR 587/Casa Blanca Road	7.2	0.3	0.5	3.3
SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue	9.4	0.4	0.7	4.5
Total 2019 corridor delay	**23.0**	**0.8**	**1.6**	**11.2**

2.3.2 Level of Service and Volume-to-capacity Ratio

Transportation professionals commonly use a rating system to measure and describe the operational status of roadway segments and TIs/intersections that make up a local roadway network. This rating system is referred to as LOS, which yields a measurement of the performance of network components. As defined in the *Highway Capacity Manual 6th Edition* (HCM 2016), LOS is a qualitative measure describing operating conditions associated with a traffic stream. Six levels of service are defined using letters, with LOS A representing the best operating condition and LOS F the worst:

- **LOS A** represents free flow.
- **LOS B** is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable.
- **LOS C** is in the range of stable flow but marks the beginning of the range in which the operation of individual users becomes significantly affected by others.
- **LOS D** represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
- **LOS E** represents operating conditions at or near the capacity level. All speeds are reduced to a low but relatively uniform value.
- **LOS F** is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the volume that can traverse the point.

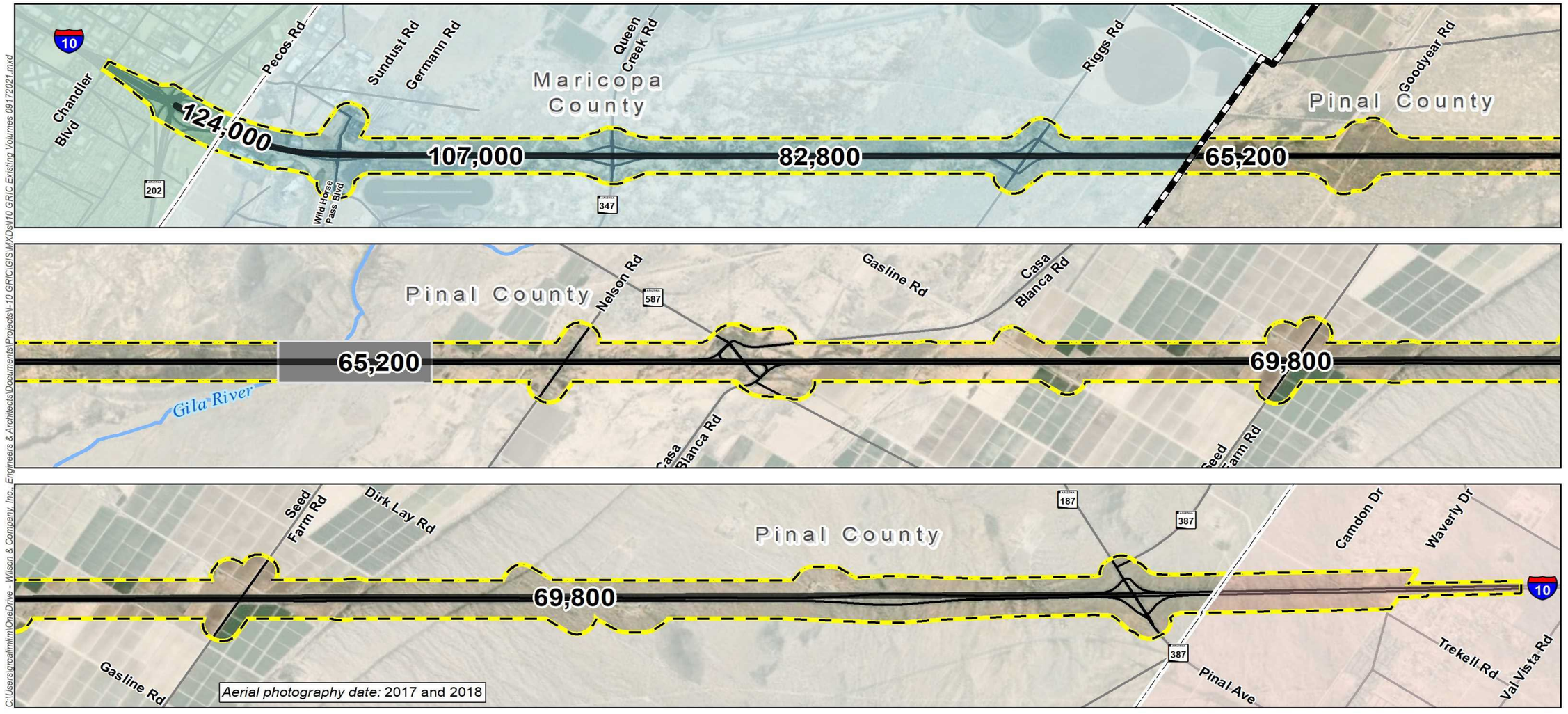


Figure 2-2. Existing year 2019 average daily traffic volumes

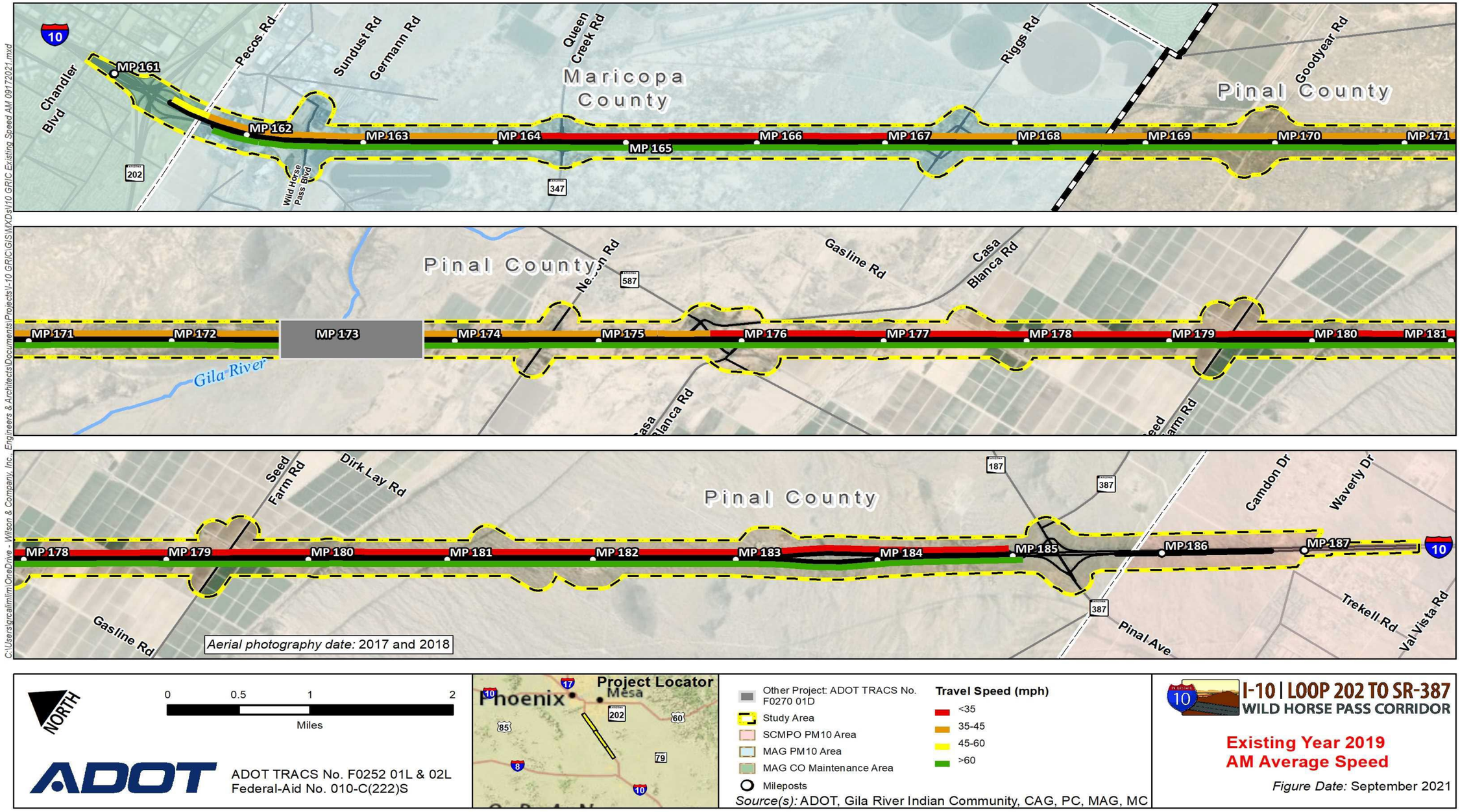
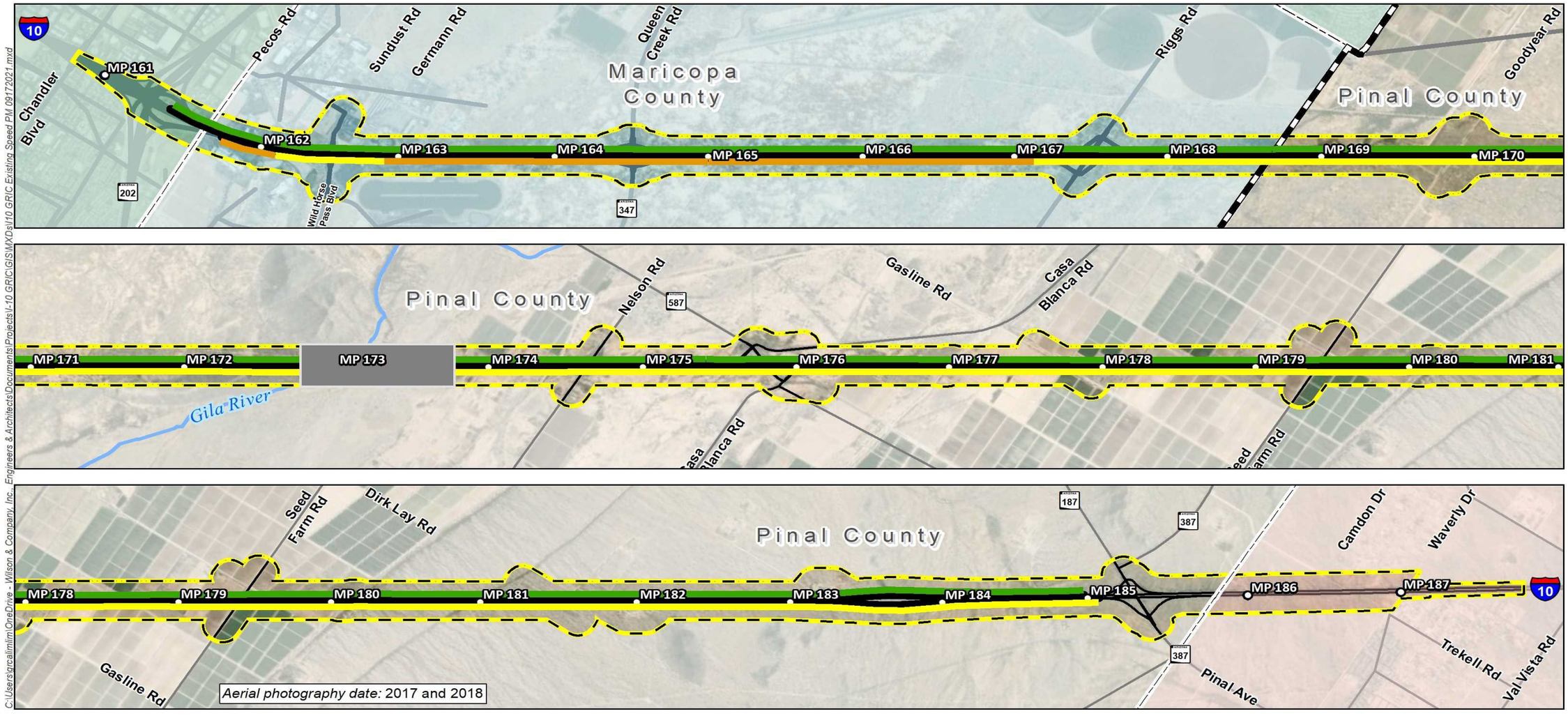


Figure 2-3. Existing year 2019 AM average speed



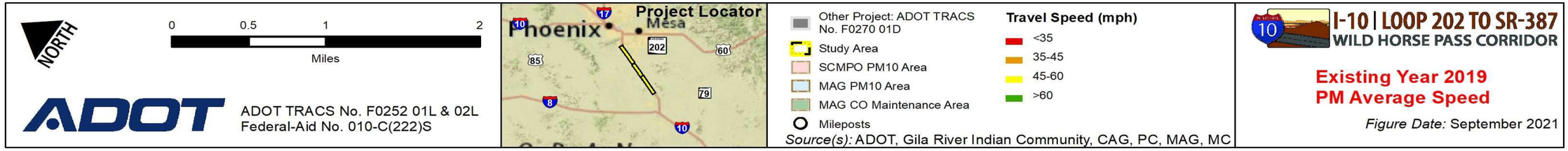


Figure 2-4. Existing year 2019 PM average speed

LOS is derived by comparing traffic volumes on a given roadway segment to roadway capacities. Roadway capacities are defined for different roadway types. This I-10 study included an analysis of general purpose Interstate lanes and HOV lanes. Capacities were correlated based on the volume of traffic each facility type would be expected to carry. The approximate lane capacity of the different facility types as coded in the MAG TDM is summarized in Table 2-2.

Table 2-2. Lane capacity by facility type

Facility type	Capacity per lane
HOV lane	1,700
General purpose Interstate lane	1,750

Comparing the projected traffic volumes from the MAG TDM to the theoretical capacity of the roadway provides a metric commonly referred to as a volume-to-capacity (v/c) ratio. The v/c ratio indicates the anticipated congestion and associated LOS that may occur on the roadway network. Table 2-3 summarizes the correlation between the v/c ratio and the LOS thresholds used in the analysis of the study area. For example, a general purpose Interstate lane with a capacity of 1,750 vehicles would be considered to operate at an acceptable LOS D until traffic volumes reached 84 percent of the capacity, or approximately 1,470 vehicles per hour per lane, as defined by MAG.

Table 2-3. Level of service volume-to-capacity thresholds

LOS	v/c threshold
A	0.00–0.50
B	0.51–0.60
C	0.61–0.72
D	0.73–0.84
E	0.85–1.00
F	1.01+

2.3.3 Existing Year 2019 Level of Service Results

Table 2-4 presents LOS results for the various corridor segments for the 2019 AM peak hour, or morning commute period, and PM peak hour, or evening commute period. *Commute* periods represent most of the traffic in the corridor flowing westward/northward along I-10 into the Phoenix metropolitan area in the morning and eastward/southward in the evening. Correspondingly, the morning commute west and evening commute east represent the direction of travel with the highest v/c ratios. Table 2-4 reveals that in the study area, the I-10 main line westbound/northbound operates over capacity, LOS F, through its entire length during the AM peak hour. During the PM peak hour, two segments operate at LOS F: SR 202L to Wild Horse Pass Boulevard and SR 347/Queen Creek Road to Riggs Road; while the remainder of the Interstate operates at capacity, LOS E. Travel time delay during both periods is greatest toward the southern end of the corridor.

Table 2-4. Existing year 2019 level of service: AM and PM peak hours

Interstate 10 analysis segment	AM peak-hour morning commute		PM peak-hour evening commute	
	LOS (WB/NB)	v/c	LOS (EB/SB)	v/c
SR 202L to Wild Horse Pass Boulevard	F	1.10	F	1.01
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	F	1.13	E	0.98
SR 347/Queen Creek Road to Riggs Road	F	1.31	F	1.08
Riggs Road to SR 587/Casa Blanca Road	F	1.11	E	0.88
SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue	F	1.15	E	0.94

The following figures depict the LOS results presented in Table 2-4 for the various analysis segments along the I-10 main line.

Figure 2-5 shows that during the AM peak hour, the corridor generally is operating at LOS F (v/c = 1.00-1.25). Notably, operating conditions in the segment between SR 347/Queen Creek Road and Riggs Road appear worse, as reflected by a v/c ratio greater than 1.25.

Figure 2-6 indicates two segments operating with the worst LOS during the PM peak-hour (v/c = 1.00-1.25): the I-10 and SR 202L system TI to Wild Horse Pass Boulevard and SR 347/Queen Creek Road to Riggs Road. The remainder of the corridor is operating at capacity LOS E (v/c = 0.85-0.99).

Figure 2-7 depicts the daily LOS, comparing the ADT to the daily capacity of the freeway. This measure can be used to identify the magnitude of travel deficiencies during off-peak hours. From the map, traffic congestion along the corridor throughout the day is consistent in both travel directions, with a performance rating of LOS of D (v/c value range of < 0.85) or better.

It is estimated that by 2025, the projected opening year of the build alternative, all segments of the study corridor will operate under LOS F conditions in the absence of capacity improvements.

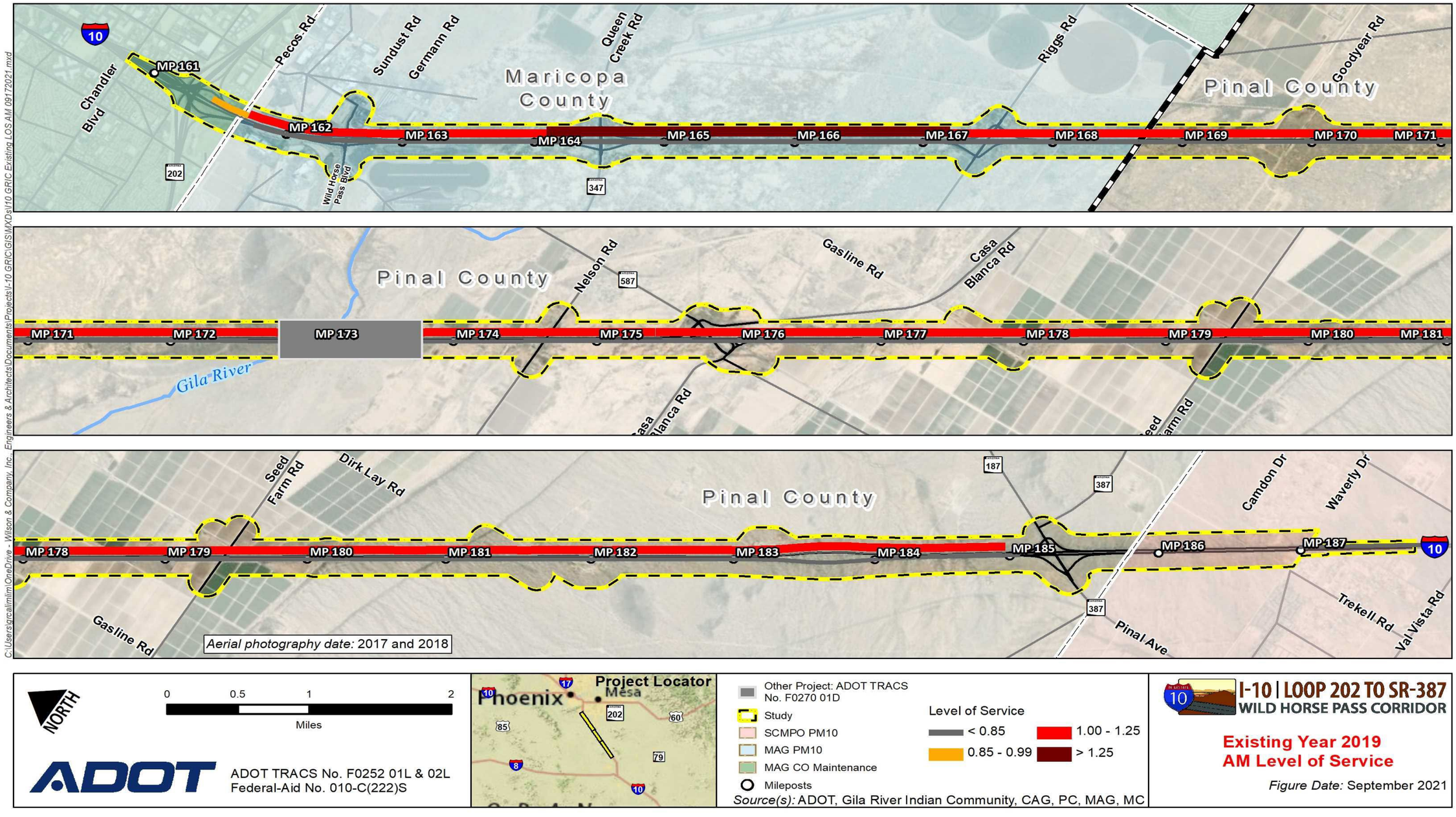


Figure 2-5. Existing year 2019 AM level of service

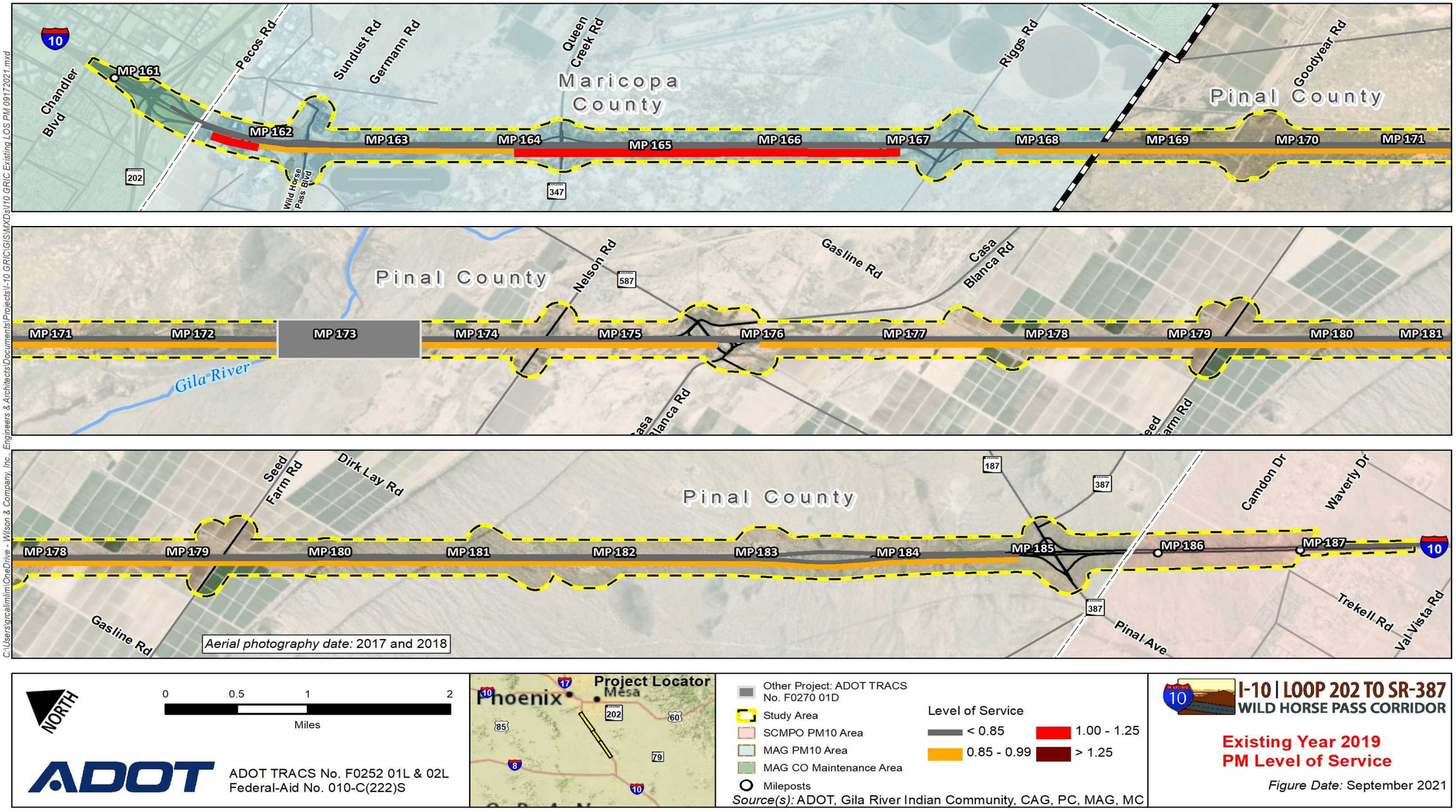


Figure 2-6. Existing year 2019 PM level of service

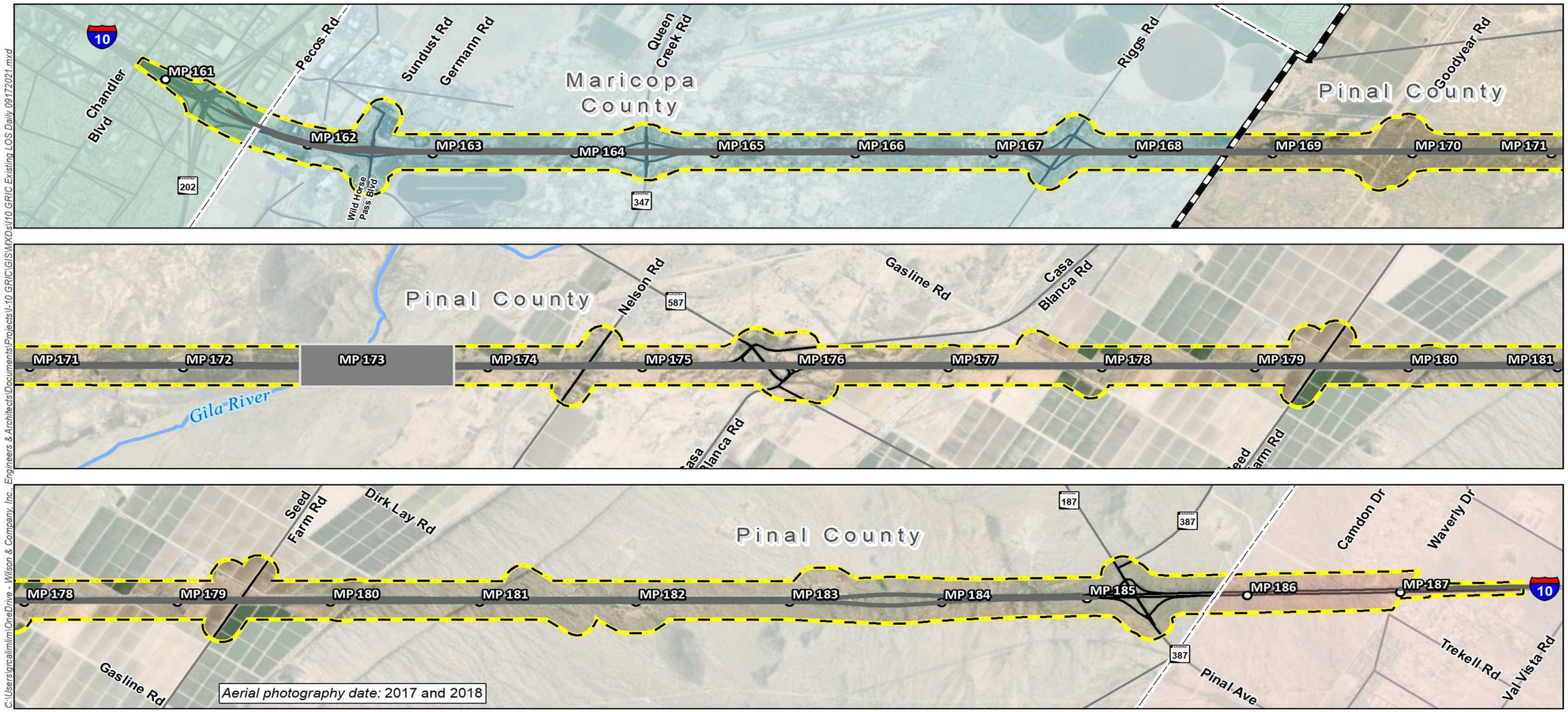


Figure 2-7. Existing year 2019 daily level of service

2.4 Forecast Year 2040 Traffic Conditions

This section provides detailed information on the future traffic volume forecasts for 2040, the 2040 No-Build Alternative operational analysis, and observations related to network deficiencies from the 2040 No-Build operational analysis.

2.4.1 Year 2040 Future Traffic Volumes

The traffic forecasts along I-10 in 2040 are based on the MAG 2040 TDM, officially adopted in June 2021. The volumes projected in the 2040 TDM were used to represent the future travel demand for all of the alternatives' operational analyses associated with 2040, including both the Build and No-Build alternatives. The forecast bidirectional daily traffic volumes in 2040 are shown in Figure 2-8. Like the existing 2019 condition, traffic volumes are anticipated to be heaviest at the northern end of the corridor, specifically north of SR 347/Queen Creek Road. North of this TI, the traffic volume is forecast between 171,000 and 198,000 vpd. This equates to an increase of 64,000 to 74,000 vpd over the 2019 conditions. Traffic volumes through the remainder of the corridor are forecast to increase to 134,000 to 152,000 vpd by 2040, representing an increase of approximately 69,000 to 82,000 vpd from 2019 traffic. The daily traffic volumes for 2040 are presented in Table 2-5, broken down by segment, directional distribution, and peak period.

Table 2-5. Year 2040 No-Build peak period traffic volumes (vehicles)

Segment	AM		PM	
	WB/NB	EB/SB	WB/NB	EB/SB
SR 202L to Wild Horse Pass Boulevard	25,200	11,900	17,900	31,000
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	23,500	9,300	14,900	28,800
SR 347/Queen Creek Road to Riggs Road	20,200	9,500	14,000	23,000
Riggs Road to SR 587/Casa Blanca Road	18,300	8,700	11,800	20,100
SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue	19,200	9,300	12,500	21,700

2.4.2 Year 2040 Future No-Build Travel Speed

Travel time and delay associated with the No-Build Alternative were estimated using data from the MAG TDM. The process involved modeling a network scenario representing the transportation system and socioeconomic projections anticipated in 2040, but without any improvements to the I-10 main line in the study area. To accomplish this, the scenario was modeled using the existing 2019 roadway capacities for the I-10 main line to accurately assess travel times associated with 2040 traffic with no improvements to the I-10 main line.

Figures 2-9 and 2-10 illustrate the forecast 2040 average speed along the I-10 main line during the AM and PM peak periods, respectively.

Future Year 2040 AM No-Build Alternative: Figure 2-9 depicts the estimated average speed during the morning commute, traveling in the westbound/northbound direction, indicating speeds generally less than 35 mph until just south of the SR 202L system TI, where speeds increase to 35 to 45 mph. Motorists are expected to experience average travel speeds in the eastbound/southbound direction of more than 60 mph throughout the corridor.

Future Year 2040 PM No-Build Alternative: Figure 2-10 depicts average speeds generally less than 35 mph during the evening commute, traveling in the eastbound/southbound direction, except near Wild Horse Pass Boulevard, where speeds incrementally increase to 35 to 45 mph. Travel speeds for westbound/northbound segments during the evening commute are estimated between 45 and 60 mph. Exceptions include segments from SR 587/Casa Blanca Road to just north of the Riggs Road TI and almost the entire segment just north of SR 347/Queen Creek Road to the I-10 and SR 202L system TI. The average speed in these two I-10 segments is estimated to be greater than 60 mph.

Travel times were computed using the speed data from the MAG TDM for roadway segments between each of the six TIs and aggregated to provide total travel time for trips traversing the entire length of the study area during peak periods. The peak period travel times were then compared to travel times at free-flow speeds (using posted speed limit data) to approximate the delay associated with peak period travel. Table 2-6 presents the travel time delay associated with the 2040 No-Build Alternative.

Table 2-6. Year 2040 No-Build travel time delay (minutes)

Segment	AM delay		PM delay	
	WB/NB	EB/SB	WB/NB	EB/SB
SR 202L to Wild Horse Pass Boulevard	0.8	0.0	0.0	0.9
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	2.6	0.0	0.0	2.6
SR 347/Queen Creek Road to Riggs Road	9.8	0.5	1.1	5.1
Riggs Road to SR 587/Casa Blanca Road	20.3	0.9	1.4	10.4
SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue	28.4	1.1	2.1	15.4
Total corridor delay	**61.9**	**2.5**	**4.6**	**34.3**

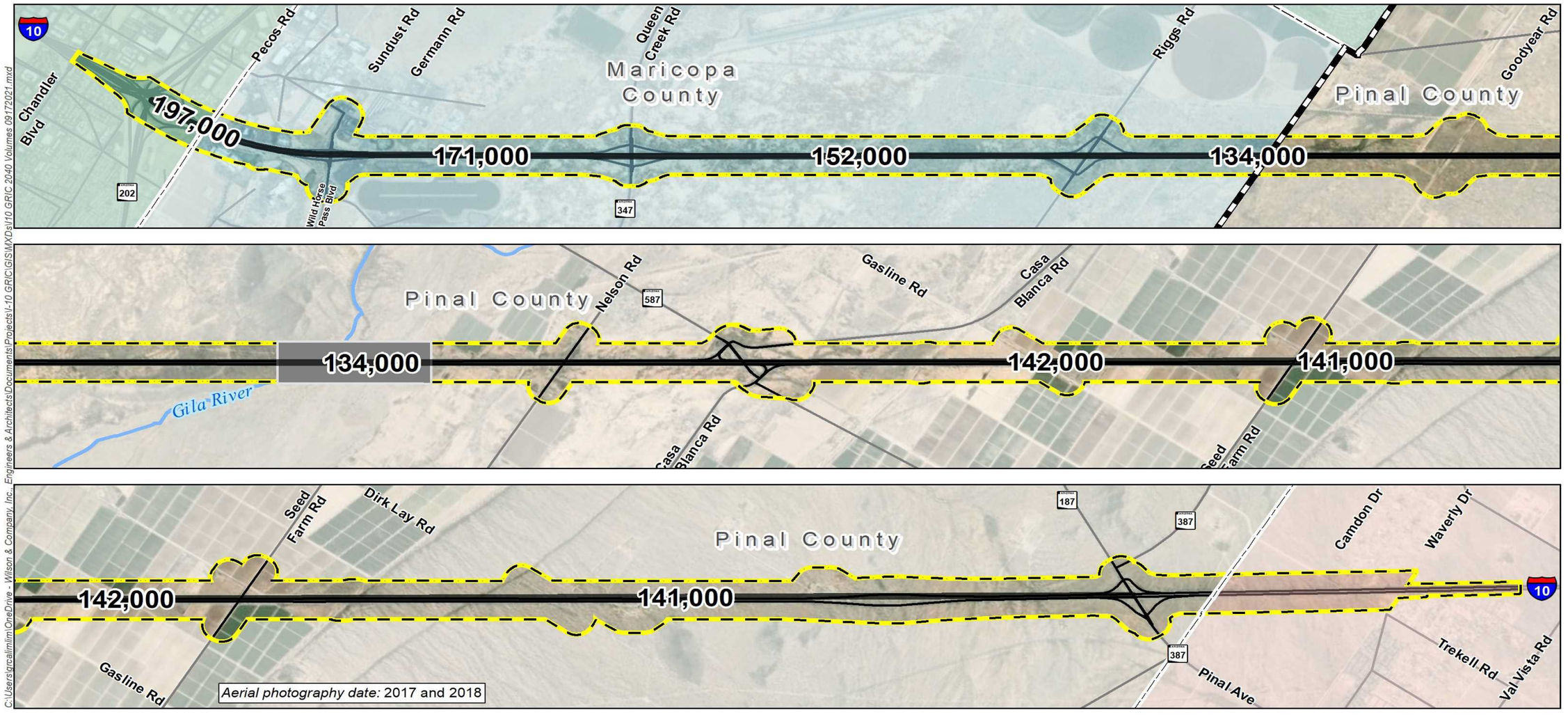


Figure 2-8. Year 2040 No-Build Alternative average daily traffic volumes

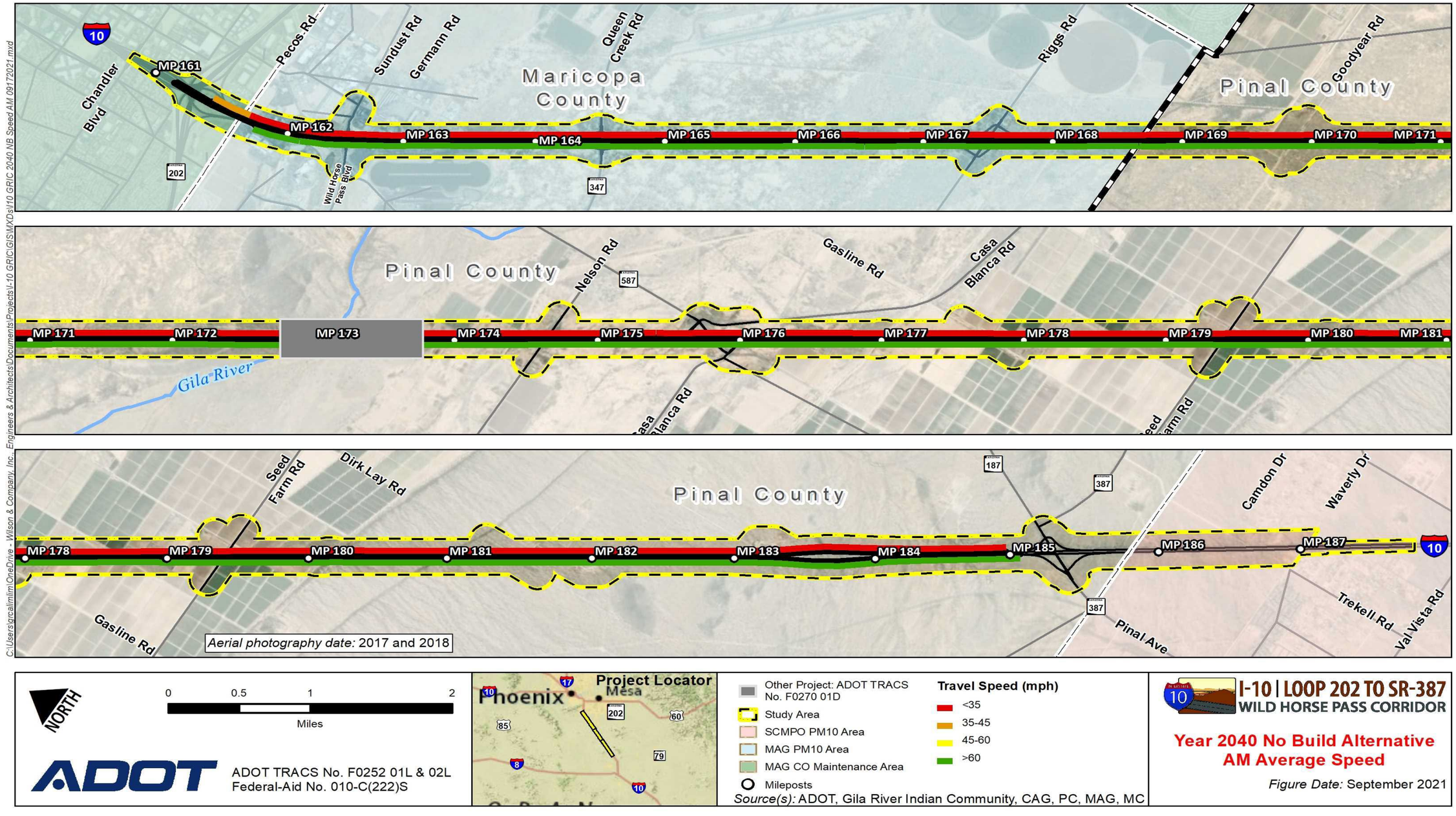


Figure 2-9. Year 2040 No-Build Alternative AM peak-hour average speed

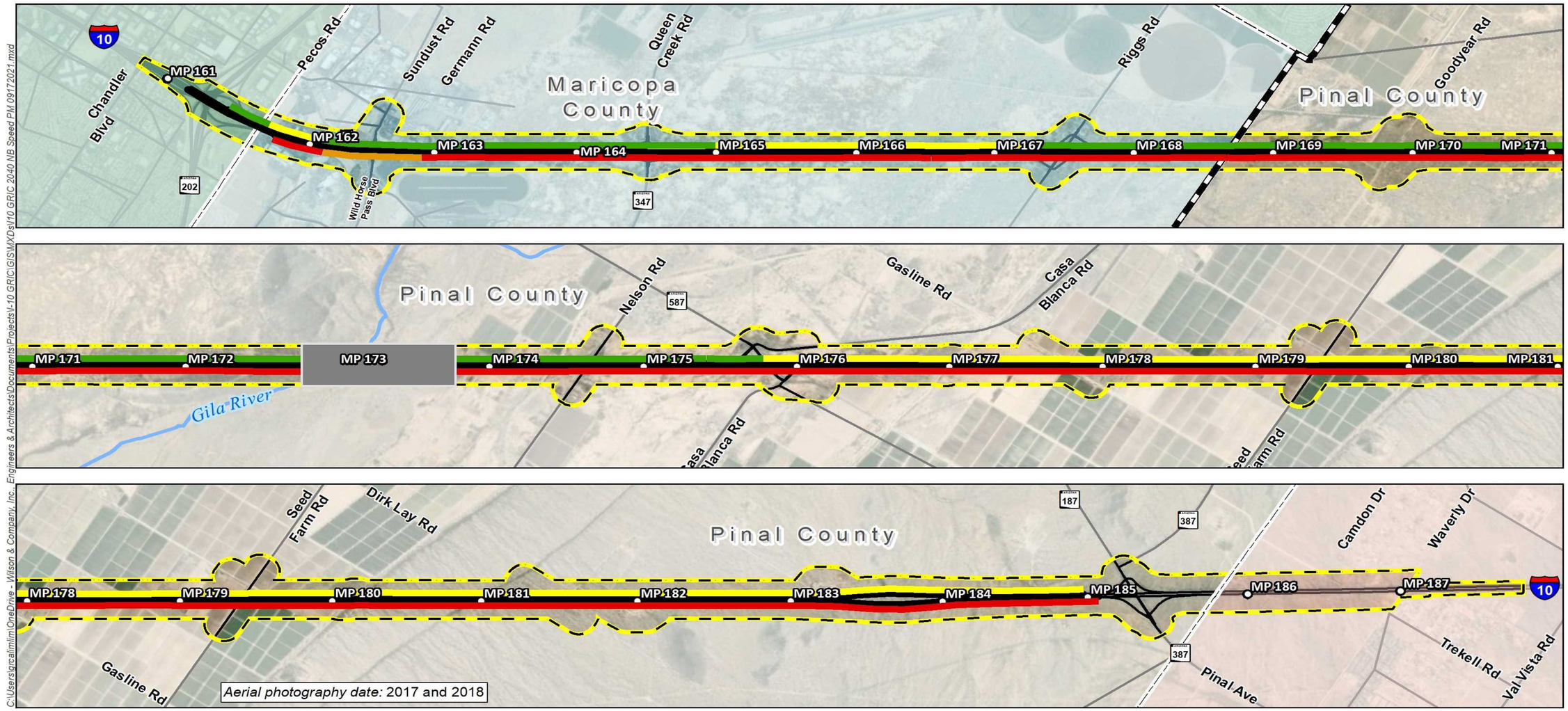


Figure 2-10. Year 2040 No-Build Alternative PM peak-hour average speed

2.4.3 Year 2040 No-Build Level of Service

To understand the performance of the I-10 main line under No-Build conditions in 2040, the travel demand forecast volumes were applied against the existing roadway capacity to generate a No-Build Alternative v/c ratio and corresponding LOS rating. Table 2-7 presents the LOS results for the various corridor segments for the 2040 No-Build Alternative. LOS ratings and v/c ratio values are presented for both the AM and PM peak periods. The results indicate that the I-10 main line is anticipated to operate over capacity (LOS F) through the entire length of the study area during both the morning and evening commutes under 2040 No-Build conditions.

Table 2-7. Year 2040 No-Build Alternative level of service: AM and PM peak hours

Interstate 10 analysis segments	AM peak-hour morning commute		PM peak-hour evening commute	
	LOS (WB/NB)	v/c	LOS (EB/SB)	v/c
SR 202L to Wild Horse Pass Boulevard	F	1.64	F	1.46
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	F	1.63	F	1.45
SR 347/Queen Creek Road to Riggs Road	F	2.10	F	1.74
Riggs Road to SR 587/Casa Blanca Road	F	1.90	F	1.52
SR 587/Casa Blanca Road to Seed Farm Road	F	1.99	F	1.63
Seed Farm Road to SR 387/SR 187/Pinal Avenue	F	1.99	F	1.63

The following figures depict the LOS results for the I-10 main line.

Figure 2-11 reveals that during the AM peak hour, the corridor is expected to operate at LOS F with an estimated v/c greater than 1.25 for the westbound/northbound direction.

Figure 2-12 shows that during the PM peak hour, most of the corridor is expected to operate at LOS F in the eastbound/southbound direction, the majority of which is expected to operate with an estimated v/c greater than 1.25, representing serious operational failure. Also, it is worth noting is that the “reverse commute” westbound/ northbound direction between Riggs Road and SR 347/Queen Creek Road also operates poorly at LOS F (v/c between 1.00 and 1.25).

Figure 2-13 demonstrates that LOS F dominates the overall operating condition in the corridor throughout the day. This means the I-10 main line will be operating over capacity in the study area in 2040 for many hours of the day, meaning travel speed will be uniformly reduced. While both directions operate at LOS F, the eastbound/southbound direction of travel does have more segments with v/c over 1.25.

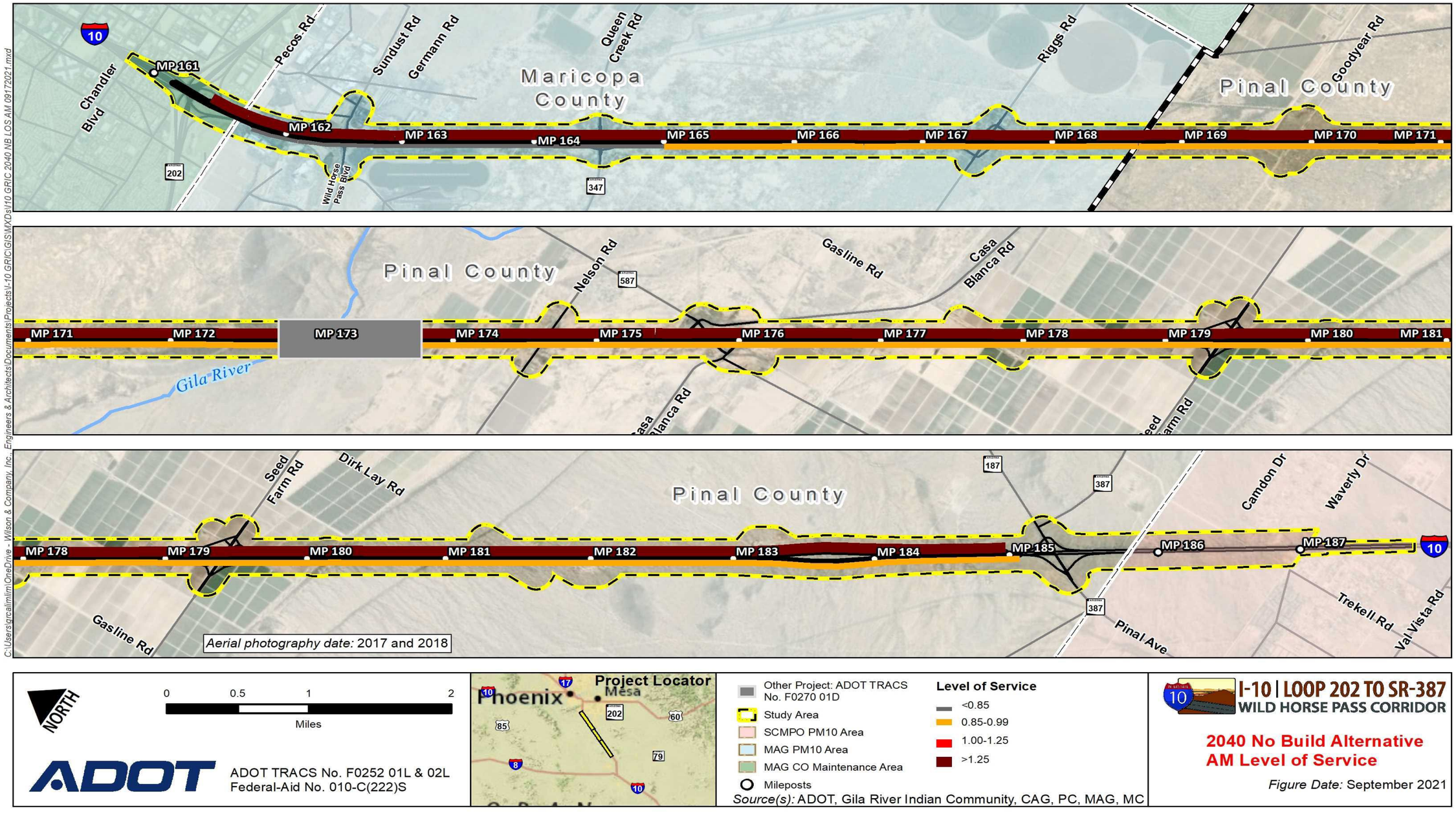


Figure 2-11. Year 2040 No-Build Alternative AM peak hour level of service

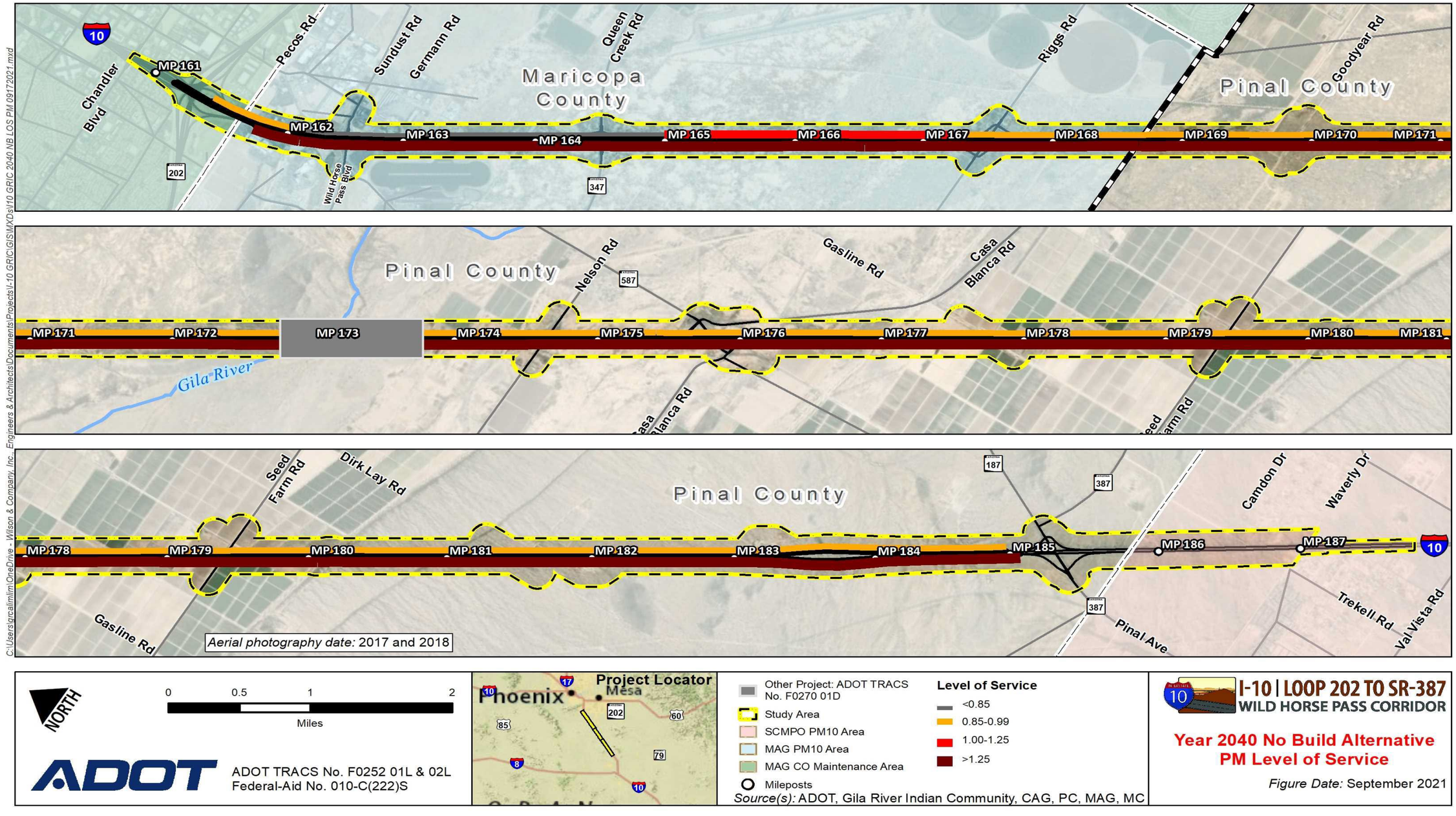


Figure 2-12. Year 2040 No-Build Alternative PM peak hour level of service

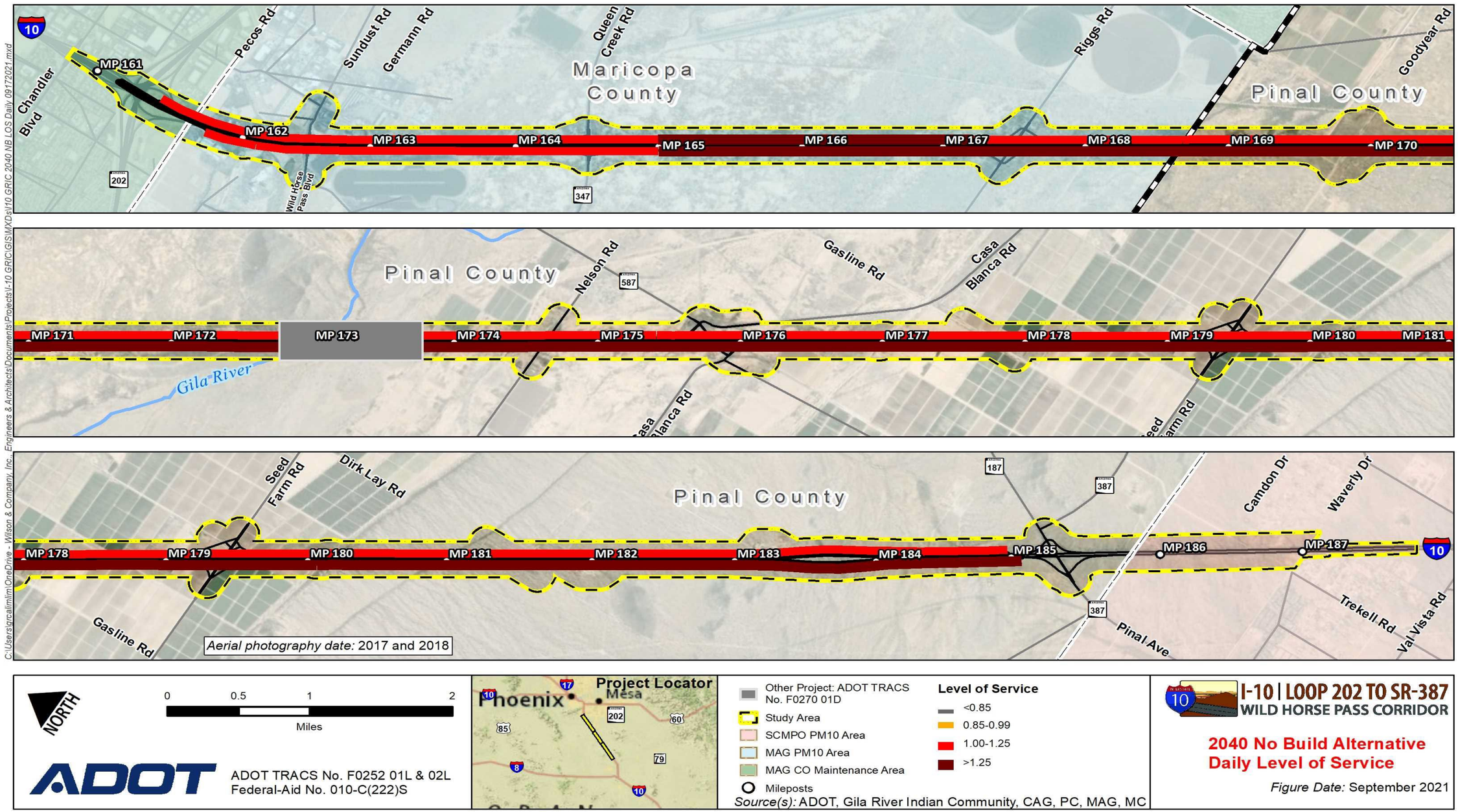


Figure 2-13. Year 2040 No-Build Alternative daily level of service

2.5 Forecast Year 2050 No-Build Alternative Traffic Conditions

This section provides detailed information on the future traffic volume forecasts for 2050, the 2050 No-Build Alternative operational analysis, and observations related to network deficiencies from the 2050 No-Build operational analysis.

2.5.1 Year 2050 No-Build Alternative Future Traffic Volumes

The traffic forecasts along I-10 in 2050 are based on the MAG 2050 TDM, officially adopted in October 2021. The forecast bidirectional daily traffic volumes in 2050 are shown in Figure 2-14. Like the existing 2019 condition, traffic volumes are anticipated to be heaviest at the northern end of the corridor, specifically north of SR 347/Queen Creek Road. North of this TI, the traffic volume is forecast between 157,000 and 193,000 vpd. This equates to an increase of 50,000 to 69,000 vpd over the 2019 conditions. Traffic volumes through the remainder of the corridor are forecast to increase to 131,000 to 141,000 vpd by 2050, representing an increase of approximately 66,000 to 71,000 vpd from 2019 traffic. The daily traffic volumes for the 2050 No-Build Alternative are presented in Table 2-8, broken down by segment, directional distribution, and peak period. The 2050 No-Build traffic in the peak direction of travel in the AM (WB/NB) and PM (EB/SB) are actually lower than those in the 2040 No-Build condition. This is likely the combined effect of the increase in employment opportunities in Pinal County in 2050 as well as improvements to other regional roadway corridors.

Table 2-8. Year 2050 No-Build peak period traffic volumes (vehicles)

Interstate 10 analysis segment	AM volumes		PM volumes	
	WB/NB	EB/SB	WB/NB	EB/SB
SR 202L to Wild Horse Pass Boulevard	21,500	14,000	20,000	28,100
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	18,700	10,900	15,100	24,200
SR 347/Queen Creek Road to Riggs Road	15,700	10,600	14,400	20,100
Riggs Road to SR 587/Casa Blanca Road	15,600	10,000	12,900	18,400
SR 587/Casa Blanca Road to Seed Farm Road	16,900	10,600	13,500	19,900
Seed Farm Road to SR 387/SR 187/Pinal Avenue	16,900	10,600	13,500	19,900

2.5.2 Year 2050 Future No-Build Travel Speed

Travel time and delay associated with the No-Build Alternative were estimated using data from the MAG TDM. The process involved modeling a network scenario representing the transportation system and socioeconomic projections anticipated in 2050, but without any improvements to the I-10 main line in the study area. To accomplish this, the scenario was modeled using the existing 2019 capacities for the I-10 main line to assess travel times associated with 2050 traffic with no improvements to the I-10 main line.

Figures 2-15 and 2-16 illustrate the forecast 2050 average speed along the I-10 main line during the AM and PM peak periods, respectively.

Future Year 2050 AM No-Build Alternative: Figure 2-15 depicts the estimated average speed during the morning commute, traveling in the westbound/northbound direction, indicating speeds are less than 35 mph except near Wild Horse Pass Boulevard, where speeds increase from 35 to 45 mph. In the eastbound/southbound direction, motorists are expected to experience an average travel speed between 45 and 60 mph until near the SR 347/Queen Creek TI, where slower speeds prevail from 35 to 45 mph for the remainder of the corridor.

Future Year 2050 PM No-Build Alternative: Figure 2-16 depicts average speeds generally less than 35 mph during the evening commute, traveling in the eastbound/southbound direction, except near Wild Horse Pass Boulevard, where speeds are incrementally higher ranging from 35 to 45 mph. Travel speeds for westbound/northbound segments during the evening commute are estimated between 35 and 45 mph while the following four areas experience higher than average travel speeds: near the SR 587/Casa Blanca Road TI (45 to 60 mph), north of SR 347/Queen Creek Road to the Wild Horse Pass Boulevard TI (45 to 60 mph), span of the Wild Horse Pass Boulevard TI (over 60 mph), and the segment between Wild Horse Pass Boulevard and SR 202L (45 to 60 mph).

Travel times were computed using the speed data from the MAG TDM for roadway segments between each of the six TIs and aggregated to provide total travel time for trips traversing the entire length of the study area during peak periods. The peak period travel times were then compared to travel times at free-flow speeds (using posted speed limit data) to approximate the delay associated with peak period travel. Table 2-9 presents the travel time delay associated with the 2050 No-Build Alternative.

Table 2-9. Year 2050 No-Build travel time delay (minutes)

Interstate 10 analysis segment	AM delay		PM delay	
	WB/NB	EB/SB	WB/NB	EB/SB
SR 202L to Wild Horse Pass Boulevard	1.5	0.2	0.3	1.1
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	5.6	0.2	0.7	1.8
SR 347/Queen Creek Road to Riggs Road	9.5	2.4	2.4	7.1
Riggs Road to SR 587/Casa Blanca Road	25.9	6.2	4.7	16.1
SR 587/Casa Blanca Road to Seed Farm Road	14.9	3.1	2.4	8.9
Seed Farm Road to SR 387/SR 187/Pinal Avenue	25.5	4.9	4.1	13.9
Total corridor delay	**82.9**	**17.0**	**14.6**	**48.9**

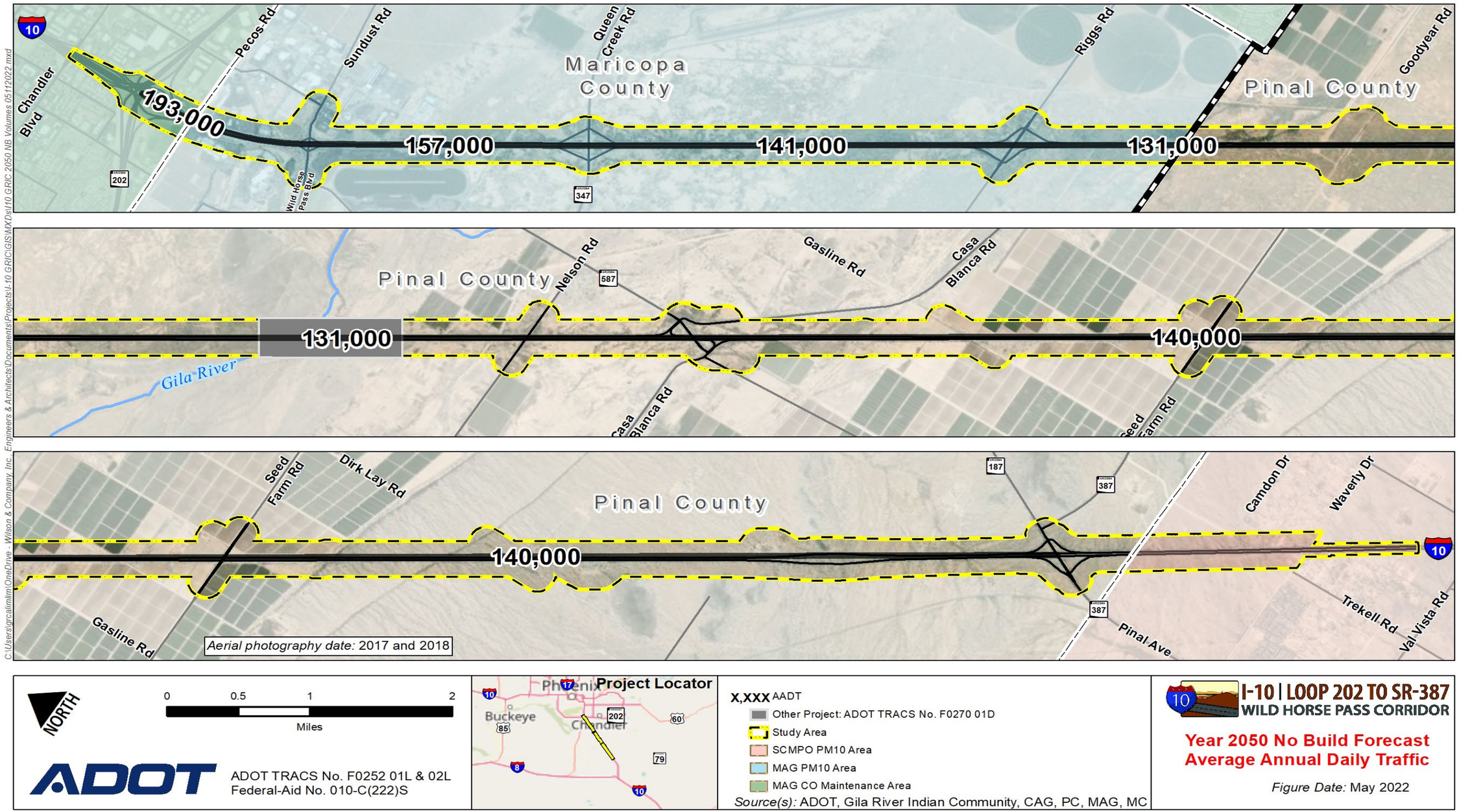


Figure 2-14. Year 2050 No-Build Alternative average daily traffic volumes

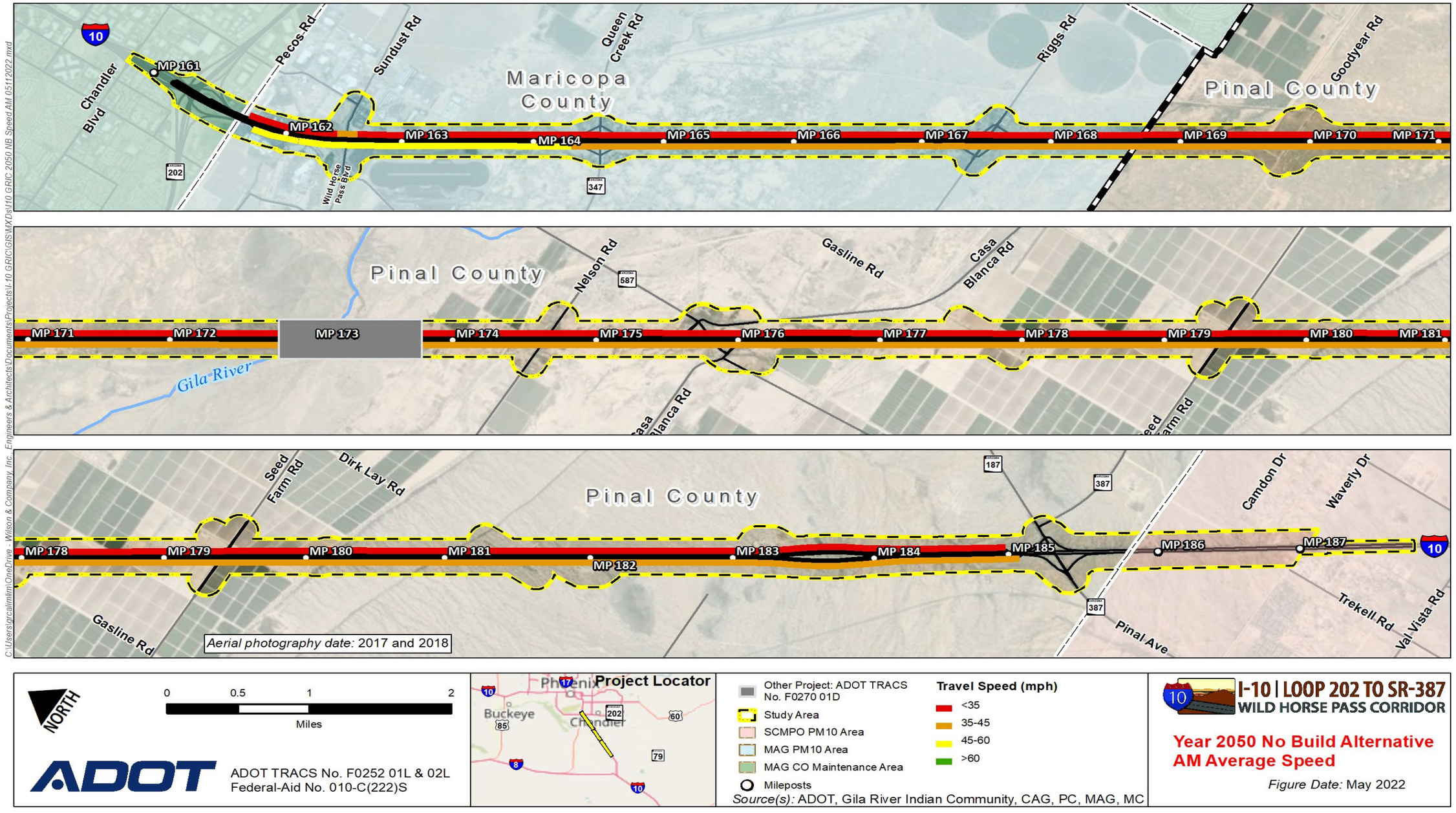


Figure 2-15. Year 2050 No-Build Alternative AM peak-hour average speed

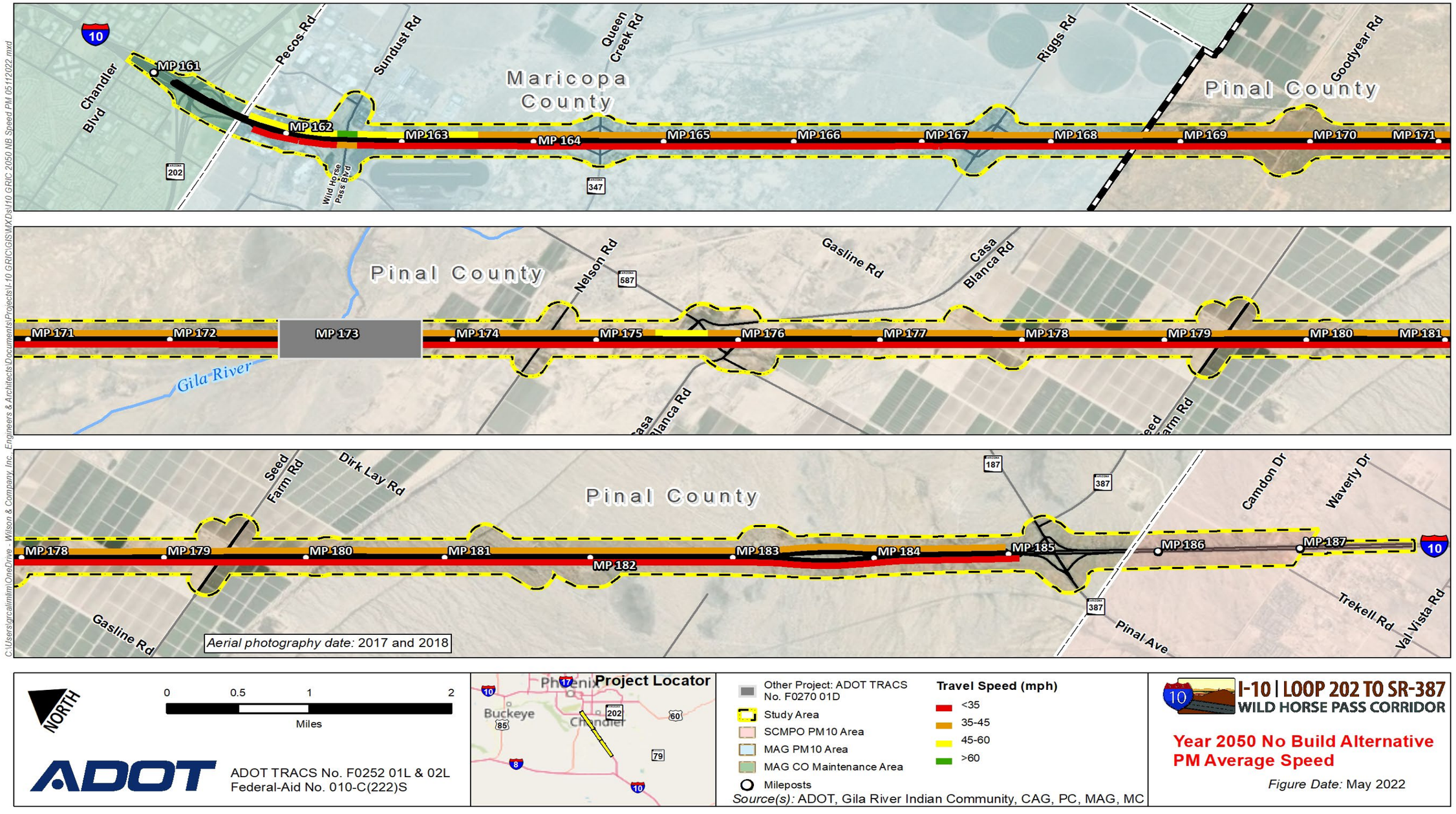


Figure 2-16. Year 2050 No-Build Alternative PM peak-hour average speed

2.5.3 Year 2050 No-Build Level of Service

To understand the performance of the I-10 main line under No-Build conditions in 2050, the travel demand forecast volumes were applied against the existing roadway capacity to generate a No-Build Alternative v/c ratio and corresponding LOS rating. Table 2-10 presents the LOS results for the various corridor segments for the 2050 No-Build Alternative. LOS ratings and v/c ratio values are presented for both the AM and PM peak periods. The results indicate that the I-10 main line is anticipated to operate over capacity (LOS F) through the entire length of the study area during both the morning and evening commutes under 2050 No-Build conditions.

Table 2-10. Year 2050 No-Build Alternative level of service: AM and PM peak hours

Interstate 10 analysis segment	AM peak-hour morning commute		PM peak-hour evening commute	
	LOS (WB/NB)	v/c	LOS (EB/SB)	v/c
SR 202L to Wild Horse Pass Boulevard	F	1.40	F	1.33
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	F	1.95	F	1.22
SR 347/Queen Creek Road to Riggs Road	F	1.64	F	1.51
Riggs Road to SR 587/Casa Blanca Road	F	1.63	F	1.38
SR 587/Casa Blanca Road to Seed Farm Road	F	1.75	F	1.50
Seed Farm Road to SR 387/SR 187/Pinal Avenue	F	1.75	F	1.50

The following figures depict the LOS results for the I-10 main line.

Figure 2-17 reveals that during the AM peak hour, the corridor is expected to operate at LOS F with an estimated v/c greater than 1.25 for the westbound/northbound direction. In addition, the eastbound/southbound direction is expected to operate at LOS F (v/c ratio between 1.00 and 1.25) for the greater length of the corridor with a few exceptions in proximity to ramps, particularly between the Wild Horse Pass Boulevard and SR 347/Queen Creek Road TIs.

Figure 2-18 shows that during the PM peak hour, the corridor is expected to operate at LOS F in the eastbound/southbound direction, the majority of which is expected to operate with an estimated v/c greater than 1.25, representing serious operational failure. One exception in the eastbound/southbound direction is the segment between Wild Horse Pass Boulevard and SR 347/Queen Creek Road, where the corridor is still expected to operate at a LOS F but with a lesser v/c ratio between 1.00 and 1.25. Also, it is worth noting that the "reverse commute" westbound/northbound direction for the following segments would operate at LOS F (v/c ratio of 1.00 to 1.25): between SR 387/Pinal Avenue and SR 587/Casa Blanca and between Riggs Road and north of SR 347/Queen Creek Road.

Figure 2-19 demonstrates that LOS F dominates the overall operating condition in the corridor throughout the day with the exception of the segments proximate to on/off ramps at the Wild Horse Pass Boulevard TI in both directions. This means the I-10 main line will be operating over capacity in the study area in 2050 through many hours of the day, meaning travel speed will be uniformly reduced. While both directions operate at LOS F, more segments in the eastbound/southbound direction of travel exhibit larger v/c ratios.

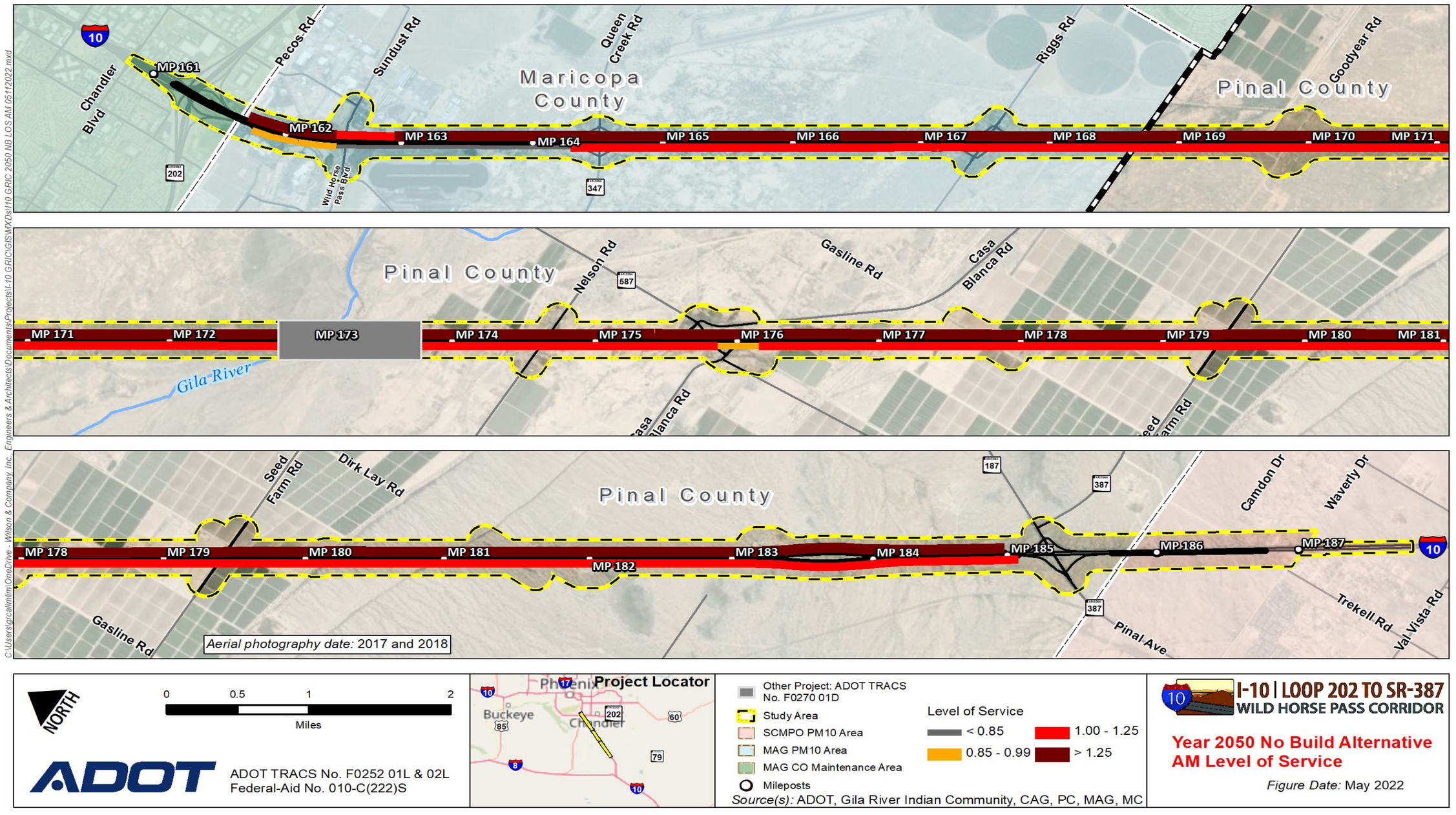


Figure 2-17. Year 2050 No-Build Alternative AM peak hour level of service

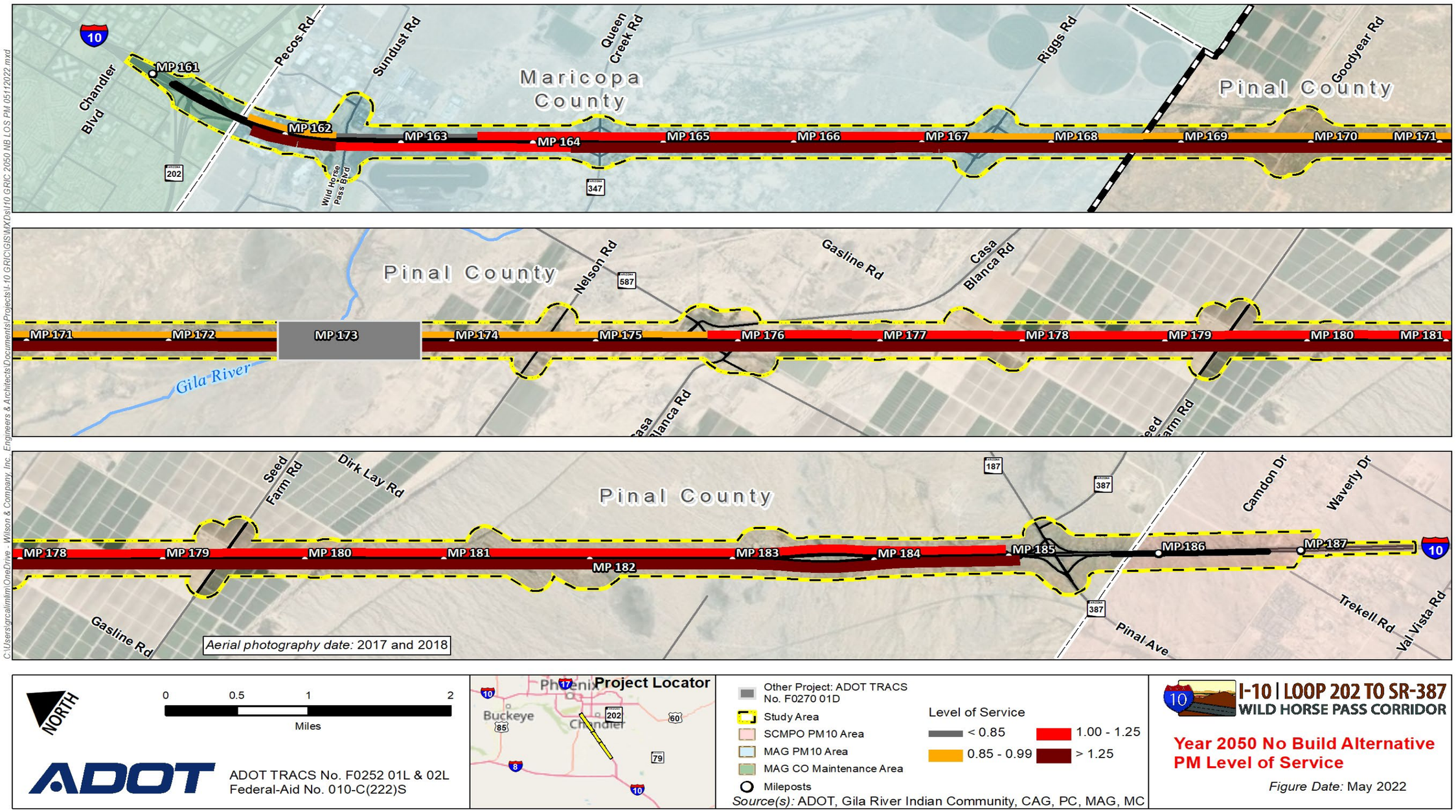


Figure 2-18. Year 2050 No-Build Alternative PM peak hour level of service

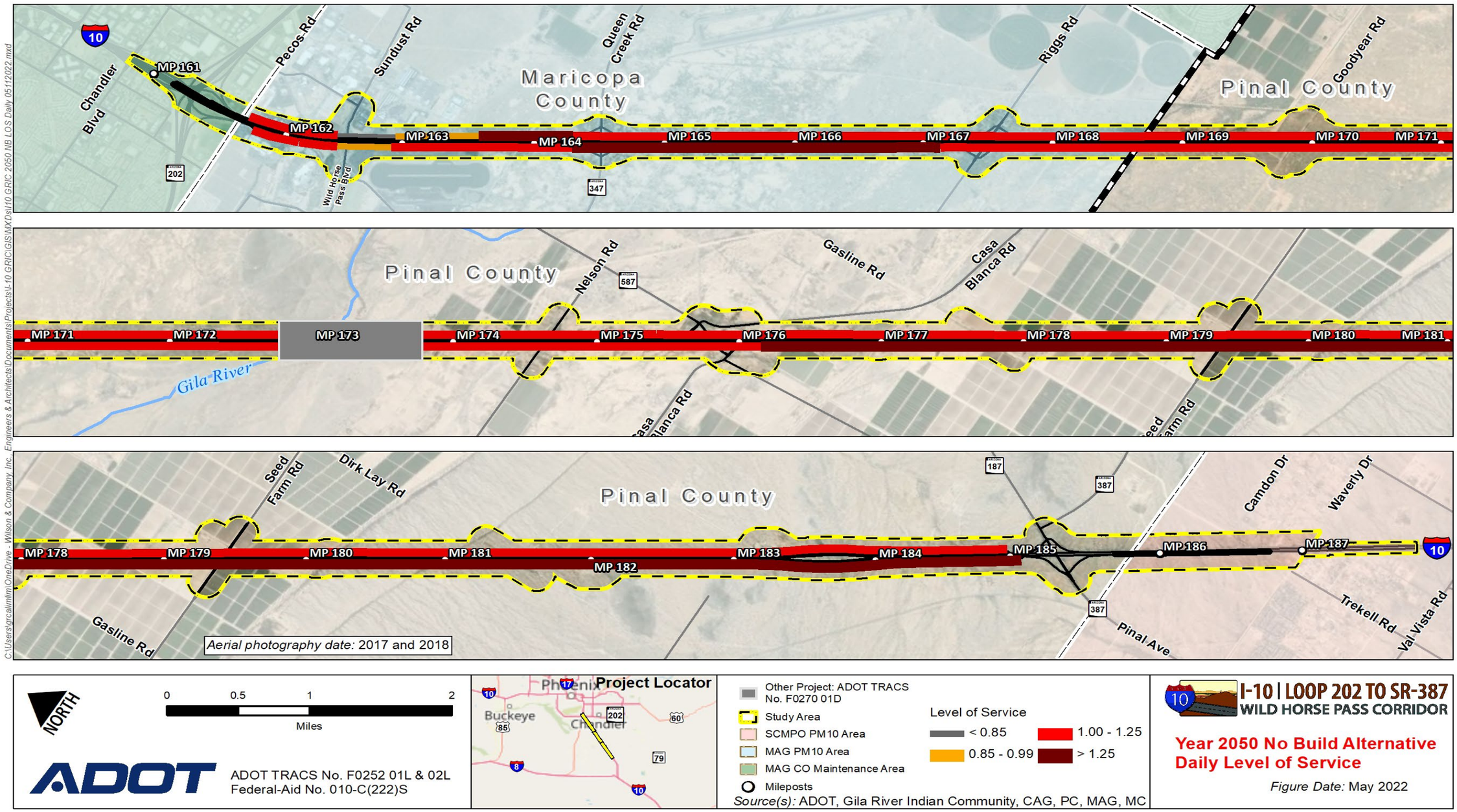


Figure 2-19. Year 2050 No-Build Alternative daily level of service

2.6 2040 Build Alternative

The Build Alternative for I-10 was developed to improve future traffic conditions primarily by increasing capacity along I-10 in the study area. The future I-10 facility associated with either of the I-10 Build Alternatives would encompass three continuous general-purpose lanes in each direction from SR 202L to SR 387/SR 187/Pinal Avenue. Additionally, I-10 north of the Riggs Road TI would include a continuous HOV lane in each direction of travel. These future improvements were incorporated into the MAG 2040 TDM and the resulting outputs were used for analysis of system performance. As described previously, the improvements are not anticipated to result in a notable change in the 2040 travel demand forecast as compared to the No-Build Alternative. However, the additional capacity is anticipated to improve LOS, increase travel speeds, and reduce delays.

2.6.1 2040 Build Alternative Travel Speed

Travel time and delay associated with the Build Alternative were estimated using outputs from the MAG TDM. Figures 2-20 and 2-21 list the anticipated 2040 average speed associated with the Build Alternative along the I-10 main line during the AM and PM peak periods, respectively.

Future Year 2040 AM Build Alternative: Figure 2-20 depicts the estimated average speed during the morning peak period. Traveling in the westbound/northbound commute direction, most of the corridor will exhibit speeds less than 35 mph, except under the SR 347/Queen Creek Road TI, where speeds temporarily increase to 35 to 45 mph. Travel speeds in the eastbound/southbound direction consistently average 60 mph or more throughout the corridor.

Future Year 2040 PM Build Alternative: Figure 2-21 depicts the estimated travel speed during the evening peak period. Traveling in the eastbound/southbound direction, speeds are consistently between 35 and 45 mph south of Riggs Road. Between SR 202L and Riggs Road, the speeds vary between less than 35 mph to more than 60 mph depending on location. Travel speeds for the westbound/northbound direction during the evening commute are generally greater than 60 mph, except for some segments north of the SR 347/Queen Creek Road TI, where they decrease to 45 to 60 mph.

There are notable improvements in traffic speeds during the evening commute in both directions compared to the 2040 No-Build Alternative. However, improvements in the morning commute speeds will be less noticeable. These results indicate that additional I-10 capacity beyond the scope of this study may eventually be required and could be addressed in future studies, as appropriate.

Travel time delay was computed using the same methodology described in Sections 2.3 and 2.4. Table 2-11 presents the travel time delay associated with the 2040 Build Alternative and the No-Build Alternative, for comparison. Based on the travel time delays presented, the Build Alternative in 2040 saves an estimated 28.9 minutes (61.9–33.0) during the morning commute and 17.3 minutes (34.3–17.0) during the evening commute when driving the length of the corridor between SR 202L and SR 387/SR 187/Pinal Avenue. Table 2-11 shows a marginal increase in delay in the AM EB/SB direction of approximately 30 seconds between the No-Build and Build Alternatives, which would not be notable when driving the entire length of the corridor.

Table 2-11. Comparison of year 2040 No-Build and Build Alternative travel time delay (minutes)

Segment	AM delay				PM delay			
	WB/NB		EB/SB		WB/NB		EB/SB	
	No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
SR 202L to Wild Horse Pass Boulevard	0.8	0.9	0.0	0.0	0.0	0.1	0.9	0.9
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	2.6	2.7	0.0	0.1	0.0	0.1	2.6	1.6
SR 347/Queen Creek Road to Riggs Road	9.8	3.0	0.5	0.5	1.1	0.5	5.1	1.8
Riggs Road to SR 587/ Casa Blanca Road	20.3	11.2	0.9	1.1	1.4	1.1	10.4	5.3
SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue	28.4	15.2	1.1	1.4	2.1	1.4	15.4	7.3
Total corridor delay	**61.9**	**33.0**	**2.5**	**3.1**	**4.6**	**3.2**	**34.4**	**16.9**

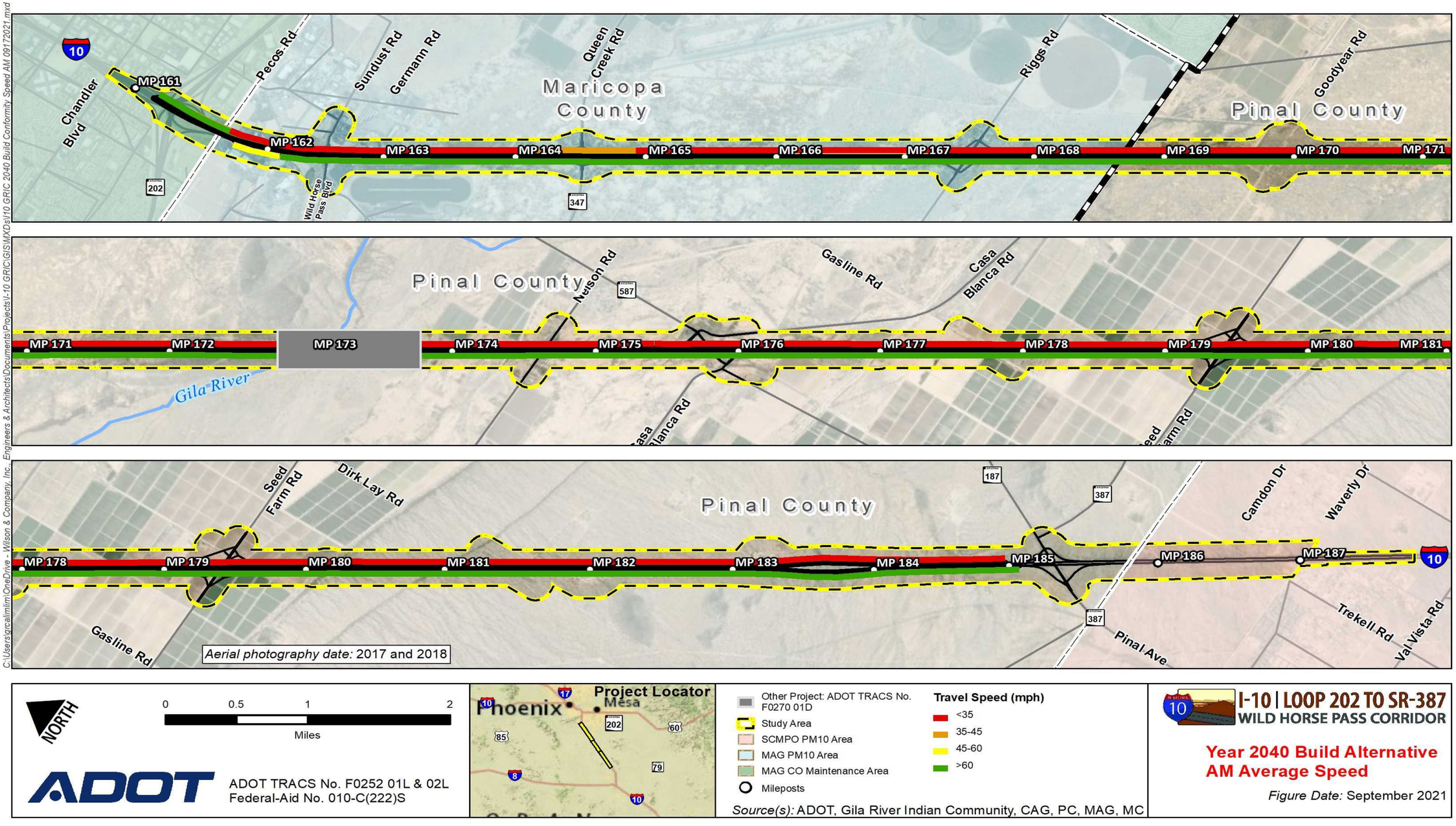


Figure 2-20. Year 2040 Build Alternative AM average speed

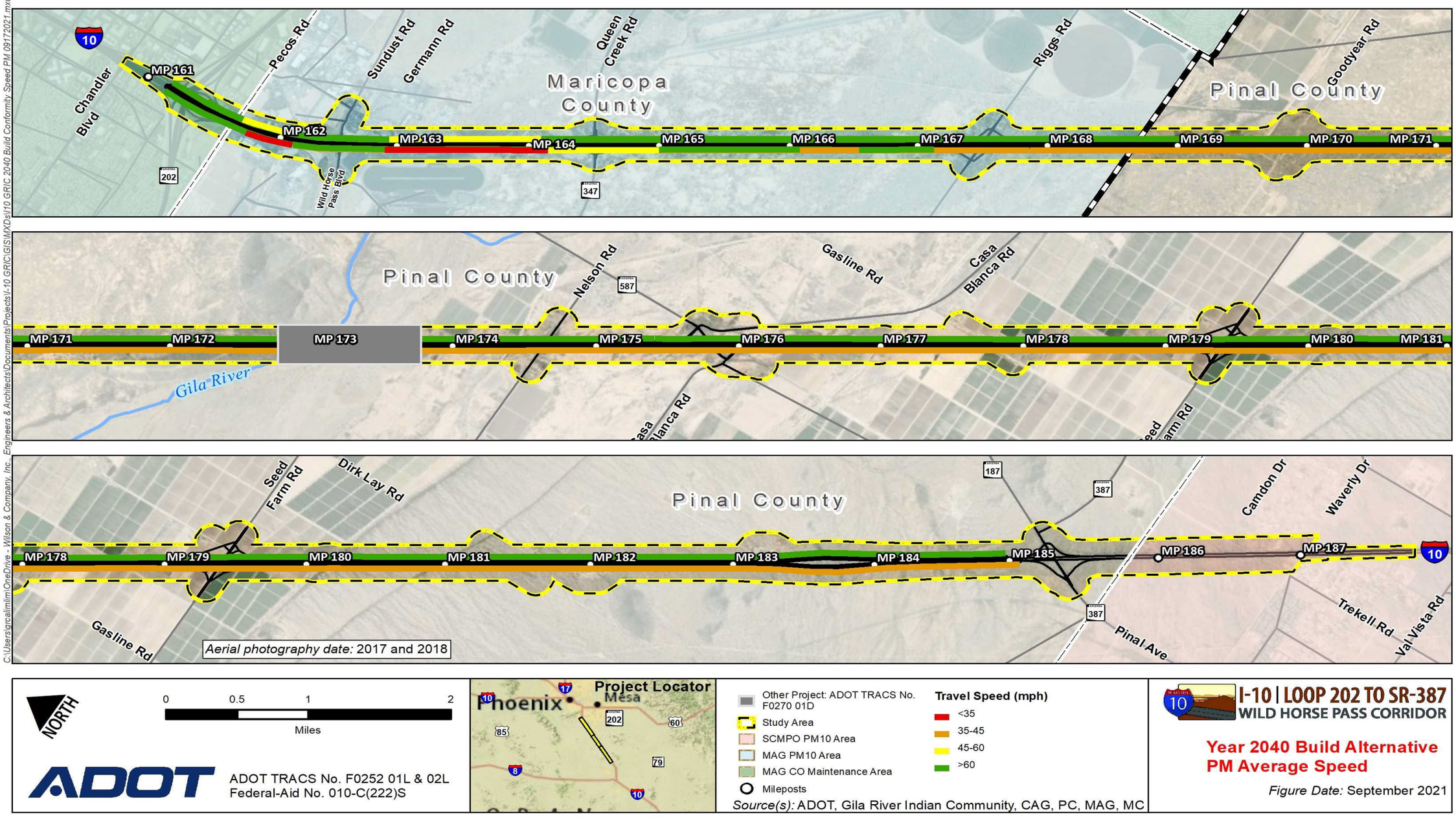


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Figure 2-21. Year 2040 Build Alternative PM average speed

2.6.2 2040 Build Alternative Level of Service

Performance of the I-10 main line for the Build Alternative was assessed using volume and capacity outputs generated by the MAG TDM. Resulting LOS ratings and v/c ratio values are presented for both the AM and PM peak periods in Table 2-12. Results indicate the general purpose lanes of the I-10 main line are anticipated to operate over capacity with an LOS F rating during both the morning and evening commutes under 2040 Build Alternative conditions. The HOV lanes of the I-10 main line are anticipated to all operate with an acceptable LOS C or better for all the segments with HOV lanes.

Although the v/c ratios decreased from the No-Build Alternative, the volume of traffic on the I-10 main line in the study area is still projected to exceed capacity of the Build Alternative in 2040.

Table 2-12. Year 2040 Build Alternative level of service: AM and PM peak hours

Interstate 10 analysis segments	AM commute		PM commute	
	LOS (WB/NB)	v/c	LOS (EB/SB)	v/c
SR 202L to Wild Horse Pass Boulevard general purpose lanes	F	1.44	F	1.31
SR 202L to Wild Horse Pass Boulevard HOV lane	A	0.49	A	0.38
Wild Horse Pass Boulevard to SR 347/Queen Creek Road general purpose lanes	F	1.34	F	1.23
Wild Horse Pass Boulevard to SR 347/Queen Creek Road HOV lane	C	0.67	A	0.50
SR 347/Queen Creek Road to Riggs Road general purpose lanes	F	1.16	F	1.00
SR 347/Queen Creek Road to Riggs Road HOV lane	B	0.57	A	0.35
Riggs Road to SR 587/Casa Blanca Road	F	1.27	F	1.01
SR 587/Casa Blanca Road to Seed Farm Road	F	1.33	F	1.09
Seed Farm Road to SR 387/SR 187/Pinal Avenue	F	1.33	F	1.09

The following figures show the LOS along the I-10 main line for the 2040 Build Alternative.

Figure 2-22 shows that during the AM peak hour, the westbound/northbound travel direction is expected to operate at LOS F for the entire corridor; a significant portion of the corridor is expected to operate with an estimated v/c greater than 1.25, representing serious operational failure.

Figure 2-23 shows that during the PM peak hour, the eastbound/southbound travel direction is expected to operate at LOS F for the majority of the corridor, except for spot areas around the SR 347/Queen Creek Road and SR 587/Casa Blanca Road TIs where LOS temporarily improves.

Figure 2-24 demonstrates that throughout the day, portions of the corridor in the eastbound/southbound direction operate near capacity, at LOS E, while the westbound/northbound direction is anticipated to have an overall acceptable daily LOS D or better. A higher percentage of westbound/northbound trips along the I-10 main line occurs during the morning commute while the eastbound/southbound trips are distributed more evenly throughout the day.

Figure 2-24's daily v/c demonstrates that the LOS F congestion shown in Figures 2-22 and 2-23 would be limited to a few hours during the peak period of travel as opposed to most of the day as would be the case with the No-Build Alternative as shown in Figure 2-13.

Based on the future travel demand along I-10 within the region, it is estimated that the additional capacity from the Build Alternative will accommodate traffic through most of the corridor with LOS D or better in the evening commute through 2030. The morning commute will, however, experience LOS E and F traffic conditions during opening year 2025 under build conditions.

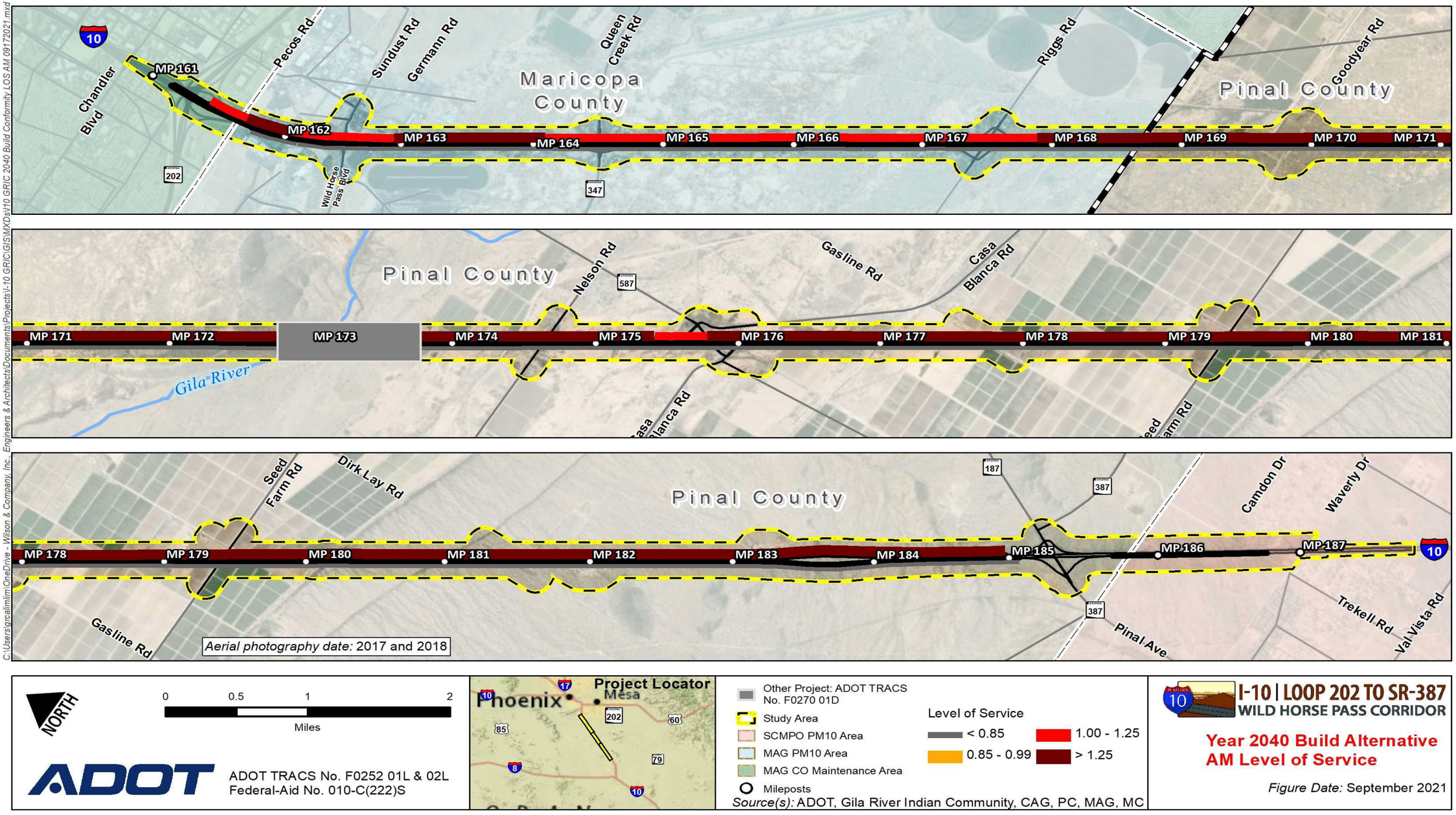

Figure 2-22. Year 2040 Build Alternative AM level of service

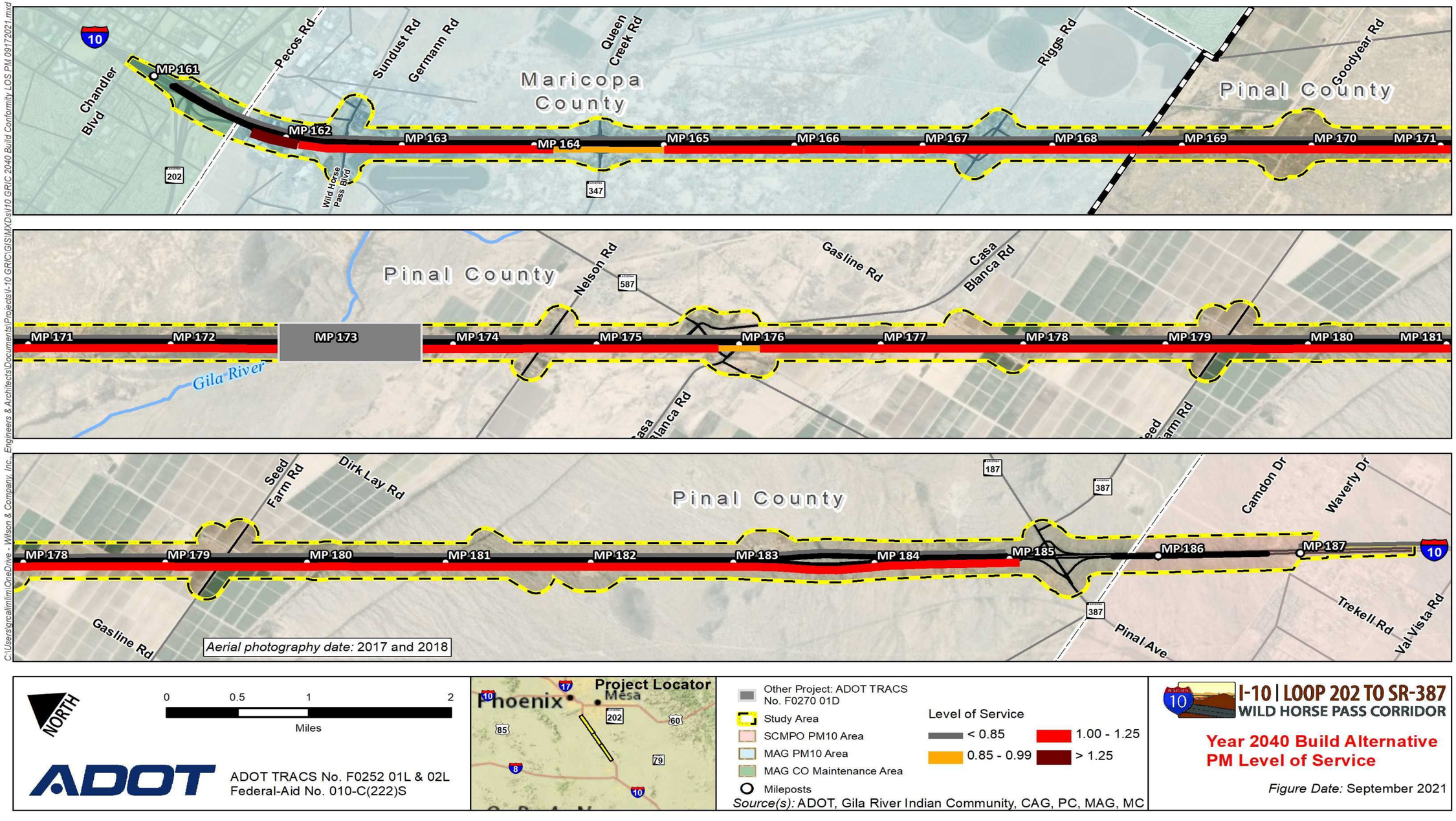

Figure 2-23. Year 2040 Build Alternative PM level of service

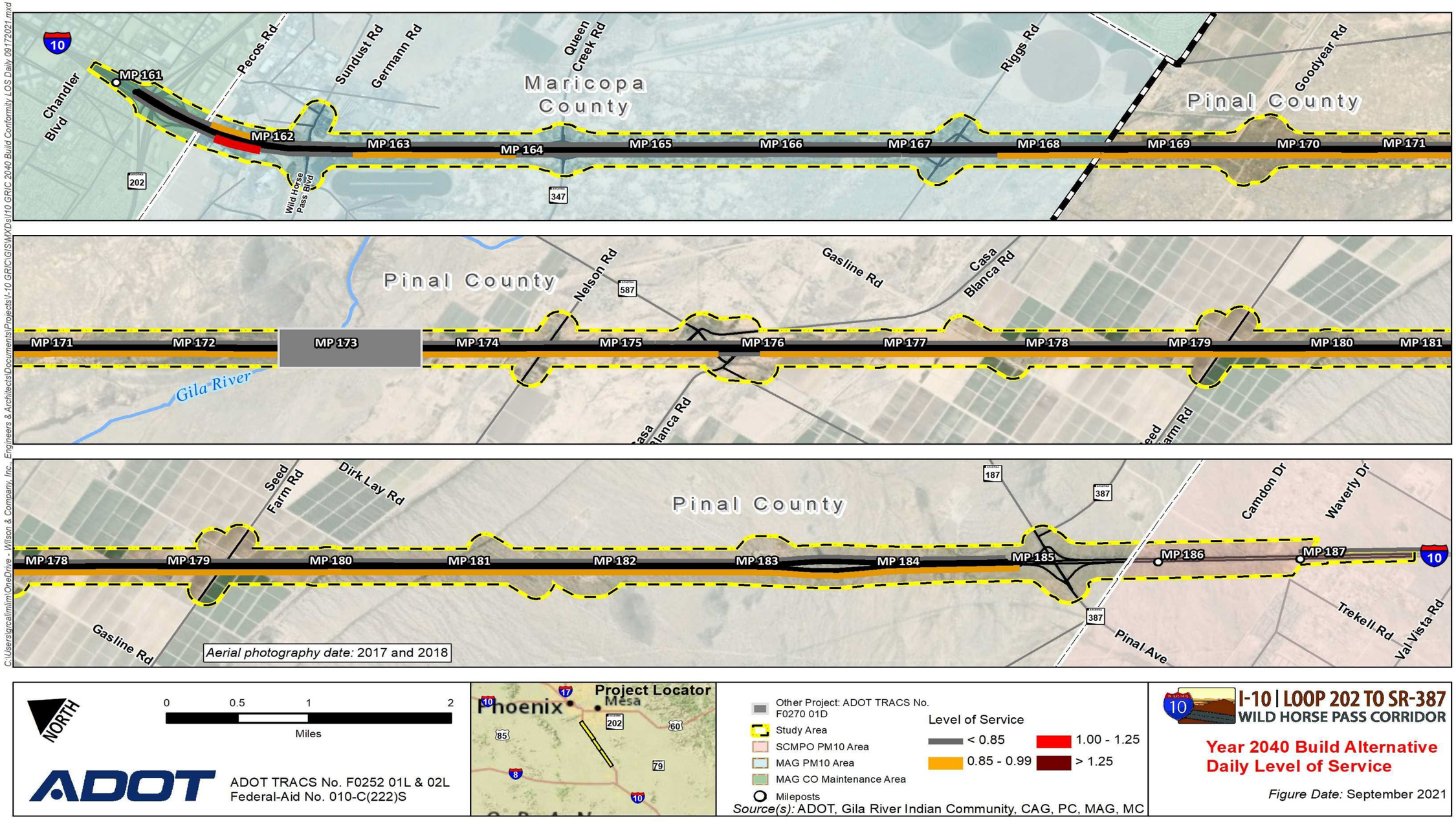

Figure 2-24. Year 2040 Build Alternative daily level of service

2.7 2050 Build Alternative

The Build Alternative for I-10 was developed to improve future traffic conditions primarily by increasing capacity along I-10 in the study area. The future I-10 facility associated with either of the I-10 Build Alternatives would encompass three continuous general purpose lanes in each direction from SR 202L to SR 387/SR 187/Pinal Avenue. Additionally, I-10 north of the Riggs Road TI would include a continuous HOV lane in each direction of travel. These future improvements were incorporated into the MAG 2050 TDM and the resulting outputs were used for analysis of system performance. As described previously, the improvements are not anticipated to result in a notable change in the 2050 travel demand forecast as compared with the No-Build Alternative. However, the additional capacity is anticipated to improve LOS, increase travel speeds, and reduce delays.

2.7.1 Year 2050 Build Alternative Future Traffic Volumes

The traffic forecasts along I-10 in 2050 are based on the MAG 2050 TDM, officially adopted in October 2021 The forecast bidirectional daily traffic volumes in 2050 are shown in Figure 2-25. Like the year 2040, traffic volumes are anticipated to be heaviest at the northern end of the corridor, specifically north of SR 347/Queen Creek Road. North of this TI, the traffic volume is forecast between 198,000 and 224,000 vpd. This equates to an increase of 91,000 to 100,000 vpd from the 2019 conditions. Traffic volumes through the remainder of the corridor are forecast to increase to 163,000 to 180,000 vpd by 2050, representing a 150 and 117 percent increase from 2019 traffic, respectively. The daily traffic volumes for the 2050 Build Alternative are presented in Table 2-13, broken down by segment, directional distribution, and peak period.

Table 2-13. Year 2050 Build traffic volumes (vehicles per day)

Interstate 10 analysis segment	AM		PM	
	WB/NB	EB/SB	WB/NB	EB/SB
SR 202L to Wild Horse Pass Boulevard	26,500	15,400	21,500	33,300
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	26,000	12,600	18,600	31,000
SR 347/Queen Creek Road to Riggs Road	22,500	12,500	17,100	26,300
Riggs Road to SR 587/Casa Blanca Road	20,800	11,700	15,000	23,600
SR 587/Casa Blanca Road to Seed Farm Road	21,700	12,400	15,800	25,100
Seed Farm Road to SR 387/SR 187/Pinal Avenue	21,800	12,300	15,800	25,000

2.7.2 2050 Build Alternative Travel Speed

Travel time and delay associated with the Build Alternative were estimated using outputs from the MAG TDM. Figures 2-26 and 2-27 list the anticipated 2050 average speed associated with the Build Alternative along the I-10 main line during the AM and PM peak periods, respectively.

Future Year 2050 AM Build Alternative: Figure 2-26 depicts the estimated average speed during the morning peak period. Traveling in the westbound/northbound commute direction, the entire corridor will exhibit speeds less than 35 mph. Travel speeds in the eastbound/southbound direction are between 45 and 60 mph throughout the corridor except for the segment between SR 202L and Wild Horse Pass Boulevard, where lower speeds prevail (between 35 and 45 mph).

Future Year 2050 PM Build Alternative: Figure 2-27 depicts the estimated travel speed during the evening peak period. Traveling in the eastbound/southbound direction, speeds are consistently less than 35 mph throughout the corridor except for the segments proximate to ramp locations near the Wild Horse Pass Boulevard TI and the Queen Creek Road TI, where the average travel speed increases to between 35 and 45 mph. Travel speeds for the westbound/northbound direction during the evening commute are generally between 45 and 60 mph, except for the segment north of the Wild Horse Pass Boulevard TI, where lower speeds prevail from 35 to 45 mph.

Compared to 2050 No-Build conditions, there are notable improvements in travel speed in the reverse commute directions for both the AM and PM peak periods under the 2050 Build Alternative conditions. By contrast, travel speeds in the commuter directions for both AM and PM peak periods are generally anticipated to remain less than 35 mph. These results indicate that additional I-10 capacity beyond the scope of this study may eventually be required and could be addressed in future studies, as appropriate.

Travel time delay was computed using the same methodology described in Sections 2.3 and 2.4. Table 2-14 presents the travel time delay associated with the 2050 Build Alternative and the No-Build Alternative, for comparison. Based on the travel time delays presented, the Build Alternative in 2050 saves an approximated 31 minutes traveling north during the morning commute and 20 minutes traveling south during the evening commute when driving the entire length of the I-10 corridor, between SR 202L and SR 387/SR 187/Pinal Avenue.

Table 2-14. Comparison of year 2050 No-Build and Build Alternatives' travel time delay (minutes)

Interstate 10 analysis segment	AM delay				PM delay			
	WB/NB		EB/SB		WB/NB		EB/SB	
	No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
SR 202L to Wild Horse Pass Boulevard	1.5	1.0	0.2	0.3	0.3	0.2	1.1	1.2
Wild Horse Pass Boulevard to SR 347/Queen Creek Road	5.6	3.5	0.2	0.5	0.7	0.5	1.8	2.4
SR 347/Queen Creek Road to Riggs Road	9.5	4.4	2.4	1.0	2.4	1.0	7.1	2.9
Riggs Road to SR 587/ Casa Blanca Road	25.9	17.5	6.2	2.6	4.7	2.1	16.1	9.0
SR 587/Casa Blanca Road to Seed Farm Road	14.9	8.9	3.1	1.3	2.4	1.1	8.9	4.7
Seed Farm Road to SR 387/ SR 187/Pinal Avenue	25.5	17.2	4.9	2.5	4.1	2.0	13.9	8.9
Total corridor delay	**82.9**	**52.5**	**17.0**	**8.2**	**14.6**	**6.9**	**48.9**	**29.1**

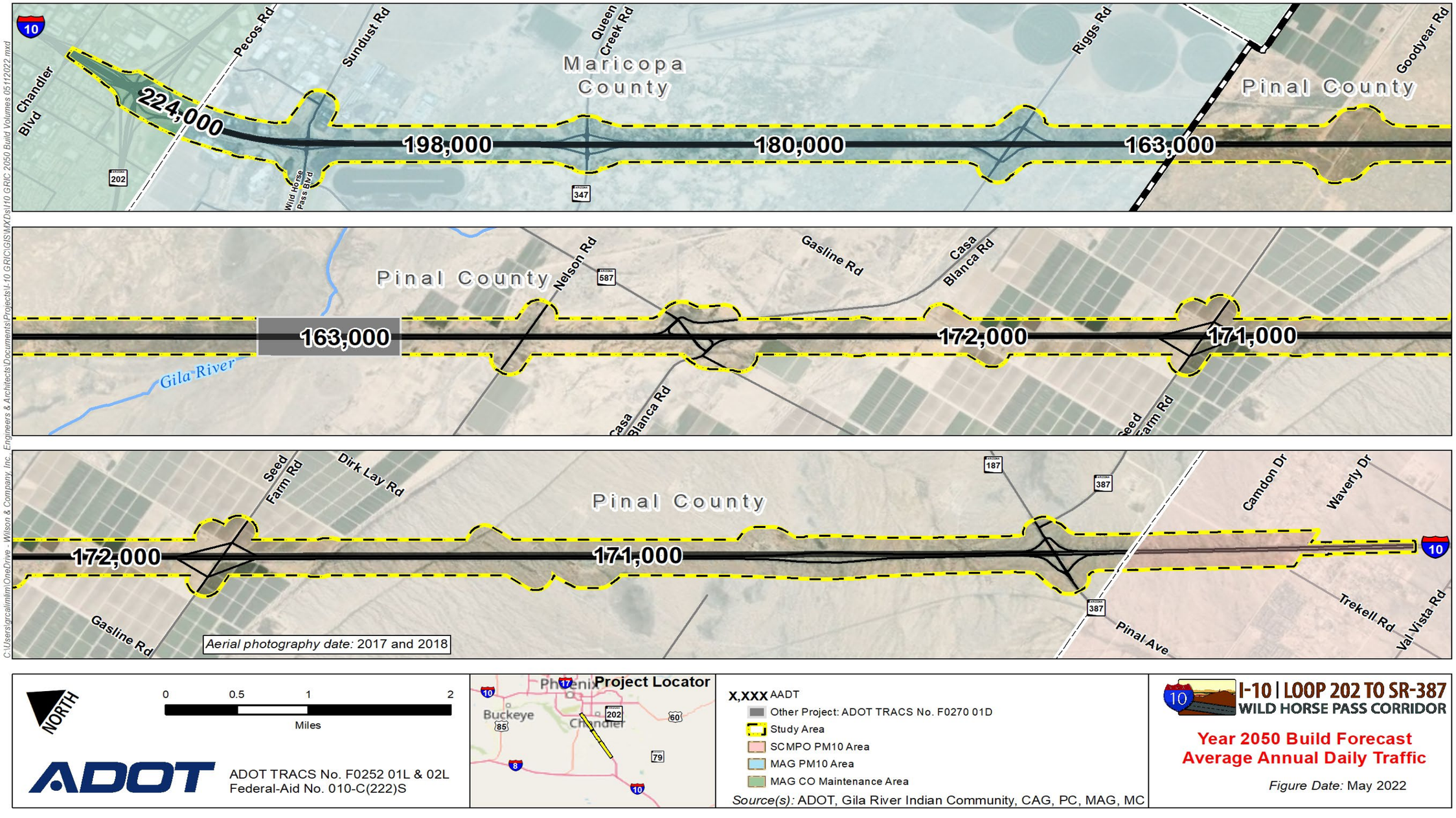

Figure 2-25. Year 2050 Build Alternative average daily traffic volumes

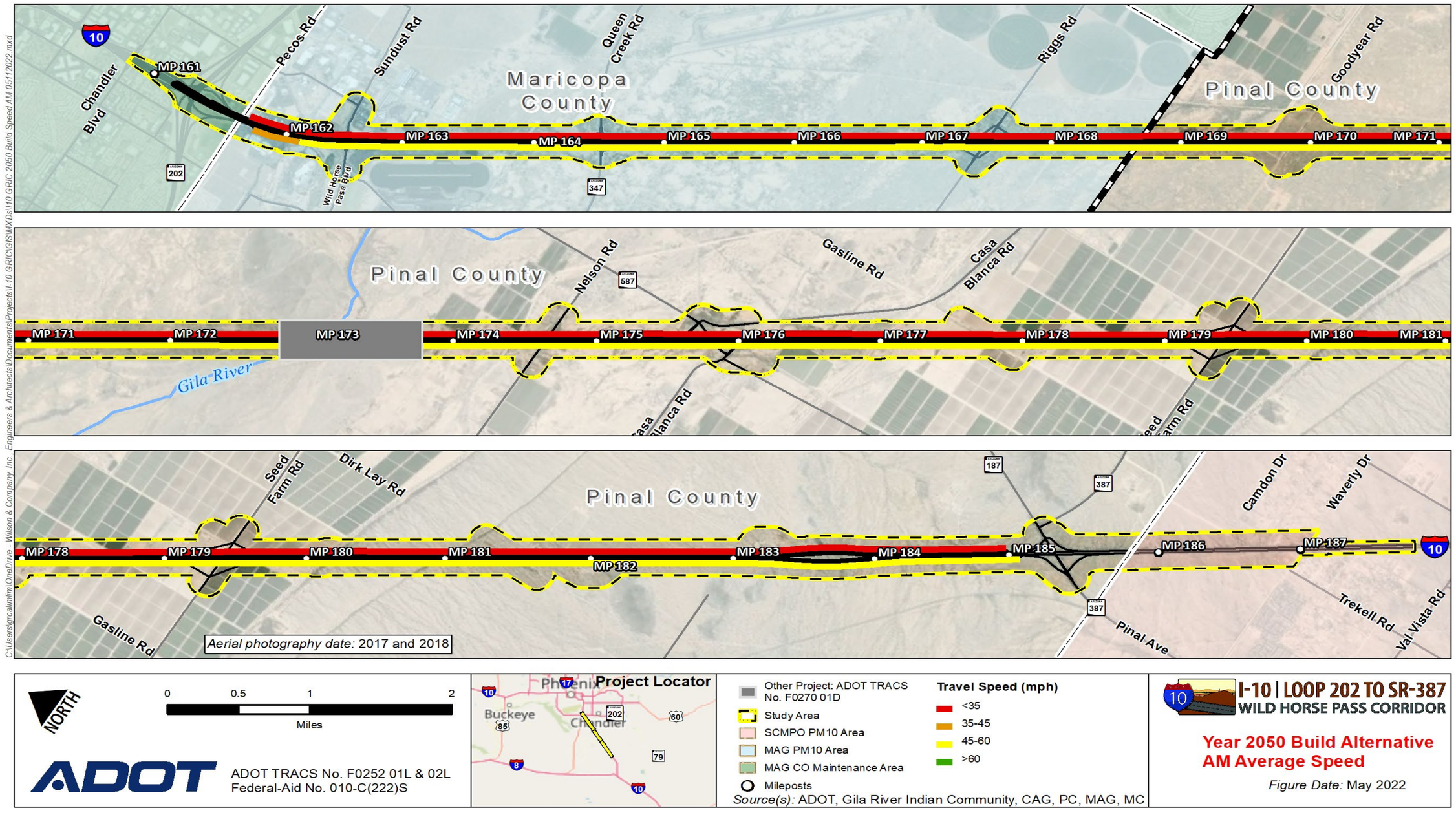

Figure 2-26. Year 2050 Build Alternative AM average speed

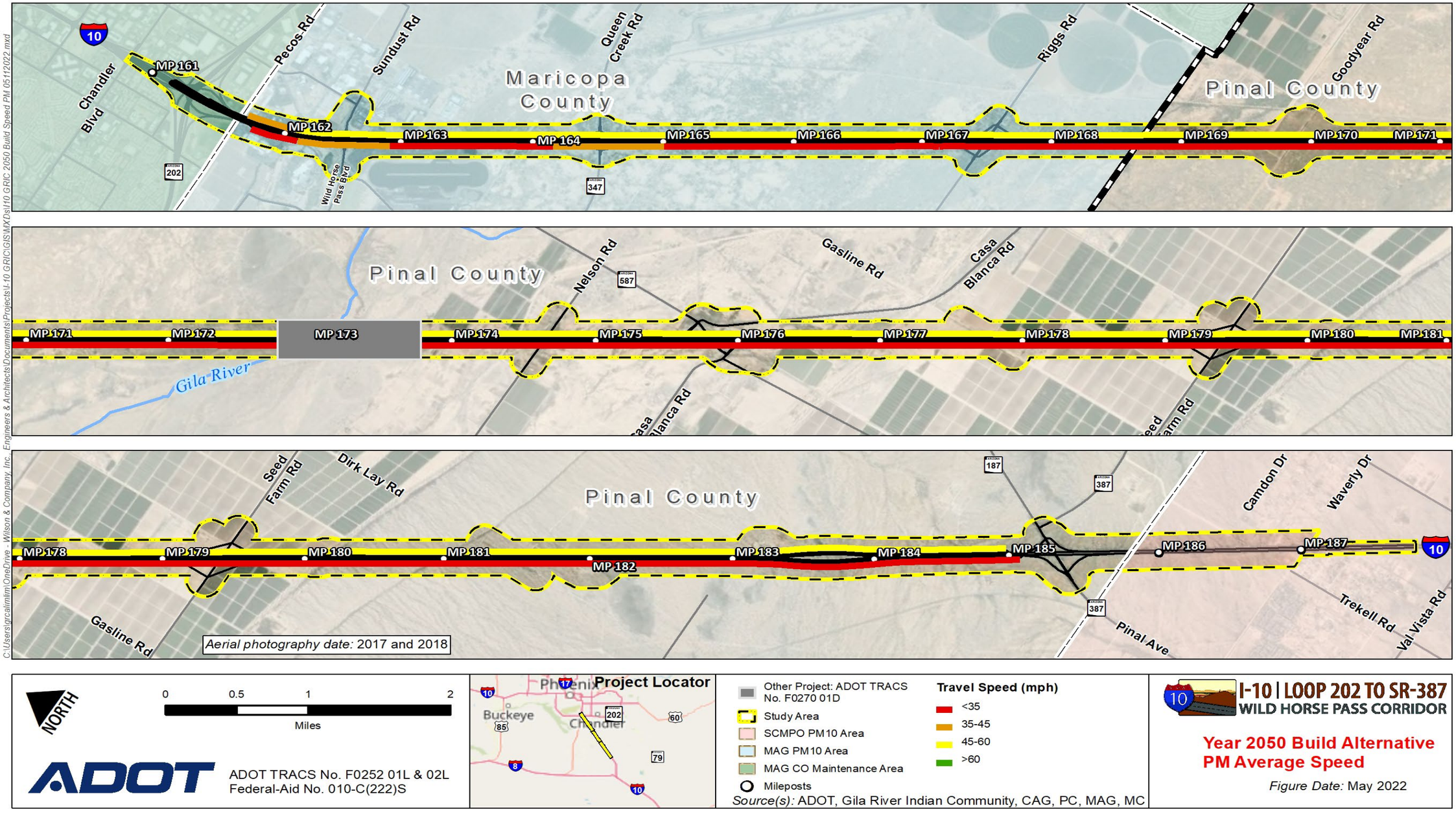

Figure 2-27. Year 2050 Build Alternative PM average speed

2.7.3 2050 Build Alternative Level of Service

Performance of the I-10 main line for the Build Alternative was assessed using volume and capacity outputs generated by the MAG 2050 TDM. Resulting LOS ratings and v/c ratio values are presented for both the AM and PM peak periods in Table 2-15. Results indicate the general purpose lanes of the I-10 main line are anticipated to operate over capacity, with an LOS F rating during both the morning and evening commutes under 2050 Build Alternative conditions. The HOV lanes of the I-10 main line are anticipated to operate with an acceptable LOS D or better.

Although the majority of the v/c ratios decreased from the No-Build Alternative, the volume of traffic on the I-10 main line in the study area is still projected to exceed capacity in 2050.

Table 2-15. Year 2050 Build Alternative level of service: AM and PM peak hours

Interstate 10 analysis segment	AM commute		PM commute	
	LOS (WB/NB)	v/c	LOS (EB/SB)	v/c
SR 202L to Wild Horse Pass Boulevard general purpose lanes	F	1.51	F	1.40
SR 202L to Wild Horse Pass Boulevard HOV lane	B	0.56	A	0.44
Wild Horse Pass Boulevard to SR 347/Queen Creek Road general purpose lanes	F	1.49	F	1.33
Wild Horse Pass Boulevard to SR 347/Queen Creek Road HOV lane	D	0.73	B	0.52
SR 347/Queen Creek Road to Riggs Road general purpose lanes	F	1.29	F	1.15
SR 347/Queen Creek Road to Riggs Road HOV lane	C	0.63	A	0.39
Riggs Road to SR 587/Casa Blanca Road	F	1.44	F	1.18
SR 587/Casa Blanca Road to Seed Farm Road	F	1.50	F	1.26
Seed Farm Road to SR 387/SR 187/Pinal Avenue	F	1.51	F	1.26

The following figures show the LOS along the I-10 main line for the Build Alternative in 2050.

Figure 2-28 shows that during the AM peak hour, the westbound/northbound travel direction is expected to operate at LOS F for the majority of the corridor; a significant portion of the corridor is expected to operate with an estimated v/c greater than 1.25, representing serious operational failure. The segments proximate to TI ramps at the SR 347/Queen Creek Road TI and the Wild Horse Pass Boulevard TI are anticipated to operate with an estimated v/c ratio between 1.00 and 1.25.

Figure 2-29 shows that during the PM peak hour, the eastbound/southbound travel direction is expected to operate at LOS F except for the segment from SR 587/Casa Blanca Road to just north of SR 347/Queen Creek Road and the segment spanning the Wild Horse Pass Boulevard TI where LOS temporarily improves to between 1.00 and 1.25.

Figure 2-30 demonstrates that throughout the day, portions of the corridor in the eastbound/southbound direction operate near capacity, at LOS F, while the westbound/northbound direction is expected to operate at LOS E except for two segments: (1) between Riggs Road to just north of SR 347/Queen Creek Road and (2) spanning the Wild Horse Pass Boulevard TI where LOS temporarily improves to LOD D or better. Based on the daily LOS graphic, a higher percentage of westbound/northbound trips occurs during the morning commute while the eastbound/southbound trips are distributed more evenly throughout the day along the I-10 main line.

Figure 2-30's daily v/c demonstrates that the eastbound/southbound direction will operate at LOS F while the westbound/northbound direction will operate mostly at LOS D during most of the day. This means the I-10 main line traveling in the eastbound/southbound direction will be over capacity in the study area in 2050 for many hours of the day, indicating that travel speed will generally be reduced. Figure 2-30's daily v/c indicates that the congestion shown in Figure 2-28 would be limited to a few hours during the peak period of travel as opposed to most of the day, as would be the case with the No-Build Alternative, as shown in Figure 2-13.

As previously described, based on the future travel demand along I-10 within the region, it is estimated that the additional capacity from the Build Alternative will accommodate traffic through most of the corridor with LOS D or better in evening commute through 2030. The morning commute will however experience LOS E and F traffic conditions on the Build Alternative opening year 2025.

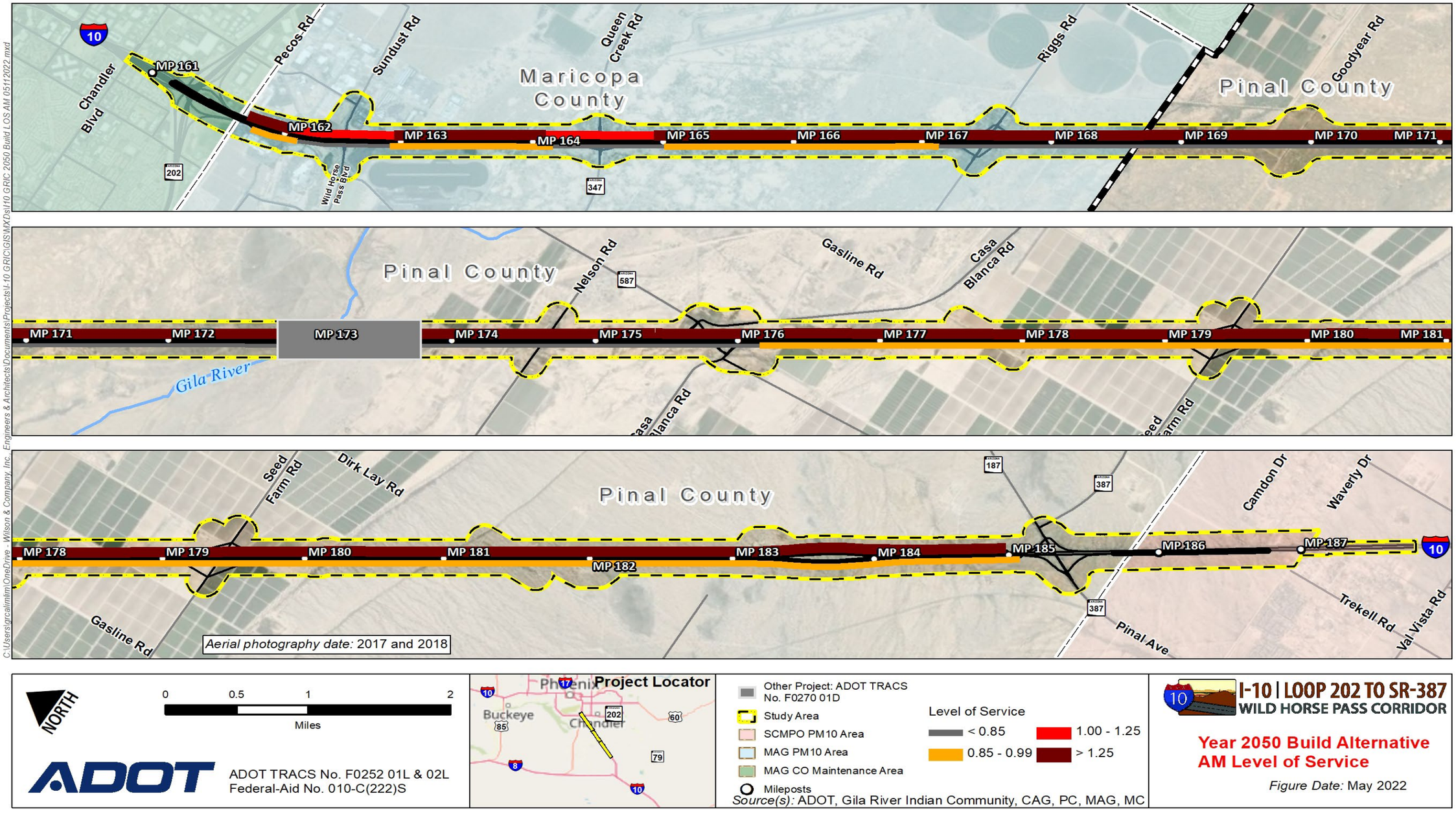

Figure 2-28. Year 2050 Build Alternative AM level of service

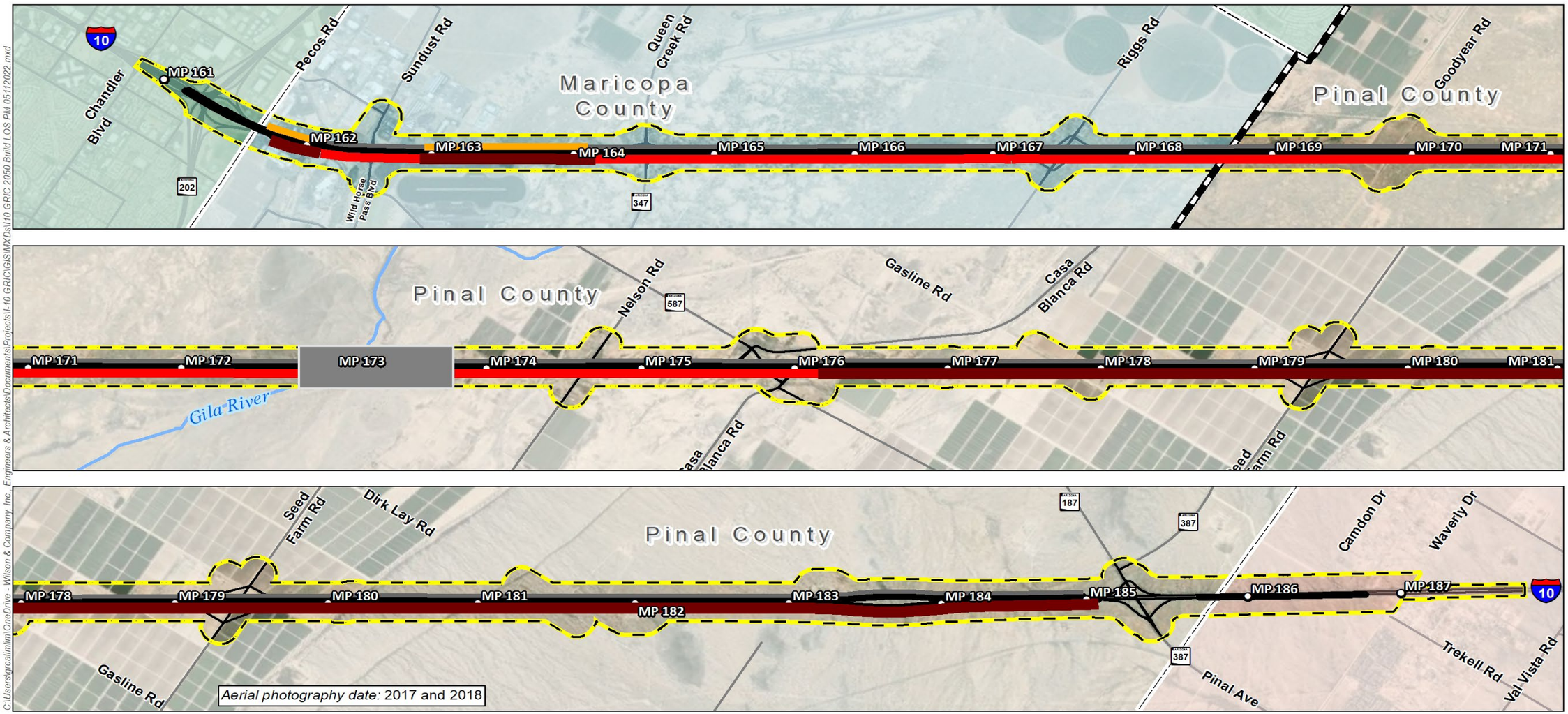

Figure 2-29. Year 2050 Build Alternative PM level of service

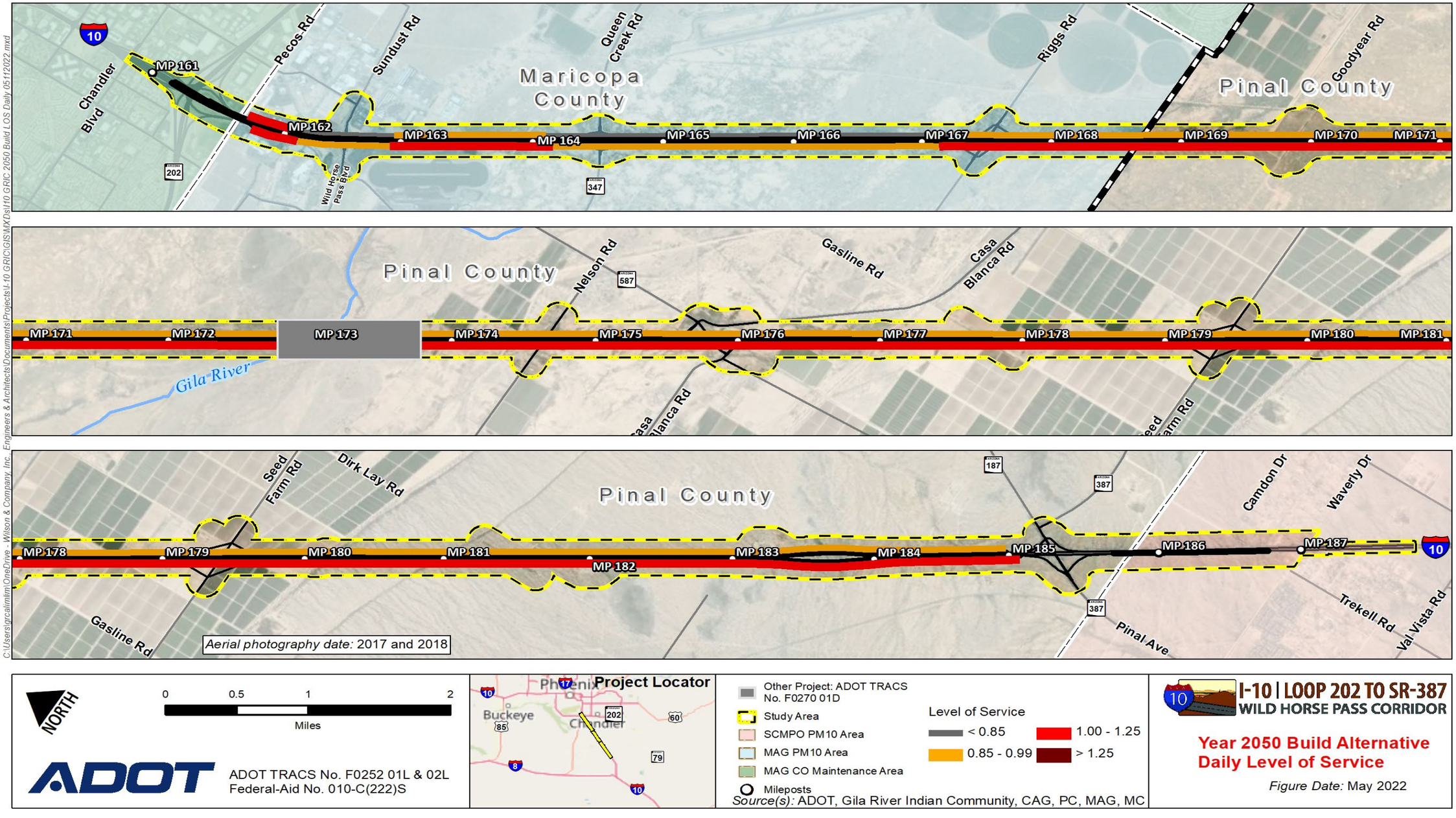

Figure 2-30. Year 2050 Build Alternative daily level of service

2.8 Traffic Interchange Level of Service

A traffic analysis was conducted to evaluate the performance of the existing TIs within the study limits. Additionally, the existing and proposed TIs were studied to evaluate their performance based on the travel demand forecasts and proposed configurations. Details and descriptions of methodologies, analyses, and results for all existing and future TIs can be referenced in Appendix E, *Traffic Data*.

2.8.1 Existing Service Traffic Interchange Performance

The I-10 corridor contains the following existing service TIs:

1. Wild Horse Pass Boulevard
2. SR 347/Queen Creek Road
3. Riggs Road
4. SR 587/Casa Blanca Road
5. SR 387/SR 187/Pinal Avenue

An additional TI at Seed Farm Road is proposed but does not currently exist.

To assess the operations at each of the existing TIs, an intersection LOS analysis was conducted for the AM and PM peak hours to identify deficiencies based on capacity constraints and associated delay. The existing level of traffic demand at each TI was identified by intersection using turning movement volumes. Existing turning movement volumes for the LOS analysis were established using a combination of methods involving count data from previous traffic reports,[1] where applicable, as well as turning volumes derived from the existing average annual daily traffic (AADT) volumes and stakeholder input from the Community's Department of Transportation and the City of Casa Grande. The MAG TDM was referenced for regional traffic distribution purposes. Figures 2-31 and 2-32 present the existing turning movement counts used to analyze the current traffic operations at each of the existing TIs.

LOS analysis for the TIs was conducted using microsimulation tools including VISSIM software and Synchro Trafficware. Resulting model outputs were used to assign LOS performance rankings consistent with HCM 2016. As defined in HCM 2016, LOS is a qualitative measure describing operating conditions associated with a traffic stream. HCM 2016 defines a range of LOS parameters representing varying operating conditions at TIs, intersections, and roadway segments as well as a driver's perception of these conditions.

For intersection/TI LOS, operating conditions are defined in terms of the average vehicle delay of all movements through an intersection, usually in seconds per vehicle (refer to Table 2-16). According to HCM 2016, "vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average control delay per vehicle during a specified time period (for example, the PM peak hour)." Control delay is the portion of the total delay attributed to signal operations and includes initial deceleration, queue move-up time, stopped delay, and acceleration delay.

Table 2-16. Level of service criteria for signalized and unsignalized intersections

LOS	Average control delay (seconds/vehicle)		General description
	Signalized intersections	Unsignalized intersections	
A	≤10.0	≤10.0	Free flow
B	>10.0 and ≤20.0	>10.0 and ≤15.0	Stable flow (slight delays)
C	>20.0 and ≤35.0	>15.0 and ≤25.0	Stable flow (acceptable delays)
D	>35.0 and ≤55.0	>25.0 and ≤35.0	Approaching unstable flow (tolerable delay, occasionally wait) through more than one signal cycle before proceeding)
E	>55.0 and ≤80.0	>35.0 and ≤50.0	Unstable flow (intolerable delay)
F	>80.0	>50.0	Forced flow (jammed)

Source: HCM 2016, Transportation Research Board (TRB), 2016

The results of the analysis for the existing year 2019 TI operations are presented in Table 2-17. Each of the TIs is operating at an acceptable LOS D or better during both the AM and PM peak hours. There are two exceptions: the SR 587/Casa Blanca Road TI operates at LOS E or F in the AM peak hour and the SR 387/ SR 187/Pinal Avenue TI operates at LOS F during the AM and PM peak hours.

[1] Kimley-Horn & Associates Inc., CallisonRTKL, 2019, *Wild Horse Pass Master Plan Update Traffic Impact and Parking Analysis Gila River Indian Community, Arizona*.
U.S. Department of Transportation, Federal Highway Administration, 2019, *SR 587 and WB I-10 Ramps / Casa Blanca Road Signal Warrant Analysis*.

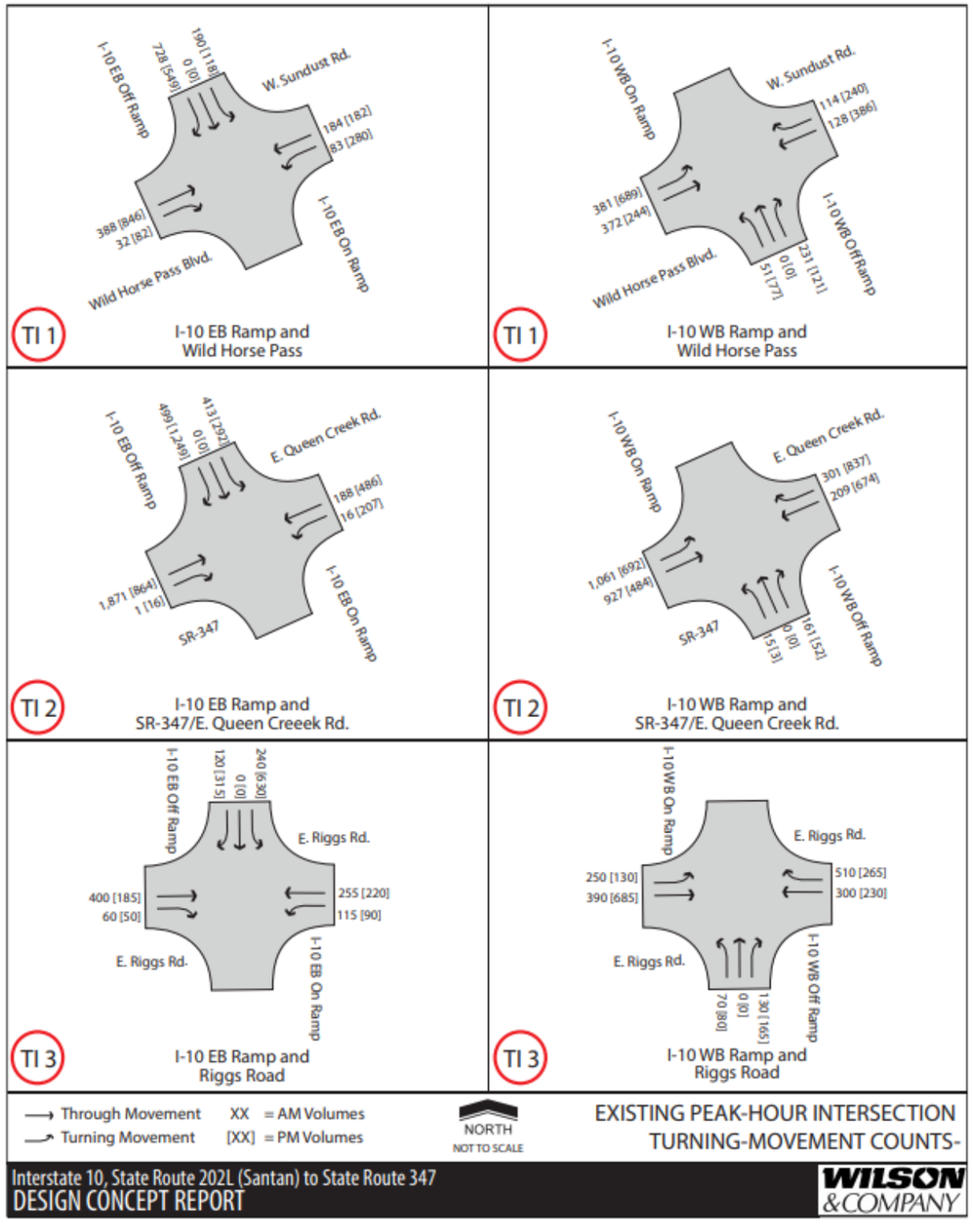

Figure 2-31. Existing (2019) turning movement counts for traffic interchanges 1 through 3

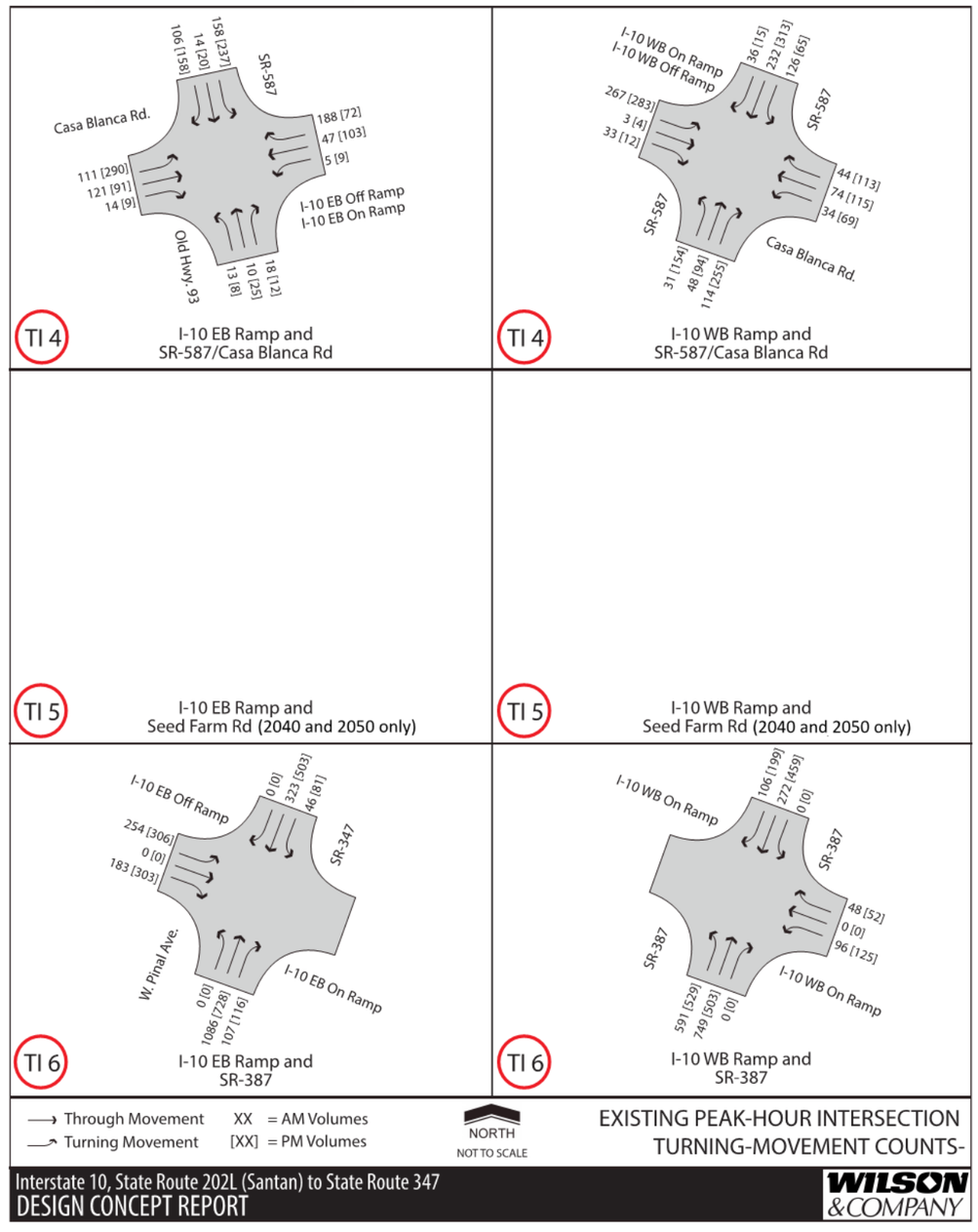

Figure 2-32. Existing (2019) turning movement counts for traffic interchanges 4 through 6

Table 2-17. Existing 2019 traffic interchange level of service results

Location	Performance measure	2019 existing AM peak hour LOS				2019 existing PM peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Wild Horse Pass Boulevard									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	16.0	—	12.0	24.0	22.0	—	9.0	29.0
	Approach LOS	B	—	B	C	C	—	A	C
	Intersection delay (seconds)	16.0				17.0			
	Intersection LOS	B				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	10.0	14.0	9.0	—	9.0	17.0	19.0
	Approach LOS	—	A	B	A	—	A	B	B
	Intersection delay (seconds)	11.0				15.0			
	Intersection LOS	B				B			
SR 347/Queen Creek Road									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	51.0	—	4.0	27.0	41.0	—	23.0	41.0
	Approach LOS	D	—	A	C	D	—	C	D
	Intersection delay (seconds)	11.0				33.0			
	Intersection LOS	B				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	23.0	27.0	10.0	—	60.0	21.0	19.0
	Approach LOS	—	C	C	A	—	E	C	B
	Intersection delay (seconds)	24.0				40.0			
	Intersection LOS	C				D			
Riggs Road									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	23.1	—	19.7	14.3	16.4	—	28.9	18.1
	Approach LOS	C	—	B	B	B	—	C	B
	Intersection delay (seconds)	17.4				23.5			
	Intersection LOS	B				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	14.4	25.9	27.7	—	9.7	35.3	37.5
	Approach LOS	—	B	C	C	—	A	D	D
	Intersection delay (seconds)	23.0				19.5			
	Intersection LOS	C				B			
SR 587/Casa Blanca Road									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	77.1	69.7	48.1	13.9	10.4	47.3	25.1	17.3
	Approach LOS	F	F	E	B	B	E	D	C
	Intersection delay (seconds)	61.0				28.0			
	Intersection LOS	F				D			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	15.4	13.3	70.6	19.4	7.9	36.0	13.9	13.3
	Approach LOS	C	B	F	C	A	E	B	B
	Intersection delay (seconds)	38.0				23.0			
	Intersection LOS	E				C			
SR 387/SR 187/Pinal Avenue									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	5.3	0.0	—	3099.0	8.3	0.0	—	4032.4
	Approach LOS	A	A	—	F	A	A	—	F
	Intersection delay (seconds)	243.5				386.5			
	Intersection LOS	F				F			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	0.0	1.5	984.6	—	0.0	1.5	1034.7	—
	Approach LOS	A	A	F	—	A	A	F	—
	Intersection delay (seconds)	138.0				183.1			
	Intersection LOS	F				F			

2.8.2 2040 No-Build Alternative Traffic Interchange Traffic Conditions

Future traffic conditions were forecast through 2040 based on area growth identified by the MAG TDM data and were refined using localized projections based on input from the Community's Department of Transportation and the City of Casa Grande. Detailed 2040 daily traffic projections along the key crossroads can be referenced in Appendix E. Figures 2-33 and 2-34 present the 2040 AM and PM peak turning movement volumes used to analyze the future traffic operations at each of the existing and proposed TIs.

The LOS analysis for the No-Build Alternative in 2040 was conducted by modeling the existing TI networks using 2040 turning movement volumes to assess the TI performance in 2040 if no improvements were made. A condensed summary of results for the No-Build Alternative 2040 LOS analysis is presented in Table 2-18. Except for the Riggs Road TI, each of the existing TIs are expected to have one or more of the ramp terminals operate at an unacceptable LOS E or F by 2040. Note that a comprehensive No-Build Alternative performance discussion is presented in Section 2.8.4 for use in comparing the relative performance of the Build Alternative.

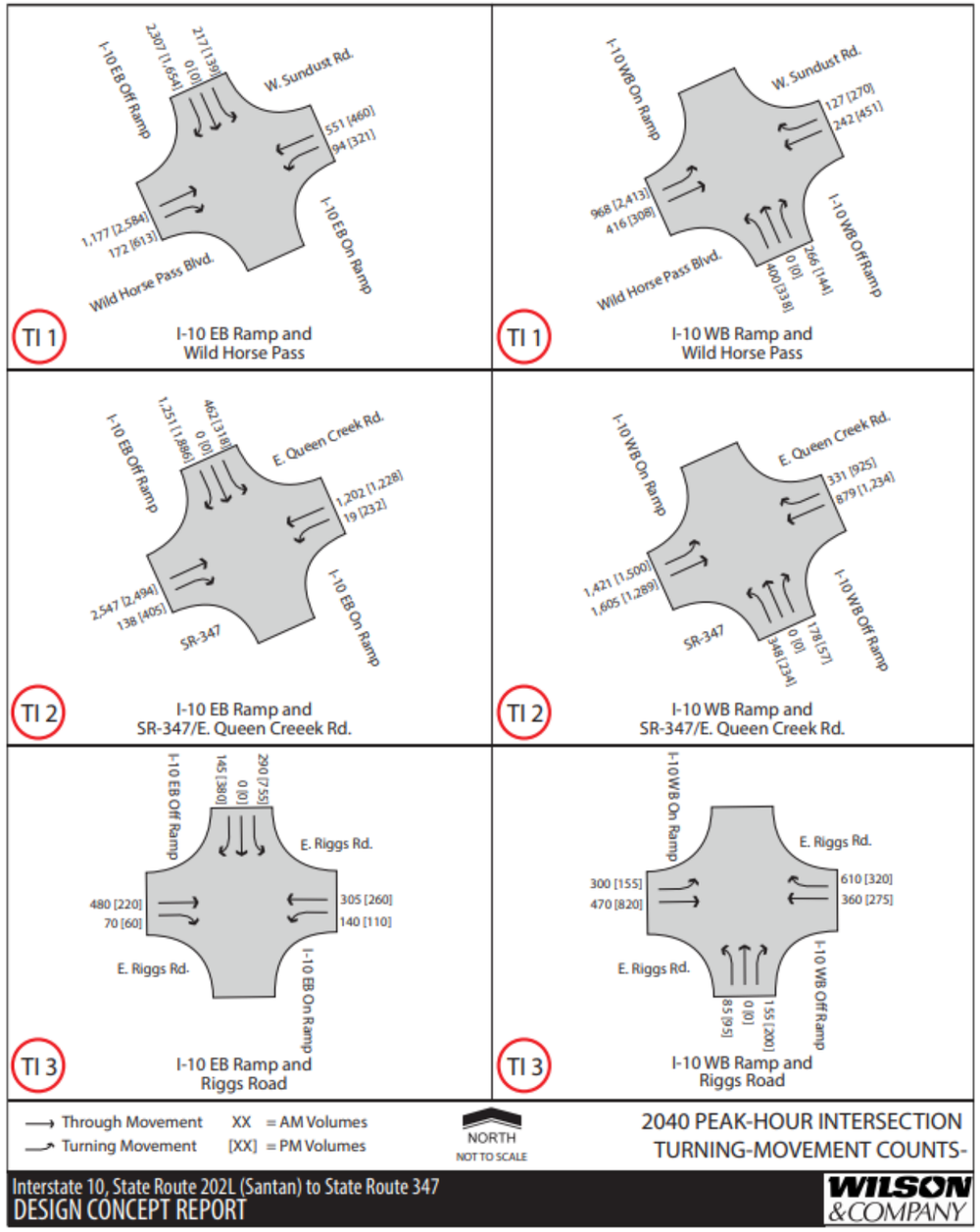

Figure 2-33. No-Build Alternative 2040 turning movement counts for traffic interchanges 1 to 3

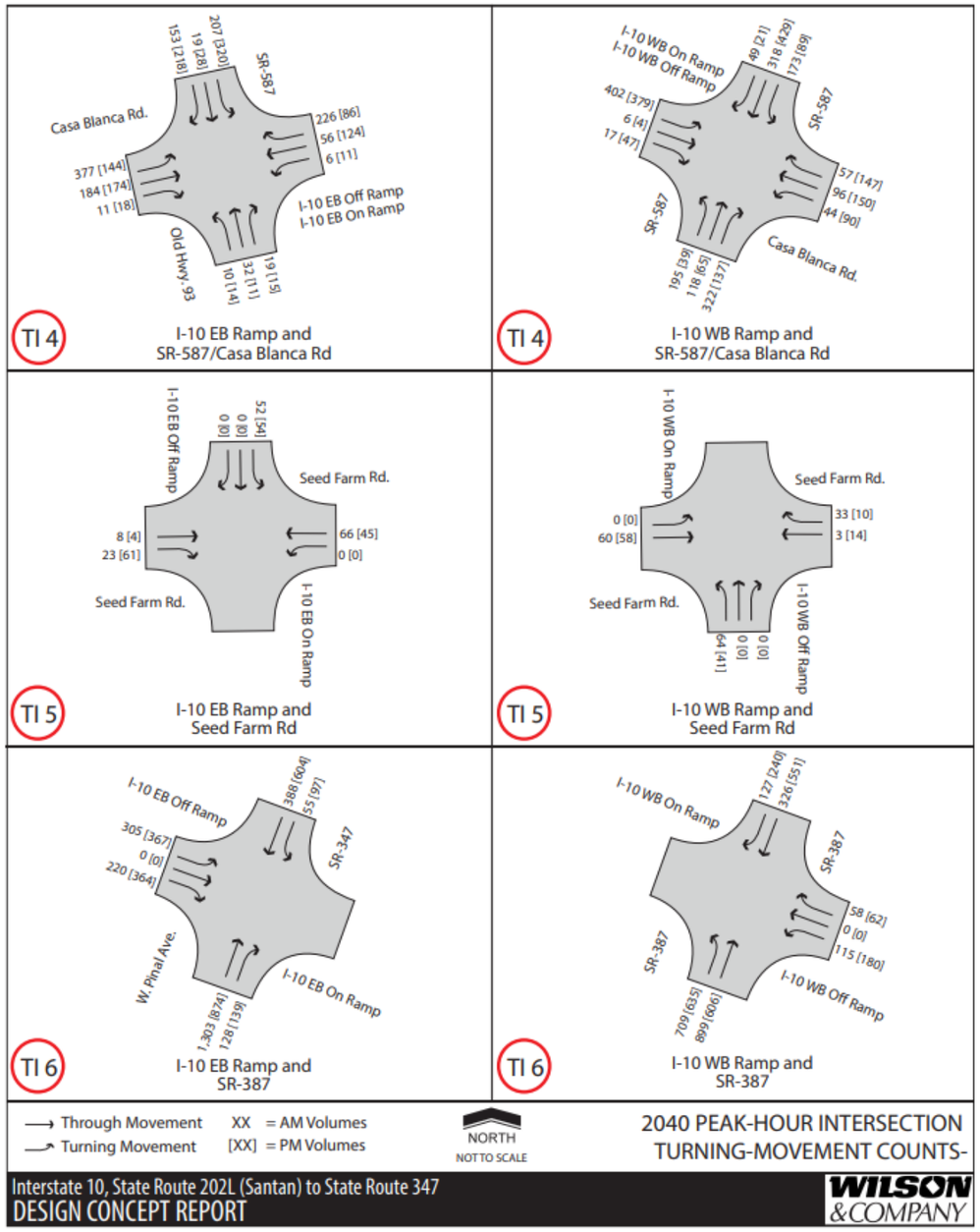

Figure 2-34. No-Build Alternative 2040 turning movement counts for traffic interchanges 4 to 6

Table 2-18. 2040 No-Build Alternative traffic interchange level of service condensed results

Location	2040 No-Build			
	AM peak hour		PM peak hour	
	LOS	Delay	LOS	Delay
Wild Horse Pass Boulevard and EB I-10	F	88	E	58
Wild Horse Pass Boulevard and WB I-10	B	18	D	45
SR 347/Queen Creek Road and EB I-10	E	78	F	111
SR 347/Queen Creek Road and WB I-10	F	83	E	61
Riggs Road and EB I-10	B	18.3	B	19.9
Riggs Road and WB I-10	C	27.2	B	19
SR 587/Casa Blanca Road and EB I-10	F	122	E	47
SR 587/Casa Blanca Road and WB I-10	F	93	F	85
Seed Farm Road and EB I-10[a]	—	—	—	—
Seed Farm Road and WB I-10[a]	—	—	—	—
SR 387/SR 187/Pinal Avenue and EB I-10	F	344.9	F	438.1
SR 387/SR 187/Pinal Avenue and WB I-10	F	1155.0	F	3457.4

[a] does not currently exist, therefore, not applicable in the No-Build Alternative

2.8.3 2040 Build Alternative Traffic Interchange Performance

Using the 2040 forecast traffic volumes identified in Figure 2-33 and 2-34, an LOS analysis was conducted for the Build Alternative using the proposed TI configurations described below. These same Build Alternative TI configurations are also applicable to the 2050 analysis discussed in subsequent sections.

Wild Horse Pass Boulevard Traffic Interchange Build Alterative

The recommended build alternative for the TI at Wild Horse Pass Boulevard involves reconstructing the current conventional diamond TI at I-10 to create a diverging diamond interchange (DDI). A DDI moves the cross street traffic to the left side of the roadway between the signalized ramp intersections, eliminating the left-turn signal phase at the ramp terminals. Vehicles on the cross street wanting to turn left can continue to the entrance ramps without conflicting with opposing through traffic and without stopping. DDIs appear to be most applicable where there are heavy left turns onto the entrance ramps or moderate to heavy left turns from the exit ramps. Improvements along Wild Horse Pass Boulevard would include widening the western and eastern approaches of the I-10 TI to accommodate the DDI configuration. Figure 2-35 presents the DDI alternative modeled at the Wild Horse Pass Boulevard TI. Additional information on this layout can be found in Chapter 4.

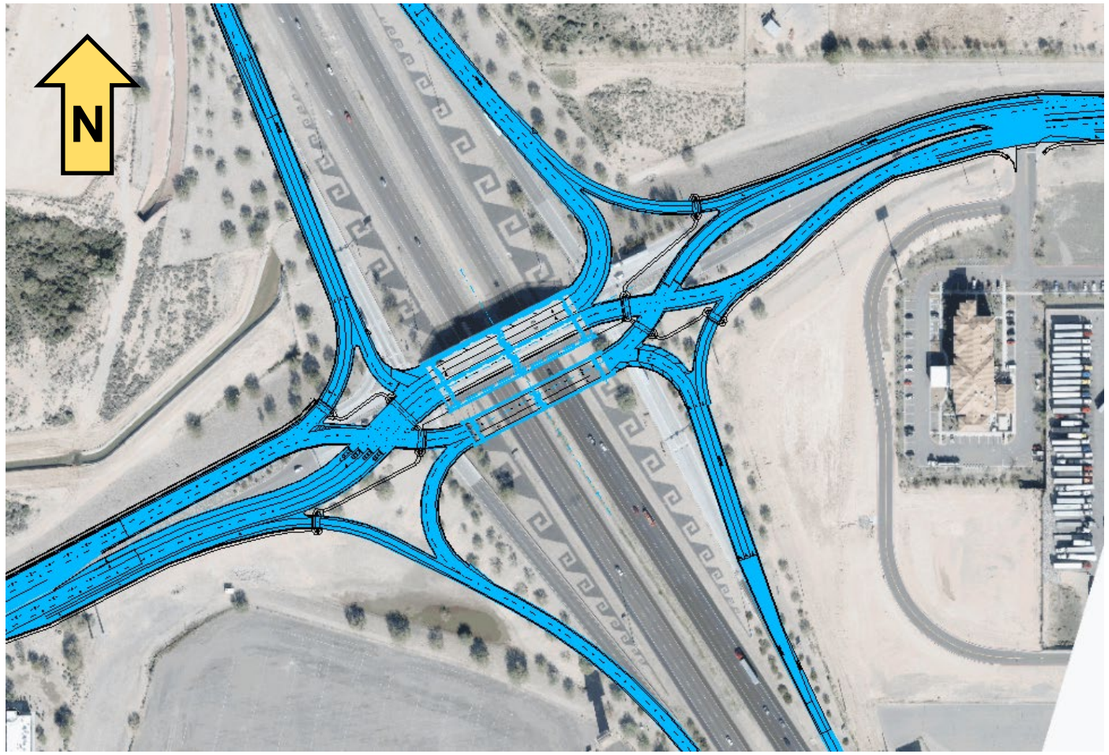

Figure 2-35. Wild Horse Pass Boulevard recommended build alternative

SR 347/Queen Creek Road Traffic Interchange Build Alternative

The recommended build alternative for the TI at SR 347/Queen Creek Road mirrors the reconstruction of the Wild Horse Pass Boulevard by converting the conventional diamond TI into a DDI. Improvements along SR 347/Queen Creek Road would include widening the western and eastern approaches of the I-10 TI to accommodate the DDI configuration. Figure 2-36 presents the DDI alternative modeled at the SR 347/Queen Creek Road TI. Additional information on this layout can be found in Chapter 4.

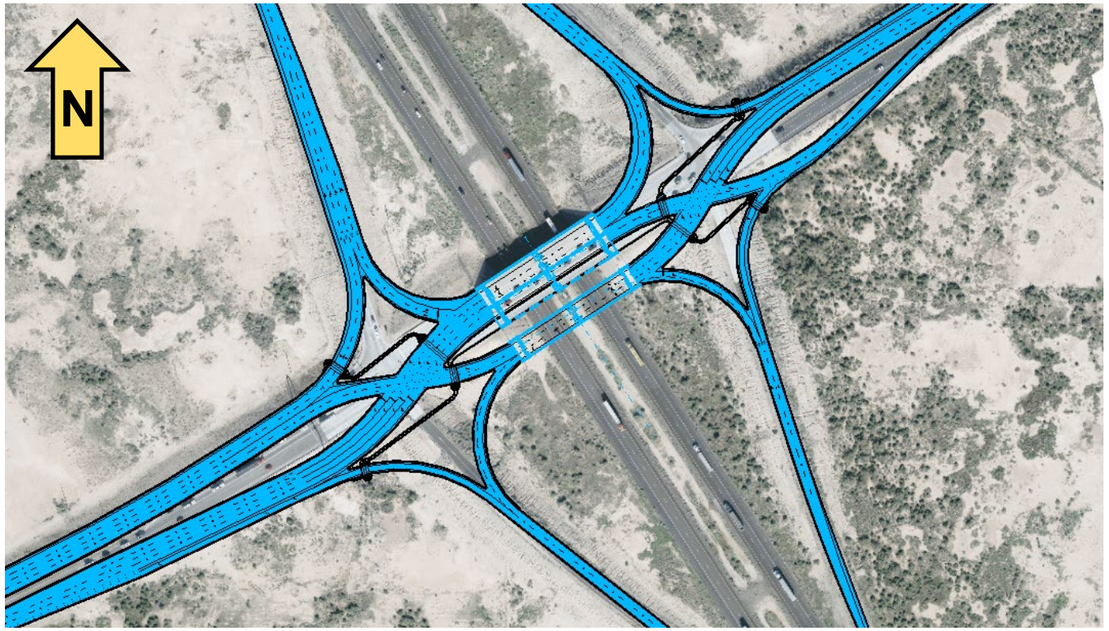

Figure 2-36. SR 347/Queen Creek Road recommended build alternative

SR 587/Casa Blanca Road Traffic Interchange Build Alternative

The recommended build alternative for the TI at SR 587/Casa Blanca Road involves a complete reconstruction of the existing partial cloverleaf TI at I-10 into a conventional diamond TI controlled by roundabouts at the ramp junctions. An additional feature of this alternative involves the construction of a Casa Blanca Road bypass over I-10 south of the existing TI. This bypass would provide a route for continuous travel along Casa Blanca Road and would provide connectivity to the TI via a three-legged roundabout just west of the proposed diamond. Figure 2-37 presents the TI alternative modeled at the SR 587/Casa Blanca Road TI. Additional information on this layout can be found in Chapter 4.

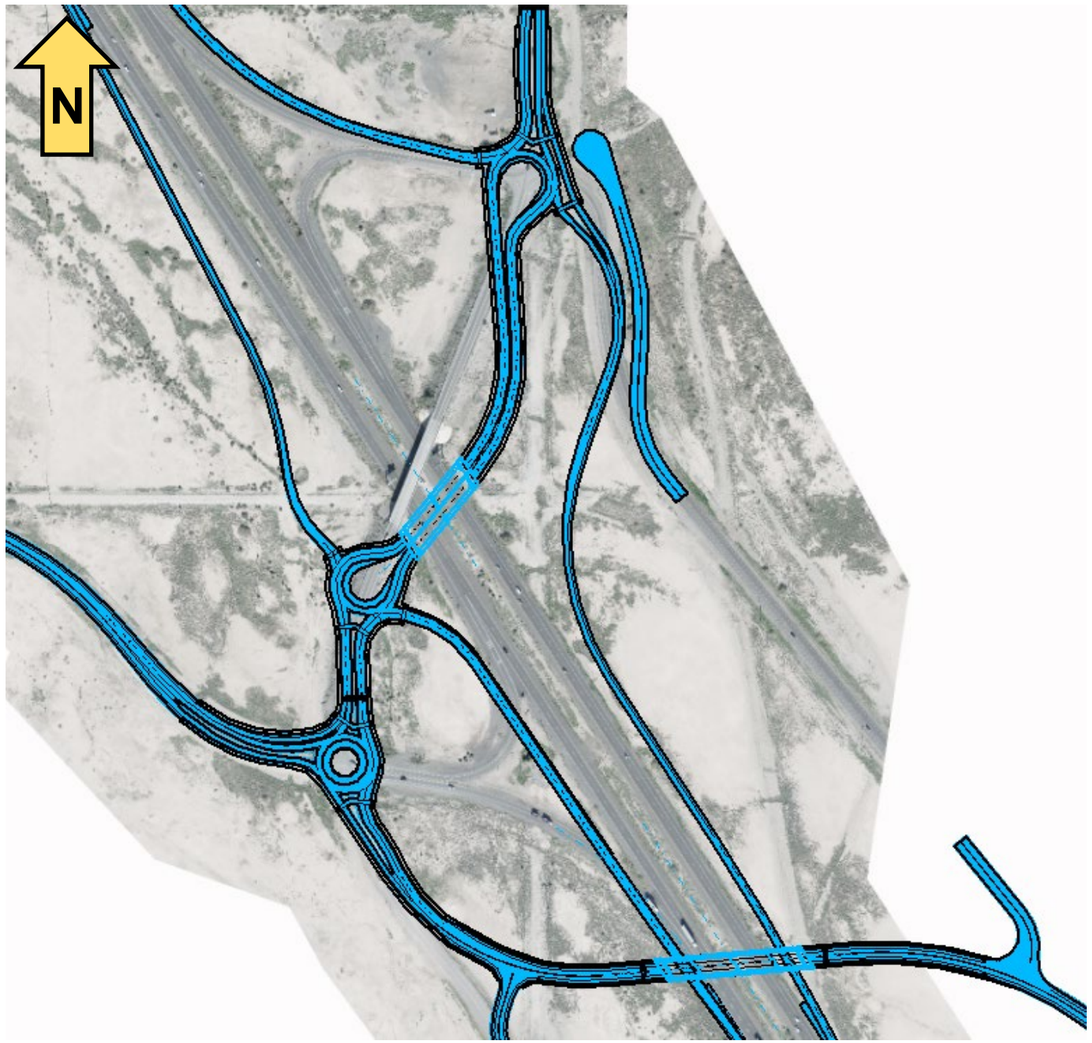

Figure 2-37. SR 587/Casa Blanca Road recommended build alternative

The recommended build alternatives for the TIs at Riggs Road, Seed Farm Road, and SR 387/SR 187/Pinal Avenue were all modeled in Synchro as conventional diamond TIs. Additional information on these layouts can be found in Chapter 4, but some highlighted features of the recommended build alternatives for the TIs at Riggs Road, Seed Farm Road, and SR 387/SR 187/Pinal Avenue are outlined below:

Riggs Road Traffic Interchange Build Alternative

The recommended build alternative for the TI at Riggs Road includes the following improvements:

- on Riggs Road, adding an eastbound lane from the eastbound I-10 ramp terminal, over the bridge, and through the westbound I-10 ramp terminal
- on Riggs Road, adding 200-foot dual left-turn lanes for the I-10 westbound entrance ramp terminal approach
- on the I-10 eastbound exit ramp, adding 300-foot dual left-turn lanes at the ramp terminal approach
- on the I-10 eastbound exit ramp, adding a 300-foot right-turn lane at the ramp terminal approach

Seed Farm Road Traffic Interchange Build Alternative

The recommended build alternative for the new TI at Seed Farm Road includes the following:

- single lanes across the bridge with no turn lanes at the ramp terminals
- single-lane ramps
- stop sign-controlled ramp terminals with free-flow east-west Seed Farm Road movements

SR 387/SR 187/Pinal Avenue Traffic Interchange Build Alternative

The recommended build alternative for the TI at SR 387/SR 187/Pinal Ave closely mirrors the ultimate configuration at Riggs Road, including the following improvements:

- signalizing the ramp terminal intersections
- on Pinal Avenue, converting the eastbound right-turn drop-lane onto the I-10 eastbound entrance ramp into a shared through/right-turn lane at the I-10 eastbound ramp junction and adding an eastbound through lane over the bridge and through the I-10 westbound ramp terminal
- on the I-10 eastbound exit ramp, adding dual left-turn lanes with 250 feet of storage at the eastbound ramp terminal while maintaining the dedicated free-flow right lane to southbound Pinal Avenue
- on Pinal Avenue, adding 250-foot dual left-turn lanes to the I-10 westbound ramp terminal approach
- on SR 387, adding a right-turn drop-lane approaching the I-10 westbound ramp terminal approach
- on the I-10 westbound exit ramp, adding a left-turn lane with 200 feet of storage

The 2040 LOS analysis results for each TI for both the recommended Build and No-Build Alternatives are presented by peak hour in Table 2-19. As these results show, all of the recommended TI Build Alternatives operate at LOS C or better throughout the corridor, a notable improvement over the No-Build Alternative at each location, which in many places would be LOS F.

Table 2-19. 2040 TI level of service results No-Build Alternative vs. Build Alternative

Location	Performance measure	No-Build 2040 peak hour LOS				Build 2040 peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Wild Horse Pass Boulevard – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	29.0	—	9.0	31.0	23.0	—	3.0	15.0
	Approach LOS	C	—	A	C	C	—	A	B
	Intersection delay (seconds)	18.0				10.0			
	Intersection LOS	B				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	164.0	29.0	13.0	—	18.0	8.0	22.0
	Approach LOS	—	F	C	B	—	B	A	C
	Intersection delay (seconds)	88.0				16.0			
	Intersection LOS	F				B			
Wild Horse Pass Boulevard – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	45.0	—	9.0	120.0	18.0	—	8.0	17.0
	Approach LOS	D	—	A	F	B	—	A	B
	Intersection delay (seconds)	45.0				11.0			
	Intersection LOS	D				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	75.0	55.0	26.0	—	13.0	20.0	22.0
	Approach LOS	—	E	D	C	—	B	B	C
	Intersection delay (seconds)	58.0				18.0			
	Intersection LOS	E				B			
SR 347/Queen Creek Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	370.0	—	6.0	165.0	27.2	—	6.1	37.4
	Approach LOS	F	—	A	F	C	—	A	D
	Intersection delay (seconds)	83.0				16.0			
	Intersection LOS	F				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	153.0	51.0	8.0	—	11.0	34.1	36.2
	Approach LOS	—	F	D	A	—	B	C	D
	Intersection delay (seconds)	78.0				28.0			
	Intersection LOS	E				C			
SR 347/Queen Creek Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	97.0	—	66.0	51.0	19.3	—	8.0	33.9
	Approach LOS	F	—	E	D	B	—	A	C
	Intersection delay (seconds)	61.0				19.0			
	Intersection LOS	E				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	217.0	91.0	9.0	—	7.8	37.3	23.9
	Approach LOS	—	F	F	A	—	A	D	C
	Intersection delay (seconds)	111.0				24.0			
	Intersection LOS	F				C			

Location	Performance measure	No-Build 2040 peak hour LOS				Build 2040 peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Riggs Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	34.0	—	15.5	34.8	23.2	—	13.4	23.1
	Approach LOS	C	—	B	C	C	—	B	C
	Intersection delay (seconds)	27.2				19.4			
	Intersection LOS	C				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	17.1	25.8	10.1	—	15.4	21.5	7.3
	Approach LOS	—	B	C	B	—	B	C	A
	Intersection delay (seconds)	18.3				15.3			
	Intersection LOS	B				B			
Riggs Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	17.5	—	19.7	18.5	11.7	—	16.4	28.2
	Approach LOS	B	—	B	B	B	—	B	C
	Intersection delay (seconds)	19.0				19.4			
	Intersection LOS	B				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	23.2	13.8	14.7	—	9.2	13.8	14.7
	Approach LOS	—	C	B	B	—	A	B	B
	Intersection delay (seconds)	19.9				11.1			
	Intersection LOS	B				B			

Location	Performance measure	No-Build 2040 peak hour LOS				Build 2040 peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
SR 587/Casa Blanca Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	77.3	107.2	144.3	17.0	5.2	7.2	—	5.1
	Approach LOS	F	F	F	C	A	A	—	A
	Intersection delay (seconds)	93.0				6.0			
	Intersection LOS	F				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	34.0	19.0	233.5	144.9	5.8	3.3	6.5	—
	Approach LOS	D	C	F	F	A	A	A	—
	Intersection delay (seconds)	122.0				6.0			
	Intersection LOS	F				A			
SR 587/Casa Blanca Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	11.6	99.1	132.7	74.4	4.2	5.8	—	4.7
	Approach LOS	B	F	F	F	A	A	—	A
	Intersection delay (seconds)	85.0				5.0			
	Intersection LOS	F				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	8.4	89.4	20.5	14.8	4.4	2.9	6.1	—
	Approach LOS	A	F	C	B	A	A	A	—
	Intersection delay (seconds)	47.0				5.0			
	Intersection LOS	E				A			

Location	Performance measure	No-Build 2040 peak hour LOS				Build 2040 peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Seed Farm Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	—	—	—	—	9.3	—	0.0	0.0
	Approach LOS	—	—	—	—	A	—	A	A
	Intersection delay (seconds)	—				—			
	Intersection LOS	—				—			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	—	—	—	—	9.2	0.0	0.0
	Approach LOS	—	—	—	—	—	A	A	A
	Intersection delay (seconds)	—				—			
	Intersection LOS	—				—			
Seed Farm Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	—	—	—	—	9.1	—	0.0	0.0
	Approach LOS	—	—	—	—	A	—	A	A
	Intersection delay (seconds)	—				—			
	Intersection LOS	—				—			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	—	—	—	—	9.2	0.0	0.0
	Approach LOS	—	—	—	—	—	A	A	A
	Intersection delay (seconds)	—				—			
	Intersection LOS	—				—			

Location	Performance measure	No-Build 2040 peak hour LOS				Build 2040 peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
SR 387/SR 187/Pinal Avenue – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	7.3	0.0	—	14852.0	14.2	23.3	—	25.1
	Approach LOS	A	A	—	F	B	C	—	C
	Intersection delay (seconds)	1155.0				16..9			
	Intersection LOS	F				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	0.0	1.8	2461.0	—	13.5	4.3	—	—
	Approach LOS	A	A	F	—	B	A	—	—
	Intersection delay (seconds)	344.9				13.5			
	Intersection LOS	F				B			
SR 387/SR 187/Pinal Avenue – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	17.2	0.0	—	36495.6	20.0	29.9	—	31.9
	Approach LOS	B	A	—	F	B	C	—	C
	Intersection delay (seconds)	3457.4				24.6			
	Intersection LOS	F				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	0.0	1.6	2481.3	—	5.3	6.3	24.1	—
	Approach LOS	A	A	F	—	A	A	C	—
	Intersection delay (seconds)	438.1				9.0			
	Intersection LOS	F				A			

2.8.4 2050 No-Build Alternative Traffic Interchange Traffic Conditions

Future traffic conditions were forecast through 2050 based on area growth identified by the MAG TDM data and were refined using localized projections based on input from the Community's Department of Transportation and the City of Casa Grande. Detailed 2050 daily traffic projections along the key crossroads can be referenced in Appendix E. Figures 2-38 and 2-39 present the 2050 AM and PM peak turning movement volumes used to analyze the future traffic operations at each of the existing and proposed TIs. Proposed TI alternatives are identical to those analyzed for 2040 conditions.

The LOS analysis for the No-Build Alternative in 2050 was conducted by modeling the existing TI networks using 2050 turning movement volumes to assess the TI performance in 2050 if no improvements were made. In the SR 387/Pinal Avenue model, for the westbound ramps in the AM peak hour, insufficient gaps are available for northbound and southbound traffic to enter the intersection. This causes computation errors in the model. The projected volumes cannot be accommodated in 2050 without intersection improvements. A condensed summary of results for the No-Build Alternative 2050 LOS analysis is presented in Table 2-20. Except for the Riggs Road TI, each of the existing TIs are expected to have one or more of the ramp terminals operate at an unacceptable LOS E or F by 2050. Note that a comprehensive No-Build Alternative performance discussion is presented in Section 2.8.2 for use in comparing the relative performance of the Build Alternative.

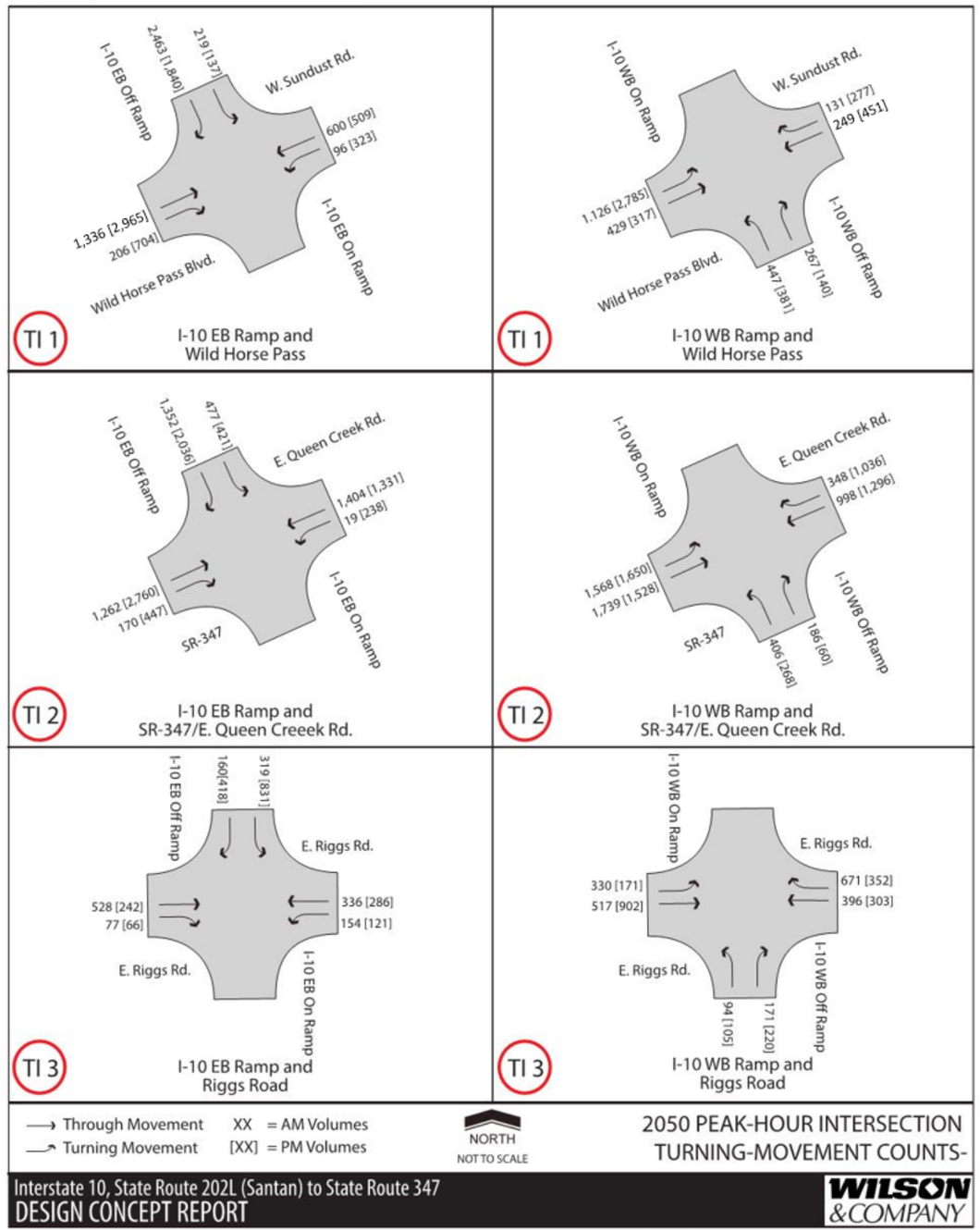

Figure 2-38. 2050 turning movement counts for traffic interchanges 1 to 3

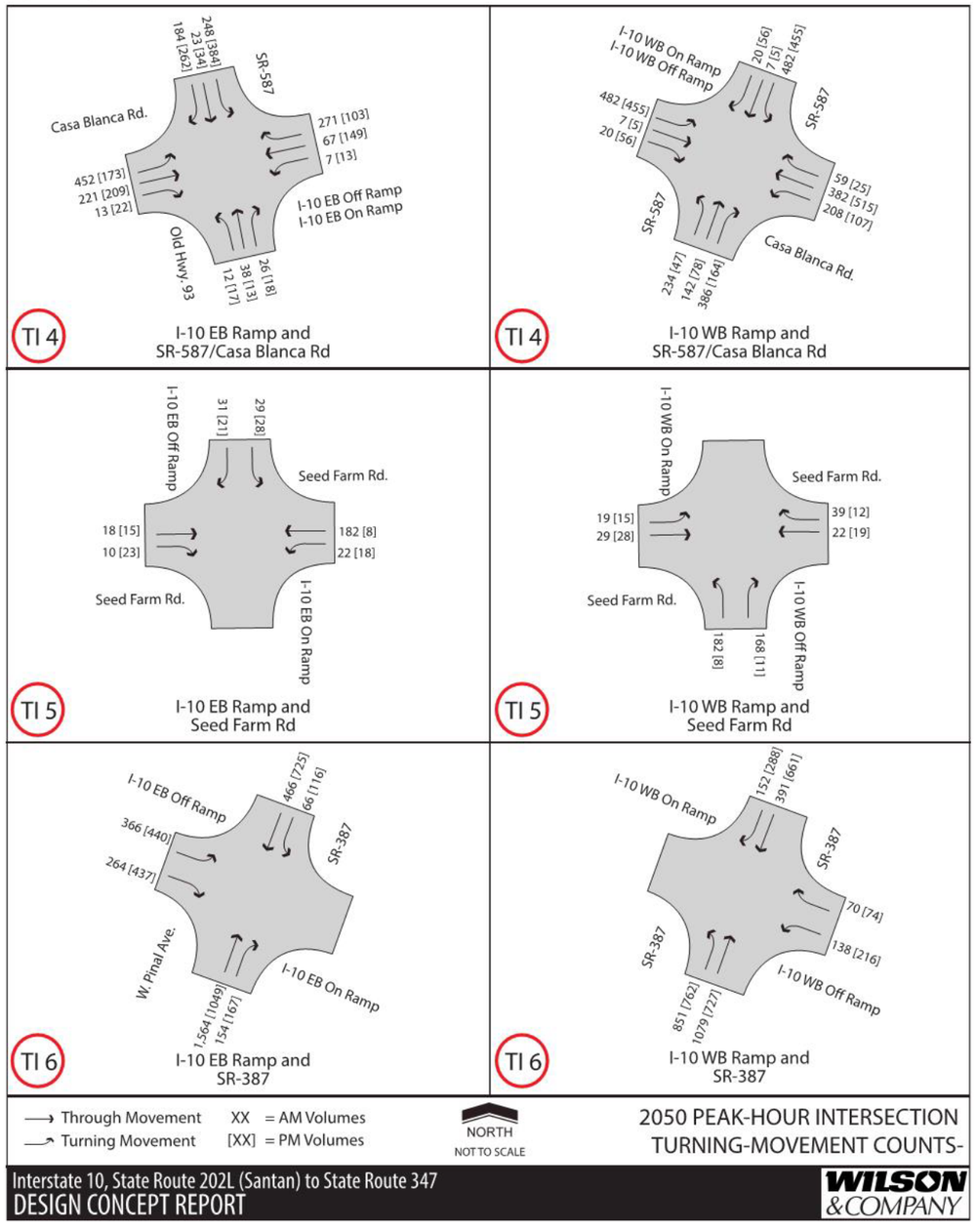

Figure 2-39. 2050 turning movement counts for traffic interchanges 4 to 6

Table 2-20. 2050 No-Build traffic interchange level of service condensed results

Location	2050 No-Build			
	AM peak hour		PM peak hour	
	LOS	Delay	LOS	Delay
Wild Horse Pass Boulevard and EB I-10	F	95	F	93
Wild Horse Pass Boulevard and WB I-10	B	19	D	55
SR 347/Queen Creek Road and EB I-10	F	84	F	111
SR 347/Queen Creek Road and WB I-10	F	86	E	70
Riggs Road and EB I-10	C	23.2	C	27.7
Riggs Road and WB I-10	E	57.3	C	22.9
SR 587/Casa Blanca Road and EB I-10	F	110	E	47
SR 587/Casa Blanca Road and WB I-10	F	89	F	89
Seed Farm Road and EB I-10[a]	—	—	—	—
Seed Farm Road and WB I-10[a]	—	—	—	—
SR 387/SR 187/Pinal Avenue and EB I-10	F	904.1	F	1110.9
SR 387/SR 187/Pinal Avenue and WB I-10	F	—[b]	F	—[b]

[a] does not currently exist, therefore, not applicable in the No-Build Alternative
[b] Delay cannot be calculated.

2.8.5 2050 Build Alternative Traffic Interchange Performance

Using the 2050 forecast traffic volumes identified in Figure 2-38 and 2-39, an LOS analysis was conducted for the Build Alternative in 2050 using the proposed TI configurations previously described in Section 2.8.3. The 2050 LOS analysis results for each TI for both the recommended Build and No-Build Alternatives are presented by peak hour in Table 2-21.

Table 2-21. 2050 TI level of service results No-Build vs. Build Alternative

Location	Performance measure	2050 No-Build peak hour LOS				2050 Build peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Wild Horse Pass Boulevard – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	43.0	—	11.0	32.0	20	—	3.0	16.0
	Approach LOS	D	—	B	C	B	—	A	B
	Intersection delay (seconds)	19.0				9.0			
	Intersection LOS	B				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	166.0	53.0	15.0	—	21.0	9.0	23.0
	Approach LOS	—	F	D	B	—	C	A	C
	Intersection delay (seconds)	95.0				18.0			
	Intersection LOS	F				B			
Wild Horse Pass Boulevard – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	52.0	—	9.0	155.0	17.0	—	7.0	22.0
	Approach LOS	D	—	A	F	B	—	A	C
	Intersection delay (seconds)	55.0				11.0			
	Intersection LOS	D				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	163.0	55.0	23.0	—	13.0	18.0	32.0
	Approach LOS	—	F	D	C	—	B	B	C
	Intersection delay (seconds)	93.0				18.0			
	Intersection LOS	F				B			
SR 347/Queen Creek Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	396.0	—	6.0	164.0	20.7	—	10.5	31.5
	Approach LOS	F	—	A	F	C	—	B	C
	Intersection delay (seconds)	86.0				17.0			
	Intersection LOS	F				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	172.0	51.0	8.0	—	13.3	41.2	16.3
	Approach LOS	—	F	D	A	—	B	D	B
	Intersection delay (seconds)	84.0				27.0			
	Intersection LOS	F				C			
SR 347/Queen Creek Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	177.0	—	67.0	52.0	18.4	—	12.4	33.9
	Approach LOS	F	—	E	D	B	—	B	C
	Intersection delay (seconds)	70.0				21.0			
	Intersection LOS	E				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	220.0	91.0	8.0	—	12.5	48.8	11.6
	Approach LOS	—	F	F	A	—	B	D	C
	Intersection delay (seconds)	111.0				28.0			
	Intersection LOS	F				C			

Location	Performance measure	2050 No-Build peak hour LOS				2050 Build peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Riggs Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	26.5	—	14.4	99.0	19.3	—	18.3	25.6
	Approach LOS	C	—	B	F	B	—	B	C
	Intersection delay (seconds)	57.3				22.0			
	Intersection LOS	E				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	18.8	37.0	10.3	—	15.8	27.0	8.5
	Approach LOS	—	B	D	B	—	B	C	A
	Intersection delay (seconds)	23.2				18.1			
	Intersection LOS	C				B			
Riggs Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	24.1	—	23.5	21.3	12.1	—	15.8	30.1
	Approach LOS	C	—	C	C	B	—	B	C
	Intersection delay (seconds)	22.9				19.8			
	Intersection LOS	C				B			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	19.5	60.8	27.8	—	12.5	25.3	14.7
	Approach LOS	—	B	E	C	—	A	C	B
	Intersection delay (seconds)	27.7				15.0			
	Intersection LOS	C				B			

Location	Performance measure	2050 No-Build peak hour LOS				2050 Build peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
SR 587/Casa Blanca Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	79.8	96.7	150.0	16.0	6.5	13.9	—	5.8
	Approach LOS	F	F	F	C	A	B	—	A
	Intersection delay (seconds)	89.0				10.0			
	Intersection LOS	F				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	97.2	19.8	219.7	116.6	10.4	5.3	9.4	—
	Approach LOS	F	C	F	F	B	A	A	—
	Intersection delay (seconds)	110.0				9.0			
	Intersection LOS	F				A			
SR 587/Casa Blanca Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	17.6	97.3	139.8	108.8	4.9	8.4	—	5.5
	Approach LOS	C	F	F	F	A	A	—	A
	Intersection delay (seconds)	920.0				7.0			
	Intersection LOS	F				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	47.2	91.3	27.0	91.3	6.6	3.5	7.8	—
	Approach LOS	E	F	D	F	A	A	A	—
	Intersection delay (seconds)	52.0				7.0			
	Intersection LOS	F				A			

Location	Performance measure	2050 No-Build peak hour LOS				2050 Build peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
Seed Farm Road – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	—	—	—	—	11.4	—	2.9	0.0
	Approach LOS	—	—	—	—	B	—	A	A
	Intersection delay (seconds)	—				9.0			
	Intersection LOS	—				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	—	—	—	—	10.1	0.0	0.8
	Approach LOS	—	—	—	—	—	B	A	A
	Intersection delay (seconds)	—				2.6			
	Intersection LOS	—				A			
Seed Farm Road – PM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	—	—	—	—	8.8	—	2.5	0.0
	Approach LOS	—	—	—	—	A	—	A	A
	Intersection delay (seconds)	—				3.0			
	Intersection LOS	—				A			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	—	—	—	—	—	8.9	0.0	5.2
	Approach LOS	—	—	—	—	—	A	A	A
	Intersection delay (seconds)	—				5.1			
	Intersection LOS	—				A			

Location	Performance measure	2050 No-Build peak hour LOS				2050 Build peak hour LOS			
		NB	SB	EB	WB	NB	SB	EB	WB
SR 387/SR 187/Pinal Avenue – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	16.1	0	—	—[a]	25.1	34.7	—	22.4
	Approach LOS	B	A	—	F	C	C	—	C
	Intersection delay (seconds)	—[a]				26.8			
	Intersection LOS	F				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	0	2.4	6458.6	—	24.1	5.6	35.1	—
	Approach LOS	A	A	F	—	C	A	D	—
	Intersection delay (seconds)	904.1				21.8			
	Intersection LOS	F				C			
SR 387/SR 187/Pinal Avenue – AM peak									
Jct. I-10 WB On/Off Ramps	Approach delay (seconds)	70.0	0	—	—[a]	28.5	—	40.6	43.7
	Approach LOS	F	A	—	F	C	—	D	D
	Intersection delay (seconds)	—[a]				34.3			
	Intersection LOS	F				C			
Jct. I-10 EB On/Off Ramps	Approach delay (seconds)	0	1.9	6300.8	—	15.6	8.3	25.9	—
	Approach LOS	A	A	F	—	B	A	C	—
	Intersection delay (seconds)	1110.9				14.9			
	Intersection LOS	F				B			

[a] Delay cannot be calculated

2.9 Safety Assessment

2.9.1 Crash Data Summary

Vehicle crash data were obtained from ADOT's *Annual Collision Data Report*. This report provides key details relating to vehicular crashes associated the State Highway System, which includes I-10. Crash data for the 5-year period between 1/1/2014 and 12/31/2018 was used for the study area from mileposts 161 to 187 as this was the dataset available at the beginning of the study in 2019. At the time of the final publication of this DCR, 2019, 2020 and 2021 crash data were also available and were collected and compared to the previously collected data. The 2019 crash data was generally consistent with the 2014-2018 data, but the 2020 and 2021 data showed a much higher number of crashes in the corridor. This period correlates to the COVID-19 pandemic where traffic volumes dropped substantially. This likely resulted in much higher speeds and thus higher crashes. As a result, the 2020 and 2021 data were deemed anomalous and did not represent the "typical" I-10 operating conditions. Because the 2019 data did not meaningfully change the findings of the data shown below, it was not incorporated into the 2014-2018 data sets that follow. The data includes crash details such as collision type, number of vehicles involved, crash point-coordinate locations, lighting conditions, and crash severity.

Report data indicate a total of 1,846 crashes were reported in the study area over the 5-year period. Forty-two of the crashes resulted in serious injury and 26 involved fatalities. Figures 2-40 to 2-42 depict the annual trends over the 5-year reporting period for total crashes, crashes involving serious injury, and crashes involving fatalities.

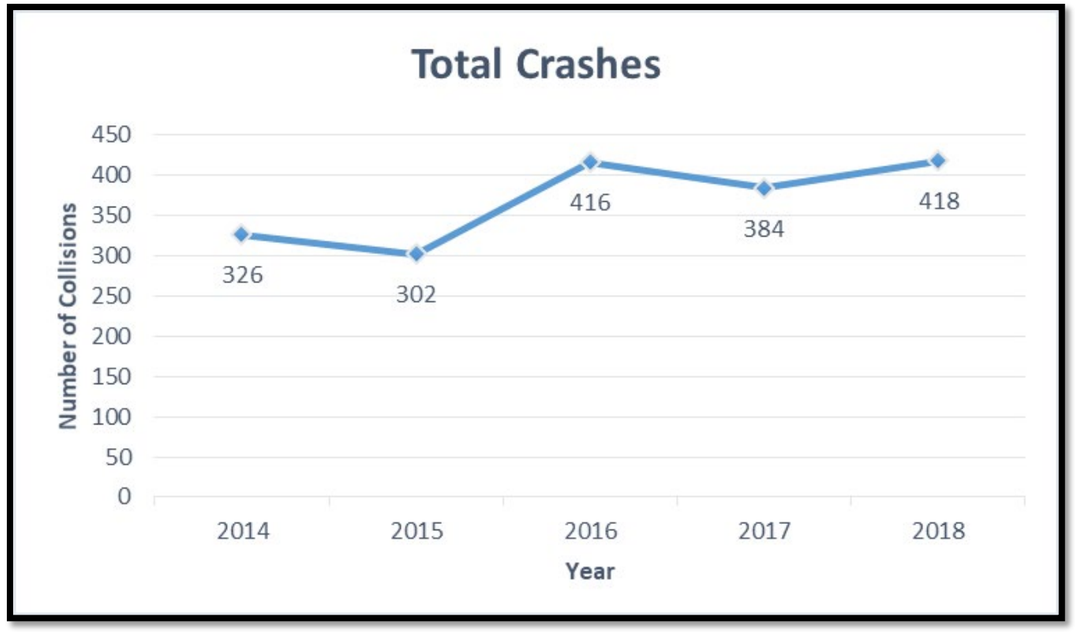

Figure 2-40. 5-year total crash history (2014–2018)

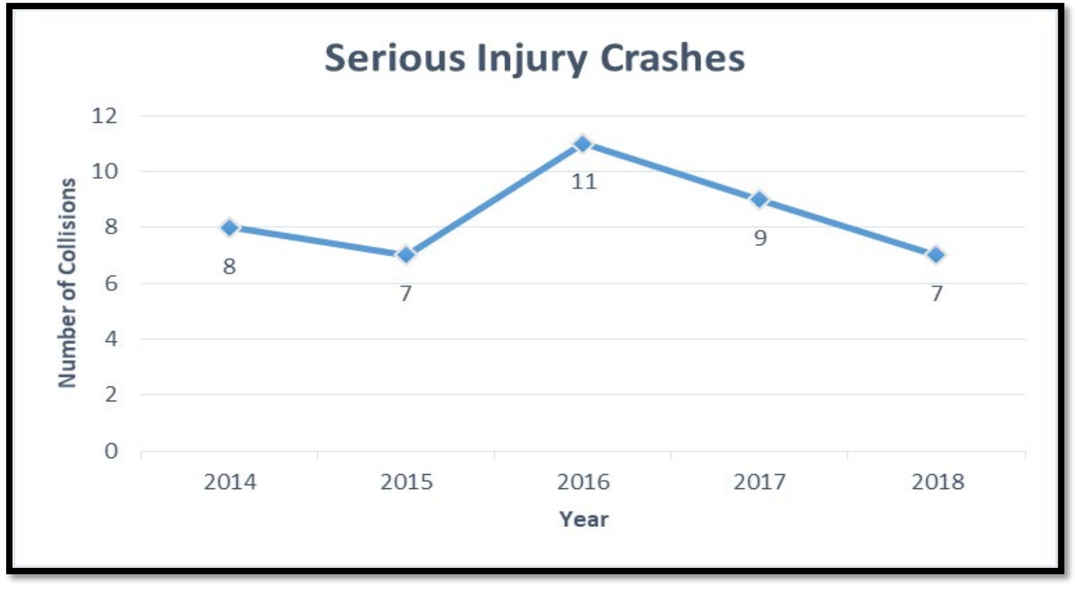

Figure 2-41. 5-year serious injury crash history (2014–2018)

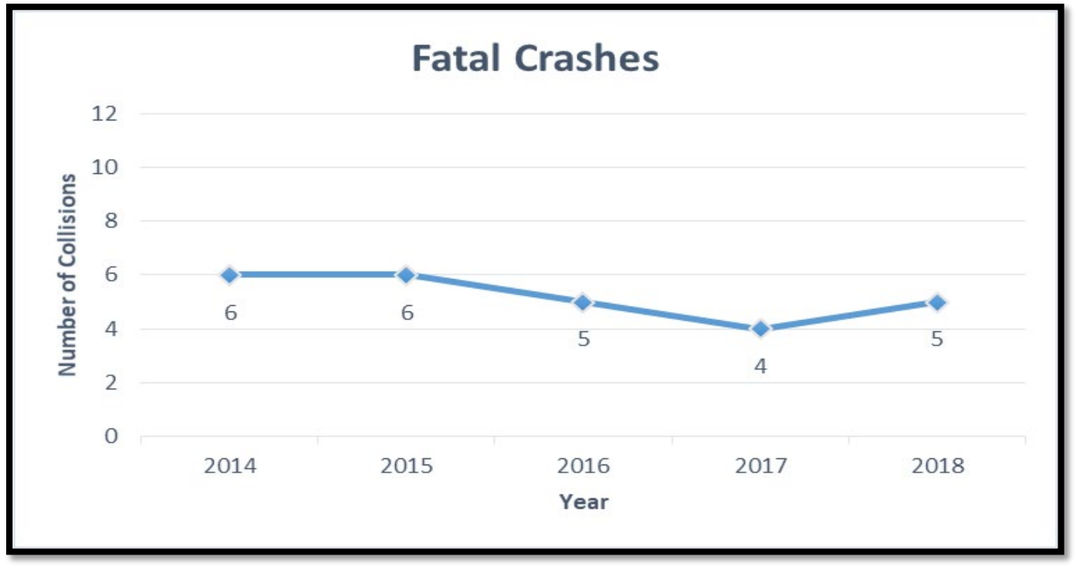

Figure 2-42. 5-year fatal crash history (2014–2018)

These historical crash trends are one of the key factors that led to the designation of this segment of I-10 as a "Safety Corridor" in 2017. Safety Corridors are areas or segments of the State Highway System where statistical information reveals high crash rates and a notable number of fatalities and serious injury collisions. This study area was one of four segments across Arizona that received this designation based on the characteristics of crashes in the corridor. This was due to the high number of serious injury or death crashes that involved driver-related behaviors such as speeding, aggressive driving, driving while impaired or distracted, and the lack of seatbelt use. As stipulated in the Safety Corridor Program, highway areas or segments also were subject to the following criteria:

Criteria for Safety Corridor Candidate Locations:

- fatal and serious injury crash rate and frequency in the top 1%
- secondary crash rate and frequency in the top 1%
- total crash rate and frequency in the top 1%
- frequent and persistent traffic violations
- number of commercial vehicles in the top 1%
- number of hours of congestion in the top 1%
- detour trip length increase greater than 150%

Safety Corridors are managed by ADOT using safety-related driver education and an enhanced enforcement program employing special signs, public information outreach, and increased enforcement of traffic laws. The intent of a Safety Corridor designation is to save lives by reducing traffic speed and improving driver behavior.

In addition to the 5-year trends and Safety Corridor metrics discussed above, Figures 2-43 to 2-46 map crash locations in the I-10 study area to provide further insight into the character and magnitude of crashes along the corridor. Figure 2-43 depicts the spatial distribution of total crashes by severity, while Figures 2-44 and 2-45 show the locations of crashes involving serious injury and crashes involving fatalities, respectively. Figure 2-46 is a visual heat map that represents the "intensity" of all crash occurrences along I-10 in the study area, considering the frequency of crashes surrounding a particular location as well as the severity of each crash incident. The heat map visualization relies on crash data to show the magnitude of crashes and the degree to which crashes are clustered or spread out along the study area. Locations represented in green indicate lower-intensity crash areas while locations represented in red indicate the highest-intensity crash areas.

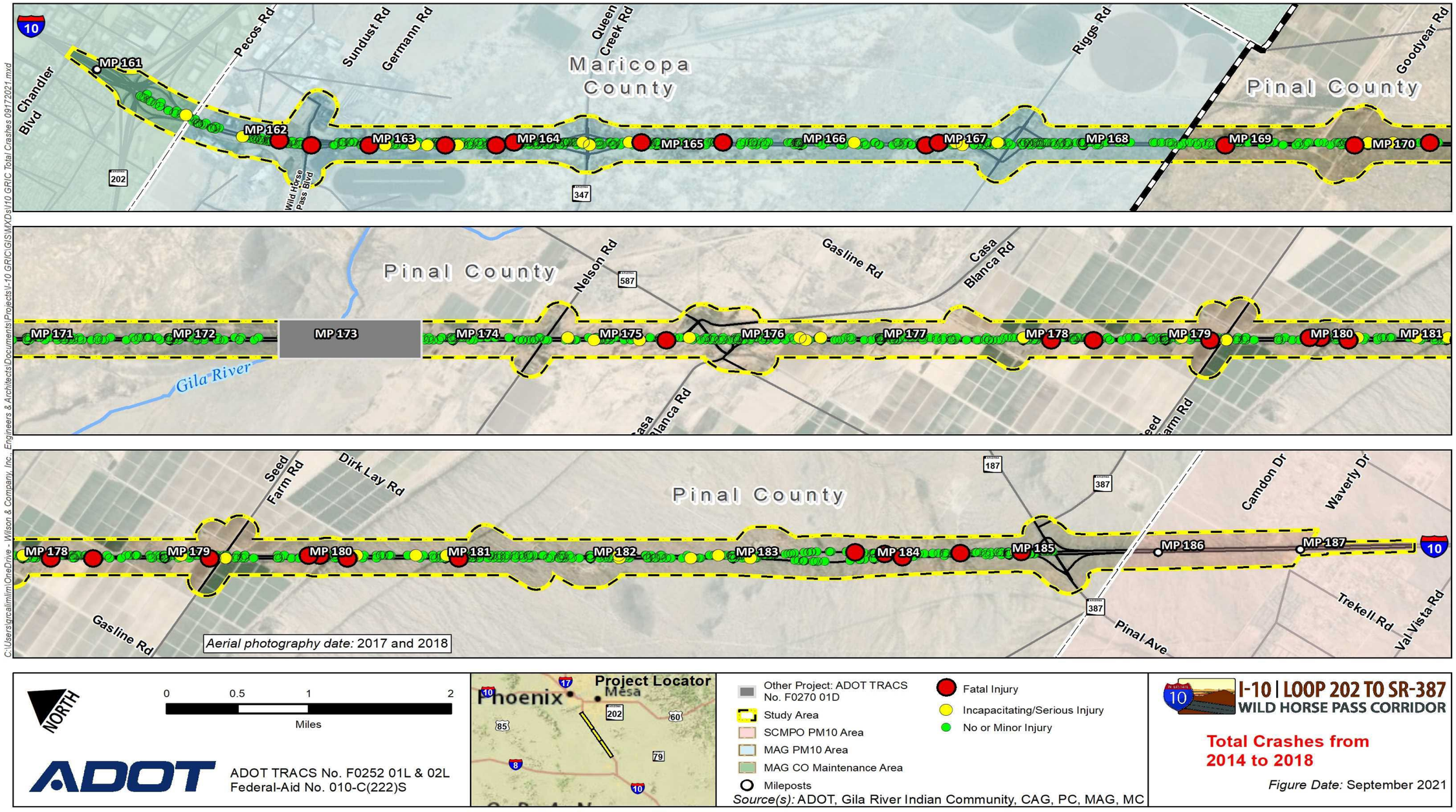

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Figure 2-43. 2014–2018 total crashes by severity and location

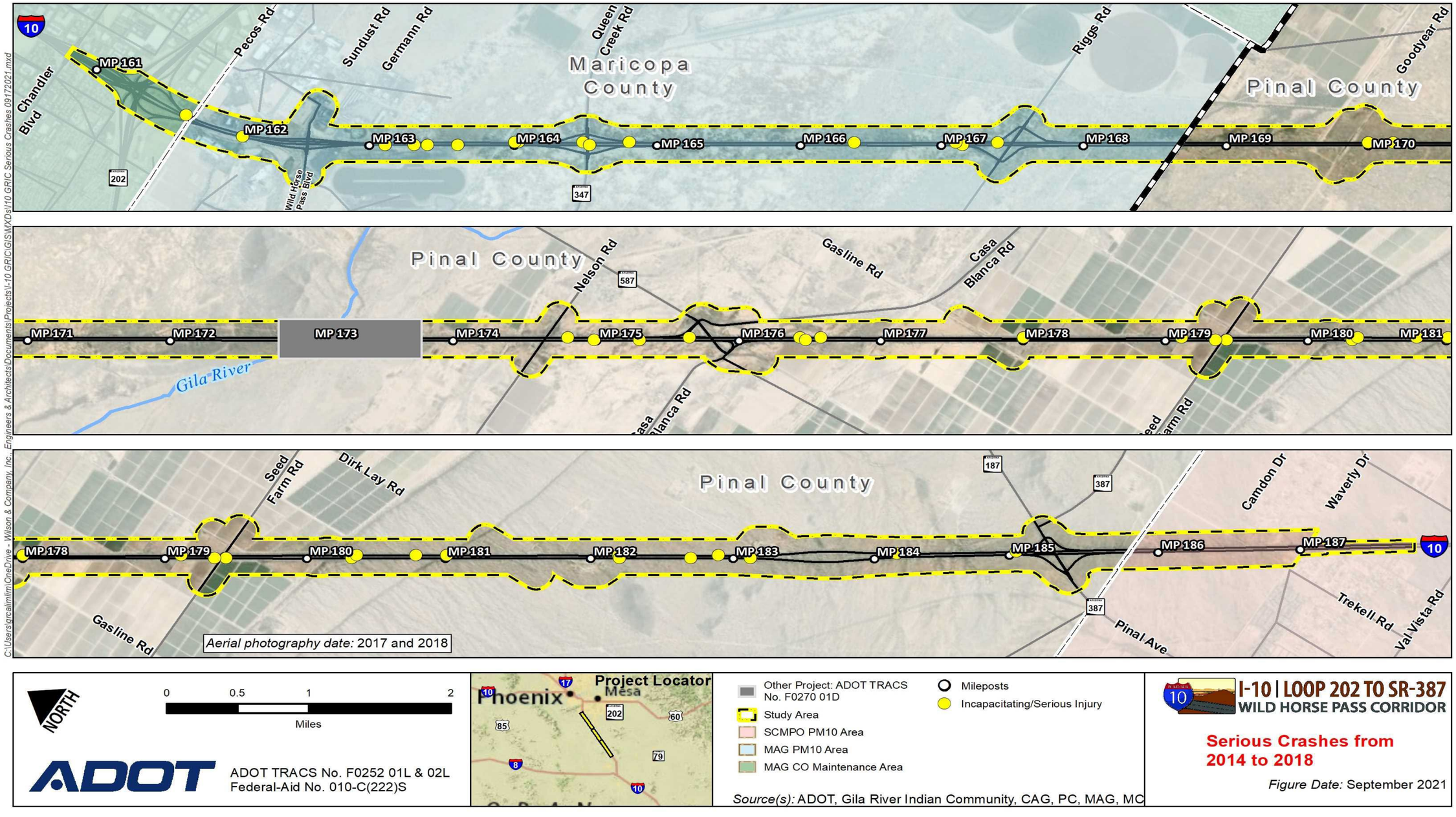

Figure 2-44. 2014–2018 serious injury crash locations

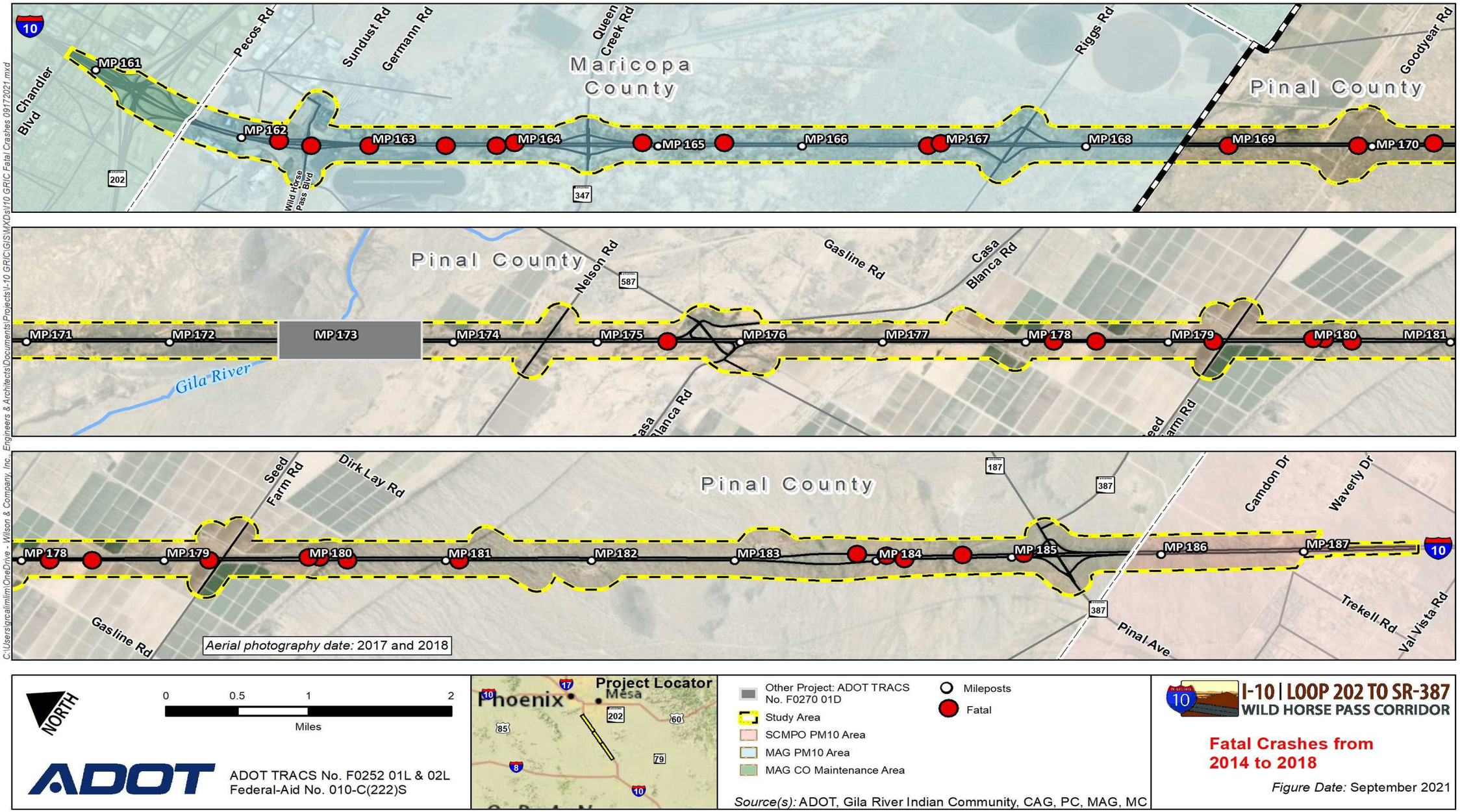

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Figure 2-45. 2014–2018 fatal crash locations

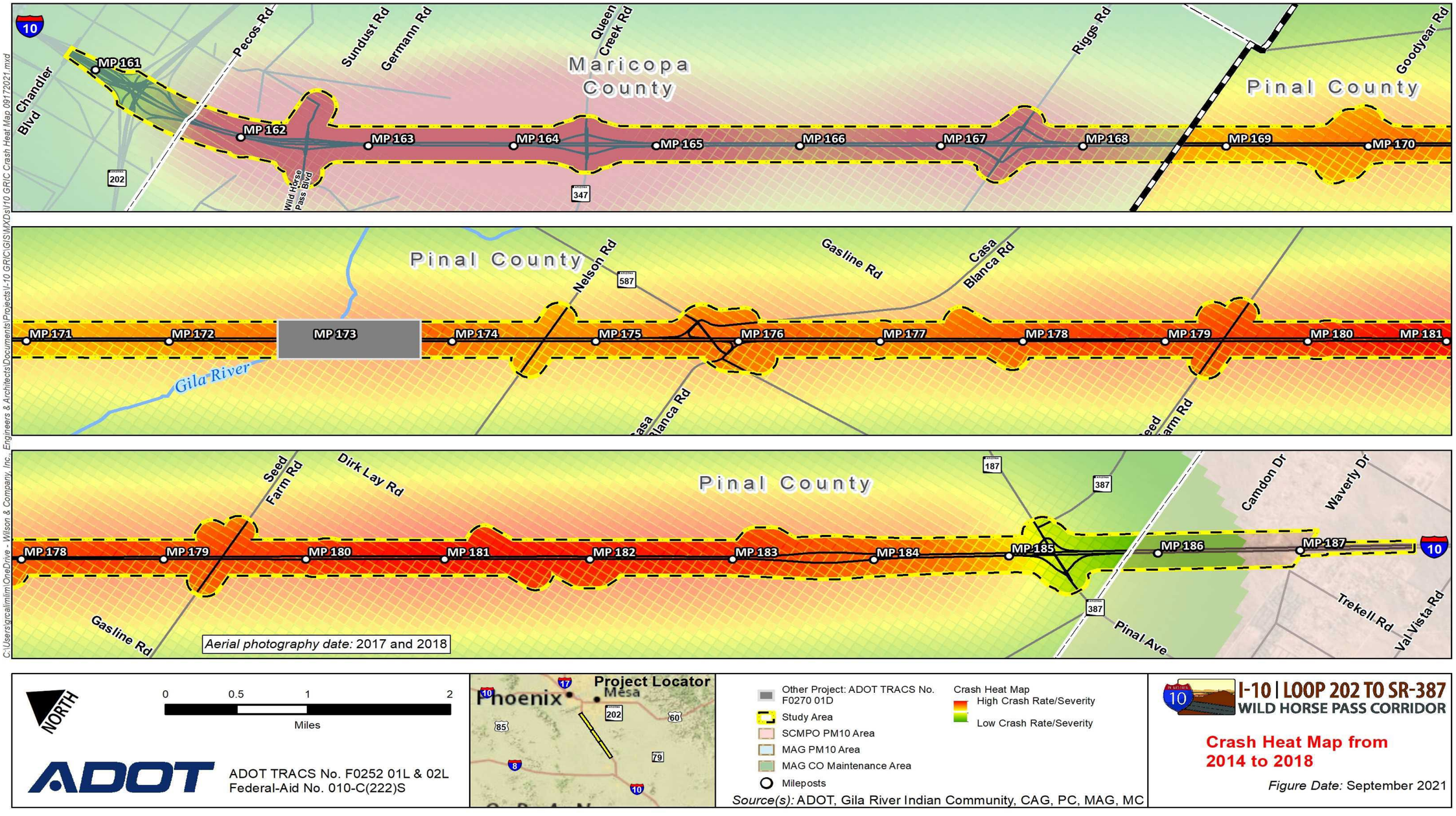

Figure 2-46. 2014–2018 study area crash heat map

2.9.2 Collision Types

The collision type provides definition to the manner and/or event of the incident resulting in a reported crash. The ADOT data represent a variety of crash characteristics defining collision type, including rear-end, single-vehicle, left-turn, sideswipe, angle, pedestrian/bicycle, and/or "other" collisions. The most common collision type indicates 937 (51 percent) of total crashes in the study area involved a rear-end collision with an annual average of 187 rear-end collisions. The second most common collision type involved single-vehicle related incidents, accounting for 515 (28 percent) of total crashes with an annual average of 103 single-vehicle collisions. Table 2-22 summarizes the statistical data for all reported collision types in the study area for the last 5 years.

Table 2-22. Collision types represented in the study area, 2014–2018

Year	Rear-end	Single-vehicle	Left-turn	Sideswipe	Angle	Pedestrian/ Bike	Other
2014	167	100	0	36	0	1	22
2015	129	102	0	52	0	0	19
2016	198	119	0	69	0	1	29
2017	227	83	0	55	0	0	19
2018	216	111	0	78	0	1	12
5-year total	**937**	**515**	**0**	**290**	**0**	**3**	**101**
Annual average	**187.4**	**103.0**	**0.0**	**58.0**	**0.0**	**0.6**	**20.2**

Table 2-22 indicates the second most common collision type involved single vehicles. Single-vehicle collisions consist of vehicles that strike any object other than another vehicle. ADOT crash data focus on three types of collisions: guardrail, attenuator crash cushions, and/or utility poles. Of the single-vehicle collisions that occurred near major TIs, 79 percent involved a guardrail, 18 percent involved an attenuator crash cushion, and 3 percent involved a utility pole (Figure 2-47).

Further analysis of the ADOT crash data revealed 33 collisions involved a serious injury and/or fatality. Of the serious injury/fatality crashes, 42 percent (14 crashes) occurred close to one of the major TIs identified in the study area (refer to Figure 2-48).

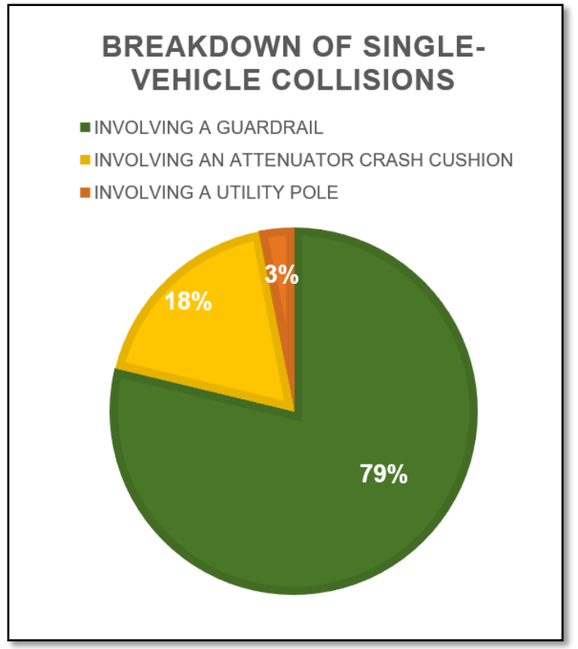

Figure 2-47. Single-vehicle collision types

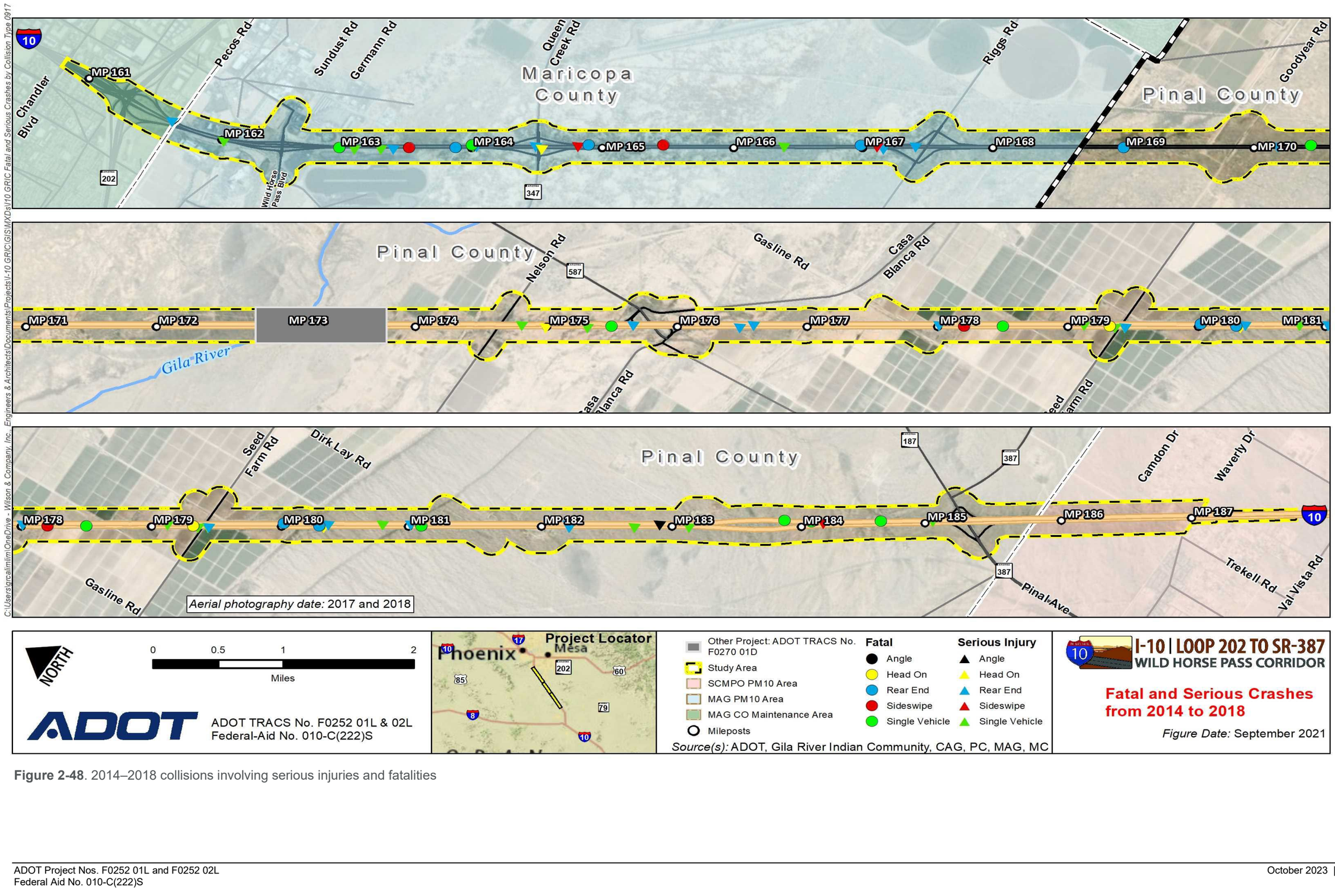

Figure 2-48. 2014–2018 collisions involving serious injuries and fatalities

2.9.3 Vehicle Operator Violations

Vehicle operator violation information is also reported with the incident crash data in the ADOT report. Vehicle violation data is used to designate whether a reported crash was the direct result of a particular action by the motorist. In some cases, a crash may be the result of multiple vehicle violations or none at all. The following list details actions that are categorized as vehicle violations according to ADOT: failure to yield, speeding, improper turning movement, drove in opposite lane, improper lane change, unsafe lane change, and unknown/none. Table 2-23 details all primary vehicle violations resulting in reported collisions in the study area during the 5-year period. According to reporting for the last 5 years, most primary violations that resulted in a collision were speeding-related, totaling 1,028 (56 percent) collisions and an annual average of 206 collisions.

Comparing the highest frequency of vehicle violations and highest frequency of collision types over time provides a visual demonstration of a possible correlation. Figure 2-49 illustrates the trend lines of rear-end collisions, speeding-related collisions, and total collisions and clearly shows a correlation.

Table 2-23. Summary of vehicle violations, 2014–2018

Year	Failed to yield	Speed too fast	Improper turn	Drove in opposing lane	Failed to keep in proper lane	Unsafe lane change	Other	Unknown/ none
2014	1	192	2	0	6	18	21	86
2015	1	145	2	0	7	27	23	97
2016	1	229	3	0	12	34	25	112
2017	1	236	1	2	5	28	27	84
2018	0	226	3	0	10	48	32	99
5-year total	**4**	**1,028**	**11**	**2**	**40**	**154**	**129**	**478**
Annual average	**0.8**	**205.6**	**2.2**	**0.4**	**8.0**	**30.8**	**25.8**	**95.6**

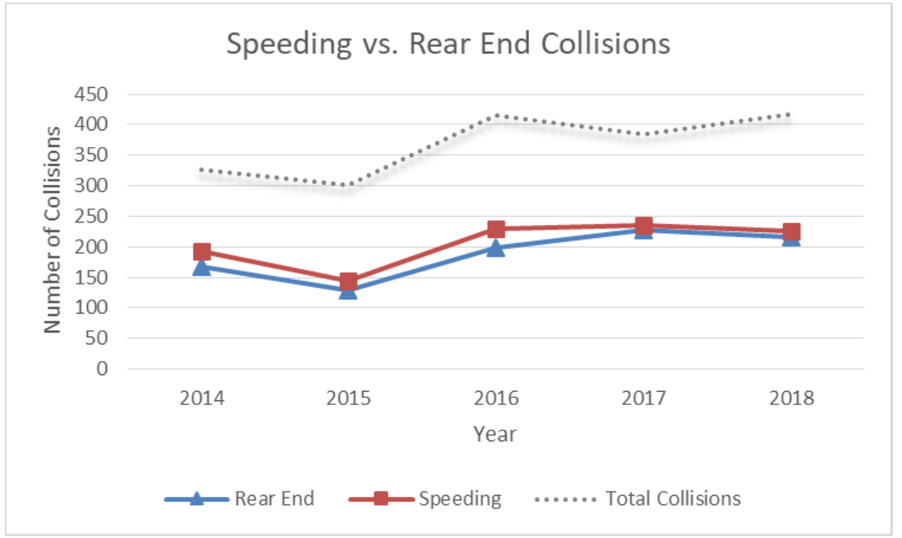

Figure 2-49. Rear-end and speeding collision correlation

2.9.4 Lighting Conditions

An additional crash characteristic analyzed in the study area is the lighting conditions present during incidents. Lighting conditions at the time a crash occurs are reported as one of the following: daylight, dusk, dark lighted, and dark unlit. Dark lighted indicates the collision took place in a location during dark hours with the presence of roadway lights. Conversely, dark unlit indicates the collision took place during dark hours where roadway lighting was either not present or not in operation. Lighting conditions may play a significant role in the frequency and severity of crash occurrences. Along I-10 in the study area, continuous roadway lighting exists only north of the Wild Horse Pass Boulevard TI ramps. The rest of I-10 in the study area lacks roadway lighting, except in areas of merging and diverging locations associated with the entrance and exit ramps at the following TIs:

- SR 347/Queen Creek Road
- Riggs Road
- SR 587/Casa Blanca Road
- eastbound (exit ramp only) and westbound (both ramps) rest areas
- SR 387/SR 187/Pinal Avenue

Table 2-24 presents a summary of lighting conditions reported for each collision during the 5-year period for which crash data were examined. The table shows there were 1,315 daylight crashes, with an annual average of 263 collisions. This compares to an average of only 100 crashes annually for all three of the other lighting conditions combined.

Table 2-24. Lighting conditions of crashes reported, 2014–2018

Year	Lighting condition				Highest crash frequency location (milepost)	
	Daylight	Dusk	Dark lighted	Dark unlit	WB segment only	EB segment only
2014	240	5	17	57	MP 164 – SR 347/Queen Creek Road exit ramp	MP 162 – Wild Horse Pass Boulevard exit ramp
2015	214	6	20	63	MP 178 – approximately ¼-mile south of Gasline Road overpass	MP 162 – Wild Horse Pass Boulevard exit ramp
2016	297	8	27	78	MP 164 – SR 347/Queen Creek Road exit ramp and MP 167 – Riggs Road exit ramp	MP 163 – SR 347/Queen Creek Road exit ramp
2017	267	13	18	82	MP 164 – SR 347/Queen Creek Road exit ramp	MP 162 – Wild Horse Pass Boulevard Road exit ramp
2018	297	9	25	77	MP 164 – SR 347/Queen Creek Road exit ramp	MP 162 – Wild Horse Pass Boulevard Road exit ramp
5-year total	**1,315**	**41**	**107**	**357**	--	--
Annual average	**263**	**8**	**21**	**71**	--	--

Table 2-24 also identifies the mileposts with the highest crash frequency each year. Three locations in the westbound direction are notable: mileposts 164, 167, and 178. Except for milepost 178, these locations are associated with the diverging traffic pattern at two exit ramps. In the eastbound direction, mileposts 162 and 163 are both locations are associated with diverging traffic patterns at two exit ramps.

Given the sparse roadway lighting in the study area, the data were further analyzed by location. Within the merging/diverging sections of I-10 associated with entrance/exit ramps, 71 percent of collisions occurred during daylight conditions, while 29 percent of collisions occurred during times where lighting conditions were considered dark. Furthermore, 57 percent of the 33 single-vehicle collisions occurred during times with daylight, and 43 percent occurred during times when lighting conditions were considered dark. Notably, 43 percent of all crashes involving serious injury or fatalities occurred during times when lighting conditions were considered dark.

2.9.5 Alternatives Safety Analysis

A high-level predictive crash analysis evaluated the safety impact of the Recommended Build Alternatives throughout the I-10 main line study area leading to 2050.

Methodology for Estimating Safety Impacts

Future year alternatives were evaluated by comparing the No-Build and Build Alternative future crash frequencies associated with crash modification factors (CMF) as defined by the ADOT *Corridor Profile Study* (2017). Development of the future crash frequencies involved a multistep process, outlined below:

Step 1. Referencing the historical 5-year crash data as presented in Sections 2.9.1 to 2.9.4, the crash sites were used to geospatially define localized segment boundaries within the 26-mile corridor to better estimate the correlation between similar operating environments and the empirical crash data.

Step 2. Using the years associated with the crash data, annual daily traffic volumes for the I-10 main line study area were obtained from the ADOT Traffic Count Database System and assigned to the respective localized segment.

Step 3. A baseline future crash frequency was predicted by assuming annual crash rates would remain constant for all localized segments using the existing I-10 facility; thus, total crashes would increase proportionally with increasing AADT forecasts. The baseline crash frequency represents the No-Build Alternative crash frequency.

Step 4. CMFs defined in the ADOT *Corridor Profile Study* corresponding to improvements associated with the Build Alternative were identified and assigned to each applicable localized segment (refer to Table 2-25 for the breakdown). The product of all attributable CMFs per localized segment and the related crash rates resulted in the crash frequency for the Recommended Build Alternative.

Alternative Safety Results Comparison

The resulting crash frequencies are depicted in Figure 2-50. In addition to predicting total annual future crashes, future crash severities were also estimated for each alternative by applying the historical distribution rate of crashes involving serious injuries and fatalities. Based on the analysis presented, the No-Build Alternative is expected to result in an annual average of 740 crashes, accumulating approximately 23,660 total crashes through 2050. Applying the crash severity distribution, approximately 330 crashes will involve a fatality (or about 10 fatal crashes per year) and 530 crashes will involve a serious injury (or about 20 serious injury-related crashes per year).

The Build Alternative is expected to result in an annual average of approximately 370 crashes, accumulating to roughly 11,740 total crashes through 2050. Applying the crash severity distribution, approximately 170 crashes will involve a fatality (or about 5 fatal crashes per year) and 260 crashes will involve a serious injury (or about 8 serious injury related crashes per year). Table 2-26 summarizes the results. Refer to Appendix F, *Safety Data*, for a detailed breakdown of the crash prediction analysis.

Based on the crash estimates, the Build Alternative is expected to result in a reduction of approximately 11,920 total crashes, 160 fatal crashes, and 270 serious injury crashes, and thus increase safety by a factor of 2 overall between now and 2050.

Table 2-25. ADOT crash modification factors defined in corridor profile study

Name	Description	CMF	Source	I-10 improvement	Applicable segment(s)
Infrastructure improvement					
Construct entrance/exit ramp	Cost per ramp; includes pavement, striping, signing, raised pavement markers (RPMs), lighting, typical earthwork and drainage; does not include any major structures or improvements on crossroad	1.09	Average of 16 values on clearinghouse; for adding a ramp not reconstructing. CMF applied to crashes 0.25 mile upstream/downstream from the gore.	Construct Seed Farm Road TI	SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue
Relocate entrance/exit ramp	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, typical earthwork, drainage and demolition of existing ramp; does not include any major structures or improvements on crossroad	1.00	Assumed to not add any crashes since the ramp is simply moving and not being added. CMF applied to crashes 0.25 mile upstream/downstream from the gore.	Reconstruct SR 587/Casa Blanca Road TI	SR 347/Queen Creek Road off ramp to on ramp (WB and EB), SR 587/Casa Blanca Road off ramp to on ramp (WB and EB), SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue
Modify entrance/exit ramp	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, minor earthwork, and drainage; for converting existing ramp to parallel-type configuration	0.21	Average of 4 values from clearinghouse (for exit ramps) and equation from HSM (for entrance ramp). CMF applied to crashes within 1/8 mile upstream/downstream from the gore.	Reconstruct SR 587/Casa Blanca Road TI	SR 587/Casa Blanca Road off ramp to on ramp (WB and EB)
Roadside design					
Install cable barrier	In median	0.81	0.81 is average of 5 values from clearinghouse	Install barrier from Riggs Road to south project limits	Riggs Road off ramp to on ramp (WB and EB), Riggs Road to SR 587/Casa Blanca Road, SR 587/Casa Blanca Road off ramp to on ramp (WB and EB), SR 587/Casa Blanca Road to SR 387/SR 187/Pinal Avenue, SR 387/SR 187/Pinal Avenue off ramp to on ramp (WB and EB), SR 387/SR 187/Pinal Avenue to south project limits
Widen shoulder (asphalt concrete [AC])	Assumes existing 10-foot right shoulder and 4-foot left shoulder, includes widening right shoulder by a total of 2 feet and left shoulder by 8 feet; new pavement for new width and mill and replace existing shoulder widths; includes pavement, minor earthwork, striping edge lines, RPMs, high-visibility delineators, safety edge, and rumble strips	0.68 (1–4 feet) 0.64 (≥ 4 feet)	Based on average values from clearing house as determined in the ADOT corridor profile studies.	Entire corridor	All segments
Widen corridor					
Construct new general-purpose lane (AC)	For addition of one general-purpose lane (AC) in one direction; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.90	North Carolina Department of Transportation uses 0.90 and Florida Department of Transportation uses 0.88	Add general-purpose lane in each direction entire corridor	All segments
Construct HOV lane	For addition of one HOV lane (AC) in one direction with associated signage and markings; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.95	Similar to general purpose lane	Extend HOV lane in each direction from SR 202L to Riggs Road	SR 202L to Wild Horse Pass Boulevard, Wild Horse Pass Boulevard off ramp to on ramp (WB and EB), Wild Horse Pass Boulevard to SR 347/Queen Creek Road, SR 347/Queen Creek Road off ramp to on ramp (WB and EB), SR 347/Queen Creek Road to Riggs Road
Intelligent Transportation Systems (ITS) potential					
The I-10 Build Alternative involves the installation of a ground fiber optic network, introducing the viability of future ITS improvements along the corridor. ITS safety enhancements along the I-10 corridor might include variable speed limits, additional dynamic messaging signing, CCTV cameras, driver alert systems, and weather alert systems. Note that these ITS enhancements are for future project identification potentials and not included in the Build Alternative or used for the limited predictive crash analysis.					

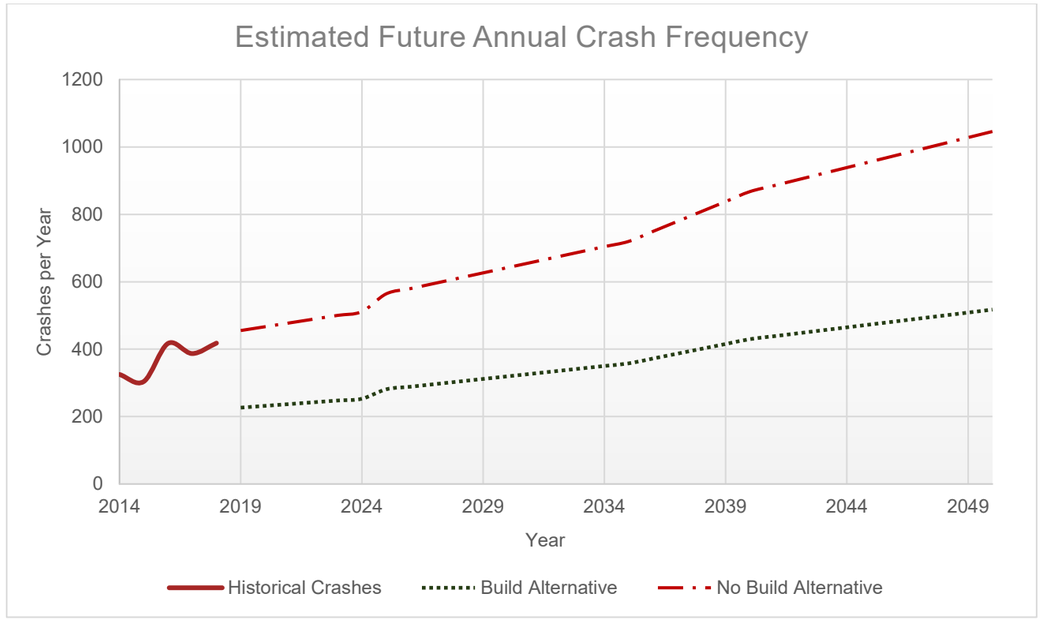

Figure 2-50. Future crash comparison of No-Build and Build Alternatives

Table 2-26 Future crash comparison of No-Build and Build Alternatives

Year	No-Build Alternative			Build Alternative		
	Total	Fatal	Serious	Total	Fatal	Serious
2019	455	6	10	227	3	5
2020	467	7	10	232	3	5
2021	478	7	11	237	3	5
2022	489	7	11	242	3	5
2023	500	7	11	248	4	5
2024	512	7	11	253	4	6
2025	564	8	13	281	4	6
2026	580	8	13	289	4	6
2027	595	8	13	296	4	7
2028	611	8	14	304	4	7
2029	626	9	14	312	4	7
2030	642	9	14	319	5	7
2031	658	9	15	327	5	7
2032	673	9	15	335	5	7
2033	689	10	15	343	5	8
2034	704	10	16	350	5	8
2035	720	10	16	358	5	8
2036	749	10	17	372	5	8
2037	779	11	17	387	6	9
2038	808	11	18	401	6	9
2039	838	12	19	415	6	9
2040	868	12	19	430	6	9
2041	885	12	20	439	6	10
2042	903	12	20	447	6	10
2043	921	13	21	456	6	10
2044	939	13	21	465	7	10
2045	957	13	21	474	7	10

Year	No-Build Alternative			Build Alternative		
	Total	Fatal	Serious	Total	Fatal	Serious
2046	975	13	22	482	7	11
2047	992	14	22	491	7	11
2048	1,010	14	23	500	7	11
2049	1,028	14	23	509	7	11
2050	1,046	14	23	517	7	11
Total	**23,660**	**330**	**530**	**11,740**	**170**	**260**
Annual average	**740**	**10**	**20**	**370**	**5**	**8**

3 Design Concept Alternatives

3.1 Introduction

In response to the public and agency scoping process, the subsequent development of the project's purpose and need, and the traffic and crash analysis detailed in Chapter 2, the study team developed a range of reasonable alternatives and options to address the study objectives. Because the study limits consist of the I-10 mainline, five TIs, and five grade-separated crossroads, the alternatives study was divided into discreet components. Three alternatives (including the no-build alternative) were developed for the I-10 main line component. Similarly, each of the 10 crossroads represented their own components with a range of options for each location, including a no-build option. Finally, a build and a no-build option were evaluated for a fiber optic trunk line within the I-10 corridor. This compartmentalization simplified the presentation and documentation of the alternatives being considered because numerous alternative/option combinations could be created depending on which alternative and option were selected for each component.

This chapter starts by discussing the design concept alternatives that were considered and eliminated in the early phases of the study (Section 3.2). The eliminated alternatives had a fatal flaw, or represented a design that was impractical for the site, or did not address the purpose and need.

Section 3.3 discusses in detail the features of all the alternatives and options developed. This includes three alternatives for the I-10 main line, consisting of the no-build alternative, an inside or median widening alternative, and an outside widening alternative. Forty TI/crossroad options were studied in detail, with each TI/crossroad having at least three options and each including a no-build option. Finally, build and no-build options were developed for the fiber optic trunk line. The features of each of these are included in this chapter.

Section 3.4 of this chapter summarizes the evaluation that compared each alternative and option using 7 engineering, 15 environmental, 2 cost, and 12 ROW criteria. The results of this evaluation are summarized in a series of matrices.

The final section of this chapter, Section 3.5, summarizes the public involvement activities used to collect public feedback on the alternatives and options.

3.2 Design Concept Alternatives Considered and Eliminated

3.2.1 I-10 Main Line

The project's purpose and need generally focused on how to reduce the growing traffic congestion on this segment of I-10. Both a median and outside widening build alternative were developed to expand I-10 to three lanes in each direction—although, as Chapter 2 demonstrates, future studies for additional capacity may be needed. This study focused instead on only expanding I-10 to three lanes in each direction to address the current corridor needs and issues.

Transit or rail alternatives within the I-10 corridor were also considered and eliminated because they have been addressed separately through ADOT's Passenger Rail Study, which considered rail service between Tucson and Phoenix and was completed in 2016. The Tier 1 Environmental Impact Statement for the rail study recommended a passenger rail corridor around the eastern boundary of the Community, generally through the San Tan Valley and Coolidge—eliminating alternatives that used I-10 through the Community.

Details about the passenger rail study can be found at this website:

- https://azdot.gov/planning/transportation-programs/state-rail-plan/passenger-rail-study-tucson-phoenix

The construction of new off-alignment freeways was also considered and eliminated because over the last 10 years, ADOT has been studying routes for two new freeways that generally parallel I-10 through this study's limits—one to the east called the North-South Freeway and one to the west called Interstate 11. The study websites for both are below:

- https://azdot.gov/planning/transportation-studies/north-south-corridor-study-proposed-new-transportation-route-pinal
- http://i11study.com/Arizona/index.asp

3.2.2 Crossroads and Traffic Interchanges

Generally, all reasonable options for the grade-separated crossroads were considered, including, in most cases, options that rehabilitated and widened the crossroads and options that replaced the crossroads. However, there are many ways in which a bridge could be widened or a crossroad be realigned. The options considered in this study represent the most reasonable versions of these options based on the known site conditions, ROW considerations, environmental impacts, constructability, utility conflicts, etc. Should this project advance into final design, a more detailed analysis may ultimately identify slightly different configurations of each option. This is a normal part of the design process.

The same is true of the TIs. This study focused on developing the TI configurations that met the future traffic demand while minimizing ROW and environmental impacts. As such, loop ramp and third-level flyover ramps were considered and eliminated because, in most cases, they would require large amounts of ROW, would not adequately address future traffic demand, or would create I-10 main line weaving concerns. This issue was most prominent at the SR 347/Queen Creek Road TI but could have applied at any of the existing TIs. In addition, the range of options focused on solutions that met the purpose and need and that operated acceptably with the projected 2040 traffic volumes. More expensive, complex, or larger footprint TI options could have met these criteria but were deemed to be an "over design" for the purpose of this study and were, therefore, not considered. Finally, while numerous TI ramp terminal control designs are available (stop signs, signals, roundabouts), the most driver-expectant configuration or logical type was proposed at each location given the site constraints.

The study team spent a considerable amount of time considering TI concepts for the SR 587/Casa Blanca Road TI. As Section 3.3.2 explains, 7 TI options (1 no-build and 6 build options) were studied in detail at this location. However, before the study team arrived at these 7 TI options, a total of 14 concepts were developed, with 7 concepts being eliminated from consideration early in the study for a variety of reasons. Twelve of these concepts were revisited from previous I-10 studies using this study's2040 traffic projections. Figure 3-1 illustrates these 12 concepts and the reasons for eliminating 8 from consideration. Two other concepts were developed, including a diverging diamond concept that was dropped from consideration because its configuration did not seem appropriate for a rural setting, and another that would become option CB7. Alternative 9 in Figure 3-1 was quickly dropped because a cursory operational analysis indicated it would not operate acceptably. Those concepts that survived became the 6 build options evaluated in detail for that TI.

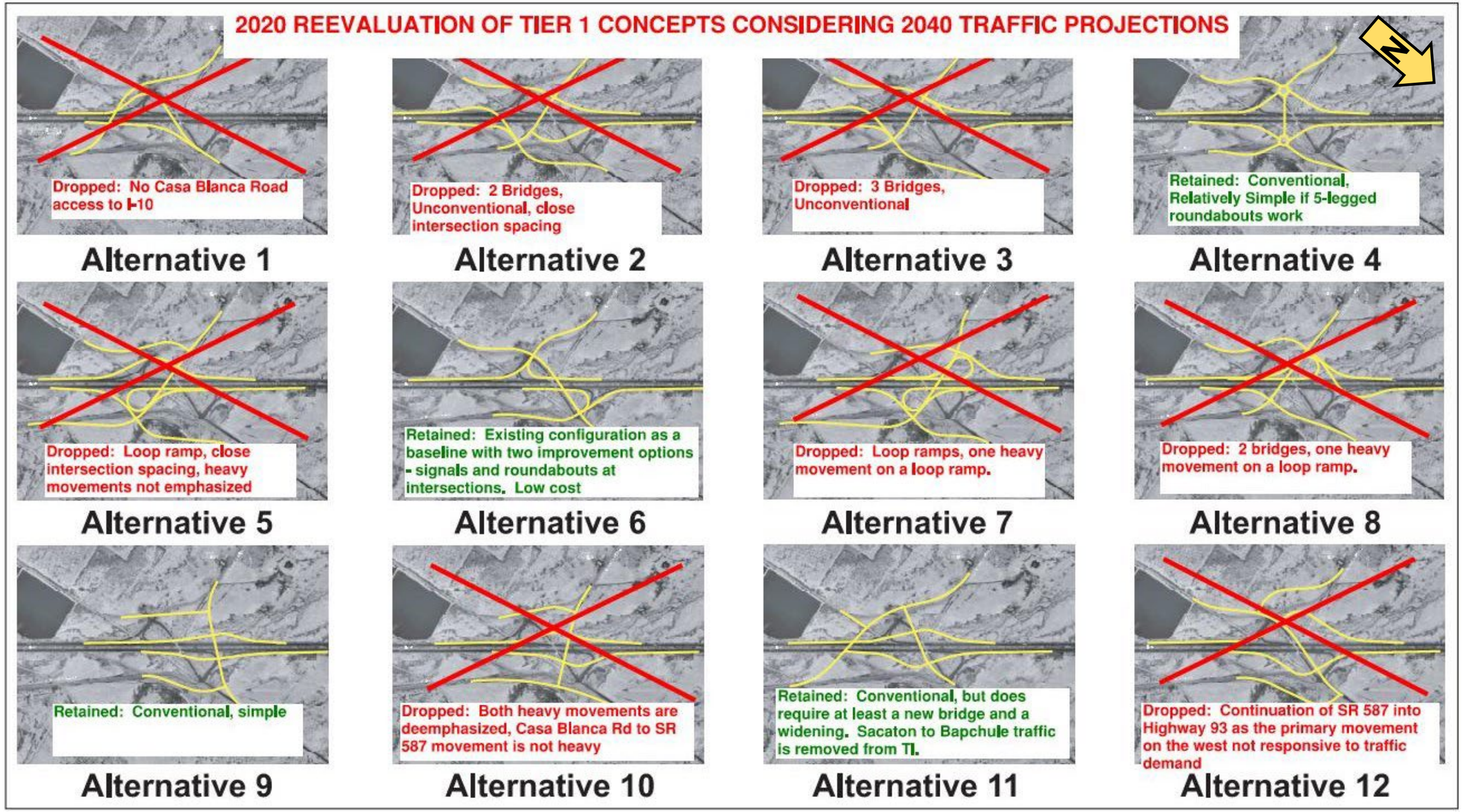

Figure 3-1. Concepts eliminated at the Interstate 10 and State Route 587/Casa Blanca Road traffic interchange

3.3 Design Concept Alternatives/Options Studied in Detail

3.3.1 I-10 Main Line Alternatives

ML1: No-Build Alternative

ML1 is the no-build alternative for I-10 and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are included in ML1. ML1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the main line build alternatives.

ML2: Main Line Alternative 2

General Description

ML2 proposes widening I-10 toward the inside or median side of I-10, holding the existing outside edge of pavement as the proposed outside edge. Generally, this concept adds 23 feet of widening each direction so that one additional 12-foot lane and 12-foot inside and outside shoulders are created. In addition, from SR 202L to Riggs Road, an extra 12 feet is added to create an HOV lane in each direction, closing the median with a concrete median barrier. Ramp gores are also reconstructed into parallel-type entry and exit configurations. See Figure 3-2 for the typical sections for this alternative.

Roadway Features

The proposed horizontal alignment for I-10 would remain the same as the existing I-10 centerline. The existing stationing would remain the same, adjusted slightly to match current surveying control tie points. The proposed I-10 vertical alignment would generally remain the same as the existing I-10 vertical alignment, however, some I-10 reprofiling is expected in a few locations to restore vertical clearance under existing bridges that are proposed to remain. Furthermore, the directional I-10 roadway widenings may be crowned rather than constructed at a constant outside pitched cross slope to also mitigate vertical clearance issues at existing bridges that will remain. If applicable, these reprofile and crowning locations are noted in the plans for the preferred alternative.

The proposed ramp horizontal alignments in the vicinity of the gores would be realigned to convert them to parallel entrance and exit ramps. They would also be revised to have longer acceleration and deceleration lengths as well as standard superelevation transitions. The proposed ramp vertical alignments would also remain as close as possible to the existing alignments, but adequate to support the upgraded horizontal geometry changes.

The proposed typical section would vary depending on the location on I-10. North of Riggs Road, I-10 would have an additional 12-foot general purpose lane and a 12-foot HOV lane added in each direction toward the median. Both the inside and outside shoulders would also be upgraded to 12-foot shoulders while holding the outside edge of pavement. A concrete barrier would run in the median separating the directions of traffic. South of Riggs Road, I-10 would have only one additional 12-foot general purpose lane in each direction toward the median. The inside and outside shoulders would also be increased to 12 feet, also by holding the existing outside edge of pavement. A median cable barrier (or some other median barrier system) would extend the length of the median from Riggs Road to the southern project limits. The cross slope for both north and south would match the existing cross slope of 1.5% sloped to the outside; however, because of vertical clearance concerns on some of the crossroad bridges, the cross slope of each direction of travel may have to be crowned to restore vertical clearance.

For approximately three-quarters of a mile immediately south of milepost 183, the eastbound and westbound I-10 roadways bifurcate as they pass through the Sacaton Mountains and cut through shallow bedrock. Like the rest of the corridor, all widening would be done only to the median side of I-10. Because of the bifurcation, a median barrier system would not be required in this segment—however, the concrete barrier along the left side of the roadway through the rock cuts would need to be replaced.

Bridge Features

The only bridges that I-10 passes over in the corridor are the two bridges over the Gila River, and neither are part of this study. The status of the 10 TI/crossroad bridges that pass over I-10 are subject to the TI/crossroad options noted below, and are generally independent of ML2, except as it relates to the vertical clearances. There are two exceptions. Because of the north-to-south alignment and resulting high skewed crossings of Gasline and Dirk Lay Roads, the five-span bridge configurations limit the I-10 median widening associated with ML2, requiring lane and shoulder width design exceptions if not removed. As such, ML2 could only be constructed with no design exceptions, assuming the Gasline and Dirk Lay Road bridges are removed at a minimum and replaced if necessary.

Right-of-way Requirements

This alternative anticipated 1.13 acres of new ROW easements along I-10 to accommodate the alternative's improvements. All these easements would be near where the TI ramp gore modifications are needed. About 20 percent was expected to be tribal land, while about 80 percent was expected to be from four allotment parcels at the Queen Creek Road and Riggs Road TIs. These areas are primarily related to upgrading the ramp gore geometry at several TIs.

Traffic Operations

In 2040, morning traffic would take approximately 32 minutes along westbound I-10 to travel the limits of the project (saving 10 minutes compared with the no-build condition). In 2040, afternoon traffic would take approximately 31 minutes (saving 8 minutes compared with the no-build condition) along eastbound I-10 to travel the limits of the project. The expected LOS north of Riggs Road would be E or F, while the expected LOS south of Riggs Road would be D or better.

Constructability and Maintenance of Traffic

The majority of the ML2 widening would be accomplished with an inside shoulder closure and possible a lane shift toward the outside, protected by temporary concrete barrier. Other short term I-10 closures, restrictions, or detours may be needed for any overhead bridge work (removals, setting girders, concrete deck pours, etc.) depending on which crossroad options are ultimately selected. Ramp closures for up to several weeks may be needed for the ramp gore modifications.

Drainage Features

This alternative would require drainage modifications including, at a minimum, median inlet reconstruction. It is likely that most of the metal culvert pipes under I-10 are in poor, degraded condition and would need to be replaced. This study assumes this is the case, so all metal culvert pipes would be replaced using jack-and-bore construction to minimize impacts on I-10 traffic. Any modifications to the crown at the crossroad bridges may require additional median drainage infrastructure. All remaining box and pipe culverts would have to be extended if they are not already connected in the median.

Utility Impacts

No utility impacts are anticipated with ML2. However, a more detailed utility impact assessment would be needed as the project design advances. For a complete list of utilities in the corridor, refer to Section 1.3.5, *Utilities*.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this alternative.

- http://i10wildhorsepasscorridor.com/resources.html

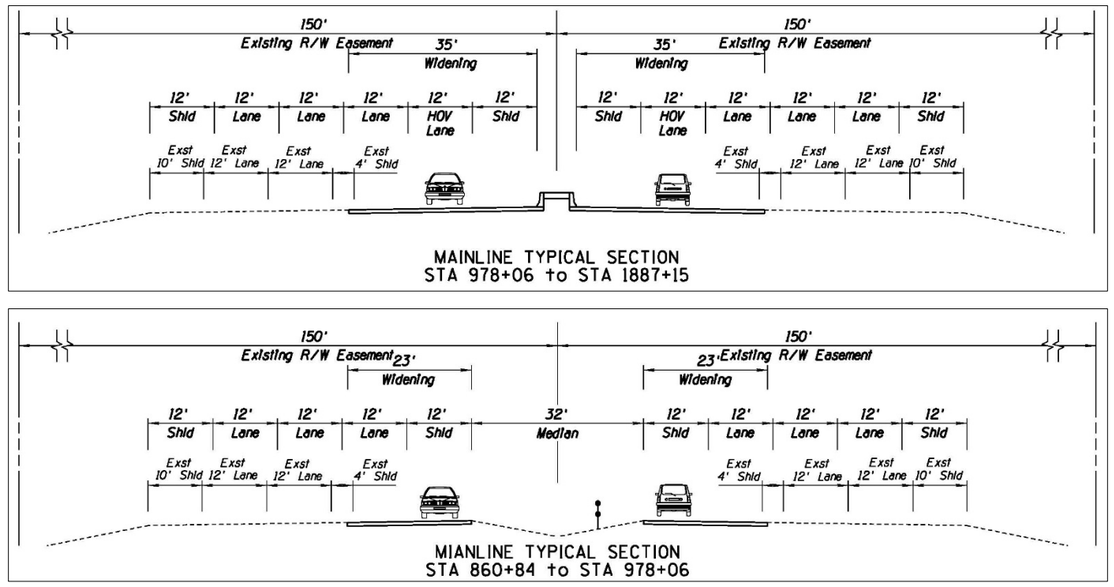

Figure 3-2. Alternative ML2 typical sections

ML3: Main Line Alternative 3

General Description

ML3 proposes widening I-10 to the outside by adding one additional general purpose lane in each direction to the outside of the freeway. In addition to the general purpose lanes, it also proposes extending the HOV lane from SR 202L to Riggs Road in each direction, but this widening would be toward the median. Twelve-foot shoulders would be provided for both the inside and outside edges throughout. Combined, this results in 15 feet of widening to the outside, and either 9 or 21 feet of widening to the median for south of Riggs Road and north of Riggs Road, respectively. Ramp gores would also reconstructed into parallel-type entry and exit configurations, which would accommodate the outside widening. See Figure 3-3 for the typical sections for this alternative.

Roadway Features

The proposed horizontal alignment for I-10 would remain the same as the existing I-10 centerline. The existing stationing would remain the same, adjusted slightly to match current surveying control tie points. The proposed I-10 vertical alignment would generally remain the same as the existing I-10 vertical alignment; however, some I-10 reprofiling is expected in a few locations to restore vertical clearance under existing bridges that are proposed to remain. Furthermore, the directional I-10 roadway widenings may be crowned rather than constructed at a constant outside pitched cross slope to also mitigate vertical clearance issues at existing bridges that would remain. If applicable, these reprofile and crowning locations are noted in the plans for the preferred alternative.

The proposed ramp horizontal alignments in the vicinity of the gores would be realigned to convert them to parallel entrance and exit ramps and to accommodate the outside widening. They would also be revised to have longer acceleration and deceleration lengths as well as standard superelevation transitions. The proposed ramp vertical alignments would also remain as close as possible to the existing alignments, but adequate to support the upgraded horizontal geometry changes.

The proposed typical section would vary depending on the location on I-10. North of Riggs Road, I-10 would have an additional 12-foot general purpose lane and a wider 12-foot outside shoulder added to the outside of I-10 in both directions using a 15-foot widening. Additionally, a 12-foot HOV lane and 12-foot shoulder would be added in each direction toward the median through a 21-foot widening. South of Riggs Road, I-10 would add one 12-foot general purpose lane and a 12-foot outside shoulder in each direction on the outside of I-10 with a 15-foot widening but would also widen the existing 4-foot inside shoulder to 12 feet through a 9-foot widening. A median cable barrier (or some other median barrier system) would extend the 26-mile length of the corridor. The cross slope for both north and south would match the existing cross slope of 1.5% sloped to the outside; however, given vertical clearance concerns on some of the crossroad bridges, the cross slope of each direction of travel may have to be crowned to restore vertical clearance.

For approximately three-quarters of a mile immediately south of milepost 183, the eastbound and westbound I-10 roadways bifurcate as they pass through the Sacaton Mountains and cut through shallow bedrock. Within this segment of I-10 for ML3, all widening would be done only to the median side of I-10 to limit the rock excavation to only one side of the roadways. Furthermore, the median barrier system would not be required in this segment (except for the concrete barriers in the rock cut sections).

Bridge Features

The only bridges that I-10 passes over in the corridor are the two bridges over the Gila River, and neither are part of this study. The status of the 10 TI/crossroad bridges that pass over I-10 are subject to the TI/crossroad

options noted below, and while the options are intended to be independent of ML3, there are certain crossroad options that are incompatible with ML3. Eight of the 10 TI/crossroad bridges have bridge piers that would directly conflict with the proposed ML3 widening, so, in those cases, only the bridge replacement options are compatible with ML3 (unless lane and shoulder width design exceptions or a main line traffic shift are used). The two exceptions are the existing Wild Horse Pass Boulevard TI and SR 347/Queen Creek Road TI bridges, which would be fully compatible with ML3.

Assuming all the 1960s-era bridges are replaced to avoid design exceptions, no vertical or lateral clearance issues would exist in the corridor.

Right-of-way Requirements

This alternative anticipated 85.22 acres of new ROW along I-10 to be constructed. Approximately 50 percent of that ROW would come from tribal land, while the other 50 percent would come from 190 allotted parcels. There would also be nine billboard relocations on tribal land and six billboard relocations on allotted parcels. This is required to expand the ROW by approximately 15 feet on each side for the length of the corridor.

Traffic Operations Summary

In 2040, morning traffic would take approximately 32 minutes along westbound I-10 to travel the limits of the project (saving 10 minutes compared with the no-build condition). In 2040, afternoon traffic would take approximately 31 minutes (saving 8 minutes compared with the no-build condition) along eastbound I-10 to travel the limits of the project. The expected LOS north of Riggs Road would be E or F, while the expected LOS south of Riggs Road would be D or better.

Constructability and Maintenance of Traffic

Because ML3 requires widening along both sides of I-10, these widening would likely be accomplished with two construction phases: one phase for the median work and a second phase for the outside widening. This would be necessary to maintain at least one usable shoulder through the corridor during each phase. Traffic shifts would be needed for each phase, and each phase would be protected by temporary concrete barrier. Other short term I-10 closures, restrictions, or detours may be needed for any overhead bridge work (removals, setting girders, concrete deck pours, etc.) depending on which TI/crossroad options are ultimately selected. Ramp closures for up to several weeks may be needed for the ramp gore modifications.

Drainage Features

This alternative would heavily affect existing drainage structures in the corridor. All of the median catch basins would have to be adjusted or replaced entirely. Any modifications to the crown at the TI/crossroad bridges would require additional drainage infrastructure. All box and pipe culverts would have to be extended or replaced.

This alternative would require drainage modifications to the median inlets and the outside extension of all culverts under I-10 designated to remain. Like ML2, it is likely that most of the metal culvert pipes under I-10 are in poor, degraded condition and would need to be replaced. This study assumes this is the case, so all metal culvert pipes would be replaced through jack-and-bore construction to minimize impacts on I-10 traffic, but in the case of ML3, these culverts would also have to be lengthened to accommodate the outside widening. All remaining box and pipe culverts would have to be extended if they are not already connected through in the median.

Utility Impacts

No utility impacts are anticipated with ML3. However, a more detailed utility impact assessment would be needed as the project design advances. For a complete list of utilities in the corridor, refer to Section 1.3.5, *Utilities*.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this alternative.

- http://i10wildhorsepasscorridor.com/resources.html

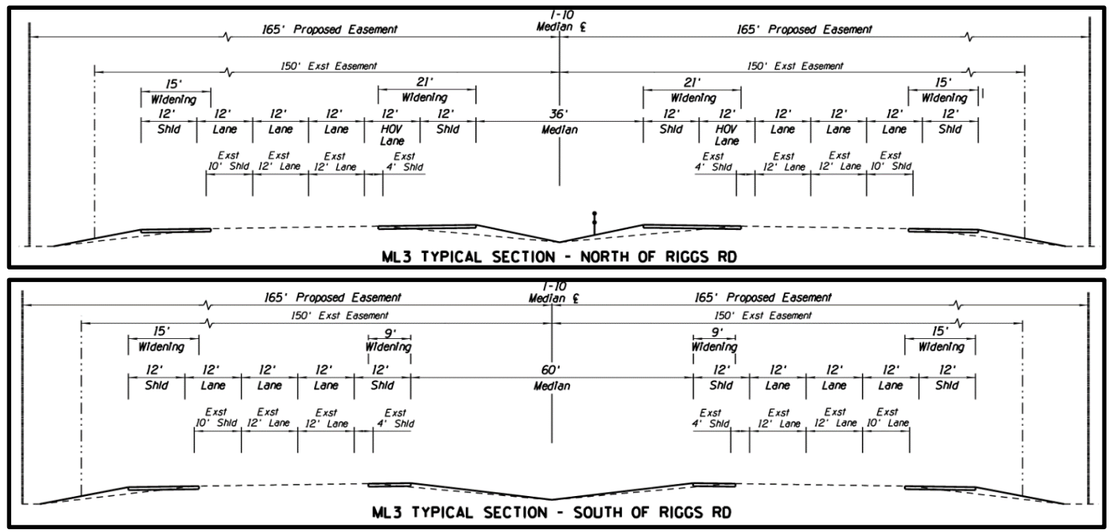

Figure 3-3. Alternative ML3 typical sections

3.3.2 Crossroads and Traffic Interchanges

WH1: Wild Horse Pass Option 1

General Description

WH1 is the no-build option for the Wild Horse Pass Boulevard TI and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with WH1. WH1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Wild Horse Pass Boulevard TI build options.

WH2: Wild Horse Pass Option 2

General Description

WH2 proposes reconstructing the existing diamond-style TI into a diverging diamond interchange (DDI). Most of the improvements would be concentrated on Wild Horse Pass Boulevard and Sundust Road, reconfiguring the crossroad approaches to the TI, reconstructing the ramp terminals, reversing the flow between the ramp terminals, using the existing bridge for eastbound traffic, and constructing a new adjacent bridge to the south for westbound traffic. This option would be compatible with both ML2 and ML3. See Figure 3-4 for the layout for this option.

Roadway Features

The horizontal alignment of Wild Horse Pass Boulevard would be split in two: one alignment for each direction of traffic. The horizontal alignments for the ramps would be shifted outward to tie into the new configuration. The vertical alignment for the eastbound traffic would match the existing road as closely as possible over the existing bridge to allow for its continued use in the new configuration. The vertical alignment for the westbound traffic would be roughly match the existing bridge and would be high enough to achieve at least 16.5 feet of vertical clearance.

The proposed typical section of this option would be a split roadway with a normal cross slope of 2% to the outside. The new configuration would have four eastbound lanes across the existing bridge and three westbound lanes across the new bridge with 10-foot shoulders across both bridges. A 5-foot bike lane would be provided for both directions throughout the TI. The existing bridge currently has a crown section today, so that crown line would be held near a lane line for the eastbound lanes; detailed staking would be needed to tie into this existing bridge. Pedestrian access through the TI would be provided with 5-foot-wide raised concrete sidewalks on both sides of the road, except across I-10 where the sidewalk would be at least 10 feet, would be two-way, would be located in between the two roadways (the preferred pedestrian treatment within DDIs), and would be separated from traffic by 32-inch-tall roadway barriers. Because this DDI is a conversion of an existing diamond, this pedestrian walkway over I-10 would be located along the southern edge of the existing bridge. All the existing and new sidewalk and curb ramps would be ADA-compliant.

Bridge Features

This option proposes a new bridge to be constructed to the south of the existing bridge. This new bridge would be 54 feet wide to accommodate the proposed roadway typical section. The pier and abutment locations would follow the same pattern as the existing bridge and the minimum vertical clearance would be at least 16.5 feet. The existing bridge would remain with no structural modifications, but some minor deck work (raised curbing, barriers, etc.) would be required to accommodate the proposed typical sections.

Right-of-way Requirements

This option would require approximately 1 acre of new ROW/easement, as shown in blue in Figure 3-4. The new easements would be all be acquired from tribal land.

Traffic Operations Summary

This option would improve left-turn movement onto I-10 headed toward Phoenix. The additional lanes on the exit ramps would also improve movement toward the outlet mall and casino. The geometry of a DDI is designed to substantially reduce collisions and wrong-way driving. The expected LOS in 2040 would improve to a B or better for both the a.m. and p.m. peak periods.

Constructability and Maintenance of Traffic

The new bridge and nearly half of the new TI would be built entirely offline. Traffic shifts and multiple phases would be necessary to complete the asphalt and concrete paving and signal systems to put the new crossover intersections into service. Some short-term lane closures and detours would be necessary, including on I-10 for the new bridge construction. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes such as when the crossover design goes active.

Drainage Features

This option would require only modifications to the on-site drainage system, which is fairly limited today. Impacts to the drainage basin in the southwest quadrant would need to be mitigated. Off-site drainage is not expected to be affected.

Utility Impacts

This option would potentially affect an existing ADOT FMS fiber optic line, an existing underground electrical line, an existing overhead power line, and an existing sewer line. The existing FMS and electrical lines are near the ramp terminals and have a higher chance of impact, while the overhead power line and the sewer line cross Wild Horse Pass Boulevard to the east of I-10, lowering the chance of impact.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

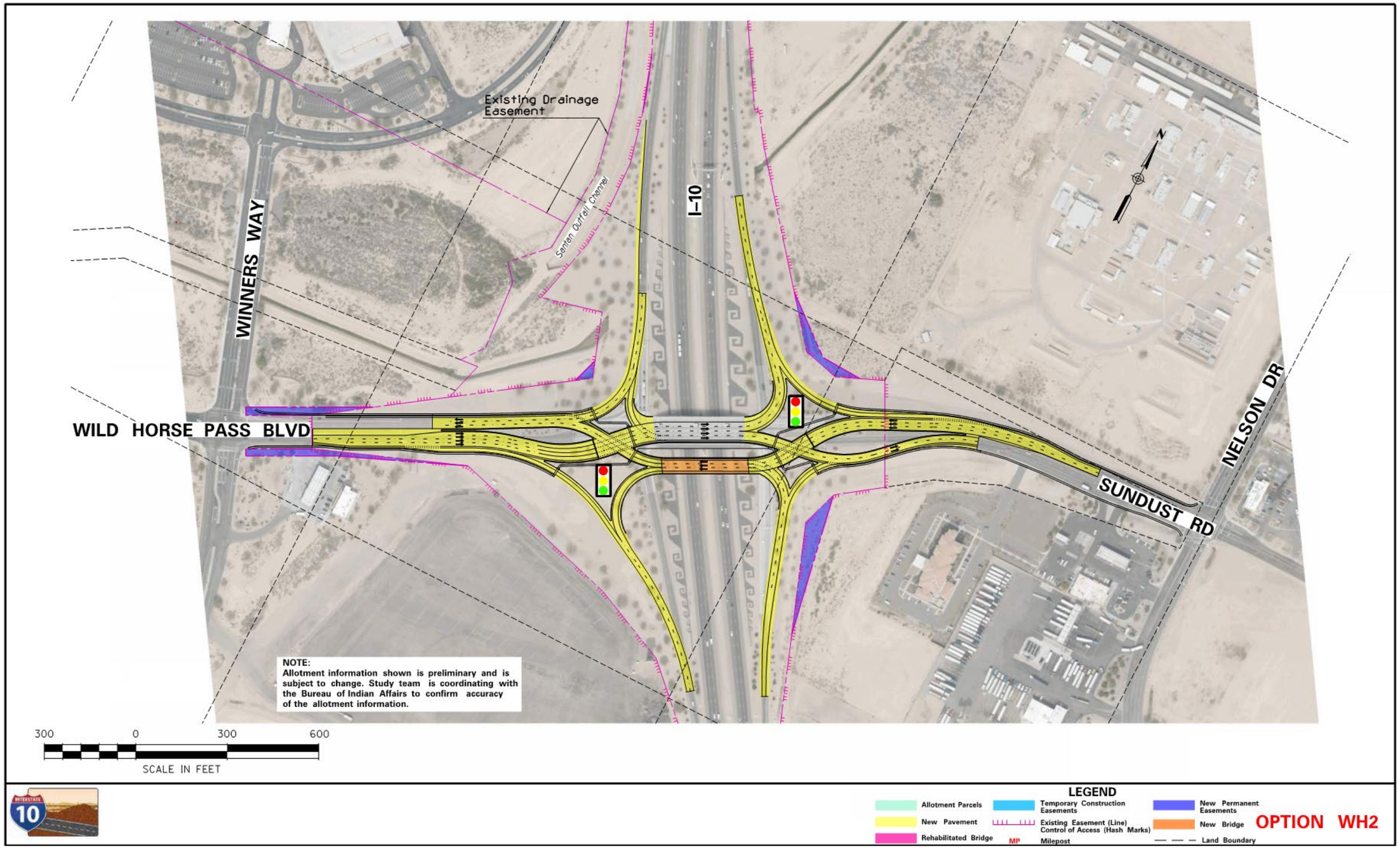

Figure 3-4. WH2 layout

WH3: Wild Horse Pass Option 3

General Description

WH3 proposes reconstructing the existing diamond-style TI at Wild Horse Pass Boulevard and replacing it with a displaced left turn (DLT) TI. The existing bridge would remain as it is today, while a new bridge would be constructed to the north for the eastbound to northbound left-turning traffic destined for the westbound I-10 entrance ramp. There would be an additional intersection to the west of I-10 to allow this eastbound to northbound left-turning traffic to cross over westbound Wild Horse Pass Boulevard to the new bridge. This option would be compatible with both ML2 and ML3. See Figure 3-5 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Wild Horse Pass Boulevard would remain unchanged with this option. The new bridge would provide at least 16.5 feet of vertical clearance.

The proposed typical section of this option would remain mostly the same as the existing with the addition of a dedicated bridge over the freeway for the eastbound to northbound left-turning traffic entering the westbound I-10 entrance ramp as well as minor adjustments to the lane configuration over the existing bridge. The new bridge would have a normal cross slope of 2% as well as two lanes with 8-foot shoulders on either side. The existing lane configuration would be modified to remove the current eastbound to northbound left-turn lanes from the existing bridge. Bike lanes would be added, and the paved median would be relocated farther to the south over the existing bridge to provide for an additional left-turn lane for eastbound traffic. Pedestrian access through the TI would remain on the existing sidewalk and would be modified to accommodate the DLT intersection. All the existing and new curb ramps would be ADA-compliant.

Bridge Features

This option proposes a new bridge to the north of the existing bridge. The new bridge would be 43 feet wide to accommodate the proposed lane configuration of the DLT ramp. The pier and abutment locations would follow the same pattern as the existing bridge and the minimum vertical clearance would be at least 16.5 feet. The existing bridge would remain with no structural modifications, but some minor deck work (relocated median curbing, etc.) would be required to accommodate the proposed typical sections.

Right-of-way Requirements

This option would require 1.1 acres of new ROW/easements split among the two western quadrants of the TI. The new easements would all be acquired from tribal land.

Traffic Operations Summary

This option would improve left-turn movement onto I-10 headed toward Phoenix. A DLT TI would slightly reduce the number of severe conflict points, but since this TI design would be new to Arizona, the unfamiliar design may create driver confusion and increase the chance of wrong-way driving, which would reduce the safety benefits of this design. The expected LOS in 2040 would improve to C or better in both the a.m. and p.m. peak periods.

Constructability and Maintenance of Traffic

The new bridge and nearly half of the new TI would be built entirely offline. Traffic shifts and multiple phases would be necessary to complete the asphalt and concrete paving and signal systems for the west side ramp terminal modifications. Some short-term lane closures and detours would be necessary, including on I-10 for the new bridge construction. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes such as when the crossover design goes active.

Drainage Features

This option would require only modifications to the on-site drainage system, which is fairly limited today. Construction activities would occur in the northwest quadrant near the Gila Drain, but the drain itself would not be affected.

Utility Impacts

This option would potentially affect an existing FMS line and an existing underground electrical line. The existing FMS and electrical lines are near the ramp terminals and have a higher chance of impact.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

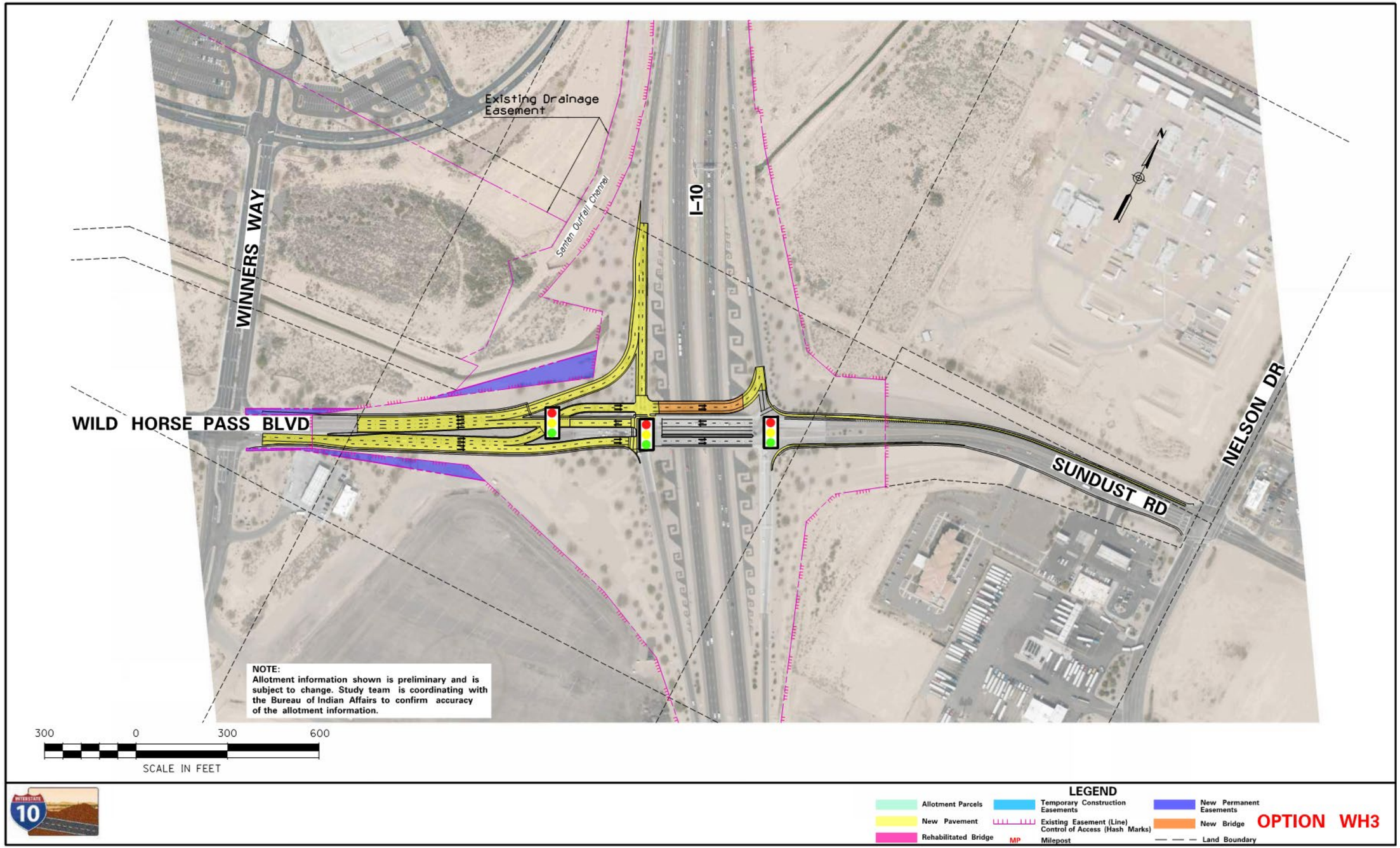

Figure 3-5. WH3 layout

QC1: SR 347/Queen Creek Road Option 1

General Description

QC1 is the no-build option for the SR 347/Queen Creek Road TI and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with QC1. QC1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the SR 347/Queen Creek Road TI build options.

QC2: SR 347/Queen Creek Road Option 2

General Description

QC2 proposes reconstructing the existing diamond-style TI into a DDI. Most of the improvements would be concentrated on SR 347 and Queen Creek Road, reconfiguring the crossroad approaches to the TI, reconstructing the ramp terminals, reversing the flow between the ramp terminals, using the existing bridge for eastbound traffic, and constructing a new adjacent bridge to the south for westbound traffic. This option would be compatible with both ML2 and ML3. See Figure 3-6 for the layout for this option.

Roadway Features

The horizontal alignment of SR 347/Queen Creek Road would be split in two: one alignment for each direction of traffic. The horizontal alignments for the ramps would be shifted farther outward to tie into the new configuration. The vertical alignment for the eastbound traffic would match the existing road as closely as possible over the existing bridge to allow for its continued use in the new configuration. The vertical alignment for westbound traffic would roughly match the existing bridge and would be high enough achieve 16.5 feet of vertical clearance provided by the existing bridge over I-10.

The proposed typical section of this option would be a split roadway with a normal cross slope of 2% to the outside. The new configuration would have four eastbound lanes across the existing bridge and three westbound lanes across the new bridge with 10-foot shoulders across both bridges. A 5-foot bike lane would be provided for both directions throughout the TI. The existing bridge currently has a crown section today, so that crown line would be held near a lane line for the eastbound lanes; detailed staking would be needed to tie into this existing bridge. Pedestrian access through the TI would be provided with 5-foot-wide raised concrete sidewalks on both sides of the road, except across I-10, where the sidewalk would be at least 10 feet, would be two-way, would be located in between the two roadways (the preferred pedestrian treatment within DDIs), and would be separated from traffic by 32-inch-tall roadway barriers. Because this DDI is a conversion of an existing diamond, this pedestrian walkway over I-10 would be located along the southern edge of the existing bridge. All the new sidewalk and curb ramps would be ADA-compliant.

Bridge Features

This option proposes a new bridge to be constructed to the south of the existing bridge. This new bridge would be 60-feet wide to accommodate the proposed roadway typical section. The pier and abutment locations would follow the same pattern as the existing bridge and the minimum vertical clearance would be at least 16.5 feet. The existing bridge would remain with no structural modifications, but some minor deck work (raised curbing, barriers, etc.) would be required to accommodate the proposed typical sections.

Right-of-way Requirements

This option would require 4.39 acres of new ROW/easements split among all four quadrants of the TI. 2.2 acres of new easements would be acquired from tribal land, while the remaining 2.19 acres would come from at least three allotted parcels.

Traffic Operations Summary

This option would improve left-turn movement onto I-10 headed toward Phoenix. The additional lanes on the southbound exit ramp would improve movement toward Maricopa. The geometry of a DDI is designed to substantially reduce collisions and wrong-way driving. The expected LOS in 2040 would improve to C or better in the a.m. peak period and to B in the p.m. peak period.

Constructability and Maintenance of Traffic

The new bridge and nearly half of the new TI would be built entirely offline. Traffic shifts and multiple phases would be necessary to complete the asphalt and concrete paving and signal systems to put the new crossover intersections into service. Some short-term lane closures and detours would be necessary, including on I-10 for the new bridge construction. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes such as when the crossover design goes active.

Drainage Features

This option would require modifications to only the on-site drainage system, which is fairly limited today. Off-site drainage is not expected to be affected.

Utility Impacts

This option would potentially affect an electrical line that runs along the west side of I-10. The Community's Department of Public Works has a proposed water line that crosses I-10 in the vicinity of Queen Creek Road that would also potentially be affected, if built first.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

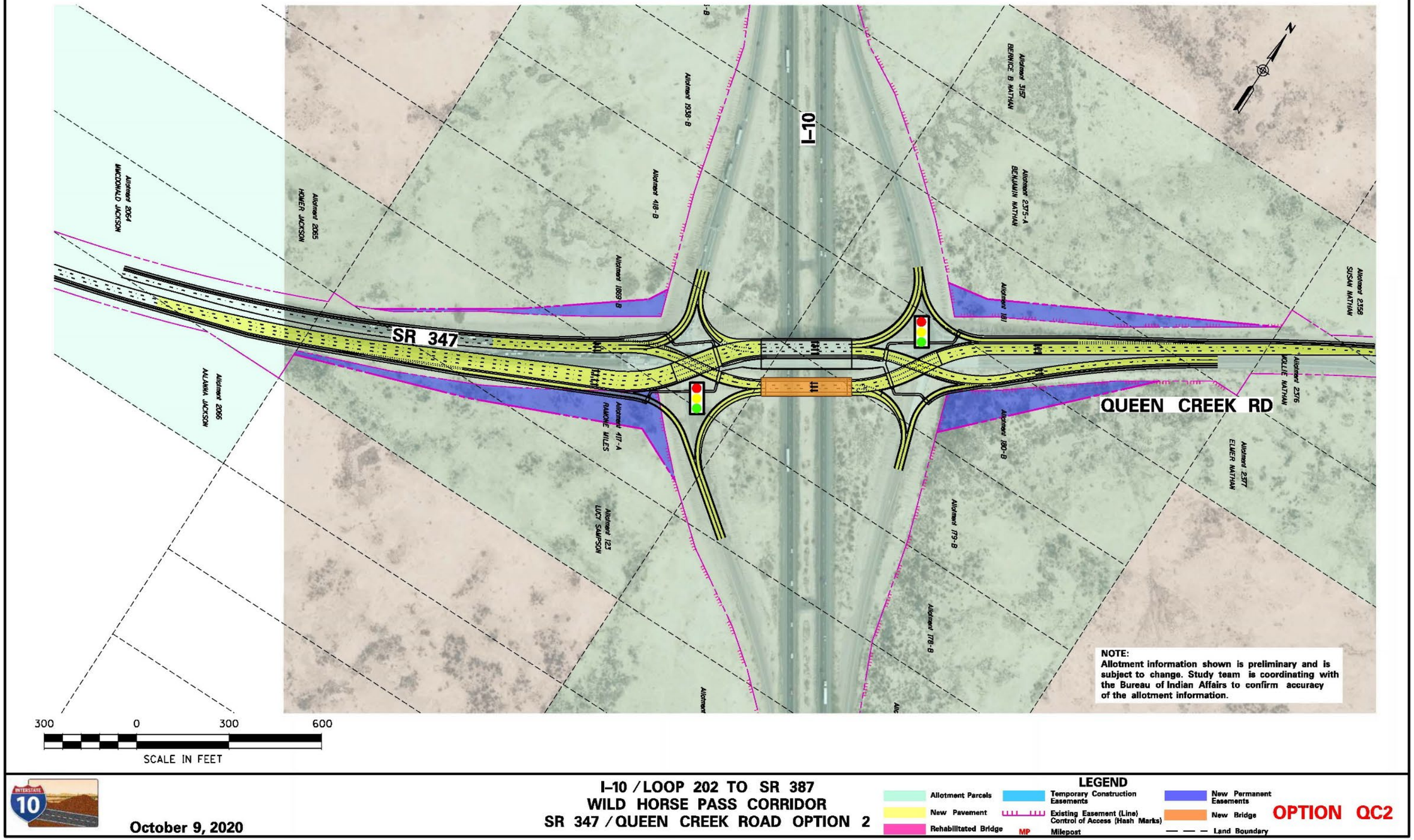

Figure 3-6. QC2 layout

QC3: SR 347/Queen Creek Road Option 3

General Description

QC3 proposes reconstructing the existing diamond-style TI at SR 347/Queen Creek Road and replacing it with a DLT TI. The existing bridge would remain as it is today while a new bridge would be constructed to the north for the eastbound to northbound left-turning traffic destined for the westbound I-10 entrance ramp. There would be an additional intersection to the west of I-10 to allow this eastbound to northbound left-turning traffic to cross over westbound SR 347 to the new bridge. This option would be compatible with both ML2 and ML3. See Figure 3-7 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of SR 347/Queen Creek Road would remain unchanged with this option. The new bridge would provide at least 16.5 feet of vertical clearance.

The proposed typical section of this option would remain mostly the same as the existing with the addition of a dedicated bridge over the freeway for the eastbound to northbound left-turning traffic entering the westbound I-10 entrance ramp as well as minor adjustments to the lane configuration over the existing bridge. The new bridge would have a normal cross slope of 2% as well as two lanes with 8-foot shoulders on either side. The existing lane configuration would be modified to remove the current eastbound to northbound left-turn lanes from the existing bridge. Bike lanes and a striped median would be added over the existing bridge. Pedestrian access through the TI would remain on the existing sidewalk and would be modified to accommodate the DLT intersection. All the new curb ramps would be ADA compliant.

Bridge Features

This option proposes a new bridge to the north of the existing bridge. The new bridge would be 43 feet wide to accommodate the proposed lane configuration of the DLT ramp. The pier and abutment locations would follow the same pattern as the existing bridge and the minimum vertical clearance would be at least 16.5 feet. The existing bridge would remain with no structural modifications, but some minor deck work (relocating the median curbing, etc.) would be required to accommodate the proposed typical sections.

Right-of-way Requirements

This option would require 4.44 acres of new ROW/easements split among all four quadrants of the TI. 1.8 acres of new ROW would be acquired from tribal land, while the remaining 2.64 acres would come from at least four allotted parcels.

Traffic Operations Summary

This option would improve left-turn movement onto I-10 headed toward Phoenix. A DLT TI does slightly reduce the number of severe conflict points, but since this TI design would be new to Arizona, the unfamiliar design may create driver confusion and increase the chance of wrong-way driving, which would reduce the safety benefits of this design. The expected LOS in 2040 would improve to C or better in both the a.m. and p.m. peak periods.

Constructability and Maintenance of Traffic

The new bridge and nearly half of the new TI would be built entirely offline. Traffic shifts and multiple phases would be necessary to complete the asphalt and concrete paving and signal systems for the west side ramp terminal modifications. Some short-term lane closures and detours would be necessary, including on I-10 for the new bridge construction. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes such as when the crossover design goes active.

Drainage Features

This option would require modifications to only the on-site drainage system, which is fairly limited today. Off-site drainage is not expected to be affected.

Utility Impacts

This option would potentially affect an electrical line that runs along the west side of I-10. The Community's Department of Public Works has a proposed water line that crosses I-10 in the vicinity of Queen Creek Road that would also potentially be affected, if built first.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

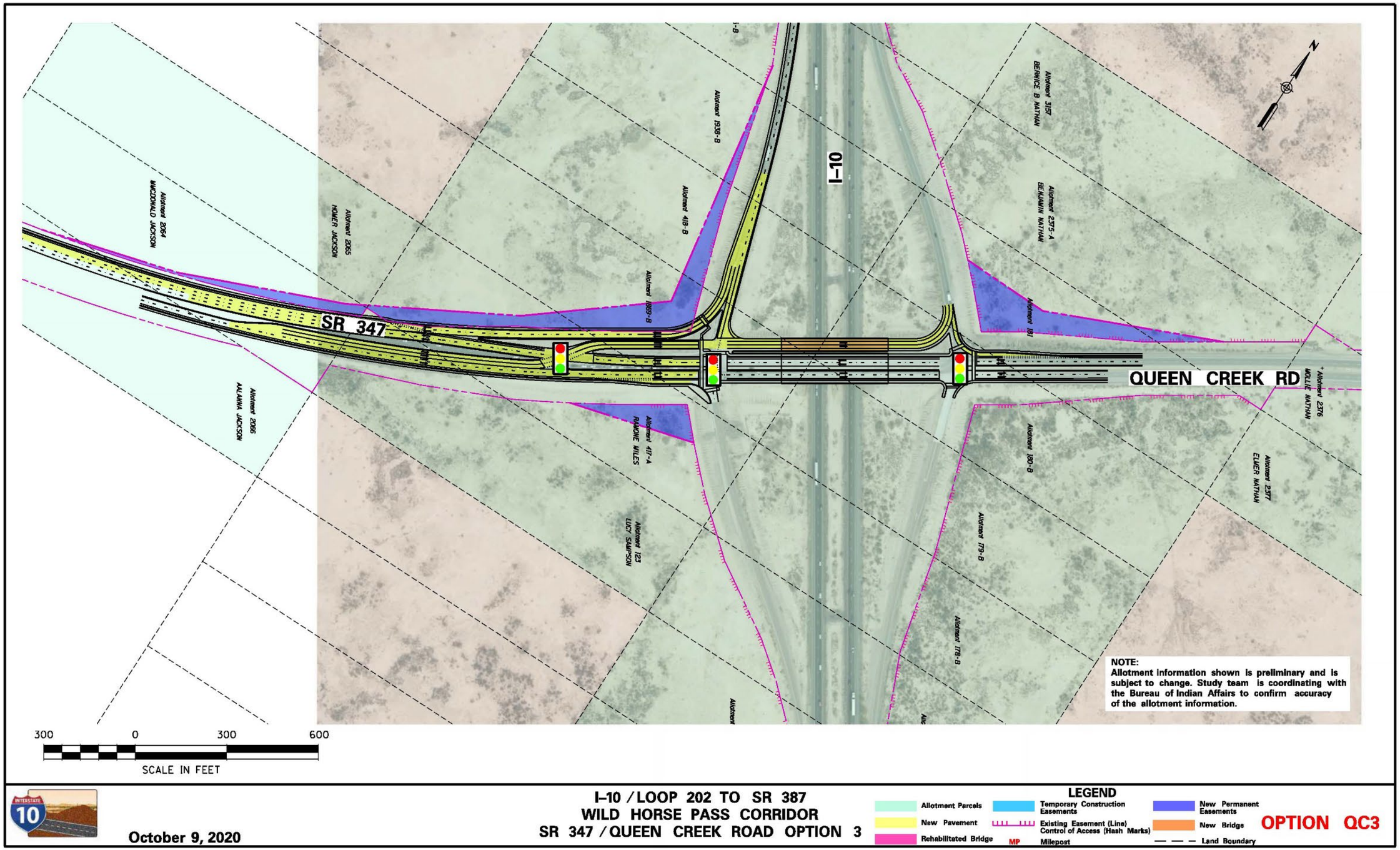

Figure 3-7. QC3 layout

RR1: Riggs Road Option 1

General Description

RR1 is the no-build option for the Riggs Road TI and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with RR1. RR1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Riggs Road TI build options.

RR2: Riggs Road Option 2

General Description

RR2 proposes a bridge deck and bridge railing rehabilitation and optimization of the ramp terminal signal timing. RR2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, RR2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-8 for the layout for this option.

Roadway Features

There would be no major roadway modifications with this option. The existing road would not change, and the existing narrow shoulders would remain. The existing vertical clearance of 16 feet would remain.

Bridge Features

This option includes a bridge deck rehabilitation that would also replace the bridge railing and approach guardrails that do not meet current standards. The existing vertical clearance of 16 feet would remain.

Right-of-way Requirements

No ROW would be required with this option.

Traffic Operations Summary

The signal timing would be optimized, which would improve the expected LOS in 2040 to B or C in the a.m. peak hour and to B or better in the p.m. peak hour.

Constructability and Maintenance of Traffic

Lane closures would be necessary with RR2. To keep the TI operating, the bridge rehabilitation would be done in halves, requiring RR2 to be restricted to just a single lane over the bridge, which would be highly undesirable and challenging. Short-term I-10 lane closures and detours would be necessary to remove the old deck and pour the replacement. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There would be no drainage modifications with this option.

Utility Impacts

There would be no utility impacts with this option.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

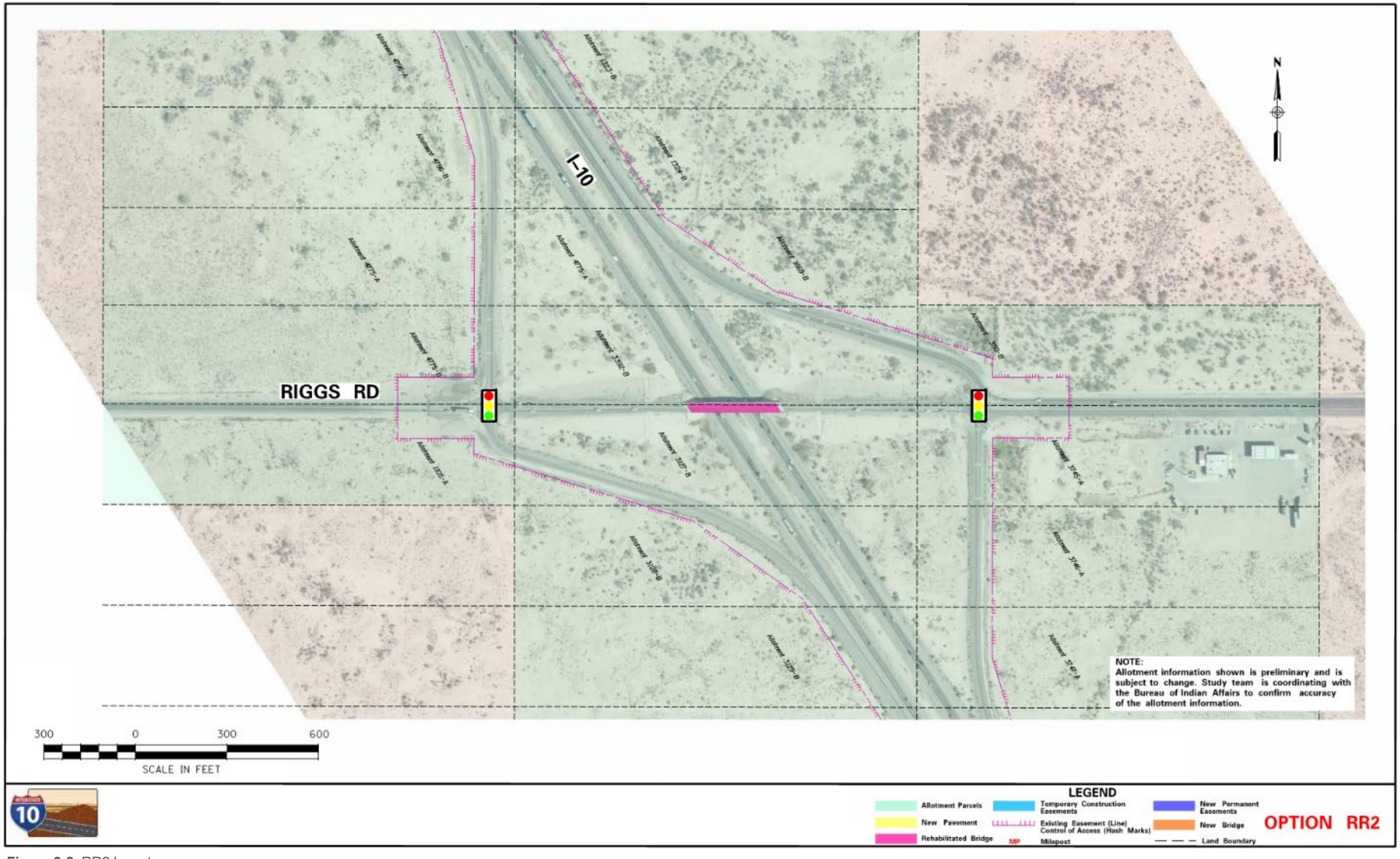

Figure 3-8. RR2 layout

RR3: Riggs Road Option 3

General Description

RR3 proposes a bridge deck rehabilitation coupled with a bridge and roadway widening to accommodate wider shoulders and left-turn lanes. The widening would also include the replacement of the bridge railing and guardrail. RR3 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, RR3 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-9 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Riggs Road would remain unchanged with this option. The widened bridge would reduce the vertical clearance over I-10 to less than 16 feet, which would require a FHWA design exception, unless modifications to I-10 were implemented to restore the vertical clearance impact.

The proposed lane configuration across the TI would remain the same as the existing configuration, but 10-foot-wide shoulders would be added. The shoulder widening would match the existing cross slope. Outside of the bridge, Riggs Road would be widened to add a dedicated left-turn pocket at both intersections. This option also would give access to bicycles to cross using the new shoulders. No sidewalks or curb ramps would be included in this option, and there are no existing ADA facilities.

Bridge Features

This option proposes the existing bridge deck be rehabilitated and the bridge itself be widened to 59 feet to accommodate wider shoulders. The bridge railings do not meet current standards and would be replaced. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

No ROW would be required with this option.

Traffic Operations Summary

The signals would be reconstructed to accommodate the widening and added turn lanes, and the timing would be optimized, which would improve the expected LOS in 2040 to B or C in the a.m. peak hour and to B or better in the p.m. peak hour.

Constructability and Maintenance of Traffic

Lane closures would be necessary with RR3. To keep the TI operating, the bridge rehabilitation would be done in halves, requiring RR3 to be restricted to just a single lane over the bridge, which would be highly undesirable and challenging. Short-term I-10 lane closures and detours would be necessary to remove the old deck and pour the replacement. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There is an existing 30-inch CMP under I-10 that would be affected by the new fill slopes and would likely need to be reconstructed. The four existing concrete drainage spillways on the Riggs Road embankment would need to be reconstructed to accommodate the wider roadway.

Utility Impacts

This option would potentially affect several underground electrical lines that cross I-10 at the TI and alongside all four ramps. There is also an overhead power line to the east that would potentially be affected.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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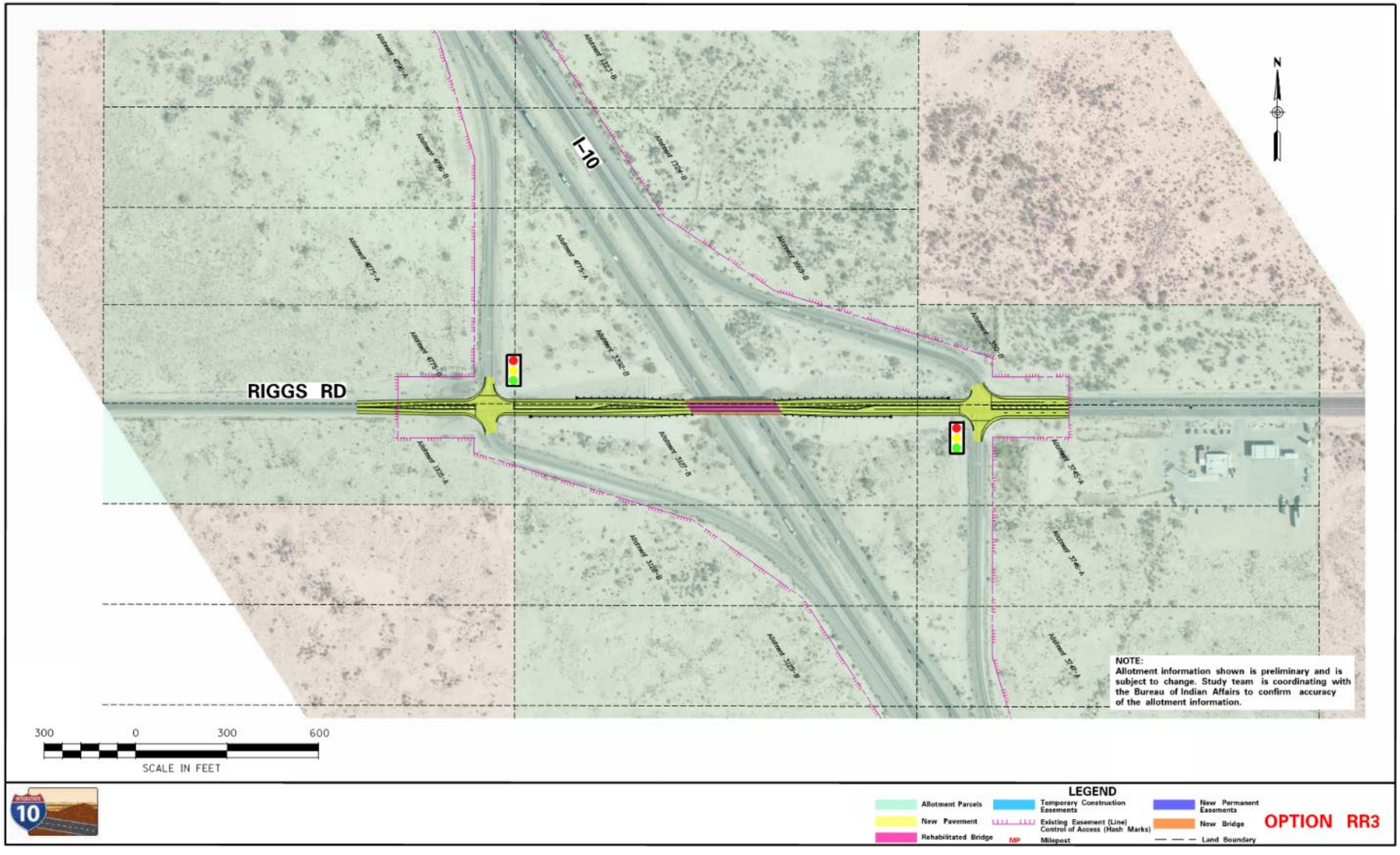

Figure 3-9. RR3 layout

RR4: Riggs Road Option 4

General Description

RR4 is essentially the same as RR3, except that pedestrian accommodations/sidewalks have been added to RR3 to create RR4. RR4 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, RR4 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-10 for the layout for this option.

Roadway Features

RR4 is similar to RR3, except that pedestrian accommodations/sidewalks have been added to the design between and including the ramp terminals. The additional width on the bridge would further reduce the I-10 vertical clearance below 16 feet, which would require a FHWA design exception, unless modifications to I-10 were implemented to restore the vertical clearance impact. All new pedestrian accommodations would be ADA-compliant.

Bridge Features

This option proposes the existing bridge deck be rehabilitated and the bridge itself be widened to 73 feet to accommodate wider shoulders and sidewalk. The bridge railings do not meet current standards and would be replaced. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

No ROW would be required with this option.

Traffic Operations Summary

The signals would be reconstructed to accommodate the widening and the added turn lanes, and the timing would be optimized, which would improve the expected LOS in 2040 to B or C in the a.m. peak hour and to B or better in the p.m. peak hour.

Constructability and Maintenance of Traffic

Lane closures would be necessary with RR3. To keep the TI operating, the bridge rehabilitation would be done in halves, requiring RR3 to be restricted to just a single lane over the bridge, which would be highly undesirable and challenging. Short-term I-10 lane closures and detours would be necessary to remove the old deck and pour the replacement. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There is an existing 30-inch CMP under I-10 that would be affected by the new fill slopes and would likely need to be reconstructed. The four existing concrete drainage spillways on the Riggs Road embankment would need to be reconstructed to accommodate the wider Riggs Road roadway or replaced with a different design if barrier-separated or raised-curb sidewalk is used.

Utility Impacts

This option would potentially affect several underground electrical lines that cross I-10 at the TI and run alongside all four ramps. There is also an overhead power line to the east that would potentially be affected.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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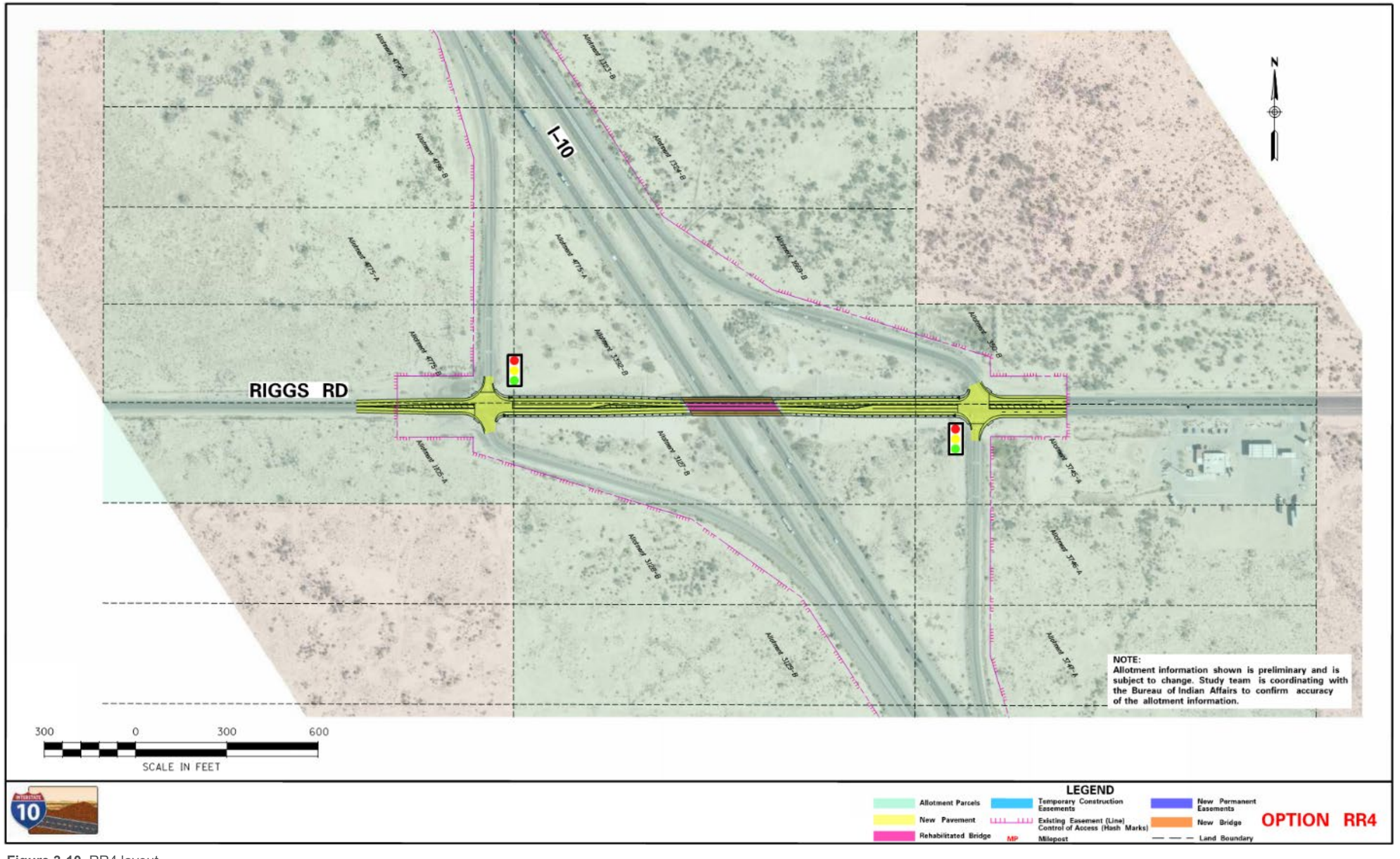

Figure 3-10. RR4 layout

RR5: Riggs Road Option 5

General Description

RR5 is similar to RR4 in configuration; however, RR5 is compatible with both ML2 and ML3 because this option replaces the existing bridge on a new horizontal and vertical alignment by realigning Riggs Road between the ramp terminals and building a new bridge adjacent to and north of the existing bridge. The existing bridge would be removed. See Figure 3-11 for the layout for this option.

Roadway Features

The proposed Riggs Road horizontal alignment of RR5 would be offset from the existing alignment and would curve to the north to allow the new bridge to be constructed offline. Shifting the alignment to the south may also be a variant of this option, although it may affect an existing culvert under I-10 to the south of the existing bridge.

The vertical alignment would be similar to the existing alignment with a crest vertical curve over the I-10 main line but would be raised a couple of feet to ensure the vertical clearance over I-10 would be at least 16.5 feet.

The proposed typical section the same as RR4.

Bridge Features

This option would construct a new bridge offset of the existing bridge. Like RR4, the proposed bridge would have a 73-foot width to accommodate the proposed typical section over the bridge. The new bridge would be a two-span bridge to match the general span configurations of the Wild Horse Pass Boulevard and SR 347/Queen Creek Road bridges using an I-10 centerline pier and abutments that would be placed outside of the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to provide 16.5 feet of minimum vertical clearance over both directions of I-10. The existing bridge would be removed after the completion and opening of the new bridge.

Right-of-way Requirements

No ROW would be required with this option.

Traffic Operations Summary

The signals would be reconstructed to accommodate the new geometry and the added turn lanes, and the timing would be optimized, which would improve the expected LOS in 2040 to B or C in the a.m. peak hour and to B or better in the p.m. peak hour.

Constructability and Maintenance of Traffic

The majority of the RR5 proposed improvements could be built offline with only minimal impacts to existing traffic. Short-term restrictions would be required to reconfigure the intersections. Short-term I-10 lane closures and detours would be necessary to remove the old bridge and to set girders and pour the deck for the new bridge. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The four existing concrete drainage spillways on the Riggs Road embankment would need to be reconstructed to accommodate the wider Riggs Road roadway or be replaced with a different design if barrier-separated or raised-curb sidewalk is used.

Utility Impacts

This option would potentially affect several underground electrical lines that cross I-10 at the TI and run alongside all four ramps. There is also an overhead power line to the east that would potentially be affected.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

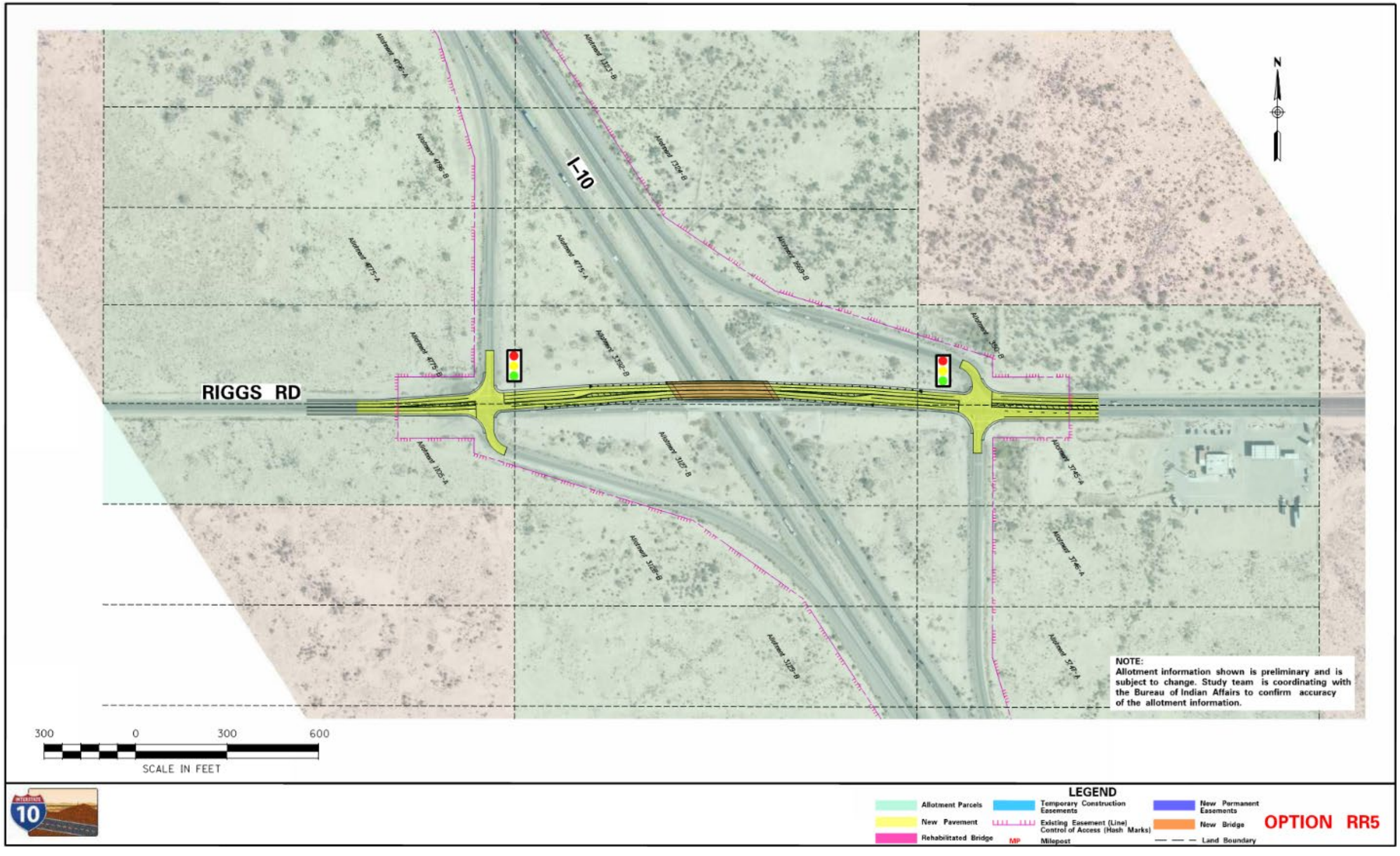

Figure 3-11. RR5 layout

GY1: Goodyear Road Option 1

General Description

GY1 is the no-build option for the Goodyear Road crossing and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with GY1. GY1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Goodyear Road build options.

GY2: Goodyear Road Option 2

General Description

GY2 proposes a roadway and bridge widening to accommodate wider shoulders and sidewalk within the I-10 easement. The bridge railing and guardrail would also be replaced with this option as part of the widening. GY2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, GY2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-12 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Goodyear Road would remain unchanged with this option. The additional width on the bridge would further reduce the I-10 vertical clearance below 16 feet unless modifications to I-10 were implemented to restore the vertical clearance impact.

The proposed typical section would remain the same as the existing two-way roadway but would add 10-foot shoulders and sidewalks. The widened portion of the bridge would match the existing cross slope. This option would give access to bicycles to cross on a standard shoulder width. All new pedestrian accommodations would be ADA-compliant.

Bridge Features

This option proposes to widen the existing bridge to 59 feet to accommodate wider shoulders and sidewalks. The bridge railings would be replaced with the widening. Bridge inspection reports indicate the deck to be in good condition, so a deck rehabilitation does not seem to be warranted. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

This option would require 1.29 acres of new ROW split among all four quadrants of the crossroad. The new ROW would be acquired from four allotted parcels.

Traffic Operations Summary

Because Goodyear Road is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

Lane or full roadway closures on Goodyear Road would be necessary for the bridge widening. A full closure would need to be approved by the Community, but the low-volume nature of this road may aid in this approval. Short-term I-10 lane closures and detours would be necessary to set girders and pour the widened deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There would be no drainage modifications with this option.

Utility Impacts

There would be no utility impacts with this option.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

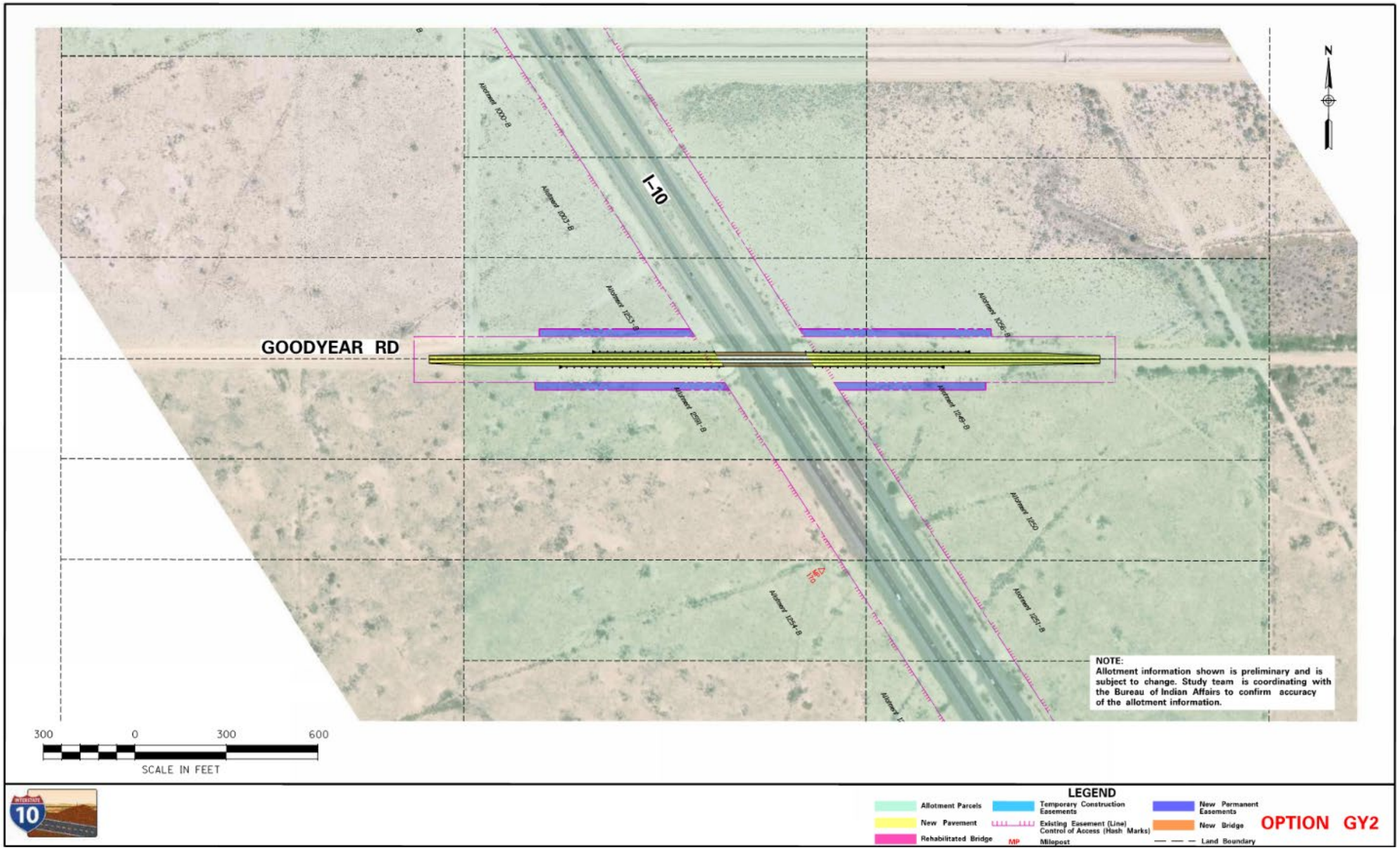

Figure 3-12. GY2 layout

GY3: Goodyear Road Option 3

General Description

GY3 is similar to GY2 in configuration; however, GY3 is compatible with both ML2 and ML3 because this option replaces the existing bridge on a new horizontal and vertical alignment by realigning Goodyear Road and building a new bridge adjacent to and north of the existing bridge. The existing bridge would be removed. See Figure 3-13 for the layout for this option.

Roadway Features

The proposed Goodyear Road horizontal alignment of GY3 would be offset from the existing alignment and would curve to the north to allow the new bridge to be constructed offline. Shifting the alignment to the south may also be a variant of this option, although it may have other undesirable impacts.

The vertical alignment would be similar to the existing alignment with a crest vertical curve over the I-10 main line but would be raised a couple of feet to accommodate a 16.5-foot vertical clearance over I-10.

The proposed typical section the same as GY2.

Bridge Features

This option would construct a new bridge offset of the existing bridge. Like GY2, the proposed bridge would have a 59-foot width to accommodate the proposed typical section over the bridge. The new bridge would be a two-span bridge using an I-10 centerline pier with abutments placed outside of the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to provide 16.5 feet minimum vertical clearance over both directions of I-10. The existing bridge would be removed after the completion and opening of the new bridge.

Right-of-way Requirements

This option would require 2.98 acres of new ROW split among all four quadrants of the crossroad. 0.3 acre of new ROW would be acquired from tribal land while the remaining 2.68 acres would come from four allotted parcels.

Traffic Operations Summary

Because Goodyear Road is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

The majority of the GY3 proposed improvements could be built offline with only minimal impacts to existing traffic. Short-term restrictions would be required to construct the tie-in points, but with the low volumes using this roadway, this is not expected to be a major concern. Short-term I-10 lane closures and detours would be necessary to remove the old bridge and to set girders and pour the deck for the new bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There would be no drainage modifications with this option

Utility Impacts

There would be no utility impacts with this option.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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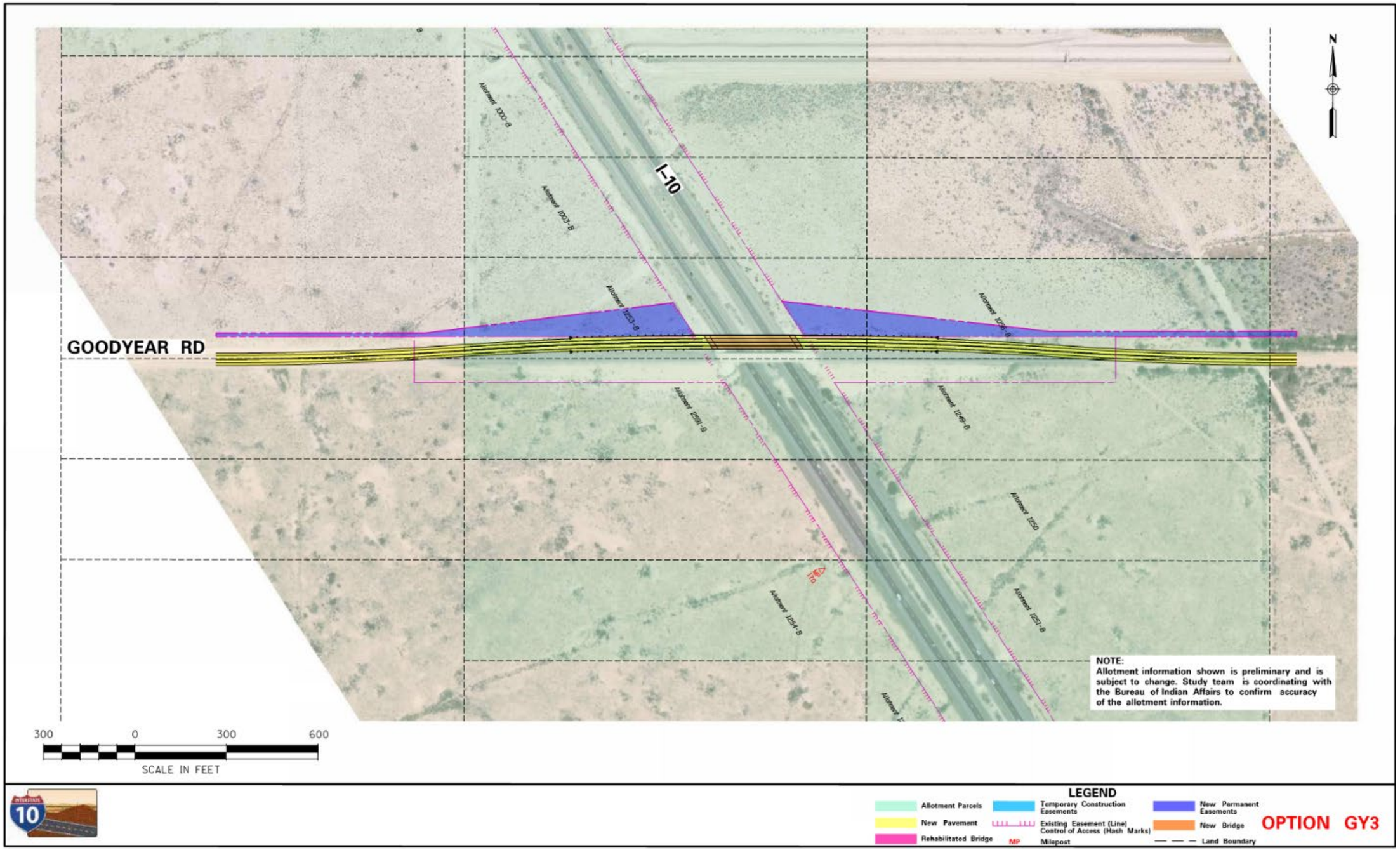

Figure 3-13. GY3 layout

NR1: Nelson Road Option 1

General Description

NR1 is the no-build option for the Nelson Road crossing and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with NR1. NR1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Nelson Road build options.

NR2: Nelson Road Option 2

General Description

NR2 proposes a roadway and bridge widening to accommodate wider shoulders and sidewalks within the I-10 easement. The bridge railing and guardrail would also be replaced with this option as part of the widening. NR2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, GY2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-14 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Nelson Road would remain unchanged with this option. The additional width on the bridge would further reduce the I-10 vertical clearance below 16 feet unless modifications to I-10 were implemented to restore the vertical clearance impact.

The proposed typical section would remain the same as the existing two-way roadway but would add 10-foot shoulders and sidewalks. The widened portion of the bridge would match the existing cross slope. This option would give access to bicycles to cross on a standard shoulder width. All new pedestrian accommodations would be ADA-compliant.

Bridge Features

This option proposes to widen the existing bridge to 59 feet to accommodate wider shoulders and sidewalk. The bridge railings would be replaced with the widening. Bridge inspection reports indicate the deck to be in good condition, so a deck rehabilitation does not seem to be warranted. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

This option would require 2.29 acres of new ROW split among all four quadrants of the crossroad. 0.5 acre of new ROW would be acquired from tribal land, while the remaining 1.79 acres would come from four allotted parcels. This option would also require 2 acres of temporary construction easements, shown in light blue in Figure 3-14. 1 acre of temporary easements would be acquired from tribal land, while the remaining 1 acre would come from two allotted parcels.

Traffic Operations Summary

Because Nelson Road is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

Lane or full roadway closures on Nelson Road would be necessary for the bridge widening. A full closure would need to be approved by the Community, but the low-volume nature of this road may aid in this approval. Short-term I-10 lane closures and detours would be necessary to set girders and pour the widened deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The four existing concrete drainage spillways on the Nelson Road embankment would need to be reconstructed to accommodate the wider Nelson Road roadway or replaced with a different design if barrier-separated or raised-curb sidewalk is used.

Utility Impacts

This option would potentially affect the overhead power line that runs along the south side of the Nelson Road.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

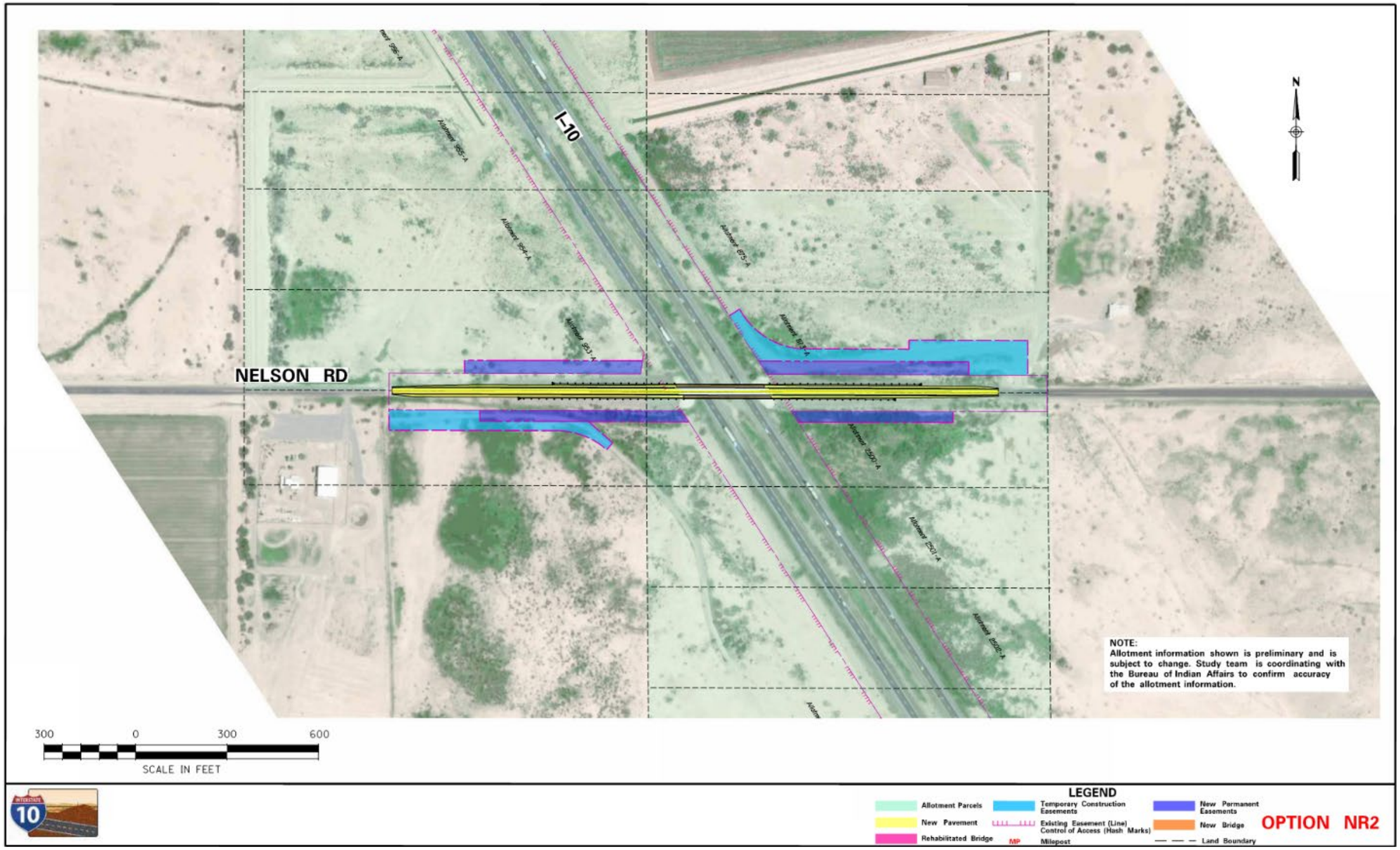

Figure 3-14. NR2 layout

NR3: Nelson Road Option 3

General Description

NR3 is similar to NR2 in configuration; however, NR3 is compatible with both ML2 and ML3 because this option replaces the existing bridge on a new horizontal alignment and vertical alignment. The northern edge of Nelson Road would remain the same as existing to minimize environmental impacts to the north, while the southern edge would move farther south to accommodate the wider bridge. The existing bridge would be removed. See Figure 3-15 for the layout for this option.

Roadway Features

The proposed Nelson Road horizontal alignment of NR3 would be offset from the existing alignment and would curve to the south to allow the new bridge to be constructed and to avoid sensitive environmental sites to the north.

The vertical alignment would be similar to the existing alignment, with a crest vertical curve over the I-10 main line, but would be raised a couple of feet to accommodate a 16.5-foot vertical clearance over I-10 and a 55 mph design speed.

The proposed typical section is the same as GY3.

Two local roadway connections/driveways would be realigned in the southwest and northeast quadrants—both requiring additional temporary construction easements to build.

Bridge Features

This option would construct a new bridge offset of the existing bridge. Like NR2, the proposed bridge would have a 59-foot width to accommodate the proposed typical section over the bridge. The new bridge would be a two-span bridge using an I-10 centerline pier with abutments placed outside of the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to provide 16.5 feet of minimum vertical clearance over both directions of I-10. The existing bridge would be removed after the completion and opening of the new bridge.

Right-of-way Requirements

This option would require 2.72 acres of new ROW split among all four quadrants of the crossroad. 0.7 acre of new ROW would be acquired from tribal land, while the remaining 2.02 acres would come from four allotted parcels. This option would also require 3 acres of temporary construction easements. 1 acre of temporary easements would be acquired from tribal land, while the remaining 2 acres would come from two allotted parcels.

Traffic Operations Summary

Because Nelson Road is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

A full roadway closure on Nelson Road would likely be necessary for the bridge replacement. A full closure would need to be approved by the Community, but the low-volume nature of this road may aid in this approval. Short-term I-10 lane closures and detours would be necessary to remove the existing bridge, set girders, and pour the new deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There is an existing 36- by 22-inch CMP to the north under I-10 that would be affected by the new fill slopes and would likely need to be reconstructed. The four existing concrete drainage spillways on the Nelson Road embankment would need to be reconstructed to accommodate the wider Nelson Road roadway or be replaced with a different design if barrier-separated or raised-curb sidewalk is used.

Utility Impacts

This option would potentially affect the overhead power line that runs along the south side of Nelson Road.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

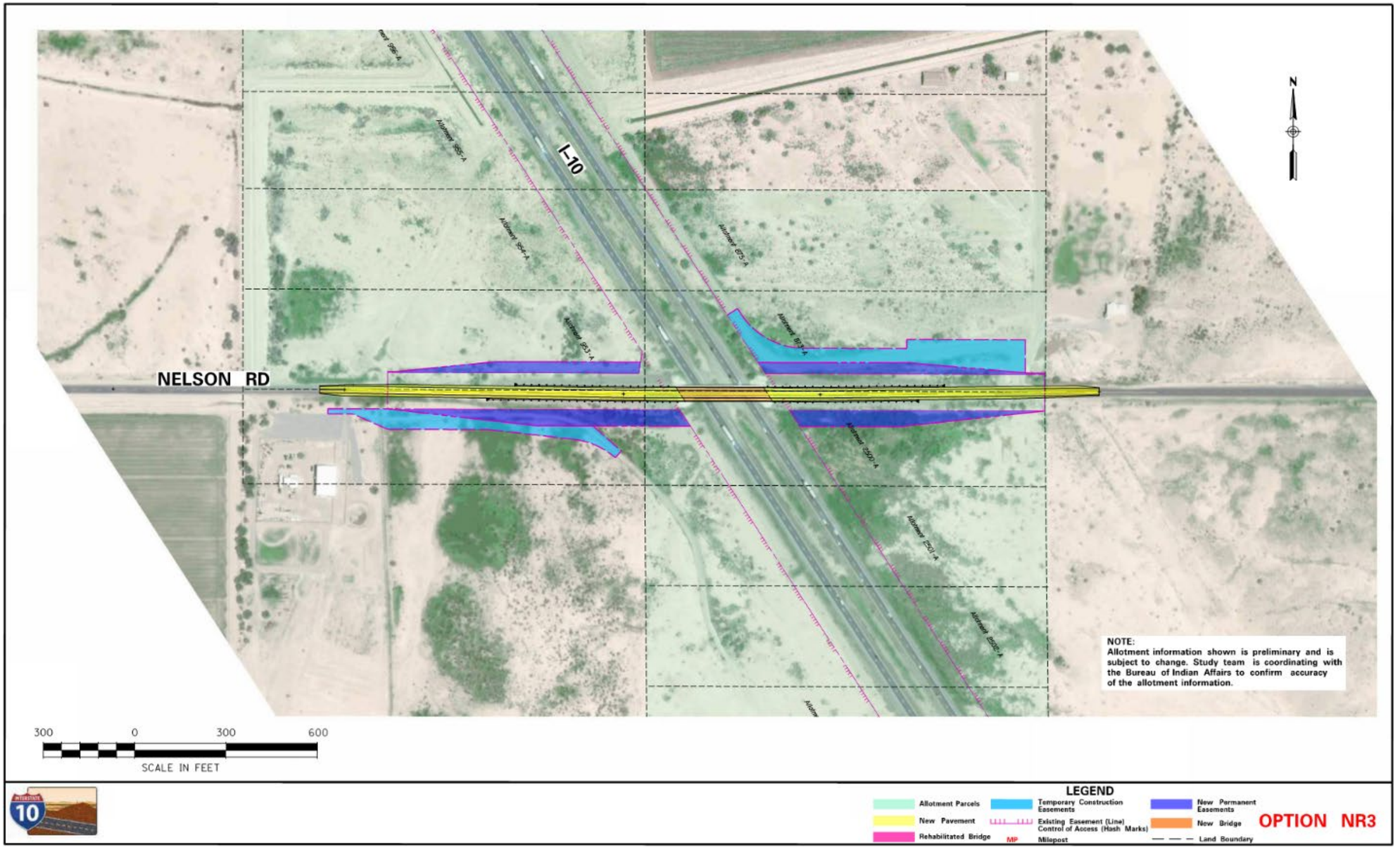

Figure 3-15. NR3 layout

CB1: SR 587/Casa Blanca Road Option 1

General Description

CB1 is the no-build option for the SR 587/Casa Blanca Road TI and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with CB1. CB1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the SR 587/Casa Blanca Road TI build options.

CB2 through CB7: SR 587/Casa Blanca Road Options – Special Note

The SR 587/Casa Blanca Road TI is unique in this 26-mile corridor because it represents approximately the corridor's halfway point and because it also connects to SR 587, a north-to-south state highway that connects directly into SR 87 in south Chandler and ultimately to SR 202L, US 60, and beyond. As a result, when incidents occur on I-10 between this TI and SR 202L that require one or both directions on I-10 to close, SR 587 becomes the most significant detour route, diverting traffic off I-10. Because of this, the concepts developed at this location evaluated both the normal operating condition as well as the simulated conditions during a diversion event. While it was recognized that this TI could never be designed to accommodate diverted interstate volumes at an acceptable LOS, a simulated diversion operating condition that doubled and then tripled the westbound I-10 to northbound SR 587 and the southbound SR 587 to eastbound I-10 movements was evaluated to determine which options performed the best under these extreme conditions. Option CB7 was developed specifically to maximize the operational characteristics of the TI during these diversion events. The *Traffic Operations Summary* section provided for each of the CB options discusses the results of this analysis.

CB2: SR 587/Casa Blanca Road Option 2

General Description

CB2 was developed as a low-impact and affordable TI upgrade to improve operations and safety in response to ADOT and the Community's desire to signalize the ramp terminals. CB2 retains the existing partial cloverleaf TI configuration but adds turning lanes and ramp terminal signals and realigns the hook-style ramps with larger-radius loop ramps and extended deceleration lanes through the end spans of the existing bridge. CB2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, CB2 would be incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. No bridge improvements are included. See Figure 3-16 for the layout for this option.

Roadway Features

The crossroad horizontal and vertical alignments would remain the same as the existing condition; however, the exit ramps would be realigned as described in the *General Description* section to improve safety. The crossroad roadway would be widened at the intersections to accommodate the new turn lanes on all four legs. The crossroad would then taper to tie into the existing bridge. No sidewalks or curb ramps would be included in this option and there are no existing ADA facilities.

Bridge Features

This option would not affect the existing bridge.

Right-of-way Requirements

This option would require 2.92 acres of new ROW split among all four quadrants of the TI. 1.5 acres of new easements would be acquired from tribal land, while the remaining 1.42 acres would come from four allotted parcels.

Traffic Operations Summary

This option would improve the expected LOS in 2040 to C or better. However, it would degrade to LOS F during traffic diversion events because this configuration would not efficiently serve the west-to-north and south-to-east movements associated with diversion traffic events.

Constructability and Maintenance of Traffic

Shoulder closures would be needed around the intersections to accommodate the turn lane construction and short-term lane restrictions would be needed to accommodate the signal installations. Some closures of up to several weeks may be required to reconstruct the exit ramps. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The existing concrete drainage spillways on the SR 587 embankment would need to be reconstructed. Existing impounding concerns east of the current TI along Casa Blanca Road and SR 587 could possibly be mitigated within the proposed TI infields if subsequent design coordination determines that is an appropriate solution.

Utility Impacts

This option would potentially affect an overhead power line along SR 587, a dual gas line that runs to the east of I-10, and a telephone line that runs under I-10 south of the bridge. It would also potentially affect several of the lighting electrical conduits that run throughout the TI.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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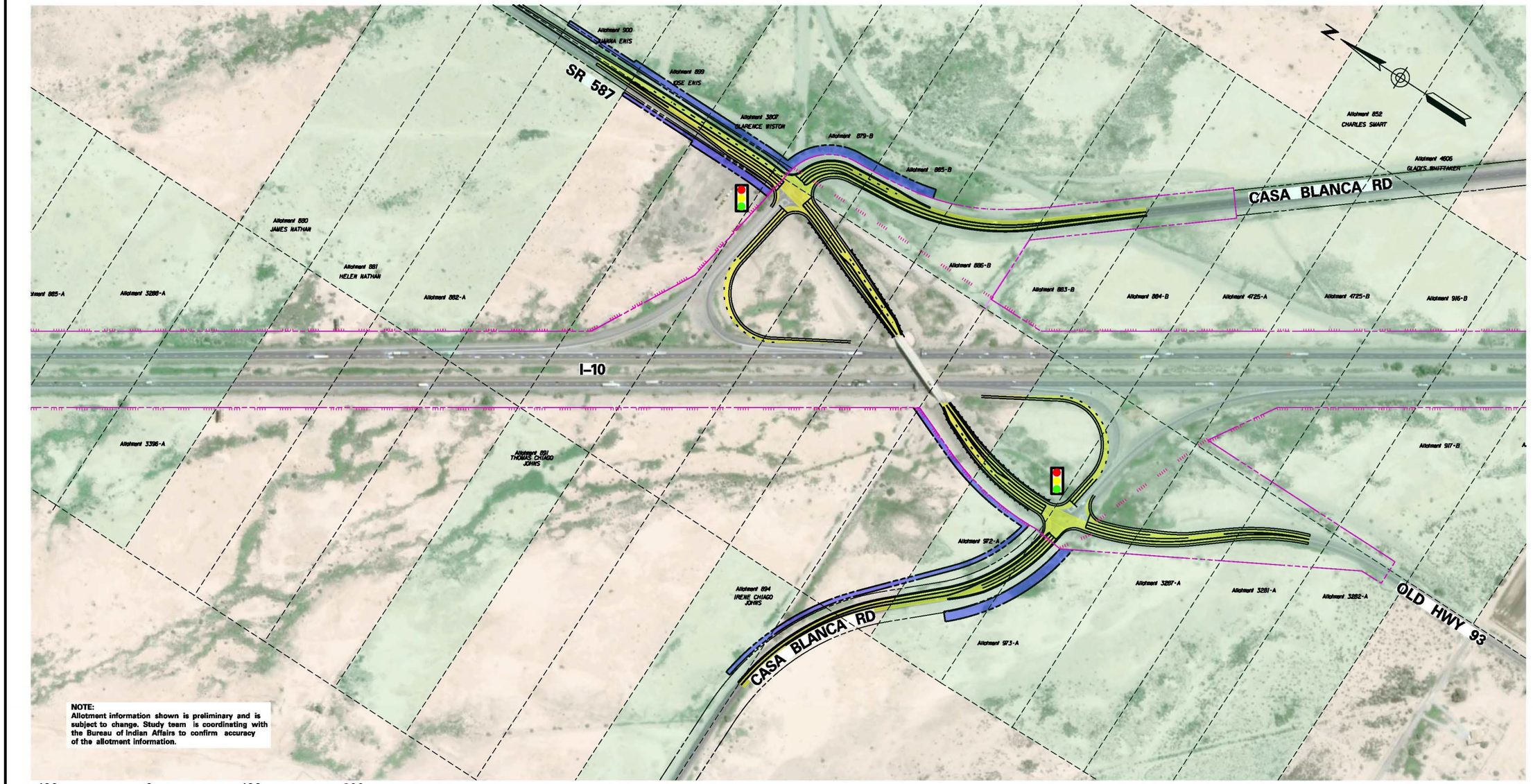

Figure 3-16. CB2 layout

CB3: SR 587/Casa Blanca Road Option 3

General Description

CB3 is similar to CB2, but CB3 adds a bridge deck rehabilitation and widening, shoulders, and sidewalk to improve operations and active transportation mobility between the ramp terminals and throughout the TI.

See Figure 3-17 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Casa Blanca Road would remain unchanged with this option. The existing bridge would provide a substandard vertical clearance of 16 feet, which would worsen in the widened portion of the bridge. CB2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, CB2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders.

The horizontal and vertical alignment of the existing hook-style exit ramps would be improved with a larger radius and longer deceleration lane, departing from I-10 upstream of the bridge for greater decision and stopping sight distance.

The proposed typical section along the crossroad would be wider than the existing to accommodate the new turn lanes, shoulders, and sidewalks. Sidewalk would be located along both sides of the road. The new sidewalk and curb ramps would be ADA-compliant.

Bridge Features

This option proposes the existing bridge be widened to 73 feet to accommodate wider shoulders and new sidewalk. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

This option would require 2.95 acres of new ROW split among all four quadrants of the TI. 1.5 acres of new ROW would be acquired from tribal land, while the remaining 1.45 acres would come from four allotted parcels.

Traffic Operations Summary

This option would improve the expected LOS in 2040 to C or better. However, it would degrade to LOS F during traffic diversion events because this configuration would not efficiently serve the west-to-north and south-to-east movements associated with diversion traffic events.

Constructability and Maintenance of Traffic

Shoulder closures would be needed around the intersections to accommodate the turn lane construction and short-term lane restrictions would be needed to accommodate the signal installations. One lane in each direction would be permitted over the existing bridge to accommodate its rehabilitation and widening. Some closures of up to several weeks may be required to reconstruct the exit ramps. Short-term I-10 lane closures and detours would be necessary to set girders and pour the new widened and rehabilitated deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There is an existing 36- by 22-inch CMP under I-10 that would be affected by the new fill slopes and would need to be reconstructed. The existing concrete drainage spillways on the SR 587 embankment would need to be reconstructed. Existing impounding concerns east of the current TI along Casa Blanca Road and SR 587 could possibly be mitigated within the proposed TI infields if subsequent design coordination determines that is an appropriate solution.

Utility Impacts

This option would potentially affect an overhead power line along SR 587, a dual gas line that runs to the east of I-10, and a telephone line that runs under I-10 south of the bridge. It would also potentially affect several of the lighting electrical conduits that run throughout the TI.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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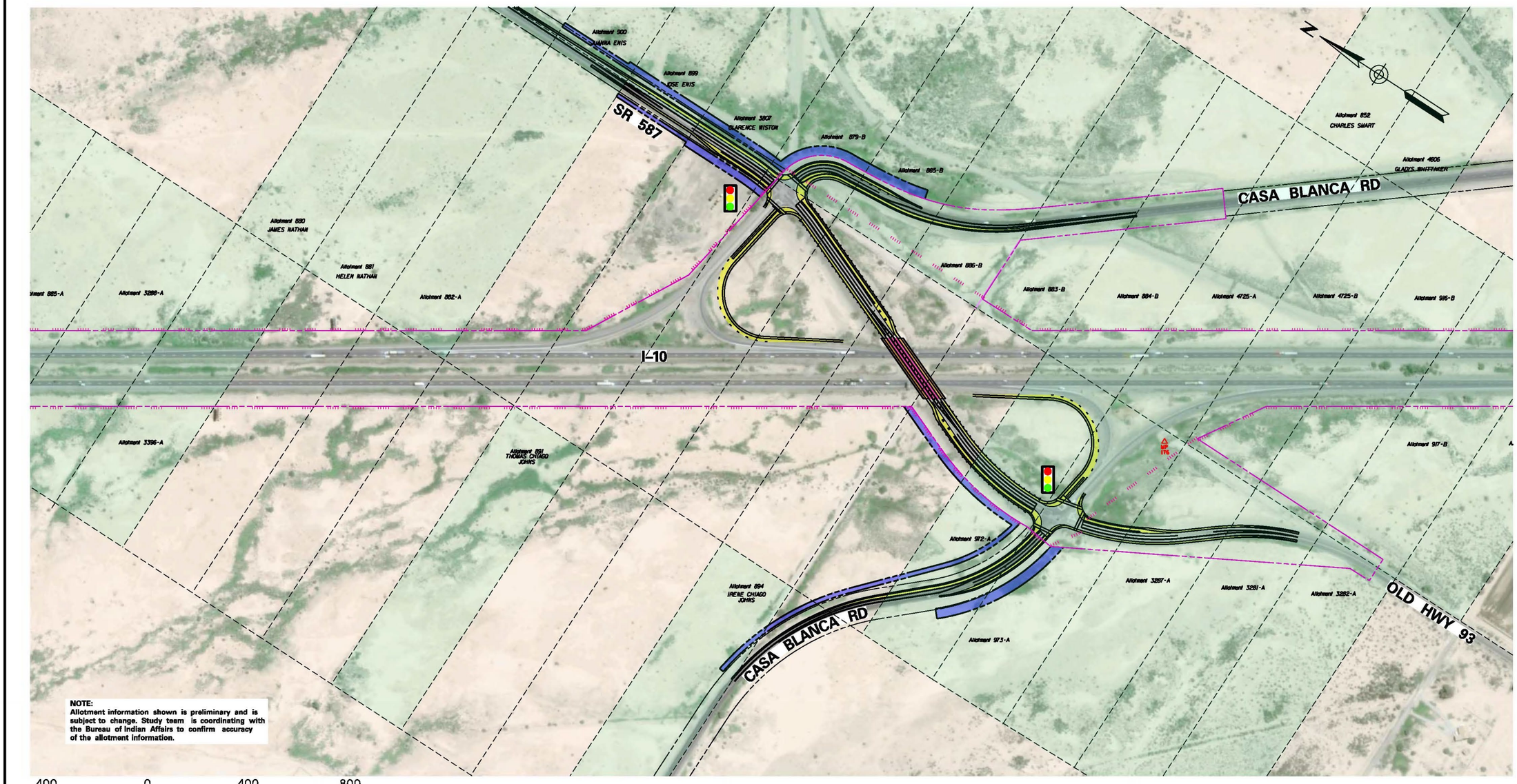

Figure 3-17. CB3 layout

CB4: SR 587/Casa Blanca Road Option 4

General Description

CB4 uses the same TI and lane configuration as CB3 but realigns the crossroad between the ramp terminals to the south so that the bridge can be replaced off the current alignment. This option was developed so that an option was available that used the existing TI configuration but was also compatible with both ML2 and ML3. See Figure 3-18 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of the crossroad would be realigned to the south to construct the new bridge south of the existing bridge. The eastbound ramp terminal would also need to be reconstructed while the westbound ramp terminal would remain in the same location but would be expanded.

The proposed vertical alignment of the crossroad would be raised compared with the existing to provide a minimum of 16.5 feet of vertical clearance over I-10. The new vertical alignment would also increase the crossroad design speed to 55 mph.

The horizontal and vertical alignment of the existing hook-style exit ramps would be improved with a larger radius and longer deceleration lane, departing from I-10 upstream of the bridge for greater decision and stopping sight distance.

The proposed typical section along the crossroad would be wider than the existing to accommodate the new turn lanes, shoulders, and sidewalks and would use a crowned 2% cross slope. Sidewalks would be located along both sides of the road. The new sidewalk and curb ramps would be ADA-compliant.

Bridge Features

The new bridge would be a 73-foot-wide two-span bridge using an I-10 centerline pier with abutments placed outside of the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to provide 16.5 feet of minimum vertical clearance over both directions of I-10. The new piers and abutments would be placed beyond the I-10 clear zone. The existing bridge would be removed after the completion and opening of the new bridge.

Right-of-way Requirements

This option would require 2.6 acres of new ROW split among all four quadrants of the TI. 1.3 acres of new ROW would be acquired from tribal land, while the remaining 1.3 acres would come from four allotted parcels.

Traffic Operations Summary

This option would improve the expected LOS in 2040 to C or better. However, it would degrade to LOS F during traffic diversion events because this configuration would not efficiently serve the west-to-north and south-to-east movements associated with diversion traffic events.

Constructability and Maintenance of Traffic

Shoulder closures would be needed around the intersections to accommodate the turn lane construction and short-term lane restrictions would be needed to accommodate the signal installations. Short-term closures would be needed for the new crossroad alignment tie-in points. Some closures of up to several weeks may be required to reconstruct the exit ramps. Short-term I-10 lane closures and detours would be necessary to set girders and pour the new bridge deck, as well as for the existing bridge removal. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

There is an existing 36- by 22-inch CMP under I-10 north of the existing bridge that would be affected by the new fill slopes and would likely need to be reconstructed. The existing concrete drainage spillways on the SR 587 embankment would need to be reconstructed. Existing impounding concerns east of the current TI along Casa Blanca Road and SR 587 could possibly be mitigated within the proposed TI infields if subsequent design coordination determines that is an appropriate solution.

Utility Impacts

This option would potentially affect an overhead power line that runs along SR 587, a dual gas line that runs to the east of I-10, and a telephone line that runs under I-10 south of the bridge. There would also be impacts to several of the lighting electrical conduits that run throughout the TI.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

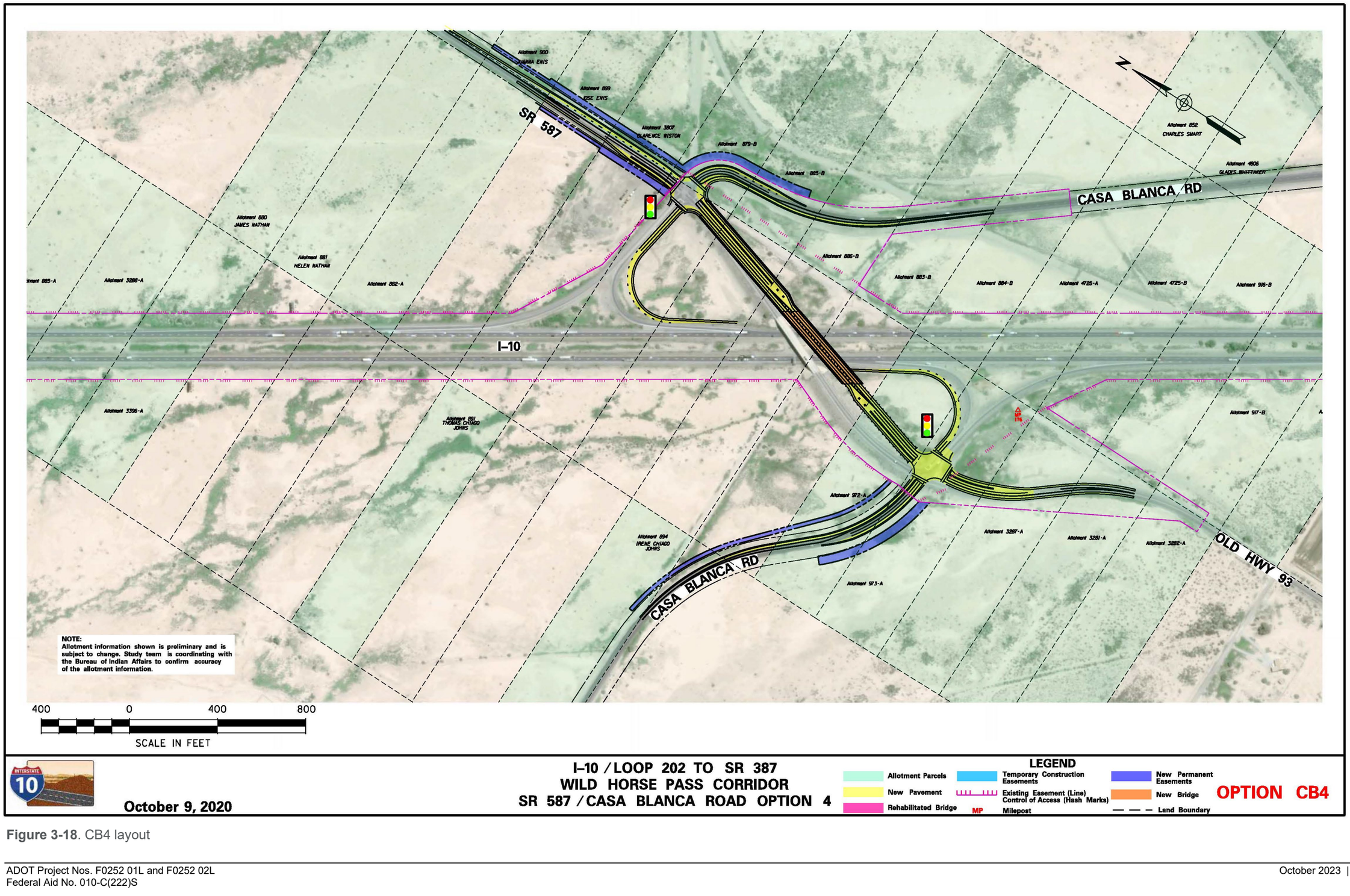

Figure 3-18. CB4 layout

CB5: SR 587/Casa Blanca Road Option 5

General Description

CB5 proposes a completely new TI configuration, with a typical diamond-style TI using five-legged roundabouts at the terminals to accommodate the Casa Blanca Road, SR 587, and old Highway 93 connections. This option would add a new bridge over I-10 for westbound traffic and would rehabilitate and widen the existing bridge for eastbound traffic. CB5 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, CB2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-19 for the layout for this option.

Roadway Features

The proposed horizontal alignment for the crossroad would be a split roadway across I-10 using the new and existing bridges and would tie into a five-legged multilane roundabout at each end. The TI would be modified into a diamond TI with both the ramps and crossroads tying into the roundabouts. The alignment for the new bridge would be offset to the north to allow for the bridge to be constructed without interfering with existing traffic over the current bridge.

The proposed vertical alignment for the new bridge would mimic the existing crossroad vertical alignment but would be raised to provide a minimum 16.5 feet of vertical clearance over I-10. The vertical alignment for the existing bridge would remain the same. The existing bridge's vertical clearance would be reduced because of the widening and would have to be mitigated with I-10 modifications, should it fall below 16 feet.

The proposed crossroad typical section would be a split roadway over I-10 using two lanes in each direction with shoulders that would also be used as bike facilities. This crossroad, along with the ramps and local roads, would connect into a five-legged multilane roundabout on both sides of the freeway. Given the higher volumes, the east roundabout would use three bypass lanes, allowing northbound traffic traveling from Casa Blanca Road to SR 587, southbound traffic traveling from SR 587 to the I-10 entrance ramp, and westbound traffic traveling from the I-10 exit ramp to Casa Blanca Road to bypass the roundabout. Given the lower volumes, there would be no bypass lanes on the western roundabout. Raised sidewalks would run along both sides of the road and around the roundabouts. The sidewalk and curb ramps would be ADA-compliant.

Bridge Features

This option proposes to construct a new bridge north of the existing bridge. The existing bridge would get a deck rehabilitation and would be widened to accommodate the proposed typical section. The new bridge would provide at least 16.5 feet of vertical clearance over I-10. The existing bridge's vertical clearance would be reduced by the widening and would have to be mitigated with I-10 modifications should it fall below 16 feet.

Right-of-way Requirements

This option would require 17.45 acres of new ROW split among all four quadrants of the TI. 12.1 acres of new ROW would be acquired from tribal land, while the remaining 5.35 acres would come from six allotted parcels.

Traffic Operations Summary

This option would improve the expected LOS in 2040 to A or better. However, it would degrade to LOS F during traffic diversion events because the five-legged roundabouts would not efficiently handle the west-to-north and south-to-east movements associated with diversion traffic events.

Constructability and Maintenance of Traffic

Traffic control would be substantial to reconfigure this TI, largely within the footprint of the current TI. Lane and shoulder closures would be needed around the intersections to convert them to roundabouts. Closures would also be needed for the new crossroad alignment tie-in points. Some closures of up to several weeks may be required for all four ramp reconstructions as well as Casa Blanca Road and old Highway 93. Short-term I-10 lane closures and detours would be necessary to set girders and pour the new and widened bridge deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Multiple drainage culverts under I-10 would need to be reconstructed. The on-site drainage would also need to be reconstructed to accommodate the new TI configuration. Existing impounding concerns east of the current TI along Casa Blanca Road and SR 587 could possibly be mitigated within the proposed TI infields if subsequent design coordination determines that is an appropriate solution.

Utility Impacts

This option would potentially affect an overhead power line that runs along SR 587, a dual gas line that runs to the east of I-10, and a telephone line that runs under I-10 south of the existing bridge. It would also potentially affect several of the lighting electrical conduits that run throughout the TI.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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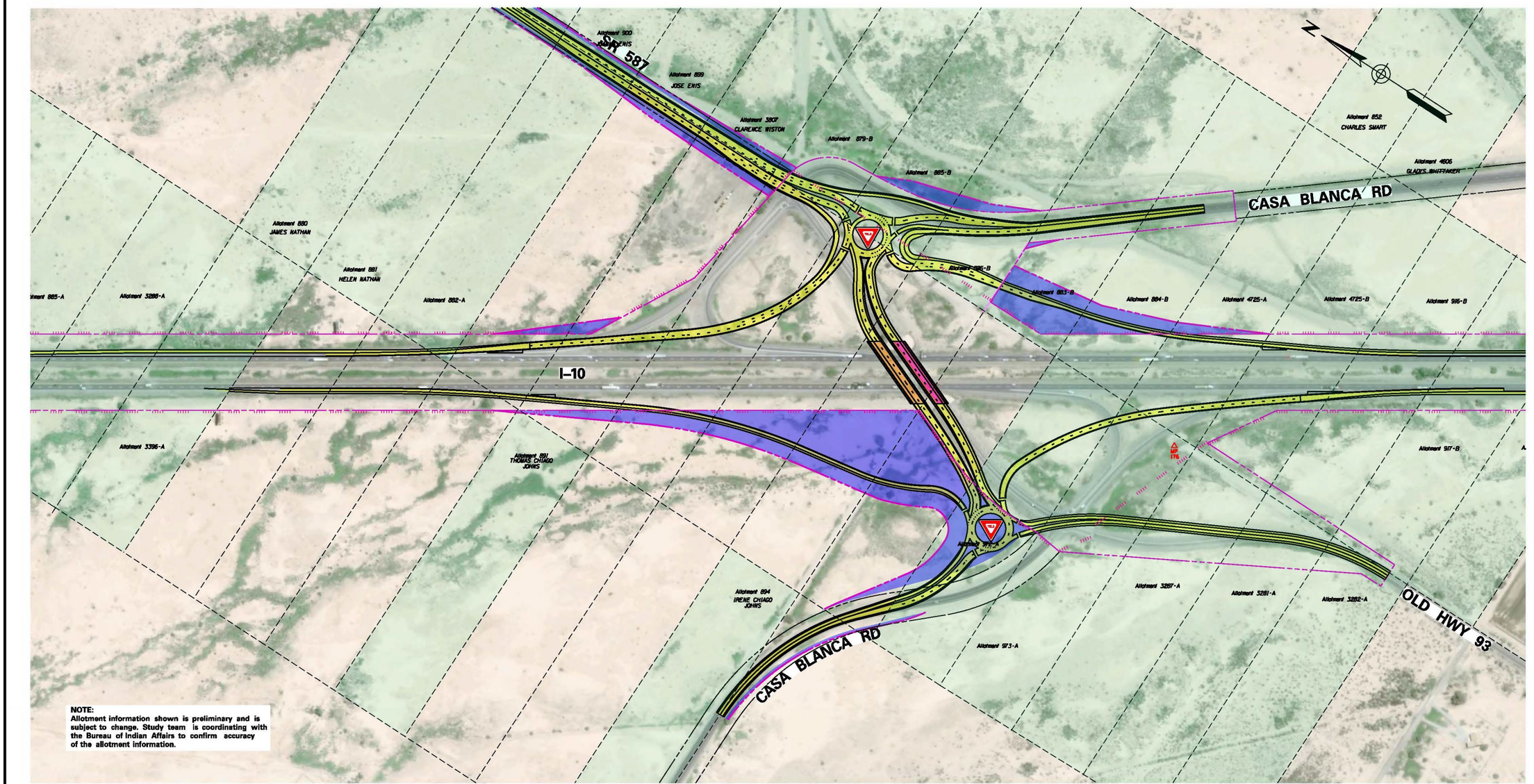

Figure 3-19. CB5 layout

CB6: SR 587/Casa Blanca Road Option 6

General Description

CB6 proposes to reconfigure the existing TI as a conventional diamond-style TI while also separating Casa Blanca Road into a bypass configuration by realigning it on its own alignment and crossing over I-10 south of the current TI. The focus of this concept was to separate Community traffic traveling between Sacaton and Casa Blanca from the TI, providing a convenient connection for the Community while preserving the Community's access to I-10. As drawn, this option is compatible with ML2 but is incompatible with ML3 because the existing bridge is retained with this configuration that has its bridge piers directly adjacent to the outside shoulders on I-10. The I-10 design could include a horizontal shift to the median at the bridge or could introduce design exceptions for narrower lanes or shoulders to make it compatible with ML3, or replace the existing bridge. See Figure 3-20 for the layout for this option.

Roadway Features

The proposed horizontal alignment for the crossroad would be a split roadway across I-10 using the new and existing bridges and would tie into a four-legged multilane roundabout at each ramp terminal. The TI would be modified into a diamond TI with both the ramps and crossroads tying into the roundabouts. The alignment for the new bridge would be offset to the north to allow for the bridge to be constructed without interfering with existing traffic over the current bridge. SR 587 would also "T" into the newly realigned Casa Blanca Road to the west of the eastbound ramp terminal using a third roundabout. Casa Blanca Road would cross over I-10 to the south of the TI on the second new alignment and bridge. Old Highway 93 would tie into the newly realigned Casa Blanca Road via a T intersection.

The proposed vertical alignment for the new westbound SR 587 bridge would mimic the existing crossroad vertical alignment but would be raised to provide a minimum 16.5 feet of vertical clearance over I-10. The vertical alignment for the existing bridge would remain the same. The existing bridge's vertical clearance would be reduced by the widening and would have to be mitigated with I-10 modifications, should it fall below 16 feet. The new Casa Blanca Road bypass vertical alignment would crest over I-10 using at least a 45 mph design speed.

The proposed SR 587 typical section would be a split roadway over I-10 using two lanes in each direction with shoulders that would also be used as bike facilities. SR 587 and the ramps would connect into a new four-legged multilane roundabout on both sides of the freeway. Given the higher volumes, the east roundabout would use two bypass lanes allowing southbound traffic traveling from SR 587 to the I-10 entrance ramp and westbound traffic traveling from the I-10 exit ramp to northbound SR 587 to bypass the roundabout. Given the lower volumes, there would be no bypass lanes on the western roundabout. Raised sidewalks would run along both sides of SR 587, around the roundabouts, and over the Casa Blanca bypass crossing, ending near the end of the full roadway section improvements. The sidewalk and curb ramps would be ADA-compliant.

Bridge Features

For SR 587, this option proposes to construct a new bridge north of the existing bridge. The existing bridge would get a deck rehabilitation and would be widened to accommodate the proposed typical section. The new bridge would provide at least 16.5 feet of vertical clearance over I-10. The existing bridge's vertical clearance would be reduced by the widening and would have to be mitigated with I-10 modifications, should it fall below 16 feet

For the Casa Blanca Road bypass, this option proposes to construct a new bridge south of the existing bridge. This new bridge would provide at least 16.5 feet of vertical clearance over I-10.

Right-of-way Requirements

This option would require 36.65 acres of new ROW split among all four quadrants of the TI. 22 acres of new ROW would be acquired from tribal land, while the remaining 14.65 acres would come from eight allotted parcels.

Traffic Operations Summary

This option would improve the expected LOS in 2040 to A or better. However, it would degrade to LOS B (or worse depending on duration and time of day) during traffic diversion events. Unlike the other SR 587/Casa Blanca Road options, the west-to-north and south-to-east movements associated with diversion traffic events would be separated from the Casa Blanca Road traffic bypassing the TI.

Constructability and Maintenance of Traffic

Traffic control would be substantial to reconfigure this TI. Lane and shoulder closures would be needed around the intersections to convert them to roundabouts. Closures would also be needed for the new crossroad alignment tie-in points. Some closures of up to several weeks may be required for all four ramp reconstructions as well as for Casa Blanca Road and old Highway 93. Short-term I-10 lane closures and detours would be necessary to set girders and pour the new and widened bridge decks. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes. Geometric revisions could be made to this concept to simplify the constructability and improve the maintenance of traffic, while preserving the concept.

Drainage Features

Multiple culverts under I-10 would need to be reconstructed. The on-site drainage would also need to be reconstructed to accommodate the new TI configuration. Existing impounding concerns east of the current TI along Casa Blanca Road and SR 587 could possibly be mitigated within the proposed TI infields if subsequent design coordination determines that is an appropriate solution.

Utility Impacts

This option would potentially affect an overhead power line that runs along SR 587, a dual gas line that runs to the east of I-10, and a telephone line that crosses under I-10 south of the bridge. There would also be impacts to several of the lighting electrical conduits that run throughout the TI.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

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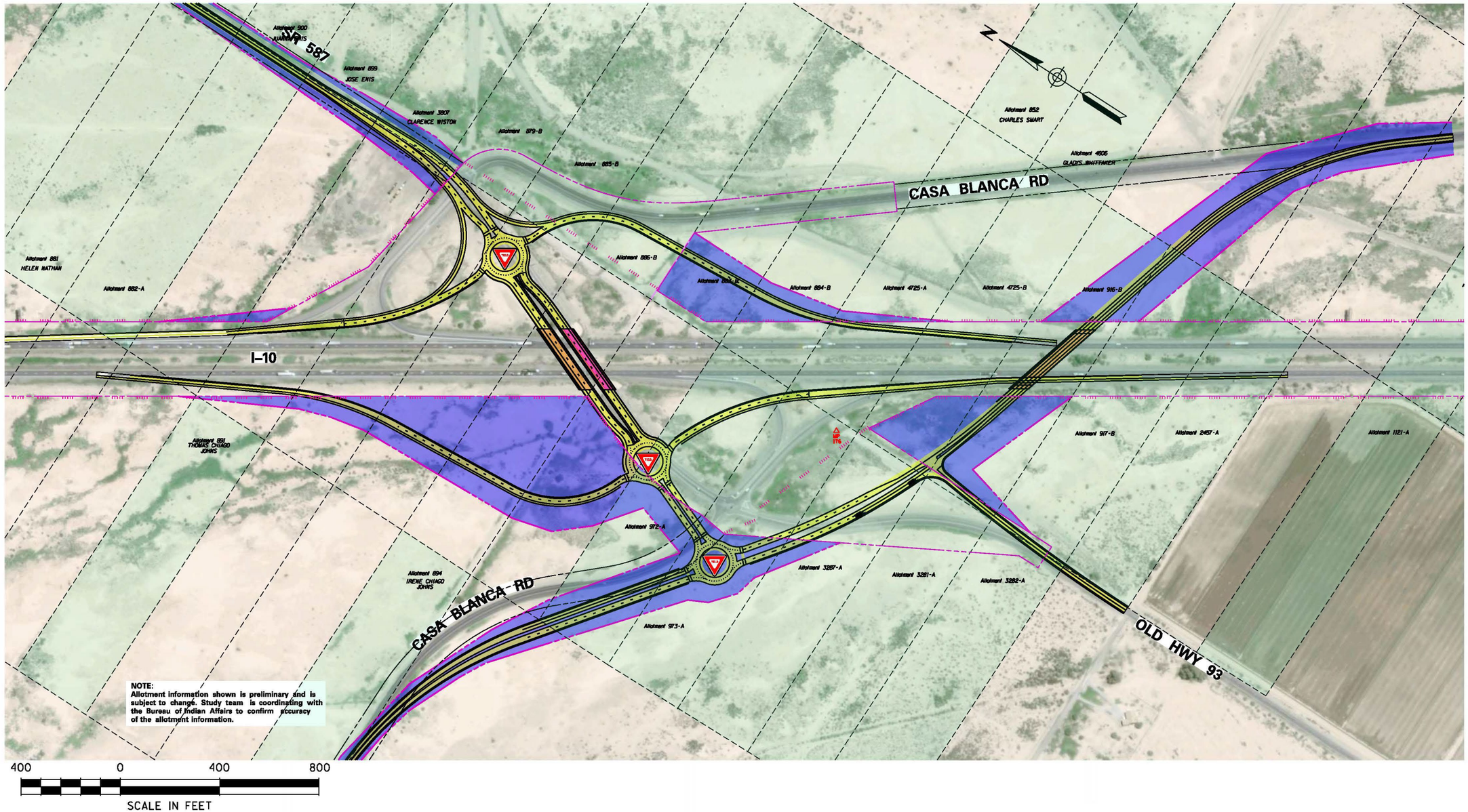

Figure 3-20. CB6 layout

CB7: SR 587/Casa Blanca Road Option 7

General Description

CB7 is another option that proposes to reconfigure the TI. This option was developed specifically to maximize the operational efficiency of the TI during the I-10 traffic diversion events where the westbound I-10 to northbound SR 587 traffic, the southbound SR 587 to eastbound I-10 traffic, or both become overwhelmed when I-10 to the north must be closed. This is done by providing a free-flow TI design with only right turns for all turning movements. This option can best be described as a rotary style TI that uses a large counter-clockwise one-way circulating roadway to connect all the roadway junctions with right-turn only connections. Rotary-style TIs typically use a round circulating roadway, but for CB7, the circulating roadway is more triangular-shaped to better fit the site constraints but to also provide the opportunity for a split diamond TI that could include future embedded ramps to further enhance traffic operations during I-10 diversion events. While the ramps and circulating roadway are one-way, the crossroads that tie into them are two-way. As drawn, this option is compatible with ML2, but is incompatible with ML3 because the existing bridge is retained with this configuration that has its bridge piers directly adjacent to the outside shoulders on I-10. The I-10 design could include a horizontal shift to the median at the bridge or could introduce design exceptions for narrower lanes or shoulders to make it compatible with ML3, or replace the existing bridge. See Figure 3-21 for the layout for this option.

Roadway Features

The proposed horizontal alignment is predominantly a triangular-shaped circulating roadway with two bridges over I-10. The existing alignment for SR 587 would be kept in place over I-10 except where the new ramps and crossroad connect. The horizontal alignment for the new bridge would be perpendicular to I-10 to minimize the skew and to provide enough separation from the existing bridge in case additional embedded ramps were added, as shown with the dashed lines in Figure 3-21. As is typical for a diamond TI, there would be four new I-10 ramps, all using right-turn and merge-only control with their connection to the circulating roadway. The two Casa Blanca Road and the old Highway 93 connections would “T” into the circulating roadway, also using right-turn and merge control.

The proposed vertical alignment for the new bridge would provide a minimum 16.5 feet of vertical clearance over the I-10 main line. The vertical alignment for the existing bridge would remain the same. The existing bridge’s vertical clearance would be reduced by the widening and would have to be mitigated with I-10 modifications, should it fall below 16 feet.

The proposed typical section for the circulating roadway would be a one-way road with one lane over both bridges but with two lanes throughout the rest of the circulating roadway. The connecting roadways (Casa Blanca Road and old Highway 93) would be crowned two-way roads with one lane in either direction and a 2% cross slope. The outside shoulders on the bridges would be 10 feet while the shoulders off the bridges would be 8 feet. Raised sidewalk would generally be placed around the outer edge of the circulating roadway, such that the only crosswalks occur at the connecting roadways but would never cross the circulating roadway. Sidewalk and curb ramps would be ADA-compliant.

Bridge Features

For SR 587, this option proposes to construct a new bridge over I-10 approximately 1,200 feet north of the existing bridge. The existing bridge would get a deck rehabilitation and would be widened to accommodate the proposed typical section. The new bridge would provide at least 16.5 feet of vertical clearance over I-10. The existing bridge’s vertical clearance would be reduced by the widening and would have to be mitigated with I-10 modifications, should it fall below 16 feet.

Right-of-way Requirements

This option would require 54.05 acres of new ROW split among all four quadrants of the TI. 47.8 acres of new ROW would be acquired from tribal land, while the remaining 6.25 acres would come from nine allotted parcels.

Traffic Operations Summary

This option would improve the expected LOS in 2040 to A or better. The LOS would degrade to B or worse, but this option performed the best of all the CB build options during traffic diversion events. This is because the free-flowing circulating roadway design provides the highest capacities, especially for the west-to-north and south-to-east movements.

Constructability and Maintenance of Traffic

Despite the drastic change in the TI configuration, traffic control would be relatively simple because a substantial amount of work could be built offline from the existing TI or could be phased relatively easily. Some lane and shoulder closures would still likely be needed, especially around geometric tie-in points. Some closures of up to several weeks may be required for all four ramp reconstructions and for SR 587, Casa Blanca Road, and old Highway 93. Short-term I-10 lane closures and detours would be necessary to set girders and pour the new and widened bridge decks. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Multiple culverts under I-10 would need to be reconstructed. The on-site drainage would also need to be reconstructed to accommodate the new TI configuration. Existing impounding concerns east of the current TI along Casa Blanca Road and SR 587 could possibly be mitigated within the proposed TI infields if subsequent design coordination determines that is an appropriate solution.

Utility Impacts

This option would potentially affect an overhead power line that runs along SR 587, a dual gas line that runs to the east of I-10, and a telephone line that crosses under I-10 south of the existing bridge. There would also be impacts to several of the lighting electrical conduits that run throughout the TI.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

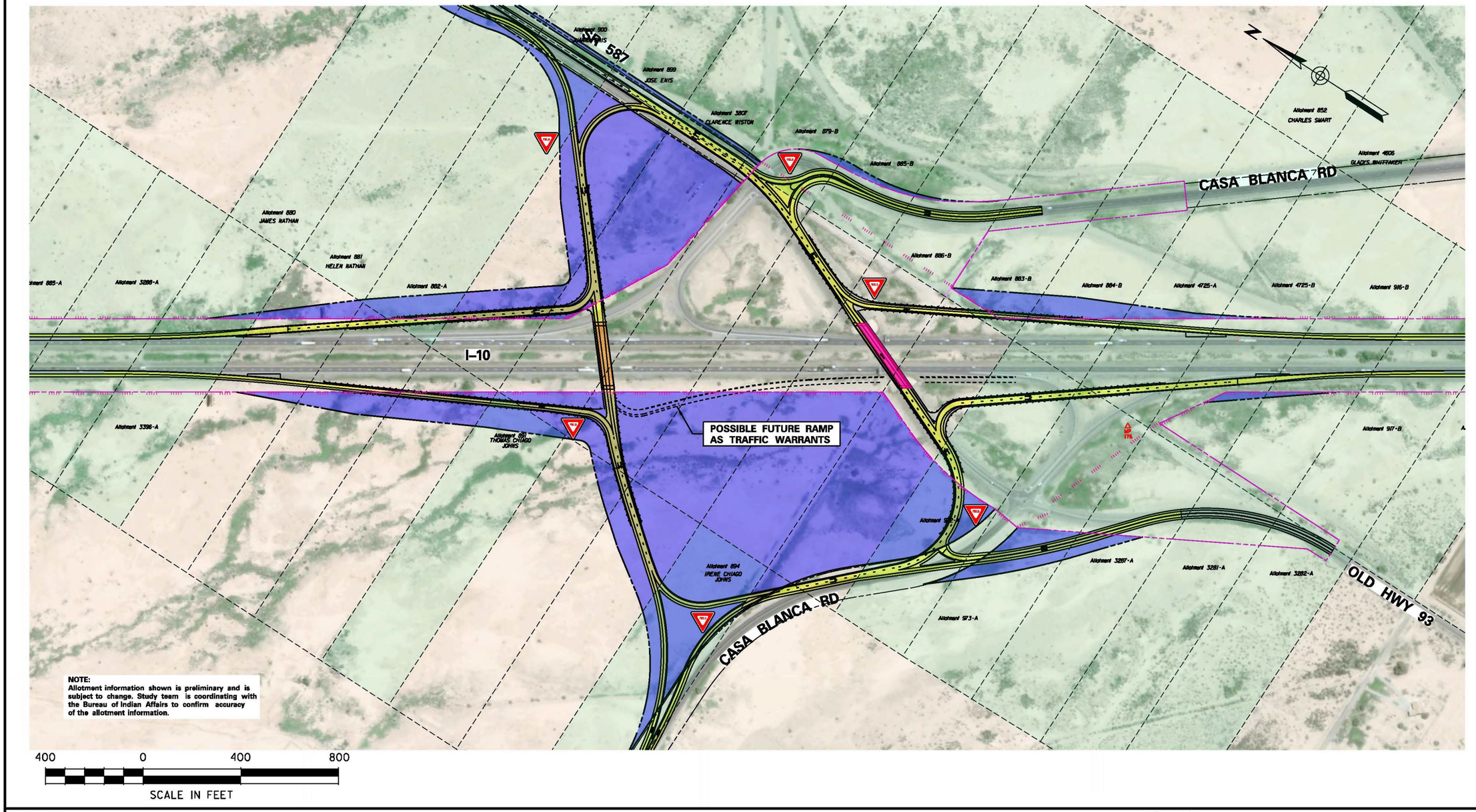

Figure 3-21. CB7 layout

GL1: Gasline Road Option 1

General Description

GL1 is the no-build option for the Gasline Road crossing and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with GL1. GL1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Gasline Road build options.

GL2: Gasline Road Option 2

General Description

Gasline Road is a north-to-south oriented roadway that crosses I-10 at a large skew angle at the northern end of Gila Farms. Because of this, the existing bridge was built with a five-span configuration to keep span lengths low, but this resulted in bridge piers just outside of both the inside and outside shoulders. As a result, widening I-10 toward the median or the outside would affect a bridge pier. Therefore, this study explored only build options that replaced this bridge. GL2 proposes a bridge replacement on the current Gasline Road alignment to minimize the new ROW required. This option is compatible with both ML2 and ML3. See Figure 3-22 for the layout for this option.

Roadway Features

The proposed horizontal alignment of this option would be the same as the existing alignment. A realignment of Gasline Road to eliminate or significantly reduce the skew was briefly considered but dropped from consideration as the impacts and costs to existing ROW, utility, and environmental features would be too high. The vertical alignment would be similar to the existing alignment, except that the proposed vertical alignment would be raised by several feet to account for the increased structure depth of the bridge, and to restore 16.5 feet of vertical clearance over I-10. The new vertical alignment would provide a design speed of 55 mph.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction, and the new bridge would have shoulders that could be used for bike use as well as for wide farm equipment that may cross I-10 within Gila Farms. An ADA-compliant sidewalk on both sides of the bridge would be included in this option.

Bridge Features

This option proposes a new bridge in the location of the existing bridge. The profile would be raised several feet to accommodate a vertical clearance of at least 16.5 feet and to accommodate the longer spans required for either the two- or four-span configuration needed to eliminate the existing lateral clearance issues with I-10. The bridge width would be increased to 59 feet to accommodate wider shoulders and pedestrian facilities.

Right-of-way Requirements

This option would require 3.9 acres of new ROW split among all four quadrants of the crossroad. The new ROW would be acquired from tribal land.

Traffic Operations Summary

Because the crossroad is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

Gasline Road would need to be closed for the duration of the bridge replacement for GL2. Short-term I-10 lane closures would be necessary to remove the existing bridge, set girders, and pour the new bridge deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

An existing 36- by 22-inch CMP to the east of the existing bridge under I-10 would be affected by the new fill slopes and would likely need to be reconstructed. The Gasline Road on-site pavement drainage would need to be reconstructed.

Utility Impacts

This option would potentially affect a dual gas line that crosses I-10 and runs parallel to Gasline Road, an overhead power line that crosses I-10 to the west of the crossroad, a farm irrigation line that crosses under I-10 to the west of the crossroad, and an underground telephone line that crosses I-10 to the east of the crossroad.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

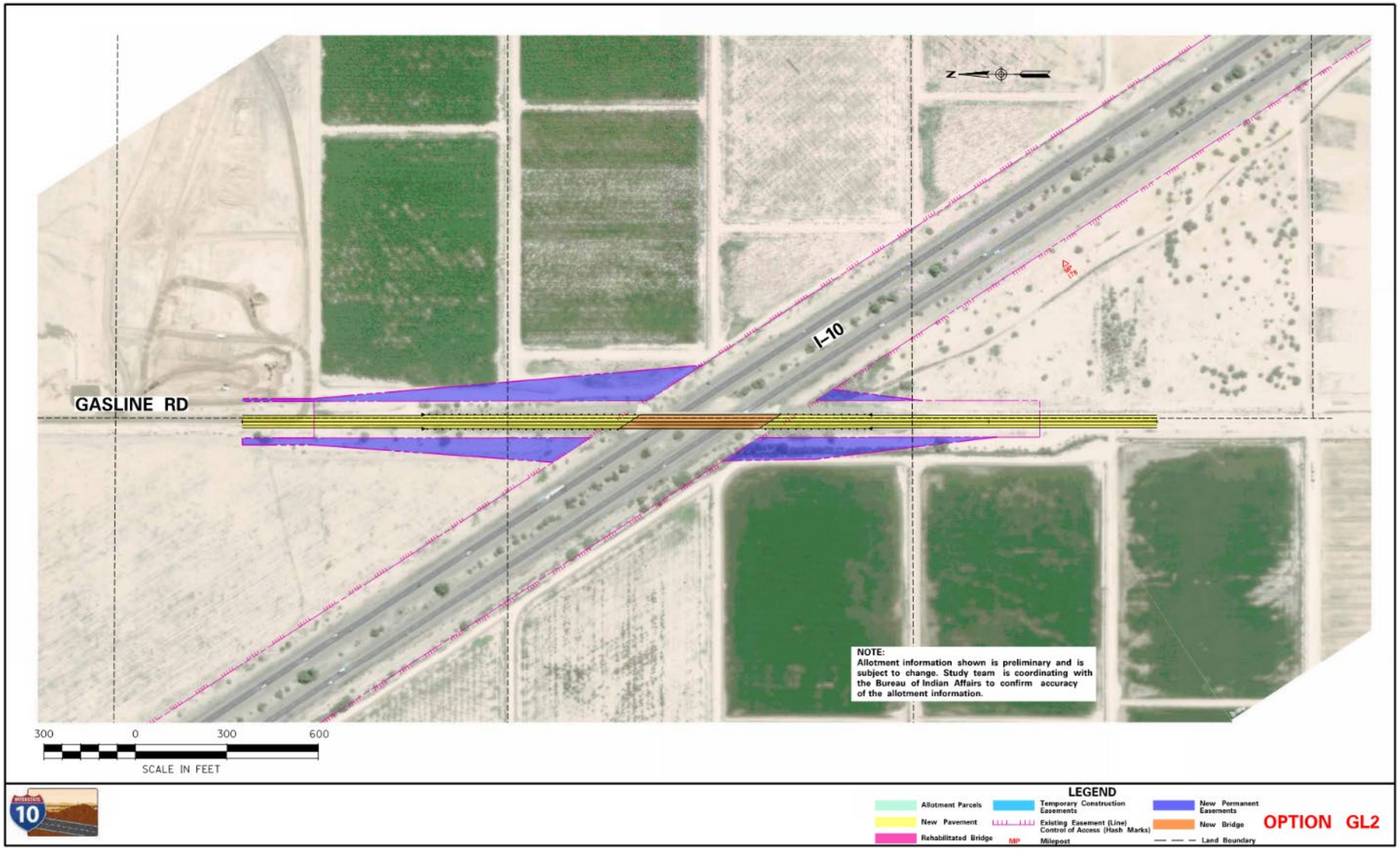

Figure 3-22. GL2 layout

GL3: Gasline Road Option 3

General Description

Like GL2, GL3 also proposes a bridge replacement at this location, but GL3 proposes to construct the new bridge to the east of the existing bridge to keep Gasline Road open for the majority of construction. This option would be compatible with both ML2 and ML3. See Figure 3-23 for the layout for this option.

Roadway Features

The proposed horizontal alignment of this option would be offset to the east of the existing alignment to primarily avoid the existing twin gas lines, an irrigation facility, and an existing overhead powerline that run parallel and west of the existing roadway. A realignment of Gasline Road to eliminate or significantly reduce the skew was briefly considered but dropped from consideration as the impacts and costs to existing ROW, utility, and environmental features would be too high. The vertical alignment would be similar to the existing alignment, except that the proposed vertical alignment would be raised by several feet to account for the increased structure depth of the bridge and to restore 16.5 feet of vertical clearance over I-10. The new vertical alignment would provide a design speed of 55 mph.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction, and the new bridge would have shoulders that could be used for bike use as well as for wide farm equipment that may cross I-10 within Gila Farms. An ADA-compliant sidewalk on both sides of the bridge would be included in this option.

Bridge Features

This option proposes that a new bridge be constructed east of and parallel to the existing bridge. The profile would be raised several feet to accommodate a vertical clearance of at least 16.5 feet and to accommodate the longer spans required for either the two- or four-span configuration needed to eliminate the existing lateral clearance issues with I-10. The bridge width would be increased to 59 feet to accommodate wider shoulders and pedestrian facilities.

Right-of-way Requirements

This option would require 4.2 acres of new ROW split among all four quadrants of the crossroad. The new ROW would be acquired from tribal land.

Traffic Operations Summary

Because the crossroad is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

The primary difference between GL2 and GL3 is that Gasline Road can remain open for most of construction for GL3 while the new bridge and approach roadways are being built. Only short-term Gasline Road closures would be needed for the final geometric tie-ins. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and then remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

An existing 36- by 22-inch CMP to the east of the existing bridge under I-10 would be affected by the new fill slopes and would likely need to be reconstructed. The Gasline Road on-site pavement drainage would need to be reconstructed.

Utility Impacts

This option would potentially affect the underground telephone line that crosses I-10 to the east of the crossroad. Given the location of the new bridge to the east of the existing crossroad, the utilities to the west of Gasline Road would not be affected.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

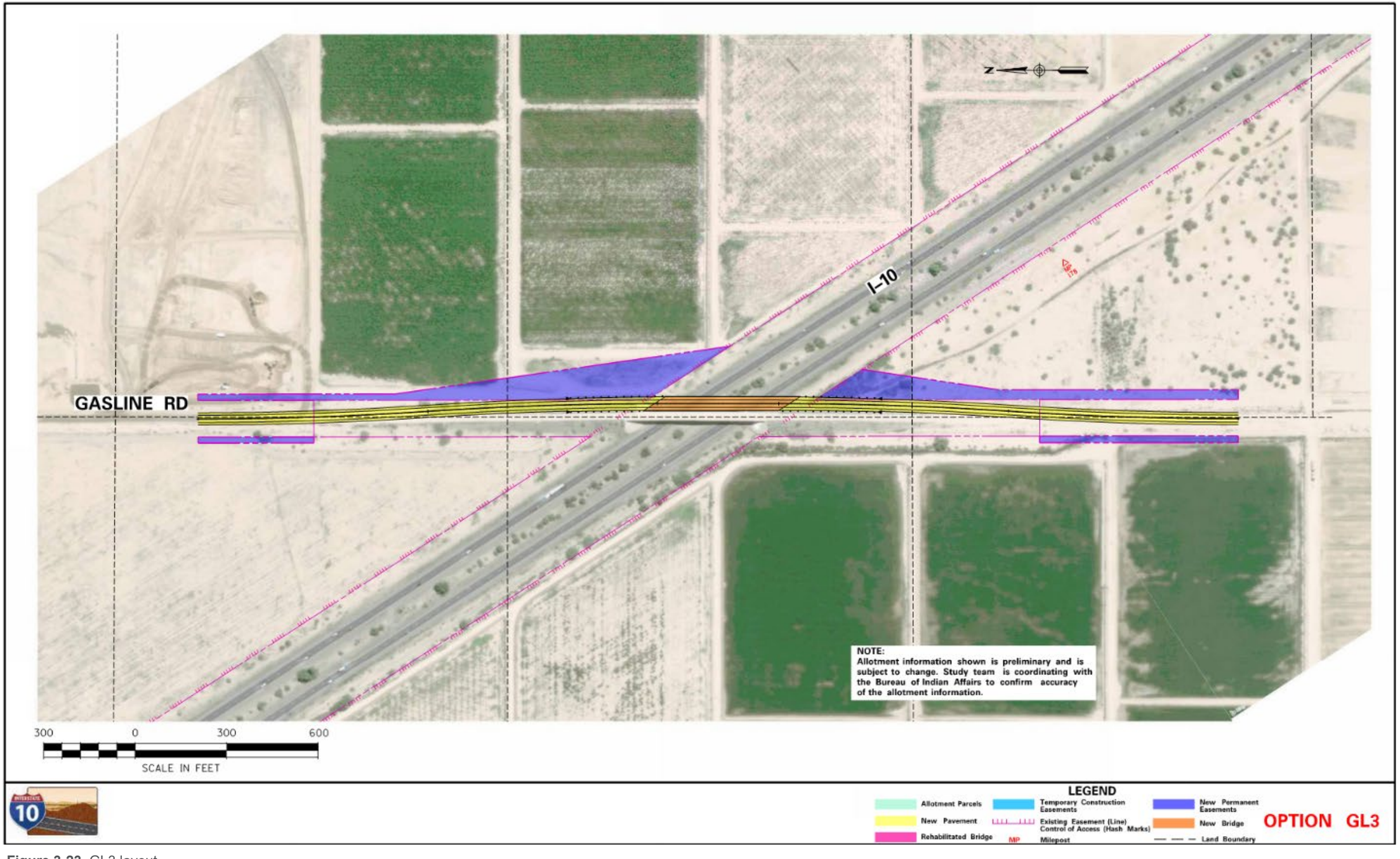

Figure 3-23. GL3 layout

SF1: Seed Farm Road Option 1

General Description

SF1 is the no-build option for the Seed Farm Road crossing and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with SF1. SF1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Seed Farm Road build options.

SF2: Seed Farm Road Option 2

General Description

SF2 proposes to retain Seed Farm Road as a grade-separated roadway over I-10 that repaves and widens the existing approach roadways and rehabilitates and widens the existing bridge deck to accommodate wider shoulders and pedestrian accommodations. SF2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, SF2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or if used a design exception for narrower lanes or shoulders. See Figure 3-24 for the layout for this option.

Roadway Features

The horizontal and vertical alignments of Seed Farm Road would remain unchanged with this option.

The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

The proposed typical section proposes one lane in each direction with shoulder and pedestrian accommodations. The proposed shoulders would provide a location for bikes to cross over I-10 and for wide agricultural equipment to cross I-10 between the Gila Farm fields. The widenings would match the existing crowned cross slope. An ADA-compliant pedestrian walkway on both sides of the roadway and bridge would be included in this option.

Bridge Features

This option proposes the existing bridge be widened to 59 feet to accommodate wider shoulders and new sidewalk, while also rehabilitating the existing bridge deck. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

This option would require 2.1 acres of new ROW split among all four quadrants of the TI. The new ROW would be acquired from tribal land. One billboard/business sign would need to be relocated in the southeast quadrant. Approximately 2 acres of new temporary construction easement would also be required, all from tribal land, to restore the Gila Farms irrigation system.

Traffic Operations Summary

Because the crossroad is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

Lane closures on Seed Farm Road would be necessary for the bridge widening. Short-term I-10 lane closures would be necessary to set girders and to pour the new bridge deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage on Seed Farm Road would need to be reconstructed.

Utility Impacts

This option would potentially affect the overhead power line that crosses I-10 to the north of the crossroad, the gas line that crosses I-10 to the south of the crossroad, and the irrigation ditches/pipes that exist along both sides of I-10 and Seed Farm Road.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

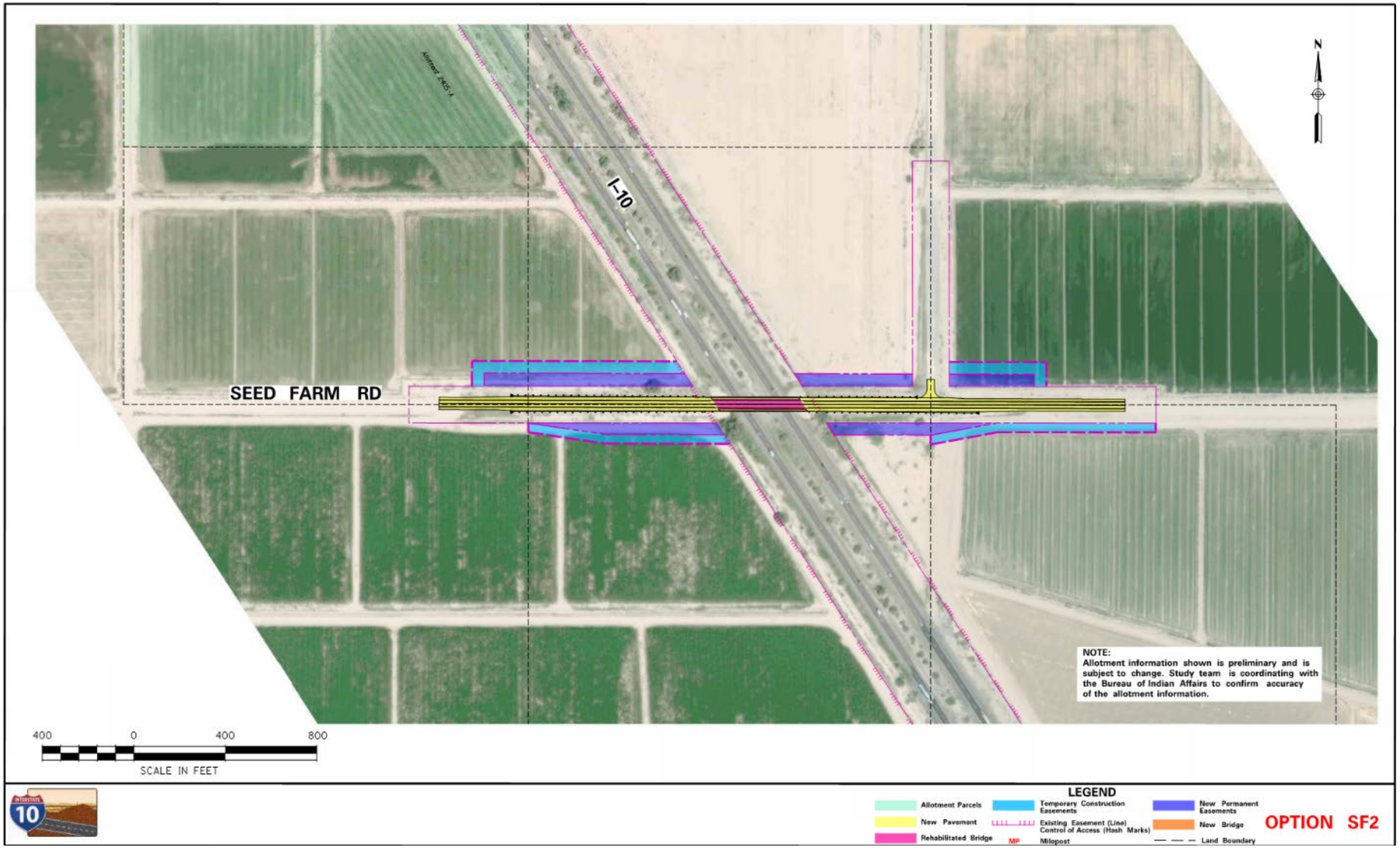

Figure 3-24. SF2 layout

SF3: Seed Farm Road Option 3

General Description

During the development of the alternatives for this study, the Community referenced the inclusion of a new TI at Seed Farm Road as documented in the MAG *I-8 & I-10 Hidden Valley Roadway Framework Study*, completed in 2007. A link to this study is here:

https://www.azmag.gov/Programs/Transportation/Freeways-and-Highways/I-8-I-10-Hidden-Valley-Roadway-Framework-Study

This proposed TI is important to the Community because it would provide a direct I-10 connection into Sacaton, which is the Community's capital and governance center. Its construction could also help relieve traffic demand at the SR 587/Casa Blanca Road TI.

In response, this study evaluated three options for upgrading the current Seed Farm Road grade separation into a full I-10 TI. SF3 is the first of these options and proposed replacing the current grade separation with a new tight diamond TI and bridge built adjacent to the current bridge to keep Seed Farm Road operational during construction. A tight diamond TI is an unusual configuration in a rural setting because the construction costs are typically much higher than for a spread diamond TI, but this option would minimize the new ROW requirements.

This option would be compatible with both ML2 and ML3. See Figure 3-25 for the layout for this option.

Roadway Features

The proposed Seed Farm Road horizontal alignment would shift to the south and the skew across I-10 would be reduced compared with that of the existing alignment. One curve to the east and two curves to the west would be added to tie the new crossing into the existing road. Four new ramps would be added to convert the crossroad into an TI. The ramp terminals would be 450 feet apart. A horizontal shift to the south was preferred compared with the north to avoid affecting an existing overhead power line, although the proposed ramps may still affect the powerline.

The proposed vertical alignment for Seed Farm Road would crest over I-10 and would be set high enough to provide a minimum of 16.5 feet of vertical clearance over I-10 and would provide a design speed of at least 55 mph. The ramp profiles would also have to raise to meet the proposed elevation of Seed Farm Road just off the bridge abutments.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction with side-by-side left turn lanes between the ramp terminals over the bridge. The proposed Seed Farm Road would have shoulders and raised sidewalks. The sidewalk and curb ramps would be ADA-compliant. The proposed shoulders would provide a location for bikes to cross over I-10 and for wide agricultural equipment to cross I-10 between the Gila Farms fields.

The ramp terminals are expected to be stop sign-controlled intersections on account of the relatively low volumes. Furthermore, the stop sign-controlled intersections avoid using signal mast arms or roundabouts that could be challenging for wide or tall agricultural equipment to pass through.

Bridge Features

This option proposes the existing bridge be removed and a new 89-foot bridge be constructed to the south of the existing alignment. The new bridge would be a two-span structure that would realign the roadway to reduce the skew across I-10. The new piers and abutments would be placed beyond the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to ensure 16.5 feet clearance over both directions of I-10.

Right-of-way Requirements

This option would require 21.9 acres of new ROW split among all four quadrants of the TI. The new ROW would be acquired from tribal land. One billboard/business sign would need to be relocated in the southeast quadrant. Approximately 5 acres of new temporary construction easement would also be required, all from tribal land, to restore the Gila Farms irrigation system.

Traffic Operations Summary

The new TI would improve access and travel times to and from Sacaton, which would remove travel demand from the SR 587/Casa Blanca Road and SR 387/SR 187/Pinal Avenue TIs. This new access would provide a more direct route between Sacaton and I-10 and decrease travel times. It also would improve mobility for vehicles, cyclists, and pedestrians alike. The projected 2040 traffic volumes are expected to be relatively low and would thus have LOS A in 2040, even with the stop sign-controlled intersections.

Constructability and Maintenance of Traffic

Seed Farm Road would be open for most of the construction period because most of the proposed improvements could be built away from existing traffic. Seed Farm Road would need to be closed only briefly for the geometric tie-in points along either end of the improvements. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage on Seed Farm Road would need to be reconstructed. Four 36- by 22-inch CMP culverts under I-10 within the footprint of the proposed TI would need to be realigned or reconstructed.

Utility Impacts

This option would potentially affect the overhead power line that crosses I-10 to the north of the crossroad, the gas line that crosses I-10 to the south of the crossroad, and the irrigation ditches/pipes that exist along both sides of I-10 and Seed Farm Road.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

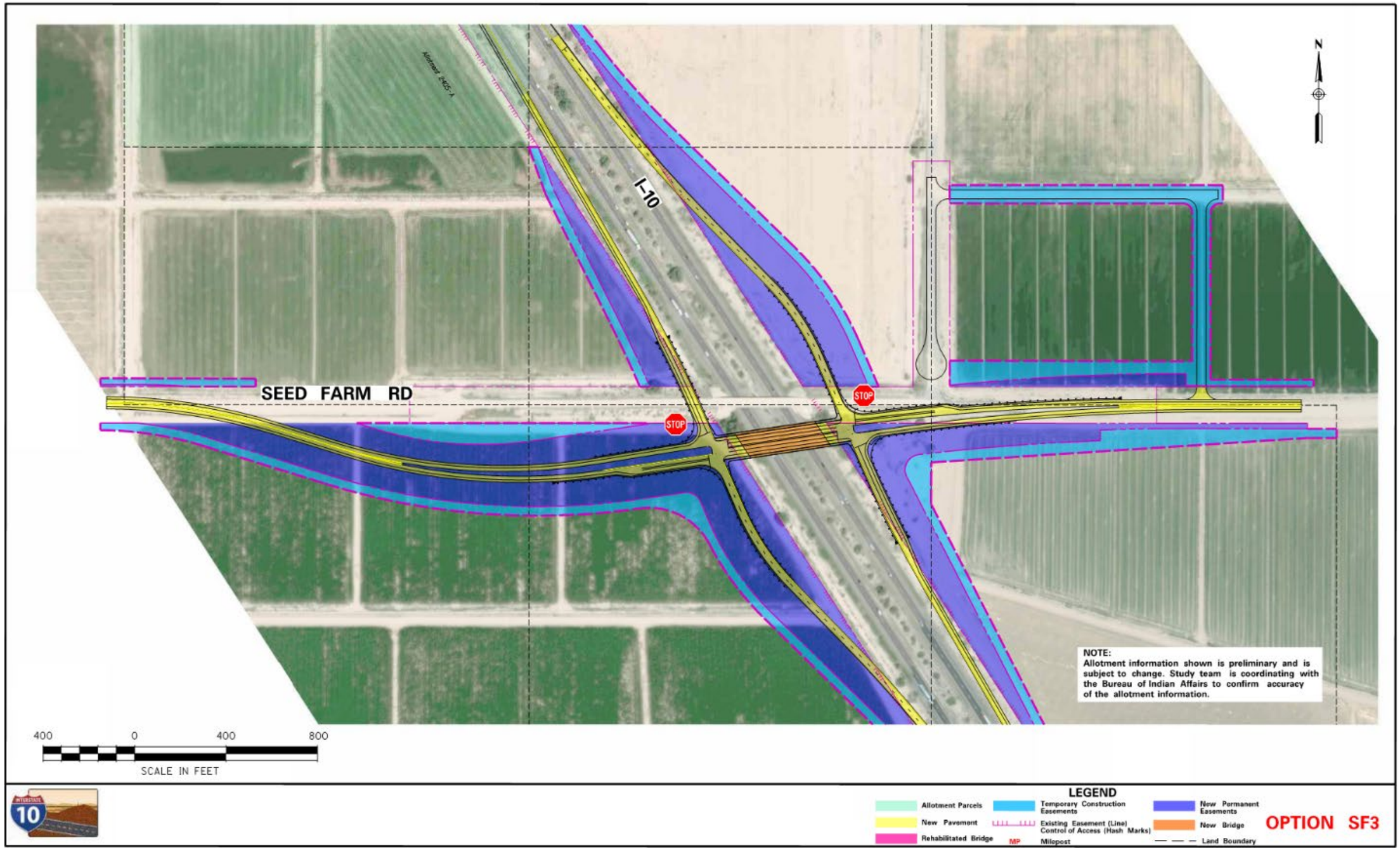

Figure 3-25. SF3 layout

SF4: Seed Farm Road Option 4

General Description

SF4 builds upon SF3, but instead of proposing a tight diamond TI, SF4 proposes a spread diamond TI configuration, which is more common in rural settings such as this location. SF4 would also replace the bridge to the south of the existing bridge but retain the same skew angle over I-10 that exists today to minimize the ROW footprint of the spread diamond ramps. This option would be compatible with both ML2 and ML3. See Figure 3-26 for the layout for this option.

Roadway Features

The proposed Seed Farm Road horizontal alignment would shift to the south and would retain the same skew across I-10 that exists today. Large-radius reversing curves on either side of the bridge would complete the tie-in locations. Four new ramps would be added to convert the crossroad into a TI. The ramp terminals would be over 1,100 feet apart. A horizontal shift to the south was preferred, rather than to the north, to avoid affecting an existing overhead power line, although the proposed ramps may still affect the power line.

The proposed vertical alignment would crest over I-10 and would be set high enough to provide a minimum of 16.5 feet of vertical clearance over I-10 and would provide a design speed of at least 55 mph. The proposed ramp profiles would largely stay flat and at-grade for the length of the ramp.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction with side-by-side left-turn lanes between the ramp terminals over the bridge. The proposed Seed Farm road would have shoulders and raised sidewalks. The sidewalk and curb ramps would be ADA-compliant. The proposed shoulders would provide a location for bikes to cross over I-10, and for wide agricultural equipment to cross I-10 between the Gila Farm fields.

The ramp terminals are expected to be stop sign-controlled intersections on account of the relatively low volumes. Furthermore, the stop sign-controlled intersections avoid using signal mast arms or roundabouts that could be challenging for wide or tall agricultural equipment to pass through.

Bridge Features

This option proposes the existing bridge be removed and a new 89-foot bridge be constructed to the south of the existing alignment. The new bridge would be a two-span structure that would mimic the skew angle that exists with the existing Seed Farm Road crossing of I-10. The new piers and abutments would be placed beyond the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to accommodate a 16.5-foot clearance over both directions of I-10.

Right-of-way Requirements

This option would require 39.87 acres of new ROW split among all four quadrants of the TI. 39.6 acres of new ROW would be acquired from tribal land, while the remaining 0.27 acre would come from one allotted parcel (this one allotted parcel may be avoided if this alternative's design is advanced). One billboard/business sign would need to be relocated in the southeast quadrant. Approximately 5 acres of new temporary construction easement would also be required, most of which would be from tribal land, to restore the Gila Farms irrigation system.

Traffic Operations Summary

The new TI would improve access and travel times to and from Sacaton, which would remove travel demand from the SR 587/Casa Blanca Road and SR 387/SR 187/Pinal Avenue TIs. This new access would provide a more direct route between Sacaton and I-10 and decrease travel times. It also would improve mobility for vehicles, cyclists, and pedestrians. The projected 2040 traffic volumes are expected to be relatively low and would thus have LOS A in 2040, even with the stop sign-controlled intersections.

Constructability and Maintenance of Traffic

Seed Farm Road would be open for most of the construction period because most of the proposed improvements could be built away from existing traffic. Seed Farm Road would need to be closed only briefly for the geometric tie-in points along either end of the improvements. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage on Seed Farm Road would need to be reconstructed. Four 36- by 22-inch CMP culverts within the footprint of the proposed TI under I-10 would need to be realigned or reconstructed.

Utility Impacts

This option would potentially affect the overhead power line that crosses I-10 to the north of the crossroad, the gas line that crosses I-10 to the south of the crossroad, and the irrigation ditches/pipes that exist along both sides of I-10 and Seed Farm Road.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

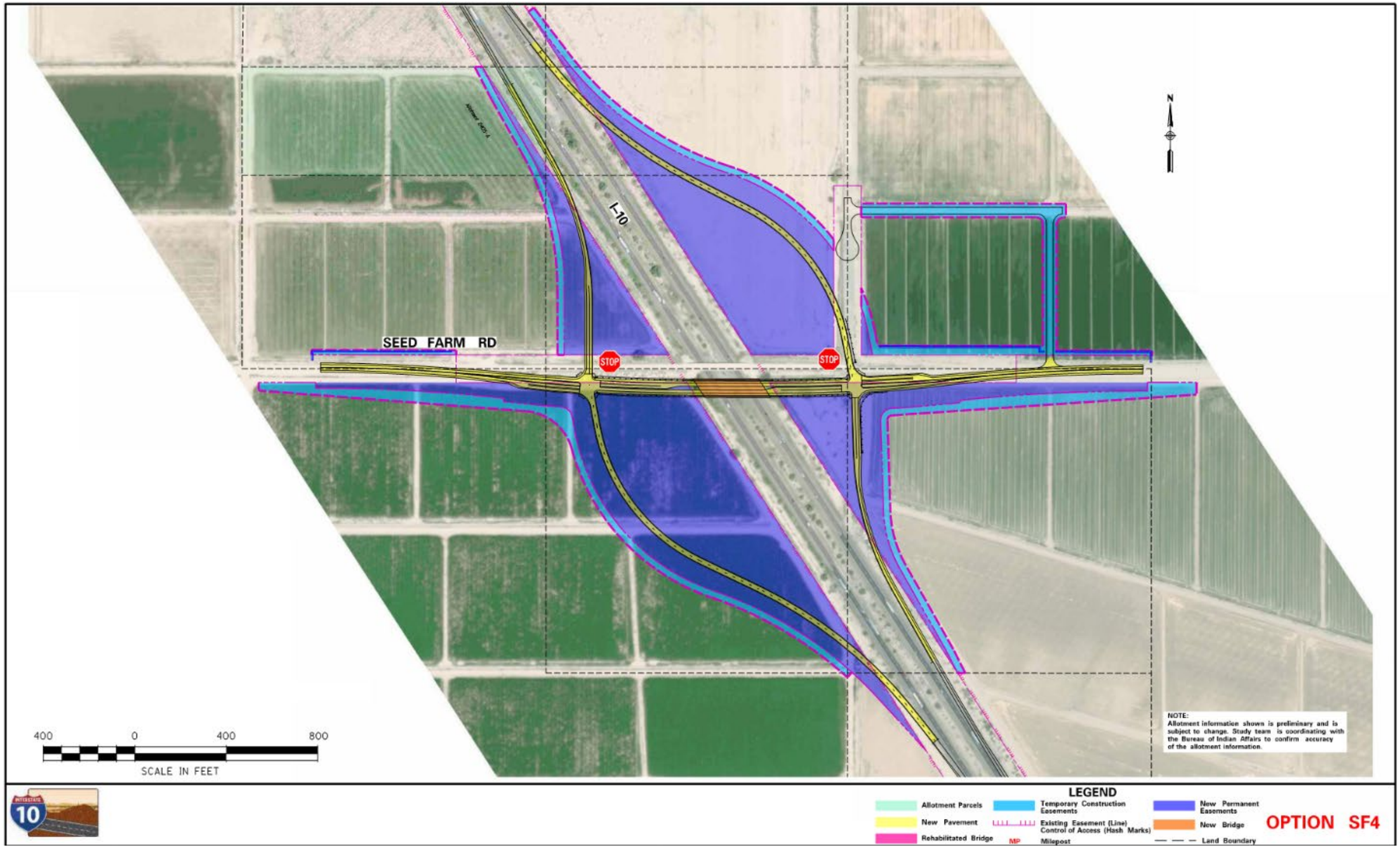

Figure 3-26. SF4 layout

SF5: Seed Farm Road Option 5

General Description

SF5 is new spread diamond option that is very similar to SF4, except that SF5 proposes to reuse the existing bridge using a deck rehabilitation and a widening instead of a replacement. SF5 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, SF5 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-27 for the layout for this option.

Roadway Features

The proposed Seed Farm Road horizontal alignment would match the current Seed Farm Road centerline. Four new ramps would be added to convert the crossroad into a TI. The ramp terminals would be over 1,100 feet apart.

The proposed Seed Farm Road vertical alignment would match the current Seed Farm Road profile over I-10. The widened bridge may reduce the vertical clearance over I-10, and if it is reduced to below 16 feet, modifications to I-10 would be needed to restore the vertical clearance impact. The proposed ramp profiles would largely stay flat and at-grade for the length of the ramp.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction with side-by-side left-turn lanes between the ramp terminals over the bridge. The proposed Seed Farm Road would have shoulders and raised sidewalks. The sidewalk and curb ramps would be ADA-compliant. The proposed shoulders would provide a location for bikes to cross over I-10 and for wide agricultural equipment to cross I-10 between the Gila Farms fields.

The ramp terminals are expected to be stop sign-controlled intersections on account of the relatively low volumes. Furthermore, the stop sign-controlled intersections avoid using signal mast arms or roundabouts that could be challenging for wide or tall agricultural equipment to pass through.

Bridge Features

This option proposes the existing bridge be widened to 59 feet to accommodate wider shoulders and new sidewalk, while also rehabilitating the existing bridge deck. The existing vertical clearance of 16 feet would be reduced unless modifications to I-10 were implemented to restore the vertical clearance impact.

Right-of-way Requirements

This option would require 37.03 acres of new ROW split among all four quadrants of the TI. 36.8 acres of new easements would be acquired from tribal land, while the remaining 0.23 acre would come from one allotted parcel (this one allotted parcel may be avoided if this alternative's design is advanced). One billboard/business sign would need to be relocated in the southeast quadrant. Approximately 5 acres of new temporary construction easement would also be required, most of which would be from tribal land, to restore the Gila Farms irrigation system.

Traffic Operations Summary

The new TI would improve access and travel times to and from Sacaton, which would remove travel demand from the SR 587/Casa Blanca Road and SR 387/SR 187/Pinal Avenue TIs. This new access would provide a more direct route between Sacaton and I-10 and decrease travel times. It also would improve mobility for vehicles, cyclists, and pedestrians. The projected 2040 traffic volumes are expected to be relatively low and would thus have LOS A in 2040, even with the stop sign-controlled intersections.

Constructability and Maintenance of Traffic

Lane closures on Seed Farm Road would be necessary for the bridge widening. Full closures of Seed Farm Road may also be necessary for a short period of time for certain types of work. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage on Seed Farm Road would need to be reconstructed. Four 36- by 22-inch CMP culverts within the footprint of the proposed TI under I-10 would need to be realigned or reconstructed.

Utility Impacts

This option would potentially affect the overhead power line that crosses I-10 to the north of the crossroad, the gas line that crosses I-10 to the south of the crossroad, and the irrigation ditches/pipes that exist along both sides of I-10 and Seed Farm Road.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

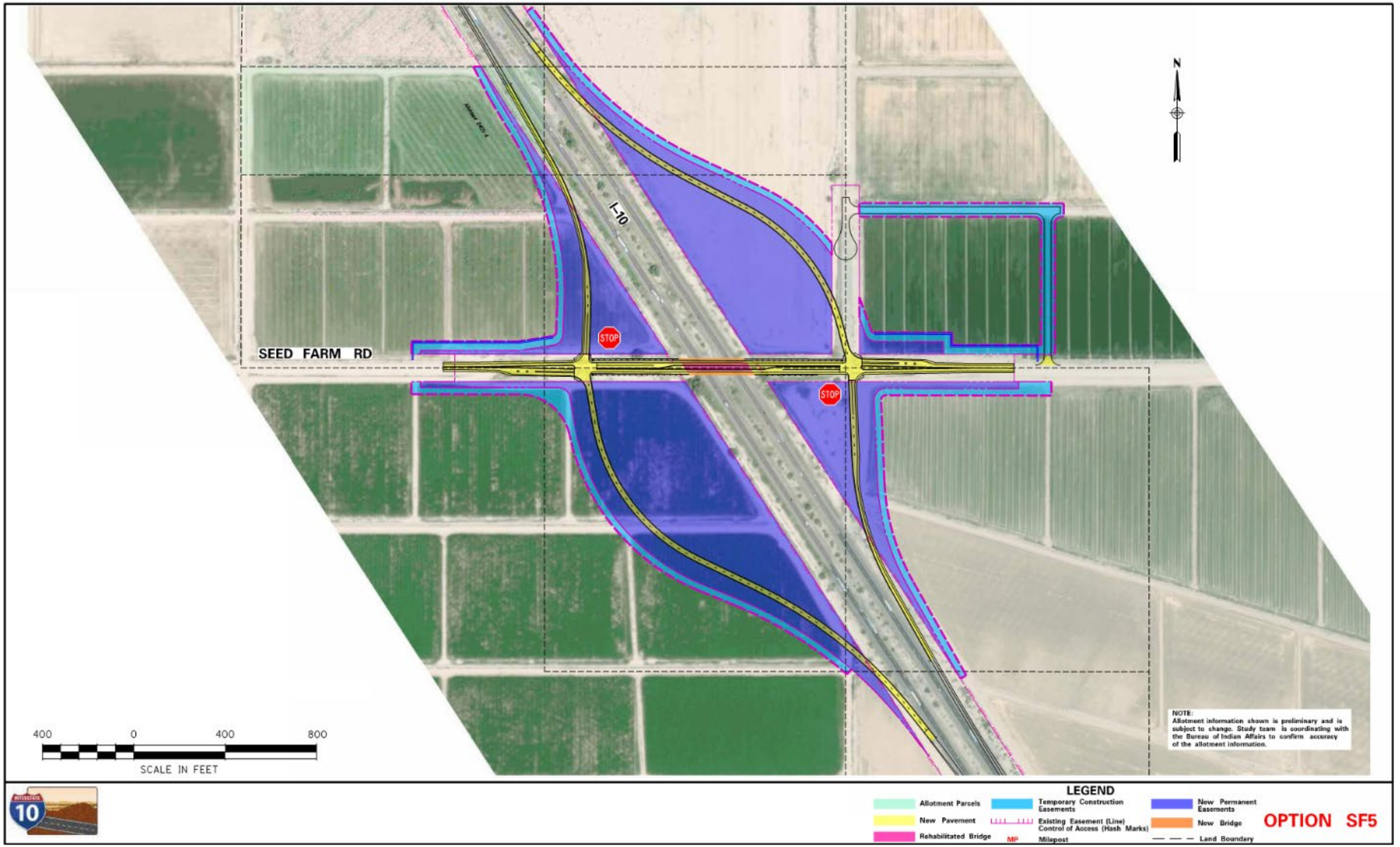

Figure 3-27. SF5 layout

DL1: Dirk Lay Road Option 1

General Description

DL1 is the no-build option for the Dirk Lay Road crossing and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with DL1. DL1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the Dirk Lay Road build options.

DL2: Dirk Lay Road Option 2

General Description

Dirk Lay Road is a north-to-south oriented roadway that crosses I-10 at a large skew angle, similar to Gasline Road. Because of this, the existing bridge was built with a five-span configuration to keep span lengths low, but this resulted in bridge piers just outside of both the inside and outside shoulders. As a result, widening I-10 either toward the median or to the outside would affect a bridge pier. Therefore, this study explored only those build options that replaced or removed this bridge. DL2 proposes a bridge replacement on the current Dirk Lay Road alignment to minimize the new ROW required. This option is compatible with both ML2 and ML3. See Figure 3-28 for the layout for this option.

Roadway Features

The proposed horizontal alignment of this option would be the same as the existing alignment. The vertical alignment would be similar to the existing alignment, except that the proposed vertical alignment would be raised by several feet to account for the increased structure depth of the bridge and to restore 16.5 feet of vertical clearance over I-10. The new vertical alignment would provide a design speed to 55 mph.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction and the new bridge would have shoulders that could be used for bike use. An ADA-compliant sidewalk on both sides of the bridge would be included in this option.

Bridge Features

This option proposes a new bridge in the location of the existing bridge. The profile would be raised several feet to accommodate a vertical clearance of at least 16.5 feet and to accommodate the longer spans required for either the two- or four-span configuration needed to eliminate the existing lateral clearance issues with I-10. The bridge width would be increased to 59 feet to accommodate wider shoulders and pedestrian facilities.

Right-of-way Requirements

This option would require 1.6 acres of new ROW split among all four quadrants of the crossroad. The new ROW would be acquired from tribal land.

Traffic Operations Summary

Because the crossroad is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

Dirk Lay Road would need to be closed for the duration of the bridge replacement for DL2. Short-term I-10 lane closures would be necessary to remove the existing bridge, set girders, and pour the new bridge deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Dirk Lay Road on-site pavement drainage would need to be reconstructed with this option. A double 48-inch CMP culvert under I-10 to the southeast would be affected and would need to be relocated.

Utility Impacts

There would be no utility impacts with this option.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

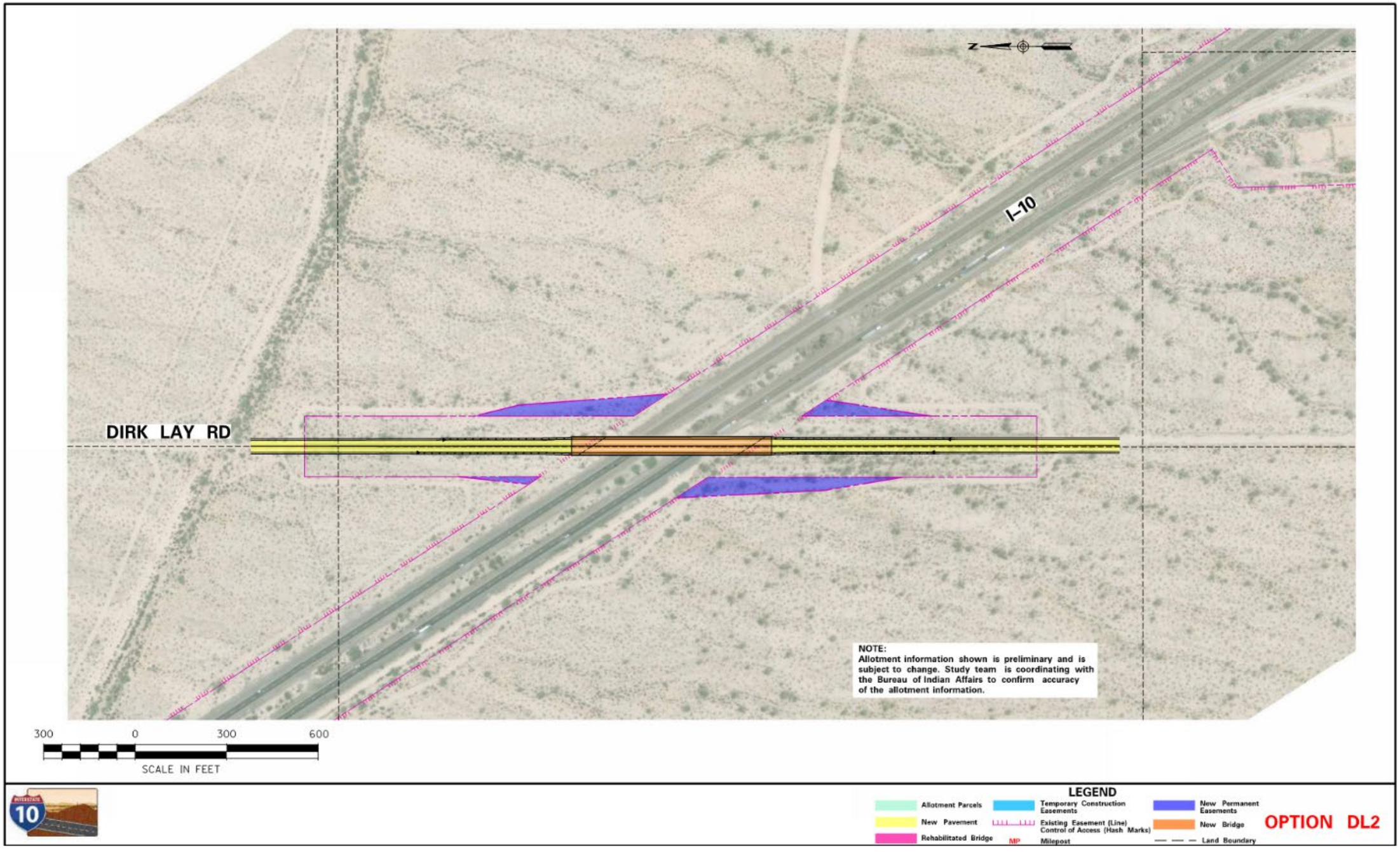

Figure 3-28. DL2 layout

DL3: Dirk Lay Road Option 3

General Description

Like DL2, DL3 proposes a bridge replacement at this location, but DL3 proposes to construct a new bridge to the west of the existing bridge to keep Dirk Lay Road open for the majority of construction. This option would be compatible with both ML2 and ML3. See Figure 3-29 for the layout for this option.

Roadway Features

The proposed horizontal alignment of this option would be offset to the west of the existing alignment to avoid culvert impacts under I-10 to the east. The vertical alignment would be similar to the existing alignment, except that the proposed vertical alignment would be raised by several feet to account for the increased structure depth of the bridge and to restore 16.5 feet of vertical clearance over I-10. The new vertical alignment would provide a design speed of 55 mph.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2% to the outside. It would have one lane in each direction, and the new bridge would have shoulders that could be used for bike use. An ADA-compliant sidewalk on both sides of the bridge would be included in this option.

Bridge Features

This option proposes a new bridge be constructed west of and parallel to the existing bridge. The profile would be raised several feet to accommodate a vertical clearance of at least 16.5 feet and to accommodate the longer spans required for either the two- or four-span configuration needed to eliminate the existing lateral clearance issues with I-10. The bridge width would be increased to 59 feet to accommodate wider shoulders and pedestrian facilities.

Right-of-way Requirements

This option would require 2 acres of new ROW split among the two western quadrants of the crossroad. The new ROW would be acquired from tribal land.

Traffic Operations Summary

Because the crossroad is a very low-volume roadway, no operational issues exist nor are expected to exist in 2040.

Constructability and Maintenance of Traffic

The primary difference between DL2 and DL3 is that Dirk Lay Road can remain open for most of construction for DL3 while the new bridge and approach roadways are being built. Only short-term Dirk Lay Road closures would be needed for the final geometric tie-ins. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Dirk Lay Road on-site pavement drainage would need to be reconstructed with this option. The shift of the road to the west would avoid affecting an existing double 48-inch CMP culvert to the southeast under I-10.

Utility Impacts

There would be no utility impacts with this option.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

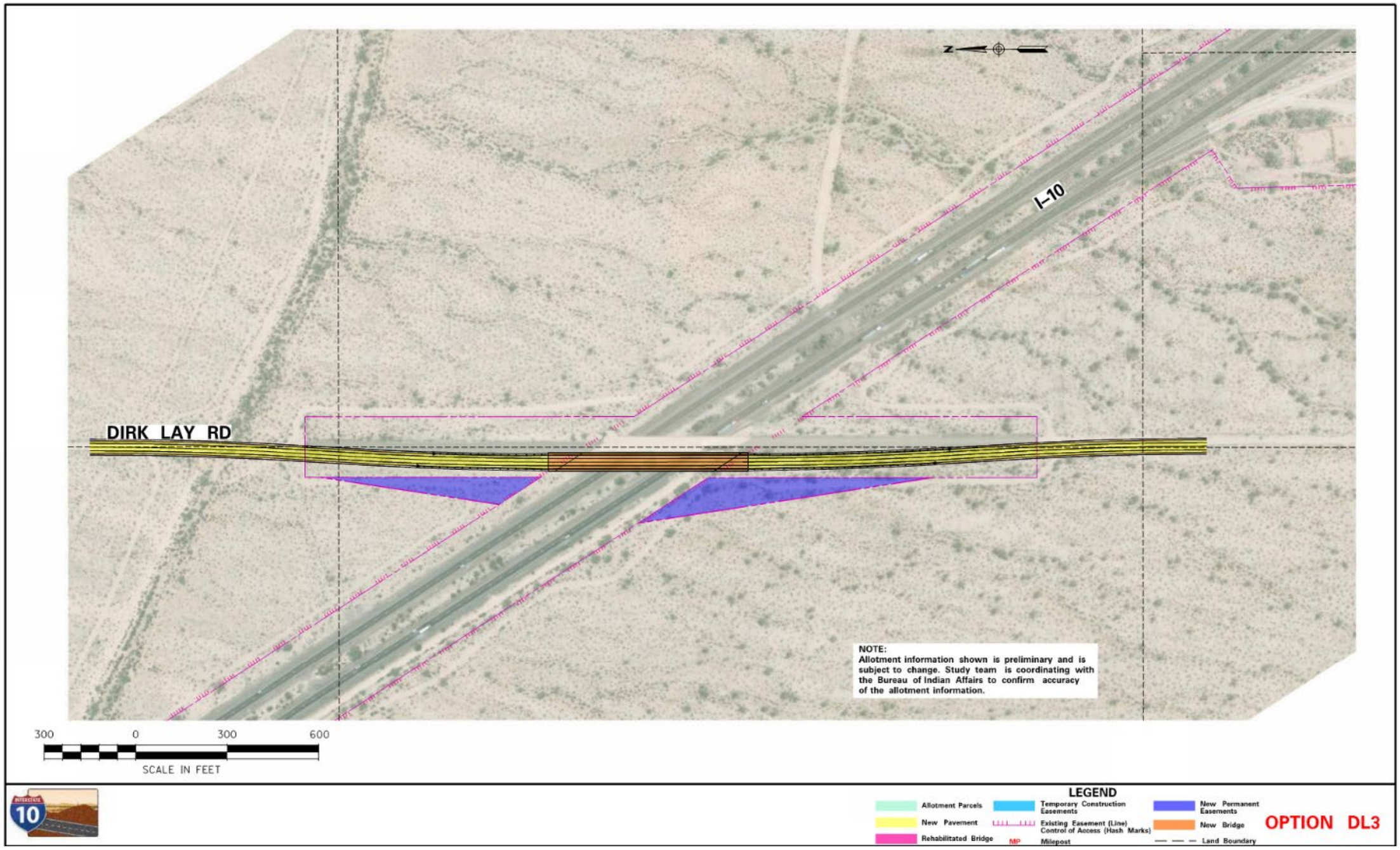

Figure 3-29. DL3 layout

DL4: Dirk Lay Road Option 4

General Description

Option DL4 was created in response to feedback received from Community representatives and the public during the public comment period described Section 3.5 of this document. This feedback suggested that this roadway was seldom, if ever, used by the Community, and that the Community did not use or maintain the roadways leading to this crossing. Public comments offered a similar sentiment. As a result, option DL4 was created that proposes to simply remove the bridge, approach roadways, and embankments; restore the area to a native desert condition; and return the associated ROW to the Community.

Option DL4 is a build option and is different than the no-build option, DL1. DL4 does propose construction activities and would create ground-disturbing activities, even if nothing new is built.

Because DL4 was added after the public comment period, it is not reflected in the evaluation matrices shared with the public that are included in Section 3.4 of this document. The following narrative serves as option DL4's evaluation.

Roadway Features

The approach roadways and embankments would be removed, and the area restored to the native desert condition. Therefore, there are no roadway features to discuss.

Bridge Features

The existing Dirk Lay Road bridge would be removed and not replaced.

Right-of-way Requirements

DL4 provides the opportunity to return approximately 8.5 acres of ROW back to the Community. This would all occur within tribal land.

Traffic Operations Summary

This is not applicable because no proposed roadway would exist.

Constructability and Maintenance of Traffic

Short-term I-10 lane closures would be necessary to remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Natural desert sheet-flow drainage patterns would be restored in the area to the extent possible.

Utility Impacts

There would be no utility impacts with this option.

Costs

The cost of this option is expected to be between $1.5 million and $2 million.

Environmental Impacts

Other than temporary construction impacts, no long-term environmental impacts exist with DL4. In fact, compared with the no-build option, DL4 would provide a net environmental benefit because this bridge crossing would be removed from the natural visual viewshed and the drainage patterns would be restored to pre-interstate conditions.

Public Input

Because DL4 was introduced as a result of public and Community input, the nature of the public input at this location (not specific to DL4) was related to the lack of use of this crossing and why its replacement was necessary. Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this location.

- http://i10wildhorsepasscorridor.com/resources.html

PA1: SR 387/SR 187/Pinal Avenue Option 1

General Description

PA1 is the no-build option for the SR 387/SR 187/Pinal Avenue TI and includes only corridor maintenance projects over the next 20 years. No capacity expansion or congestion relief improvements are anticipated with PA1. PA1 is used as the baseline condition for the 2040 design year and is used to measure the incremental impacts and benefits of the SR 387/SR 187/Pinal Avenue TI build options.

PA2: SR 387/SR 187/Pinal Avenue Option 2

General Description

PA2 would widen the existing SR 387/SR 187/Pinal Avenue bridge and roadway between the ramp terminals over I-10 to add left-turn storage lanes, shoulders, and raised sidewalks. Traffic signals would be added to both ramp terminal intersections. PA2 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, PA2 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-30 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Pinal Avenue would remain unchanged with this option. The widened bridge may reduce the vertical clearance over I-10, and if it is reduced to below 16 feet, modifications to I-10 would be needed to restore the vertical clearance impact.

The proposed typical section for this option is a two-way crowned asphalt roadway sloping 2% to the outside. In the new configuration, the roadway would have two through lanes, back-to-back left-turn/storage area, shoulders, and a raised sidewalk on both sides of the roadway. All sidewalks and ramps would be ADA-complaint.

Bridge Features

The existing four-span Pinal Avenue bridge has piers immediately adjacent to the existing I-10 outside pavement edges. This option would symmetrically widen the existing structure approximately 15 feet on each side and perpetuate the existing pier and abutment locations. The resulting total bridge width would be about 73 feet, including bridge barriers. The wider structure would accommodate the shoulders, left-turn storage, and the raised sidewalks. The widened bridge may reduce the vertical clearance over I-10, and if it is reduced to below 16 feet, modifications to I-10 would be needed to restore the vertical clearance impact.

Right-of-way Requirements

No new ROW is anticipated with this option.

Traffic Operations Summary

The ramp termini on either side of the TI are currently unsignalized; in this option, signals would be added at the ramp termini.

As growth occurs in the future and more people commute between Casa Grande and Phoenix, this TI is likely to see higher movements in the north-to-west and east-to-south movements. The addition of traffic signals at the ramp terminals would improve capacity and safety for the TI. The additional width on the bridge allows for increased storage for left turns from Pinal Avenue to westbound I-10. The LOS is expected to be D or better in 2040.

Constructability and Maintenance of Traffic

Shoulder and lane closures along SR 387/SR 187/Pinal Avenue would be necessary for the bridge and roadway widening. Short-term I-10 lane closures would be necessary to set girders and pour the new widened bridge deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage would need to be reconstructed. This is particularly noteworthy where the crossroad is being widened and where parallel flowing drainage in this area would need to be realigned. No drainage impacts are anticipated for the existing I-10 culverts.

Utility Impacts

ADOT electrical conduits may be affected with this option, although this risk is considered low.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

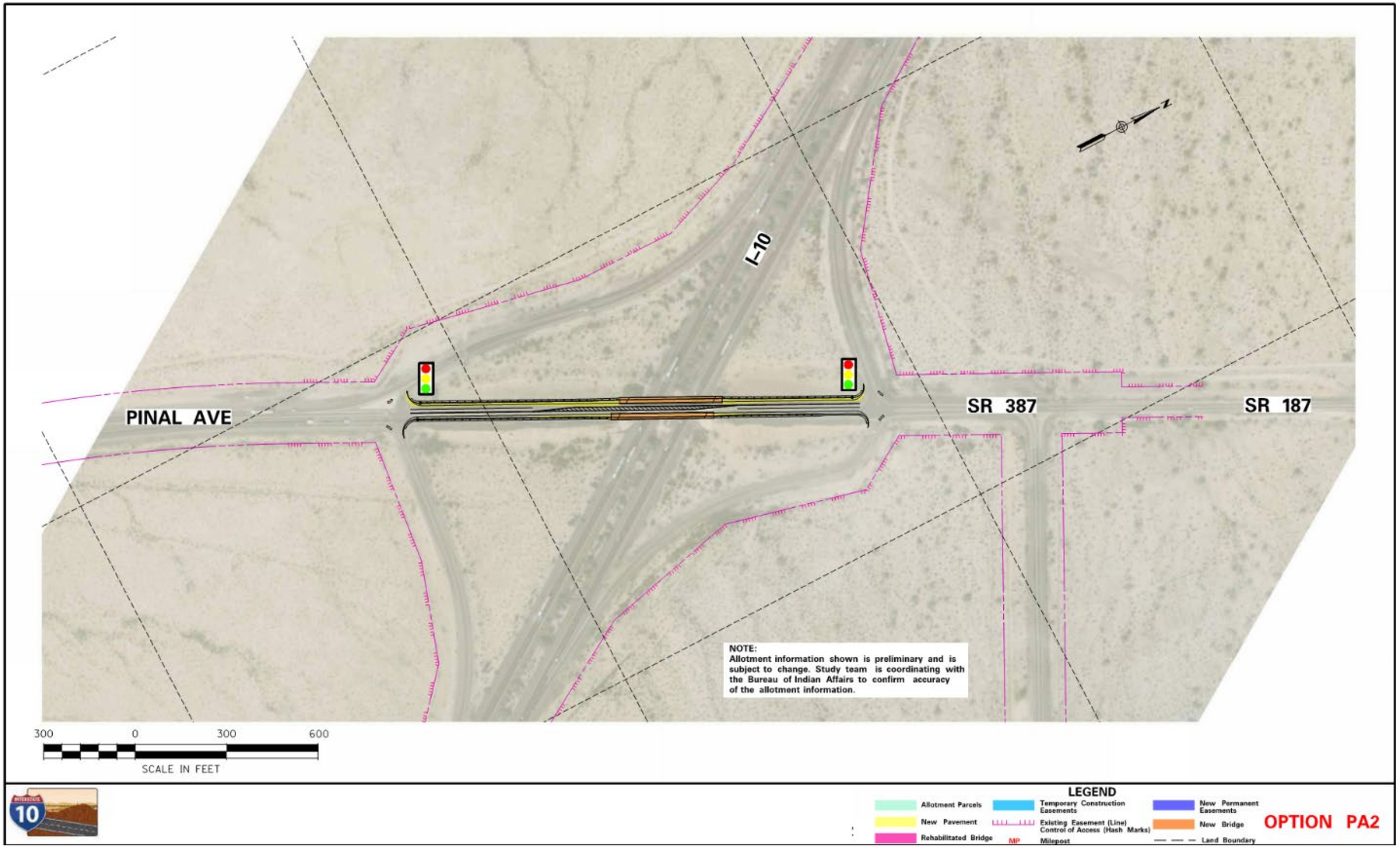

Figure 3-30. PA2 layout

PA3: SR 387/SR 187/Pinal Avenue Option 3

General Description

PA3 is identical to PA2 but adds a right-turn lane to the westbound exit ramp terminal. All other features of PA3 are the same as PA2. PA3 is compatible with ML2. However, because the existing bridge piers are adjacent to the existing outside shoulders on I-10, PA3 is incompatible with ML3 unless the I-10 design included a horizontal shift to the median at the bridge or used a design exception for narrower lanes or shoulders. See Figure 3-31 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Pinal Avenue would remain unchanged with this option. The widened bridge may reduce the vertical clearance over I-10, and if it is reduced to below 16 feet, modifications to I-10 would be needed to restore the vertical clearance impact.

The proposed typical section for this option is a two-way crowned asphalt roadway sloping 2% to the outside. In the new configuration, the roadway would have two through lanes, back-to-back left-turn/storage area, shoulders, and a raised sidewalk on both sides of the roadway. All sidewalks and ramps would be ADA-complaint.

Bridge Features

The existing four-span Pinal Avenue bridge has piers immediately adjacent to the existing I-10 outside pavement edges. This option would symmetrically widen the existing structure approximately 15 feet on each side and perpetuate the existing pier and abutment locations. The resulting total bridge width would be about 73 feet, including bridge barriers. The wider structure would accommodate the shoulders, left-turn storage, and the raised sidewalks. The widened bridge may reduce the vertical clearance over I-10, and if it is reduced to below 16 feet, modifications to I-10 would be needed to restore the vertical clearance impact.

Right-of-way Requirements

No new ROW is anticipated with this option.

Traffic Operations Summary

The ramp termini on either side of the TI are currently unsignalized; in this option, signals would be added at the ramp termini.

As growth occurs in the future and more people commute between Casa Grande and Phoenix, this TI is likely to see higher movements in the north-to-west and east-to-south movements. The addition of traffic signals at the ramp terminals would improve capacity and safety for the TI. The additional width on the bridge allows for increased storage for left turns from Pinal Avenue to westbound I-10. The LOS is expected to be D or better in 2040.

Constructability and Maintenance of Traffic

Shoulder and lane closures along SR 387/SR 187/Pinal Avenue and the westbound exit ramp would be necessary for the bridge and roadway widening. Short-term I-10 lane closures would be necessary to set girders and pour the new widened bridge deck. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage would need to be reconstructed. This is particularly noteworthy where the crossroad is being widened and where the westbound exit ramp is widened for right turns; parallel flowing drainage in this area would need to be realigned. No drainage impacts are anticipated for the existing I-10 culverts.

Utility Impacts

ADOT electrical conduits may be affected with this option, although this risk is considered low.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

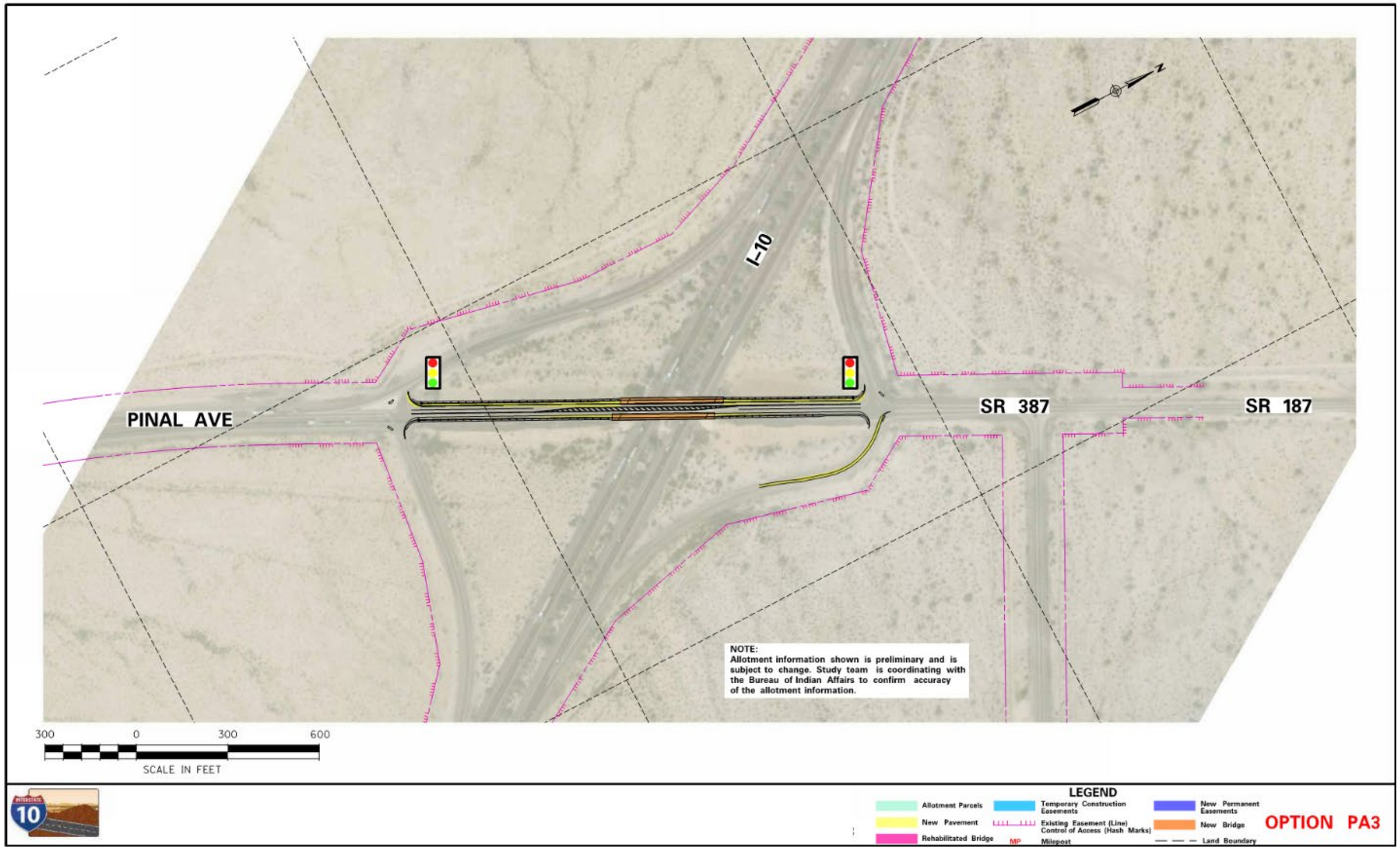

Figure 3-31. PA3 layout

PA4: SR 387/SR 187/Pinal Avenue Option 4

General Description

PA4 proposes the same basic configuration as PA3 but replaces the bridge over I-10 instead of using the existing bridge by realigning the crossroad to the south in between the ramp terminals. PA4 is compatible with both ML2 and ML3. See Figure 3-32 for the layout for this option.

Roadway Features

The horizontal and vertical alignment of Pinal Avenue would generally remain unchanged outside of the ramp terminals but would use a new horizontal and vertical alignment in between the existing ramp terminals. This new alignment is proposed to the south for two main reasons: (1) a shift to the east avoids any impact to the existing eastbound ramp terminus, including the free right that exists for access into the city of Casa Grande, and (2) it avoids awkward geometry. Just south of I-10, Pinal Avenue enters a horizontal curve to align the road on the section line as it travels south into Casa Grande. To create a shift to the north, it would have been necessary to either (1) reconstruct approximately one-half mile of Pinal Avenue heading south to realign it for a crossing on the west side, or (2) use a compound or broken-back curve to align Pinal Avenue to cross I-10 north of the current structure. By realigning to the south of existing bridge, the existing Pinal Avenue horizontal curve south of I-10 can be extended into a reverse curve to align Pinal Avenue for such a crossing of I-10.

The proposed vertical alignment would be raised by several feet to account for the increased structure depth of the bridge and to restore 16.5 feet of vertical clearance over I-10. The new vertical alignment would provide a design speed to 55 mph.

The proposed typical section for this option is a two-way crowned asphalt roadway sloping 2% to the outside. In the new configuration, the roadway would have two through lanes, back-to-back left-turn/storage area, shoulders, and a raised sidewalk on both sides of the roadway. All sidewalks and ramps would be ADA-complaint.

Bridge Features

This option proposes the existing bridge be removed and a new 73-foot-wide bridge be constructed to the south of the existing alignment. The new bridge would be a two-span structure that would mimic the skew angle that exists with the existing crossing of I-10. The new piers and abutments would be placed beyond the I-10 clear zone. The new bridge would be constructed on a profile higher than the existing to accommodate a 16.5-foot clearance over both directions of I-10.

Right-of-way Requirements

No new ROW is anticipated with this option.

Traffic Operations Summary

The ramp termini on either side of the TI are currently unsignalized; in this option, signals would be added at the ramp termini.

As growth occurs in the future and more people commute between Casa Grande and Phoenix, this TI is likely to see higher movements in the north-to-west and east-to-south movements. The addition of traffic signals at the ramp terminals would improve capacity and safety for the TI. The additional width on the bridge allows for increased storage for left turns from Pinal Avenue to westbound I-10. The LOS is expected to be D or better in 2040.

Constructability and Maintenance of Traffic

The crossroad would be open for most of the construction period because most of the proposed improvements could be built away from existing traffic. The crossroad would need to be closed only briefly for the geometric tie-in points along either end of the improvements. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

The on-site pavement drainage would need to be reconstructed. This is particularly noteworthy in the quadrant of the TI where Pinal Avenue is relocated toward the south and where the westbound exit ramp is widened for right turns; parallel flowing drainage in this area would need to be realigned. One 24-inch culvert under I-10 would need to be replaced.

Utility Impacts

ADOT electrical conduits may be affected with this alternative, although this risk is considered moderate to low.

Costs

Refer to Section 3.4 for detailed information on cost.

Environmental Impacts

Refer to Section 3.4 for detailed information on environmental impacts.

Public Input

Refer to the public information meeting summary report for the November 18, 2020, meeting, found at the following website, for detailed feedback from the public on this option.

- http://i10wildhorsepasscorridor.com/resources.html

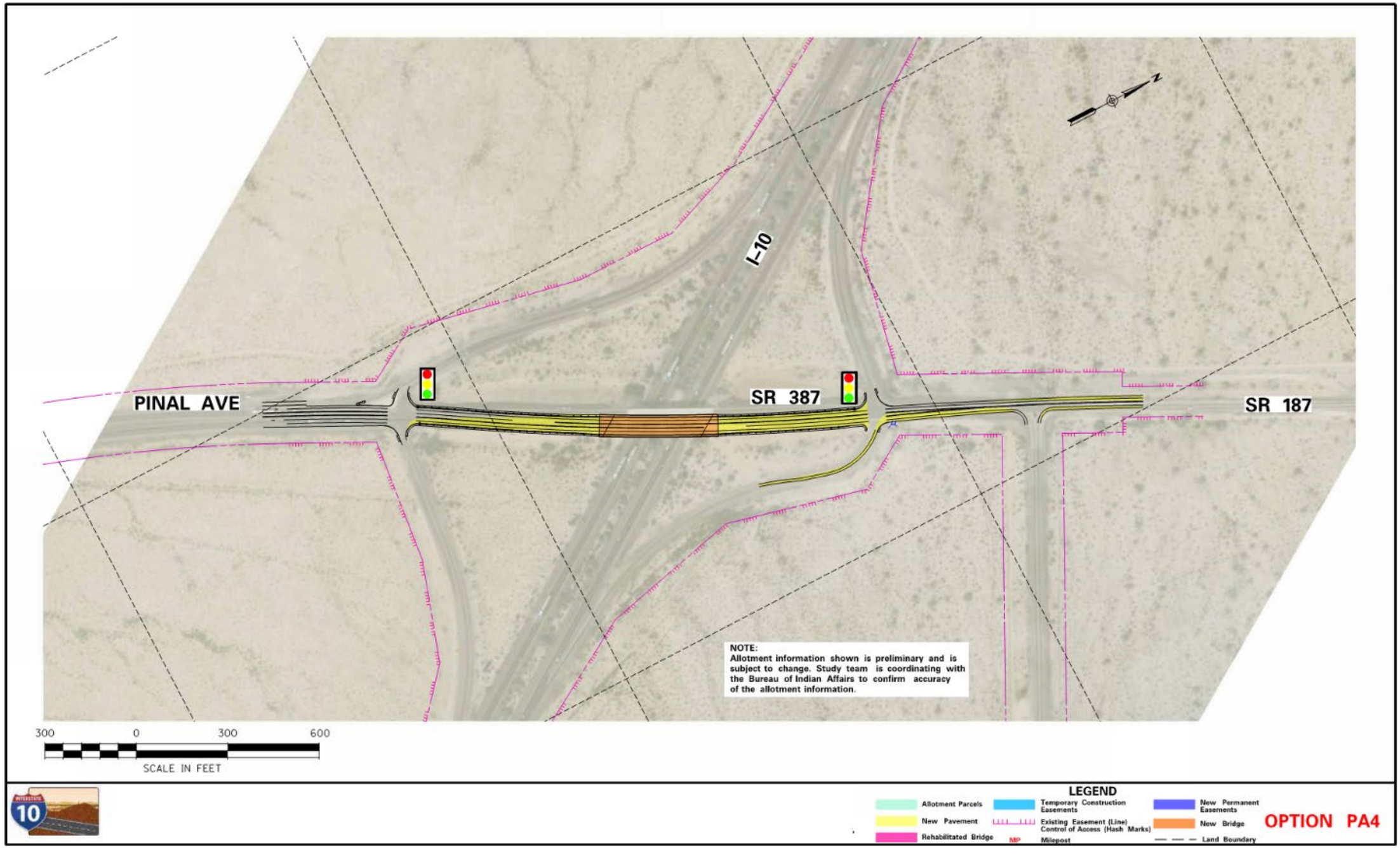

Figure 3-32. PA4 layout

3.3.3 Fiber Optic Trunk Line

In addition to the physical roadway improvements, the scope of this study also includes evaluating the addition of a fiber optic trunk line for the entire length of the I-10 study limits. This fiber optic trunk line would be used for the ADOT FMS to upgrade I-10 to an intelligent transportation corridor, just as ADOT is doing with all the major transportation corridors in the state. This fiber optic trunk line would connect freeway monitoring CCTV cameras, DMSs, ramp metering, weight-in-motion, road and weather conditions sensors, and any other future technology that helps ADOT operate and maintain a safe and efficient freeway facility. The fiber optic trunk line evaluation has been done in coordination with ADOT's Broadband office and with GRTI at the request of the Community.

Fiber Optic No-Build Option

General Description

Because no fiber optic facilities exist today, the fiber optic no-build option would make no changes. However, this option is used as the baseline condition for evaluating the benefits and impacts of building the fiber optic trunk line.

Fiber Optic Build Option

General Description

As the name implies, the fiber optic build option would propose the construction of one or more conduits in the same trench along the western edge of the existing I-10 ROW, inside the ROW fence line. Four installation methods have been identified, depending on the ground conditions:

- plowed installation through 95 percent of the corridor (see Figure 3-33)
- directional drill through 3 percent of the corridor—to be used when the conduits pass under existing roads, embankments, or major drainage crossings
- rock drill or rock trench through 1 percent of the corridor to pass through the Sacaton Mountain ridgeline where exposed bedrock exists
- bridge hangers for 1 percent of the corridor to hang under the superstructure of the proposed Gila River Bridges (note that this is part of a separate study and not part of this study)

Pull boxes are to be installed frequently enough to install the fiber optic lines and for routine maintenance activities.

Right-of-way Requirements

No new ROW is anticipated with this option.

Traffic Operations Summary

The installation of a fully functioning FMS system would incrementally improve traffic operations, improve safety, and provide a valuable source of real-time driver information to corridor users.

Constructability and Maintenance of Traffic

Based on the construction methods mentioned above and the proposed location of the fiber optic trunk line, constructability should be simple and no impacts on existing traffic would be expected.

Drainage Features

The design of the fiber optic trunk line would have to consider crossing drainage features, but this is not expected to be a major concern.

Utility Impacts

The design of the fiber optic trunk line would have to consider crossing various types of underground utilities, but this is also not expected to be a major concern.

Costs

The cost of this facility is expected to range from $3 million to $6 million for the entire corridor.

Environmental Impacts

Environmental impacts are expected to be minimal. Mitigation would largely focus on potential cultural resources discovered during installation. Section 4(f) issues may also apply but would be related to the cultural resources.

Public Input

Few public comments were received on the fiber optic trunk line and were generally supportive.

Figure 3-33. Sample fiber optic plowed installation

Source: "Direct Communications Corporate Blog," Direct Communications, last modified September 14, 2014, https://blog.directcom.com/2014/09/16/update-on-rockland-fiber-to-the-home-construction-project/

3.4 Evaluation of Alternatives and Recommendations

The alternatives and options described in Section 3.3 were evaluated using criteria from five major categories: engineering impacts, environmental impacts, cost impacts, right-of-way/easement impacts, and public feedback. These major areas were divided into more specific subcategories, and then each alternative and option was evaluated with regard to those specific subcategories. The following sections define each of these categories. The evaluation of each alternative and option was then placed in a matrix, shown in Figures 3-34, 3-35, and 3-36. A summary matrix was then developed, as shown in Figure 3-37. Both versions were shared during the public comment period. Note that option DL4 does not appear in these matrices because, as mentioned in the DL4 discussion, DL4 was developed after the public comment period in response to public comments.

3.4.1 Engineering Impacts

- Roadway design factors: Summary of highway design geometric features, including items such as shoulder widths, clearance under bridges, etc.
- Drainage considerations: Summary of impacts to the drainage culverts under I-10
- Traffic operations in 2040: Summary of modeled level of traffic operations in 2040
- Safety: Indicators of anticipated safety implications for each alternative/option
- Constructability/Maintenance of traffic: Ease of construction and the impacts on traffic during construction
- Utility considerations: Summary of expected utility impacts and probability and/or severity of outages for relocations for each alternative/option
- Maintenance/Maintainability: Ease and relative cost of maintaining each alternative/option

3.4.2 Environmental

- Floodplain: Area of impact to floodplains, measured in acres
- Jurisdictional waters of the U.S.: Area of impact to waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers; can be canals, rivers, washes; measured in acres
- Water resources: Impacts to features such as canals, irrigation channels, and wells
- Noise: Summary of whether noise from the proposed action is expected to exceed the FHWA Noise Abatement Criteria and, if so, what mitigation may be required
- Air Quality: Determines whether the proposed action would conform to emission budgets of air pollutants not in attainment in the study area, and if the proposed action would cause or contribute to new air quality violations; if the proposed action conforms and would not cause new violations, it is said to be in conformity
- Visual: Assesses the degree of change of the proposed action's compatibility, which is the environment's ability to absorb the proposed project in scale, form, and material; it also assesses viewer sensitivity (viewers to and in the project corridor and their duration of exposure) to the change the project creates
- Hazardous materials: Summarizes the presence of known hazardous materials potentially impacted by the alternative/option
- Land use: Identifies existing land use in the study area (residential, commercial, etc.) and evaluates future planned land use that may be needed for a long-term I-10 transportation use; future land use is based on community land use plans in the study area
- Local businesses: Identifies businesses in the study area (commercial, industrial, etc.) and evaluates whether any business would need to be fully or partially acquired or would be otherwise affected by the alternative/option (access, circulation, etc.)
- Socioeconomic factors: Identifies residential areas and community facilities near the alternative/option (schools, churches, hospitals, parks, etc.) and evaluates whether any residences or community facilities would need to be fully or partially acquired or would be otherwise affected by the improvements (access, circulation, noise, visual, etc.); in addition, the process identifies any minority or low-income populations near the proposed improvements and evaluates whether the proposed improvements would result in disproportionally high adverse impacts, as compared to the entire study area population
- Biological resources: Assesses potential for, and impacts to, threatened and endangered species, special-status species (including tribal species), and these species' habitat; also evaluates impacts to native plants and migratory birds
- Prime and unique farmlands: Identifies the impacts to important rural lands needed to produce food, feed, fiber, forage, and oilseed crops, whether or not they are used for that purpose today
- Archaeological resources: Assesses the magnitude of impacts for each alternative/option to archaeological resources that have been determined eligible for listing on the National Register of Historic Places based on their potential to yield important information on the history and/or prehistory of the study area
- Traditional cultural properties: Assesses the magnitude of impacts for each alternative/option to properties eligible for listing on the National Register of Historic Places based on their associations with the cultural practices, traditions, beliefs, arts, crafts, or social institutions of a living community
- Section 4(f) and Section 6(f): Assesses impacts to Section 4(f) properties, which are publicly owned recreational resources, wildlife and waterfowl refuges, and National Register-eligible archeological and historic properties (these do not need be publicly owned); also assesses impacts to Section 6(f) resources, which are recreational properties that receive Land and Water Conservation Fund grants

3.4.3 Cost

- Design and construction costs: Estimated cost in 2020 dollars to design and construct the alternative/option
- Utility costs: Estimated cost in 2020 dollars to relocate or adjust the impacted utilities summarized in the utility impacts criterion noted above
- Right-of-way/Easement costs: Relative costs of additional right-of-way/easements needed to construct the alterative/option; right-of-way costs are not quantified at this point in the evaluation but are generally considered proportional to the quantity of new ROW/easement, summarized below

3.4.4 Right-of-Way/Easement[1]

- New permanent easement or right-of-way: Area of additional new easement or ROW required for the proposed improvements of each alternative/option, measured in acres
- Temporary easements: Area of additional new temporary easement required to construct the proposed improvements of each alternative/option, measured in acres; following construction, the temporary easement areas revert back to the property owner
- Residential relocations: Number of residential units that must be acquired and relocated to construct the alternative/option
- Business/Billboard relocations: Number of businesses or billboards that must be acquired and relocated to construct the alternative/option

3.4.5 Public Input

A virtual public meeting and corresponding public comment period was held to gather public comments on the alternatives and options and the results of the evaluation were shared. A summary of this public engagement process is provided in Section 3.5 of this document.

[1] All four of the ROW/easement criteria will be calculated separately for tribal lands, allotted lands, and off-Community land.

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
I-10 Mainline Widening Alternatives (1 added lane each direction + HOV lanes from SR 202L to Riggs Road)									
	ML1	No Build	No changes to existing geometry. Existing geometric design features will be maintained, whether or not the meet current design standards.	Beyond routine maintenance, no changes to existing conditions.	AM travel time approximately 42 minutes WB through project limits. PM travel time approximately 39 minutes EB through project limits. LOS E/F on all segments	No improvements over existing conditions.	No impacts.	No Impacts.	Routine maintenance functions will condition as it does today, but will increasingly become greater as the corridor ages without improvements.
	ML2	Median Widening + Ramp Upgrades	Mainline: Desirable design standards with all mainline widening to the median. 12-ft inside/outside shoulders, 12' additional inside lane. 1.5% constant cross slope maintained; however, typical section may have to be modified to a crowned section for each direction to avoid undesirable vertical clearance impacts under select bridges that remain, most notably Riggs Road, Goodyear Road, Nelson Road, Casa Blanca Road, Seed Farm Road, and SR-387/SR-187/Pinal Ave. HOV lane extended south to Riggs Road. Ramps: Parallel entrance/exits, super corrected, increased accel/decel lengths. All entrance ramps upgraded to metered configurations. Casa Blanca hook-style short exit ramps extended through bridge end span to create a long deceleration lane.	Median catch basins will need to be added, relocated and/or adjusted. Crowning of mainline at bridges will require additional drainage infrastructure. A few box culverts will be extended through the median where they are not currently connected. Pipe extensions on the outside will be needed where ramp geometry is revised.	AM travel time approximately 32 minutes WB through project limits. PM travel time approximately 31 minutes EB through project limits. LOS D or better south of Riggs Road, but LOS E/F north of Riggs Road.	Median widening will require median barrier - CMF 0.81 from CPS New General Purpose Lane - CMF 0.9 from CPS Ramp modifications - CMF 0.21 from CPS Shoulder widening - CMF 0.64 from CPS	Majority of mainline work can be accomplished with only an inside shoulder closure, with occasional single lane closures. Short term (4 weeks +/-) ramp closures likely necessary to complete ramp gore modifications.	Minimal to no utility impacts associated with the I-10 median widening.	New pavement from widening, pavement preservation of existing pavements and new concrete median barrier in the northern six miles reduces near-term maintenance. Median cable barrier for 20 miles will increase maintenance.
	ML3	Outside Widening + Ramp Upgrades	Mainline: Desirable design standards with all general purpose mainline widening to the outside. 12-ft inside/outside shoulders, 12' additional inside lane. 1.5% cross slope maintained; however, typical section may have to be modified to a crowned section for each direction to avoid undesirable vertical clearance impacts under select bridges that remain, most notably Riggs Road. HOV lane extended south to Riggs Road with widening to the median. Ramps: Parallel entrance/exits, super corrected, increased accel/decel lengths. All entrance ramps upgraded to metered configurations. Casa Blanca hook-style short exit ramps extended through bridge end span to create a long deceleration lane.	Median catch basins will need to be added, relocated and/or adjusted north of Riggs Road. Crowning of mainline at bridges will require additional drainage infrastructure. All box culverts and pipe extensions will be extended to the new clear zone to the outside.	AM travel time approximately 32 minutes WB through project limits. PM travel time approximately 31 minutes EB through project limits. LOS D or better south of Riggs Road, but LOS E/F north of Riggs Road.	New General Purpose Lane - CMF 0.9 from CPS Ramp modifications - CMF 0.21 from CPS Shoulder widening - CMF 0.64 from CPS No benefit from median barrier south of Riggs Road, but north of Riggs Road - CMF 0.81 from CPS.	Majority of mainline work can be with an outside shoulder closure and some inside shoulder closures, with occasional single lane closures Ramp closures necessary to complete upgrades	Minimal to no utility impacts associated with the I-10 outside widening.	New pavement from widening and pavement preservation reduces near-term maintenance. Six miles of median cable barrier in Maricopa County will inicrease maintenace.

Figure 3-34. Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Wild Horse Pass / Sundust Road Interchange Options									
	WH1	No Build	No impacts, except for ADA upgrades. Crest curve actual design speed is 62 mph which is adequate for the existing 35 mph posted speed limit. Existing vertical clearance exceeds 16.5'. Compatible with both ML2 or ML3.	No impacts	Operational problems that exist today will only get worse over the next 20 years under no-build. Expected Level of Service F in the am peak and E in the pm peak.	ADA upgrades will improve safety and accessibility for pedestrians, otherwise no changes.	No impact	No impact	Maintenance functions will condition as it does today, but will increasingly become greater as the corridor ages without improvements. Since this location is only about 30 years old, do not expect maintenance to increase dramatically over the next 20 years.
	WH2	Diverging Diamond Interchange (DDI) with bike & ped accomodations	Relatively new configuration to AZ, but becoming commonplace across the US. Standard 12' lanes, except through the crossovers and across the existing bridge where lanes shall be 15'. Standard shoulders and vertical clearance on new bridge. DDI configuration eliminates the off-ramp to on-ramp through movement sometimes utilized during incident management, bridge maintenance, or overheight vehicle passage. Compatible with both ML2 or ML3.	Minor modifications to the on-site drainage system to accommodate the new configuration.	Expected Level of Service B in both am and pm peak period.	Compared to a diamond interchange (no-build), a DDI reduces conflict points by 50% and eliminates many of the most severe crash types. Data suggests that total crashes will be reduced by 46 percent. Geometric design discourages wrong way drivers.	The new bridge and nearly half of the new interchange can be built entirely offline. Relatively minor traffic adjustments will be neceesary to complete the paving and signal system at the crossovers. Some short term lane closures and detours will be necessary, including on I-10. Advance traffic control notification to the public will be needed prior to when the crossover design goes active.	Potential impacts to FMS and ADOT electrical. Minor outages to each could be expected.	A bigger interchange with more bridge and more pavement will eventually require more maintenance, but it will be minimal for probably the next 20 years given how new the interchange is overall.
	WH3	Displaced Left Turn (DLT) Interchange with bike & ped accomodations	Unfamilar interchange design in AZ, and generally rare in the US. Driver confusion and/or wrong way drivers could be a concern. Standard 12' lanes, standard 8' shoulders on new bridge. DLT configuration preserves the off-ramp to on-ramp through movement sometimes utilized during incident management, bridge maintenance, or overheight vehicle passage. Compatible with both ML2 or ML3.	Minor modifications to the on-site drainage system to accommodate the new configuration. Working near the Gila Ditch in the northwest quadrant.	Expected Level of Service C in both am and pm peak period.	Compared to a diamond interchange (no-build), a DLT slightly reduces the number of the most severe conflict points. However, unfamiliar design may create driver confusion and could increase the change of wrong way drivers, possibly reducing safety benefits.	The new bridge and most of the new interchange can be built entirely offline. Relatively minor traffic adjustments will be neceesary to complete the paving and signal system at the eastbound ramp terminal and the DLT crossover. Some short term lane closures and detours will be necessary, including on I-10. Advance traffic control notification to the public will be needed prior to when the DLT design goes active.	Potential impacts to FMS and ADOT electrical. Minor outages to each could be expected.	A bigger interchange with more bridge and more pavement will eventually require more maintenance, but it will be minimal for probably the next 20 years given how new the interchange is overall.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
SR 347 / Queen Creek Road Interchange Options									
	QC1	No Build	No changes. Crest curve actual design speed is 75 mph which is adequate for existing posted speed of 45 mph east of I-10 and 55 mph west of I-10. Existing vertical clearance exceeds 16.5'. Compatible with both ML2 or ML3.	No impacts	Operational problems that exist today will only get worse over the next 20 years under no-build. Expected Level of Service F in both the am and pm peak.	No changes	No impacts	No impacts, but a future Gila River Community Department of Public Works (DPW) waterline crossing of I-10 is proposed nearby and will need to be coordinated.	Maintenance functions will condition as it does today, but will increasingly become greater as the corridor ages without improvements. Since this location is only about 20 years old, do not expect maintenance to increase dramatically over the next 20 years.
	QC2	Diverging Diamond Interchange (DDI) with bike & ped accomodations	Relatively new configuration to AZ, but becoming commonplace across the US. Standard 12' lanes, except through the crossovers and across the existing bridge where lanes shall be 15'. Standard shoulders and vertical clearance on new bridge. DDI configuration eliminates the off-ramp to on-ramp through movement sometimes utilized during incident management, bridge maintenance, or overheight vehicle passage. Compatible with both ML2 or ML3.	Minor modifications to the on-site drainage system to accommodate the new configuration.	Expected Level of Service C in the am peak and B in the pm peak.	Compared to a diamond interchange (no-build), a DDI reduces conflict points by 50% and eliminates many of the most severe crash types. Data suggests that total crashes will be reduced by 46 percent. Geometric design discourages wrong way drivers.	The new bridge and nearly half of the new interchange can be built entirely offline. Relatively minor traffic adjustments will be neceesary to complete the paving and signal system at the crossovers. Some short term lane closures and detours will be necessary, including on I-10. Advance traffic control notification to the public will be needed prior to when the crossover design goes active.	Minor impacts to ADOT electrical systems. Minor outages to each could be expected. Coordination with the future DPW waterline will be required.	A bigger interchange with more bridge and more pavement will eventually require more maintenance, but it will be minimal for probably the next 20 years given how new the interchange is overall.
	QC3	Displaced Left Turn (DLT) Interchange with bike & ped accomodations	Unfamilar interchange design in AZ, and generally rare in the US. Driver confusion and/or wrong way drivers could be a concern. Standard 12' lanes, standard 8' shoulders on new bridge. DLT configuration preserves the off-ramp to on-ramp through movement sometimes utilized during incident management, bridge maintenance, or overheight vehicle passage. Compatible with both ML2 or ML3.	Minor modifications to the on-site drainage system to accommodate the new configuration.	Expected Level of Service C in both the am and pm peak.	Compared to a diamond interchange (no-build), a DLT slightly reduces the number of the most severe conflict points. However, unfamiliar design may create driver confusion and could increase the change of wrong way drivers, possibly reducing safety benefits.	The new bridge and most of the new interchange can be built entirely offline. Relatively minor traffic adjustments will be neceesary to complete the paving and signal system at the eastbound ramp terminal and the DLT crossover. Some short term lane closures and detours will be necessary, including on I-10. Advance traffic control notification to the public will be needed prior to when the DLT design goes active.	Minor impacts to ADOT electrical systems. Minor outages to each could be expected. Coordination with the future DPW waterline will be required.	A bigger interchange with more bridge and more pavement will eventually require more maintenance, but it will be minimal for probably the next 20 years given how new the interchange is overall.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Riggs Road Interchange Options									
	RR1	No Build	Existing crossroad deficiencies remain including narrow shoulder width. Vertical clearance is 16.0'. Crest curve actual design speed is 54 mph which is adequate for existing 45 mph posted speed limit. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impacts	Operational problems that may exist today will only get worse over the next 20 years under no-build. Eastbound exit ramp is known to backup onto I-10 during certain times.	Bridge railing is dated and does not meet current crash test criteria. Guardrail offset and shoulder does not meet current standards. Disabled vehicles have no space to pull off the traveled way and emergency vehicles have no shoulder for use in response to incidents across the interchange. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone and are therefore barrier protected.	No impacts	No impact	Bridge is nearing the end of its service life, with the bridge deck/superstructure having the most need. Narrow approach roadways with guardrail remain.
	RR2	Bridge deck rehabilitation	Existing deficiencies remain including narrow shoulder width. Vertical clearances of 16.0' will be retained. Bridge railing replaced and updated with the new deck rehabilitation. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impacts	Retiming of the existing signals will result in Level of Service B/C in the am peak hour, and level of service B in the pm peak hour now and into 2040.	Bridge railing is replaced to meet current MASH crash test criteria however guardrail is not replaced. Disabled vehicles have no space to pull off the traveled way and emergency vehicles have no shoulder for use in response to incidents through the interchange. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Rehab bridge CMF 0.95 from CPS.	Assuming deck rehabilitation is done in halves, lane closures necessary, 1-way operations with temporary signal on Riggs. Some short term lane closures and detours will be necessary, including on I-10, for old deck removal, setting forms, and for deck pours.	No impact	Bridge deck is replaced reducing near-term maintenance. Condition of approach guardrails remain, though end treaments would be updated to current standards if needed.
	RR3	Bridge deck rehabilitation with shoulder widening	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Median is extended across the bridge between ramp terminal intersections. Vertical clearance will drop a few inches less than the existing 16.0' with widening. Symmetrical widening proposed to minimize the length of impacts along Riggs Road. Bridge width increased to about 59-feet. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	An existing 30" CMP under I-10 has the potenial of being impacted by new fill slopes. Would likely need to be reconstructed to a new alignment. Four existing concrete drainage chutes down the Riggs Road embankment would need to be reconstructed.	Retiming of the existing signals will result in Level of Service B/C in the am peak hour, and level of service B in the pm peak hour now and into 2040. Bikes gain use of standard shoulder width through the interchange.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width through the interchange. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Rehab bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS.	Assuming deck rehabilitation is done in halves, lane closures necessary, 1-way operations with temporary signal on Riggs. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for old deck removal, setting forms, setting girders, and for deck pours.	Conflict with the underground ADOT signal electrical line crossing I-10 at Riggs Rd. Minor outage could be expected.	Bridge deck, bridge railing, and guardrail are replaced or rehabilitated reducing near-term maintenance.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
	RR4	Bridge deck rehabilitation with shoulder widening and sidewalks	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Median is extended across the bridge between ramp terminal intersections. Sidewalk included on both sides between ramp intersections. Vertical clearance will drop a few inches less than the existing 16.0' with widening. Symmetrical widening proposed to minimize the length of impacts along Riggs Road. Bridge width increased to about 73-feet. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	An existing 30" CMP under I-10 has the potenial of being impacted by new fill slopes. Would likely need to be reconstructed to a new alignment. Four existing concrete drainage chutes down the Riggs Road embankment would need to be reconstructed.	Retiming of the existing signals will result in Level of Service B/C in the am peak hour, and level of service B in the pm peak hour now and into 2040. Bikes gain use of standard shoulder width through the interchange. Pedestrians have access to sidewalks between the ramp intersections.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width through the interchange. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Rehab bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS.	Assuming deck rehabilitation is done in halves, lane closures necessary, 1-way operations with temporary signal on Riggs. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for old deck removal, setting forms, setting girders, and for deck pours.	Conflict with the underground ADOT signal electrical line crossing I-10 at Riggs Rd. Minor outage could be expected.	Bridge deck, bridge railing, and guardrail are replaced or rehabilitated reducing near-term maintenance.
	RR5	Bridge replacement off of the existing alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Median is extended across the bridge between ramp terminal intersections. Sidewalk included on both sides between ramp intersections. Vertical clearances will be increased to at least 16.5'. New bridge to be realigned offset the original bridge footprint to the north. Bridge width increased to about 73-feet. Option required for use with I-10 mainline alternative ML3, but also compatible with ML2.	Four existing concrete drainage chutes down the Riggs Road embankment would need to be reconstructed.	Retiming of the existing signals will result in Level of Service B/C in the am peak hour, and level of service B in the pm peak hour now and into 2040. Bikes gain use of standard shoulder width through the interchange. Pedestrians have access to sidewalks between the ramp intersections.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width through the interchange. New two-span structure would place new abutments/piers beyond the I-10 clear zone. Replace bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Majority of Riggs Road built off-line, with short term restrictions for final tie-ins along Riggs Road. No I-10 shoulder closures required to build new bridge abutments and piers.	Conflict with the underground ADOT signal electrical line crossing I-10 at Riggs Rd. Minor outage could be expected.	New underpass structure, bridge railing, guardrail, and approach pavement reduce near-term maintenance.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Goodyear Road Grade Separation Options									
	GY1	No Build	Existing deficiencies remain including narrow shoulder width and vertical clearances is 16.1 feet. Crest curve actual design speed is 55 mph which is adequate (no known posted speed limit exists). Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impact	No impact. This is currently a very low volume roadway so no operational issues exist now and none are expected by 2040.	Bridge railing is dated and does not meet current crash test criteria. Guardrail offset and shoulder does not meet current standards. Disabled vehicles have no space to pull off the traveled way and emergency vehicles have no shoulder for use in response to incidents across the bridge. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone and are therefore barrier protected.	No impact	No impact	Poor condition of approach pavement remains, and will continue to deteriorate. As bridge ages, maintenance will also increase.
	GY2	Shoulder widening on approaches and bridge	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance will drop a few inches less than the existing 16.1' with widening. Symmetrical widening to maintain crown on center of bridge deck. Bridge width increased to about 47-feet. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	Pavement drainage runnoff design perpetuated.	This is currently a very low volume roadway so no operational issues exist or are expected in 2040. Bikes gain use of standard shoulder width.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Shoulder widening CMF 0.64 from CPS	Lane or full roadway closures on Goodyear Road required for bridge widening. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for setting forms, setting girders, and for deck pours.	No impact	Bridge railing, guardrail, and approach pavement are replaced and/or rehabilitated reducing near-term maintenance.
	GY3	Bridge replacement off of the existing alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance will be increased to at least 16.5' and profile design speed increased to 55 mph minimum. Roadway realigned off original bridge footprint to the north to facilitate construction while maintaining traffic. Bridge width increased to about 47-feet. Option required for use with I-10 mainline alternative ML3, but also compatible with ML2.	Pavement drainage runnoff design perpetuated.	This is currently a very low volume roadway so no operational issues exist or are expected in 2040. Bikes gain use of standard shoulder width.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width. New two-span structure would place new abutments/piers beyond the I-10 clear zone. Replace bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Majority of Goodyear Road built off-line, with short term restrictions for final tie-ins along Goodyear Road. No I-10 shoulder closures required to build new bridge abutments and piers.	No impact	New underpass structure, bridge railing, guardrail, and approach pavement reduce near-term maintenance.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Nelson Road Grade Separation Options									
	NR1	No Build	Existing deficiencies remain including narrow shoulder width and vertical clearances is 16.1 feet. Crest curve actual design speed is 51 mph which is inadequate for existing 55 mph posted speed limit. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impact	No impact. No known traffic operations concerns today or are projected by 2040.	Bridge railing does not meet current crash test criteria and guardrail offset does not meet current standards. Disabled vehicles have no space to pull off the traveled way. Emergency vehicles have no shoulder for use in response to incidents. 51 mph design speed and 55 mph posted speed along the crest vertical curve over the freeway remains. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone.	No impact	No impact	Poor condition of approach pavement remains, and will continue to deteriorate. As bridge ages, maintenance will also increase.
	NR2	Shoulder widening on approaches and bridge	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance will drop a few inches less than the existing 16.1' with widening and the 51 mph design speed remains. Symmetrical widening to maintain crown on center of bridge deck. Bridge width increased to about 47-feet. Local roadway connections to Nelson Road in northeast and southwest quadrants will been to be reconfigured. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	Slope drains in all four corners from Nelson Road will need to be reconstructed.	No known traffic operations concerns today or are projected by 2040. Bikes gain use of standard shoulder width.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width. 51 mph stopping sight distance remains along the crest vertical curve over the freeway, along with the 55 mph posted speed limit. Could consider dropping posted speed limit to 50 mph. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Shoulder widening CMF 0.64 from CPS	Deck widening will be done in halves with lane closures necessary, 1-way operations with temporary signal on Nelson required. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for setting forms, setting girders, and for deck pours.	Potential impact to existing overhead powerline located along the south side of Nelson Road. Minor short term outage could be expected.	Bridge railing, guardrail, and approach pavement are replaced or reconstructed reducing near-term maintenance.
	NR3	Full crossroad and bridge replacement	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance increased to at least the minimum 16.5' and profile design speed increased to 55 mph minimum. Roadway realigned slightly south to facilitate reconstruction while maintaining traffic with half and half construction. Bridge width increased to about 47-feet. Local roadway connections to Nelson Road in northeast and southwest quadrants will been to be reconfigured. Option required for use with I-10 mainline alternative ML3, but also compatible with ML2.	Impact on a 36"x22" CMP under I-10 from fill slopes. Culvert would require replacement. Slope drains in all four corners from Nelson Road will need to be reconstructed.	No known traffic operations concerns today or are projected by 2040. Bikes gain use of standard shoulder width.	Bridge railing and guardrail are replaced to meet current MASH crash test criteria. Disabled and emergency vehicles have use of standard shoulder width. Design speed of crest vertical curve increased to 55 mph over the freeway to match posted speed. New two-span structure removes piers and abutments from the I-10 clear zone. Replace bridge CMF 0.95 from CPS. Shoulder widening CMF 0.64 from CPS	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Nelson Road built with half and half construction, with 1-way operations with temporary signal on Nelson required. No I-10 shoulder closures required to build new bridge abutments and piers.	Impacts existing overhead powerline located along the south side of Nelson Road. Minor short term outage could be expected.	New underpass structure, bridge railing, guardrail, and approach pavement reduce near-term maintenance.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
SR 587 / Casa Blanca Road Interchange Options									
	CB1	No Build	Existing deficiencies remain at the underpass including narrow shoulder width and vertical clearances is 16.1 feet. Crest curve actual design speed is 58 mph which is adequate for existing 55 mph posted speed limit. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impact	Continued use stop sign control of existing ramp intersections. Level of Service today is F on the east intersection and B for the west intersection. By 2040, the east intersection will continue to get worse with an even longer Level of Service F rating, while the west intersection will drop to an E by or before 2040. During incidents on I-10 north of the SR-587 interchange, traffic diversion to/from I-10 to the south from/to SR-587 to the north is significant and degrades the typical operational performance of the current interchange even more. No bike / pedestrian accommodation across the underpass structure.	Full-width shoulders are not available for disabled or emergency vehicles across the existing bridge. The additional congestion expected at the stop sign controlled intersections would likely result in an increase in congestion related crashes. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone.	No impact	No impact	Pavement rehabilitation along the interchange ramps, SR 587, and Casa Blanca Road would likely be require before 2040. As bridge ages, maintenance will also increase.
	CB2	Add ramp terminal signals and turn lanes only	Existing deficiencies remain over the bridge including narrow shoulder widths. Vertical clearance will drop a few inches less than the existing 16.1' with widening. Ramp intersections are widened to provide right and left turn lanes where warranted, and to accommodate signal control. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	A 36x22" CMP will potentially be impacted by the fill slope of the crossroad and will need to be realigned. Slope drains along SR-587 will require reconstruction.	Interchange Level of Service upgraded to C or better in 2040. Under traffic diversion events, CB2 operations will hit Level of Service F, which is to be expected as this interchange configuration does not efficiently handle the West-to-North (WN) and South-to-East (SE) movements associated with the traffic diversion event. Bike/pedestrians not accommodated across the bridge.	Full-width shoulders are not available for disabled or emergency vehicles across the existing bridge. New signals with turn lanes and wider shoulders around the intersections will reduce congestion and will improve safety. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Construct signal CMF 0.95 from CPS; Construct turn lanes CMF 0.81 from CPS.	Shoulder closures around the intersections for widening to accommodate turn lanes. Short term lane restrictions for signal installations.	Potential impact to overhead power along SR-587 and crossing I-10, risk is low to moderate. Relocation required for some ADOT lighting electrical conduits. Potential impact to the dual EPNG gasline to the north of I-10, though risk is low. Potential impact to the telephone line crossing I-10, though the risk is low. Service impacts to all of these are expected to be minor or nonexistent.	Roadway pavement along the interchange ramps, SR 587, and Casa Blanca Road would be rehabilitated and widened thereby reducing near-term maintenance. New traffic signals would increase maintenance inventory, and given remote location, would be at least 1 hour away from service should something occur.
	CB3	Add ramp terminal signals, turn lanes, bridge deck rehabilitation, and widening for bike and ped accomodations	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance will drop a few inches less than the existing 16.1' with widening. Median is extended across the bridge between ramp terminal intersections. Ramp intersections are widened to provide right and left turn lanes where warranted, and to accommodate signal control. Sidewalk included on both sides between ramp terminal intersections. Bridge width increased to about 73-feet. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	A 36x22" CMP will be impacted by the fill slope of the crossroad and will need to be realigned. Slope drains along SR-587 will require reconstruction.	Interchange Level of Service upgraded to C or better in 2040. Under traffic diversion events, CB3 operations will hit Level of Service F, which is to be expected as this interchange configuration does not efficiently handle the West-to-North (WN) and South-to-East (SE) movements associated with the traffic diversion event. Bike/pedestrians are accommodated across the bridge.	Bridge railing and guardrail replaced to meet current MASH crash test criteria. Full-width shoulders are available for disabled or emergency vehicles across the bridge. Bike/pedestrians are accommodated across the bridge. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Construct signal CMF 0.95 from CPS; Construct turn lanes CMF 0.81 from CPS; Rehab bridge CMF 0.95 from CPS.	Lane closures on SR-587 required for bridge widening, may require short term 1-way operation. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for setting forms, setting girders, and for deck pours. Shoulder closures around the intersections for widening to accommodate turn lanes. Short term lane restrictions for signal installations.	Potential impact to overhead power along SR-587 and crossing I-10, risk is low to moderate. Relocation required for some ADOT lighting electrical conduits. Potential impact to the dual EPNG gasline to the north of I-10, though risk is low. Potential impact to the telephone line crossing I-10, though the risk is low. Service impacts to all of these are expected to be minor or nonexistent.	Bridge deck and the roadway pavement along the interchange ramps, SR 587, and Casa Blanca Road would be rehabilitated and widened thereby reducing near-term maintenance. New traffic signals would increase maintenance inventory, and given remote location, would be at least 1 hour away from service should something occur.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
	CB4	CB3 but with bridge replacement off of the existing alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Median is extended across the bridge between ramp terminal intersections. Ramp intersections are widened to provide right and left turn lanes where warranted, and to accommodate signal control. Sidewalk included on both sides between ramp terminal intersections. New bridge off alignment to the south of existing and accomodates a minimum of 16.5' vertical clearance. Option required for use with I-10 mainline alternative ML3, but also compatible with ML2.	A 36x22" CMP will be impacted by the fill slope of the crossroad and will need to be realigned. Slope drains along SR-587 will require reconstruction.	Interchange Level of Service upgraded to C or better in 2040. Under traffic diversion events, CB4 operations will hit Level of Service F, which is to be expected as this interchange configuration does not efficiently handle the West-to-North (WN) and South-to-East (SE) movements associated with the traffic diversion event. Bike/pedestrians are accommodated across the bridge.	Bridge railing and guardrail replaced to meet current MASH crash test criteria. Full-width shoulders are available for disabled or emergency vehicles across the bridge. Bike/pedestrians are accommodated across the bridge. New two-span structure removes piers and abutments from the I-10 clear zone. Replace bridge CMF 0.95 from CPS. Construct signal CMF 0.95 from CPS; Construct turn lanes CMF 0.81 from CPS.	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Casa Blanca Road / SR-587 mostly built offline, with tempoary lane restrictions for tie-ins. No I-10 shoulder closures required to build new bridge abutments and piers. Shoulder closures around the intersections for widening to accommodate turn lanes. Short term lane restrictions for signal installations.	Potential impact to overhead power along SR-587 and crossing I-10, risk is low to moderate. Relocation required for some ADOT lighting electrical conduits. Potential impact to the dual EPNG gasline to the north of I-10, though risk is low. Potential impact to the telephone line crossing I-10, though the risk is low. Service impacts to all of these are expected to be minor or nonexistent.	Complete new bridge and roadway pavement requiring less near-term maintenance. Roadway pavement along the interchange ramps, SR 587, and Casa Blanca Road would be rehabilitated and widened thereby reducing near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure. New traffic signals would increase maintenance inventory, and given remote location, would be at least 1 hour away from service should something occur.
	CB5	Diamond Interchange with 5-legged roundabouts at intersections	Standard 12' lanes and 8' shoulders. Two 5-legged modern roundabouts are at both ramp terminals. New bridge next to the exisitng bridge, which will be built to accommodate 2 standard lanes and sidewalk across the bridge. New bridge to the north accomodates minimum 16.5' vertical clearance, whereas existing bridge vertical clearance will decrease a few inches below 16.1' due to widening, unless this bridge is replaced completely. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, exceptions are sought for shoulders, or the existing bridge is also replaced.	On-site drainage will need to be completely reconstructed and regraded for the new interchange configuration. Multiple culverts under I-10 will need to be modified (replaced or extended) to accommodate the new configuration.	Interchange Level of Service upgraded to A or better in 2040. Under traffic diversion events, CB5 operations will hit Level of Service F, as the roundabouts will become overwhelmed with the the West-to-North (WN) and South-to-East (SE) movements associated with the traffic diversion event. Bike/pedestrians are accommodated across the bridges between the roundabouts.	Bridge railing and guardrail replaced to meet current MASH crash test criteria on existing bridge. Full-width shoulders are available for disabled or emergency vehicles across both bridges. Bike/pedestrians are accommodated across both bridges. The new two-span structure avoids piers and abutments from being in the I-10 clear zone, however, the existing four-span structure will remain and will maintain piers adjacent to outside edge of mainline shoulder and within the clear zone. Construct multilane roundabout CMF 0.4 from CPS; Construct turn lanes CMF 0.81 from CPS; Rehab bridge CMF 0.95 from CPS.	Constructs a new bridge off alignment and then detour traffic across it while widening exsiting bridge. Some short term I-10 closures will be necessary for new bridge and old bridge rehabilitation for setting forms, setting girders, and for deck pours for new bridge. Casa Blanca Road / SR-587 mostly built offline, with tempoary lane restrictions for tie-ins. Outside I-10 shoulder closures required to widen existing piers, but no I-10 shoulder closures required to build new bridge abutments and piers. Shoulder closures around the intersections for widening and construction of the new roundabouts.	Potential impact to overhead power along SR-587 and crossing I-10, risk is high. Relocation required for some ADOT lighting electrical conduits. Potential impact to the dual EPNG gasline to the north of I-10, though risk is low. Potential impact to the telephone line crossing I-10, though the risk is low. Service impacts to all of these are expected to be moderate to nonexistent.	Complete new bridge, a rehabilitated existing bridge, and new roadway pavement throughout the interchanges will require less near-term maintenance. Since roundabouts do not require signals, maintenance requirements are substantially less given the remote location.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS							
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
	CB6	Diamond Interchange with Casa Blanca Road bypass	Standard 12' lanes and 8' shoulders throughout. New bridge next to the exisitng bridge, which will be widened to accommodate 2 standard lanes and sidewalk across the bridge. New bridge to the north will accomodates a minumum 16.5' vertical clearance, whereas the existing bridge vertical clearance will decrease a few inches below 16.1' due to the widening, unless this bridge is also replaced completely. New bridge to the south where Casa Blanca Road crosses I-10. The new Casa Blanca Road bridge will also accomodate a minimum 16.5' vertical clearance. Three new intersections are created, and a modern roundabout is proposed at each (though signals could be used in their place as a variant). Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, exceptions are sought for shoulders, or the existing bridge is also replaced.	On-site drainage will need to be completely reconstructed and regraded for the new interchange configuration. Multiple culverts under I-10 will need to be modified (replaced or extended) to accommodate the new configuration.	Interchange Level of Service upgraded to A or better in 2040. Under traffic diversion events, CB6 operations will only drop to Level of Service B. This is because the West-to-North (WN) and South-to-East (SE) movements associated with the traffic diversion event are largely separated from the Casa Blanca Road traffic. Bike/pedestrians are accommodated across the bridges between the roundabouts.	Bridge railing and guardrail replaced to meet current MASH crash test criteria on existing bridge. Full-width shoulders are available for disabled or emergency vehicles across all three bridges. Bike/pedestrians are accommodated across all bridges. The new two-span structure avoids piers and abutments from being in the I-10 clear zone, however, the existing four-span structure will remain and will maintain piers adjacent to outside edge of mainline shoulder and within the clear zone. Construct multilane roundabout CMF 0.4 from CPS; Construct turn lanes CMF 0.81 from CPS; Rehab bridge CMF 0.95 from CPS.	Constructs new bridge off alignment and then detour traffic across them as applicable while widening exsiting bridge. Some short term I-10 closures will be necessary for new bridge and old bridge rehabilitation for setting forms, setting girders, and for deck pours. Casa Blanca Road / SR-587 mostly built offline, with tempoary lane restrictions for tie-ins. Outside I-10 shoulder closures required to widen existing piers, but no I-10 shoulder closures required to build new bridge abutments and piers. Minor closures around the intersections for widening and construction of the new roundabouts.	Potential impact to overhead power along SR-587 and crossing I-10, risk is high. Relocation required for some ADOT lighting electrical conduits. Potential impact to the dual EPNG gasline to the north of I-10, though risk is low. Potential impact to the telephone line crossing I-10, though the risk is low. Service impacts to all of these are expected to be moderate to nonexistent.	Complete new bridge, a rehabilitated existing bridge, and new roadway pavement throughout the interchanges will require less near-term maintenance. Since roundabouts do not require signals, maintenance requirements are substantially less given the remote location.
	CB7	Split Diamond Interchange with triangular circulating roadway	Split diamond configuration with one-way free-flow yield controlled circulating roadway connecting all legs. Standard 12' lanes and 8' shoulders. New bridge north of the exisitng bridge, which will be built to accommodate 2 standard lanes and sidewalk across the bridge. New bridge to the north will accomodate a minumum of 16.5' vertical clearance, whereas existing bridge vertical clearance will decrease a few inches below 16.1' for the widening, unless this bridge is replaced. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, exceptions are sought for shoulders, or the existing bridge is also replaced.	On-site drainage will need to be completely reconstructed and regraded for the new interchange configuration. Multiple culverts under I-10 will need to be modified (replaced or extended) to accommodate the new configuration.	Split diamond with circulating roadway will dramatically increase flow of traffic through the interchange. Interchange Level of Service upgraded to A or better in 2040. Under traffic diversion events, CB7 operations will only drop to Level of Service B. This is because the West-to-North (WN) and South-to-East (SE) movements associated with the traffic diversion event are easily handled with the freeflowing design. Sidewalks provided for pedestrians between two legs of Casa Blanca Road.	Bridge railing and guardrail replaced to meet current MASH crash test criteria on existing bridge. Full-width shoulders are available for disabled or emergency vehicles across both bridges. Bike/pedestrians are accommodated across both bridges. The new two-span structure avoids piers and abutments from being in the I-10 clear zone, however, the existing four-span structure will remain and will maintain piers adjacent to outside edge of mainline shoulder and within the clear zone. Construct multilane roundabout CMF 0.4 from CPS; Construct turn lanes CMF 0.81 from CPS; Rehab bridge CMF 0.95 from CPS.	Constructs new bridge off alignment and then detour traffic across it while widening exsiting bridge. Some short term I-10 closures will be necessary for new bridge and old bridge rehabilitation for setting forms, setting girders, and for deck pours. Majority of interchange built offline, with tempoary lane restrictions for tie-ins. Outside I-10 shoulder closures required to widen existing piers, but no I-10 shoulder closures required to build new bridge abutments and piers. Minor closures around the crossroad tie-in points to the circulating roadway.	Potential impact to overhead power along SR-587 and crossing I-10, risk is medium to low. Relocation required for some ADOT lighting electrical conduits. Potential impact to the dual EPNG gasline to the north of I-10, though risk is low. Potential impact to the telephone line crossing I-10, though the risk is low. Service impacts to all of these are expected to be minor or nonexistent.	Complete new bridge, a rehabilitated existing bridge, and new roadway pavement throughout the interchanges will require less near-term maintenance. Since circulating roadway design does not require signals, maintenance requirements are substantially less given the remote location.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Gasline Road Grade Separation Options									
	GL1	No Build	Existing deficiencies remain including narrow shoulder width, vertical clearance is 16.1 feet, and horizontal clearances along I-10 needing barrier protection. Crest curve actual design speed is 51 mph which is adequate as no known posted speed limit exists. Incompatible with both ML2 and ML3 due the bridge skew and its five-span configuration, unless mainline width design exceptions are sought for shoulders.	No impact	No impact. Traffic volumes are relatively small at this crossing so operational performance is not an issue. Wide farm equipment occasionally crosses and takes up the entire roadway width on the bridge.	Bridge railing does not meet current crash test criteria and guardrail offsets do not meet current standards. Disabled vehicles have no space to pull off the traveled way and emergency vehicles have no shoulder for use in response to incidents across I-10. Five-span structure maintains piers adjacent to inside and outside edge of mainline shoulder and within the clear zone.	No impact	No impact	Poor condition of approach pavement remains, and will continue to deteriorate. As bridge ages, maintenance will also increase.
	GL2	Bridge replacement on current alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Roadway to stay on original alignment. Bridge design to either a two or four span configuration to eliminate laterial clearance issues with I-10. Vertical clearance increased to at a minimum of 16.5' and profile design speed increased to 55 mph. Bridge width increased to about 47-feet. Profile of Gasline Road raises by several feet to accomodate the design criteria listed. Compatible with both ML2 and ML3.	Gasline Road pavement drainage will need to be reconstructed. A 36x22" CMP under I-10 may be impacted and will need to be realigned or relocated.	No change in traffic operations as congestion is not an issue. However, shoulders provide 2-way operation of the roadway even with wide farm equipment crossings. Bikes and pedestrians can use the new shoulders.	New bridge updates all design standards including new bridge barrier. Full-width shoulders are available for disabled or emergency vehicles across the bridge. Bike/pedestrians are accommodated across the bridge. New two or four-span structure will relocate piers outside the I-10 clear zone. Replace bridge CMF 0.95 from CPS. Shoulder widening CMF 0.64 from CPS.	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Full closure of Gasline Road required during bridge replacement (6-9 months). Shoulder closures (Inside and Outside) on Interstate to remove old build piers, and to construct new ones.	Potential impact to the two EPNG gaslines - risk medium Potential impact to overhead powerline - risk high Potential Impact to Gila River Farm Irrigation Laterial 7-4 - risk high Potential impact to the underground telephone line crossing I-10 east of Gasline Road - risk medium Service impacts to all of these are expected to be moderate to nonexistent.	Complete new bridge and roadway pavement requiring less near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure.
	GL3	Bridge replacement on parallel alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Roadway shifted east of original alignment. Bridge design to either a two or four span configuration to eliminate laterial clearance issues with I-10. Vertical clearance increased to at a minimum of 16.5' and profile design speed increased to 55 mph. Bridge width increased to about 47-feet. Profile of Gasline Road raises by several feet to accomodate the design criteria listed. Compatible with both ML2 and ML3.	Gasline Road pavement drainage will need to be reconstructed. A 36x22" CMP under I-10 will be impacted and will need to be relocated.	No change in traffic operations as congestion is not an issue. However, shoulders provide 2-way operation of the roadway even with wide farm equipment crossings. Bikes and pedestrians can use the new shoulders.	New bridge updates all design standards including new bridge barrier. Full-width shoulders are available for disabled or emergency vehicles across the bridge. Bike/pedestrians are accommodated across the bridge. New two or four-span structure will relocate piers outside the I-10 clear zone. Replace bridge CMF 0.95 from CPS. Shoulder widening CMF 0.64 from CPS.	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Avoids full closure of Gasline Road required during bridge replacement. Shoulder closures (Inside and Outside) on Interstate to remove old build piers, and to construct new ones.	Avoids impact to the two EPNG gaslines Avoids impact to overhead powerline Avoids impact to Gila River Farm Irrigation Laterial 7-4 Impact to the underground telephone line crossing I-10 east of Gasline Road - risk severity is medium Service impacts to all of these are expected to be moderate to nonexistent.	Complete new bridge and roadway pavement requiring less near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Seed Farm Road Grade Separation / Interchange Options									
	SF1	No Build	Existing non-standard 10' lanes, 3' shoulders, and existing 16.1' vertical clearance will remain. Crest curve actual design speed is 53 mph which is adequate as no known posted speed limit exists. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impact	No impact. Traffic volumes are relatively small at this crossing so operational performance is not an issue. Wide farm equipment occasionally crosses and takes up the entire roadway width on the bridge.	Bridge railing does not meet current crash test criteria and guardrail offset does not meet current standards. Disabled vehicles have no space to pull off the traveled way. Emergency vehicles have no shoulder for use in response to incidents across I-10. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone.	No impact	No impact	Poor condition of approach pavement remains, and will continue to deteriorate. As bridge ages, maintenance will also increase.
	SF2	Bridge deck rehabilitation with shoulder widening - no interchange	Existing design speed of 53 mph will be retained. Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided with symmetrical 7' widening on roadway and 9' on bridge. Existing 16.1' vertical clearance will decrease a few inches due to the widening. Bridge width increased to about 47-feet. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	Seed Farm Road pavement drainage will need to be reconstructed. No impact to existing I-10 culverts.	No change in traffic operations as congestion is not an issue. However, shoulders provide 2-way operation of the roadway even with wide farm equipment crossings. Bikes and pedestrians can use the new shoulders.	Bridge railing and guardrail are replaced to meet current MASH criteria. Disabled and emergency vehicles will have use of standard shoulders. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Rehab bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS	Deck widening will be done in halves with lane closures necessary, 1-way operations with temporary signal on Seed Farm Road required. The option would close Seed Farm Road for several months while widening is completed. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for setting forms, setting girders, and for deck pours.	Potential impact to the overhead powerline crossing I-10 north of Seed Farm Road - risk is low Potential impact to the gasline crossing I-10 south of Seed Farm Road - risk is medium Potential impact to the irrigation laterals crossing Seed Farm Road and the irrigation dithes along Seed Farm Road - risk of impact is high but impacts are relatively low. Service impacts to all of these are expected to be moderate to nonexistent.	New bridge deck and railing and roadway pavement and guardrail will all require less near-term maintenance.
	SF3	New tight diamond interchange with bridge replacement	Design speed will be increased to 55 mph. Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance over I-10 is increased to at a minimum of 16.5'. Pedestrian sidewalks provided on both sides of the road through the interchange. Complete bridge replacement to a two-span structure and roadway realignment and reconstruction which reduces skew with I-10. Ramp terminal intersection spacing of about 450-feet with side-by-side left turn lanes requiring an 89-foot bridge width. Tight diamond interchange configuration less commonly associated with rural connections like Seed Farm Road. Terrace Road intersection with Seed Farm east of I-10 will need to be realigned with a new access point further east. Compatible with both ML2 and ML3.	Seed Farm Road pavement drainage will need to be reconstructed. Four 36"x22" metal pipe culverts under I-10 need extension or realignment.	New interchange improves access and travel times to and from Sacaton which will remove traffic demand from SR-587/Casa Blanca and SR-387/SR-187/Pinal Ave interchanges. New access provides more direct route to I-10 and decreases travel times, improved mobility for vehicles, cyclists, and pedestrians alike. Level of Service A is projected for 2040.	New bridge with new barrier and guardrail. Disabled and emergency vehicles will have use of standard shoulders. Two-span structure removes piers from the clear zone adjacent to outside edge of mainline shoulder. Replace bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS. New TI improves incident response time for emergency services.	Majority of improvements can be built off-line with little impacts to Seed Farm Road Short term closure of Seed Farm Road for final tie-ins on both sides. Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Shoulder closures (Outside) on Interstate to remove old build piers, and to construct new ones.	Potential impact to the overhead powerline crossing I-10 north of Seed Farm Road - risk is high Potential impact to the gasline crossing I-10 south of Seed Farm Road - risk is high Potential impact to the irrigation laterals crossing Seed Farm Road and the irrigation dithes along Seed Farm Road - risk of impact is high, and impact many facilities. Service impacts to all of these are expected to be moderate to nonexistent.	Complete new bridge and roadway pavement requiring less near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure. However, a new interchange means much more pavement to maintain over its life.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
	SF4	New spread diamond interchange with bridge replacement	Design speed will be increased to 55 mph. Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance over I-10 is increased to a minimum of 16.5'. Pedestrian sidewalks provided on both sides of the road through the interchange. Complete bridge replacement to a two-span structure and roadway realignment and reconstruction to the south. Ramp terminal intersection spacing of about 1,150-feet with back-to-back left turn lanes requiring an 81-foot bridge width. Spread diamond interchange configuration most commonly associated with rural connections like Seed Farm Road. Terrace Road intersection with Seed Farm east of I-10 will need to be realigned with a new access point further east. Compatible with both ML2 and ML3.	Seed Farm Road pavement drainage will need to be reconstructed. Four 36"x22" metal pipe culverts under I-10 need extension or realignment.	New interchange improves access and travel times to and from Sacaton which will remove traffic demand from SR-587/Casa Blanca and SR-387/SR-187/Pinal Ave interchanges. New access provides more direct route to I-10 and decreases travel times, improved mobility for vehicles, cyclists, and pedestrians alike. Level of Service A is projected for 2040.	New bridge with new barrier and guardrail. Disabled and emergency vehicles will have use of standard shoulders. Two-span structure removes piers from the clear zone adjacent to outside edge of mainline shoulder. Replace bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS. New TI improves incident response time for emergency services.	Majority of improvements can be built off-line with little impacts to Seed Farm Road Short term closure of Seed Farm Road for final tie-ins on both sides. Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Shoulder closures (Outside) on Interstate to remove old build piers, and to construct new ones.	Potential impact to the overhead powerline crossing I-10 north of Seed Farm Road - risk is high Potential impact to the gasline crossing I-10 south of Seed Farm Road - risk is high Potential impact to the irrigation laterals crossing Seed Farm Road and the irrigation dithes along Seed Farm Road - risk of impact is high, and impact many facilities. Service impacts to all of these are expected to be moderate to nonexistent.	Complete new bridge and roadway pavement requiring less near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure. However, a new interchange means much more pavement to maintain over its life.
	SF5	New spread diamond interchange with widened existing bridge	Existing design speed of 53 mph will be retained. Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Existing 16.1' vertical clearance will decrease a few inches due to the widening. Pedestrian sidewalk provided on the north side of the bridge and on both sides of the road through the interchange. Bridge modification remains a four-span structure. Roadway reconstruction limits the profile grade to 3% max. Ramp terminal intersection spacing of about 1,150-feet with back-to-back left turn lanes requiring a 70-foot bridge width. Spread diamond interchange configuration most commonly associated with rural connections like Seed Farm Road. Terrace Road intersection with Seed Farm east of I-10 will need to be realigned with a new access point further east.	Seed Farm Road pavement drainage will need to be reconstructed. Four 36"x22" metal pipe culverts under I-10 need extension or realignment.	New interchange improves access and travel times to and from Sacaton which will remove traffic demand from SR-587/Casa Blanca and SR-387/SR-187/Pinal Ave interchanges. New access provides more direct route to I-10 and decreases travel times, improved mobility for vehicles, cyclists, and pedestrians alike. Level of Service A is projected for 2040.	Bridge railing and guardrail are replaced to meet current MASH criteria. Disabled and emergency vehicles will have use of standard shoulders. Four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Rehab bridge CMF 0.95 from CPS; Shoulder widening CMF 0.64 from CPS. New TI improves incident response time for emergency services.	Deck widening will be done in halves with lane closures necessary, 1-way operations with temporary signal on Seed Farm Road required. The option would close Seed Farm Road for several months while widening is completed. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for setting forms, setting girders, and for deck pours.	Potential impact to the overhead powerline crossing I-10 north of Seed Farm Road - risk is high Potential impact to the gasline crossing I-10 south of Seed Farm Road - risk is medium Potential impact to the irrigation laterals crossing Seed Farm Road and the irrigation dithes along Seed Farm Road - risk of impact is high, and impact many facilities. Service impacts to all of these are expected to be moderate to nonexistent.	New bridge deck and railing and roadway pavement and guardrail will all require less near-term maintenance. However, a new interchange means much more pavement to maintain over its life.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
Dirk Lay Road Grade Separation Options									
	DL1	No Build	Existing deficiencies remain including narrow shoulder width. Vertical clearance is 16'-3.5". Horizontal clearances along I-10 needing barrier protection. Crest curve actual design speed is 54 mph which is adequate as no known posted speed limit exists. Incompatible with both ML2 and ML3 due the bridge skew and its five-span configuration, unless mainline width design exceptions are sought for shoulders.	No impact	No impact. Traffic volumes are relatively small at this crossing so operational performance is not an issue.	Bridge railing does not meet current crash test criteria and guardrail offsets do not meet current standards. Disabled vehicles have no space to pull off the traveled way and emergency vehicles have no shoulder for use in response to incidents across I-10. Five-span structure maintains piers adjacent to inside and outside edge of mainline shoulder and within the clear zone.	No impact	No impact	Poor condition of approach pavement remains, and will continue to deteriorate. As bridge ages, maintenance will also increase.
	DL2	Bridge replacement on current alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) and sidewalks are provided. Vertical clearance increased to at least the minimum 16.5' and profile design speed increased to 55 mph. Roadway to stay on original alignment. Bridge width increased to about 61 feet. Profile of Dirk Lay Road raises by several feet to accomodate the design criteria listed. Compatible with both ML2 and ML3.	Dirk Lay Road pavement drainage will need to be reconstructed. A double 48" CMP under I-10 will be impacted and will need to be relocated.	No change in traffic operations as congestion is not an issue. Bikes and pedestrians can safety cross I-10.	New bridge updates all design standards including new bridge barrier. Full-width shoulders are available for disabled or emergency vehicles across the bridge. Bike/pedestrians are accommodated across the bridge. New two or four-span structure will relocate piers outside the I-10 clear zone. Replace bridge CMF 0.95 from CPS. Shoulder widening CMF 0.64 from CPS.	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Full closure of Dirk Lay Road required during bridge replacement (6-9 months). Shoulder closures (Inside and Outside) on Interstate to remove old build piers, and to construct new ones.	No impacts.	Complete new bridge and roadway pavement requiring less near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure.
	DL3	Bridge replacement on parallel alignment	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) and sidewalks are provided. Vertical clearance increased to at least the minimum 16.5' and profile design speed increased to 55 mph. Roadway realigned parallel and to the west of the original bridge footprint to facilitate construction while maintaining traffic on Dirk Lay Road. Bridge width increased to about 61 feet. Compatible with both ML2 and ML3.	Dirk Lay Road pavement drainage will need to be reconstructed.	No change in traffic operations as congestion is not an issue. Bikes and pedestrians can safety cross I-10.	New bridge updates all design standards including new bridge barrier. Full-width shoulders are available for disabled or emergency vehicles across the bridge. Bike/pedestrians are accommodated across the bridge. New two or four-span structure will relocate piers outside the I-10 clear zone. Replace bridge CMF 0.95 from CPS. Shoulder widening CMF 0.64 from CPS.	Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Avoids full closure of Dirk Lay Road required during bridge replacement. Shoulder closures (Inside and Outside) on Interstate to remove old build piers, and to construct new ones.	No impacts.	Complete new bridge and roadway pavement requiring less near-term maintenance. Increased vertical clearance reducing the likelihood over-height vehicles hit the superstructure.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
SR 387 / SR 187 / Pinal Avenue Interchange Options									
	PA1	No Build	No change from existing. Crest curve actual design speed is 54 mph which is slightly inadequate for the posted 55 mph speed limit. Vertical clearance is 16.6'. Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	No impact	Operational problems that exist today will only get worse over the next 20 years under no-build. Expected Level of Service F at both intersections in both the am and pm peak.	The exisitng left turn lanes from SR-187/Pinal Ave to each direction of I-10 are less than the recommended lengths for new cnstruction. No existing accomodation exists for bikes or pedestrians, which can be problematic during annual bike events that occur in this area.	No impact	No impact	Bridge is nearing the end of its typical service life. Narrow approach roadways with guardrail remain.
	PA2	Shoulder widening & sidewalk on approaches and bridge, add signals	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Left turn lane storage lengths are increased to meet standards for new construction. Roadway to stay on original alignment, but widen the exisiting structure. Structure widened to about 73 feet. Vertical clearance will reduce a few inches below 16.6' for the bridge widening. Add signals to intersections (roundabouts are an option to signals). Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	Pinal Ave/SR-187 pavement drainage will need to be reconstructed. No impact to existing I-10 culverts.	As growth occurs in the future and more people commute from Casa Grande to/from Phoenix, this interchange is likely to see higher movements in the north-to-west and east-to-south movements. The additonal width on the bridge allows for increased storage for left turns from Pinal Ave to westbound I-10. Expected Level of Service is expected to improve to D or better in 2040. Improved mobility for cyclists and pedestrians.	The existing four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Bicycles are accomodated in the Pinal Ave shoulders; pedestrians are barrier-separated from roadway traffic. Shoulder widening CMF 0.64 from CPS. Construct turn lanes CMF 0.81 from CPS; Traffic signal installation CMF 0.95 from CPS (and could go as low as 0.4 if roundabouts used instead of signals).	Pinal Ave/SR-187 shoulder closures for bridge and roadway widening. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for old deck removal, setting forms, setting girders, and for deck pours.	ADOT electrical conduits may be impacted - risk is low. A minor outage could be expected.	Upgraded interchange pavement and bridge widening reducing near-term maintenance, however, two new signalized intersections will increase maintenance.
	PA3	Upgrade ramp terminal capacity, shoulder widening & sidewalk on approaches and bridge, add signals	Roadway to stay on original alignment, but widen the exisitng structure. Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Left turn lane storage lengths are increased to meet standards for new construction. Structure widened to about 73 feet in width. Vertical clearance will reduce a few inches below 16.6' for the bridge widening. Westbound to northbound right turn pocket added. Add signals to intersections (roundabouts are an option to signals). Compatible with ML2, but incompatible with ML3 due the bridge piers immediately adjacent to the outside shoulder of I-10, unless the mainline design is altered with a horizontal shift toward the median, or exceptions are sought for shoulders.	Pinal Ave/SR-187 pavement drainage will need to be reconstructed. No impact to existing I-10 culverts.	As growth occurs in the future and more people commute from Casa Grande to/from Phoenix, this interchange is likely to see higher movements in the north-to-west and east-to-south movements. The additonal width on the bridge allows for increased storage for left turns from Pinal Ave to westbound I-10. A right turn pocket is added to the WB exit ramp at the junction with the crossroad, which will better facilitate access to Sacaton from the south. Expected Level of Service is expected to improve to D or better in 2040. Improved mobility for cyclists and pedestrians.	The existing four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Bicycles are accomodated in the Pinal Ave shoulders; pedestrians are barrier-separated from roadway traffic. Shoulder widening CMF 0.64 from CPS. Construct turn lanes CMF 0.81 from CPS; Traffic signal installation CMF 0.95 from CPS (and could go as low as 0.4 if roundabouts used instead of signals).	Pinal Ave/SR-187 and ramp shoulder closures for bridge and roadway widening. Outside I-10 shoulder closures to widen piers. Some short term I-10 closures will be necessary for old deck removal, setting forms, setting girders, and for deck pours.	ADOT electrical conduits may be impacted - risk is low. A minor outage could be expected.	Upgraded interchange pavement and bridge widening reducing near-term maintenance, however, two new signalized intersections will increase maintenance.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

Alternatives and Options Evaluation Matrix - Engineering

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS						
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability
	PA4	Bridge replacement off of the existing alignment, add signals	Standard 12' lanes and 8' shoulders (10' shoulders on bridge) are provided. Vertical clearance increased to at least the minimum 16.5' and profile design speed increased to 55 mph. Roadway realigned to east, parallel to original bridge footprint to facilitate construction while maintaining traffic. Bridge width increased to about 73 feet. Add signals to intersections (roundabouts are an option to signals). Option required for use with I-10 mainline alternative ML3, but also compatible with ML2.	Pinal Ave/SR-187 pavement drainage will need to be reconstructed. One 24" culvert under I-10 is impacted and will need to be replaced.	As growth occurs in the future and more people commute from Casa Grande to/from Phoenix, this interchange is likely to see higher movements in the north-to-west and east-to-south movements. The additonal width on the bridge allows for increased storage for left turns from Pinal Ave to westbound I-10. A right turn pocket is added to the WB exit ramp at the junction with the crossroad, which will better facilitate access to Sacaton from the south. Expected Level of Service is expected to improve to D or better in 2040. Improved mobility for cyclists and pedestrians.	The existing four-span structure maintains piers adjacent to outside edge of mainline shoulder and within the clear zone. Bicycles are accomodated in the Pinal Ave shoulders; pedestrians are barrier-separated from roadway traffic. Shoulder widening CMF 0.64 from CPS. Construct turn lanes CMF 0.81 from CPS; Traffic signal installation CMF 0.95 from CPS (and could go as low as 0.4 if roundabouts used instead of signals); Replace bridge CMF 0.95 from CPS.	Majority of improvements can be built off-line with little impacts to SR-187/Pinal Ave Short term closure of SR-187/Pinal Ave for final tie-ins on both sides. Some short term I-10 closures will be necessary for old bridge removal, and for setting forms, setting girders, and for deck pours for new bridge. Shoulder closures (Outside) on Interstate to remove old build piers, and to construct new ones.	ADOT electrical conduits may be impacted - risk is medium to low. A minor outage could be expected.	Upgraded interchange pavement and a new bridge reducing near-term maintenance, however, two new signalized intersections will increase maintenance.

Figure 3-34 (continued). Alternatives and options evaluation matrix – engineering

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 1-8 of 15)							
			Environmental Impacts							
			Floodplain (Acres)	Jurisdictional Waters (Acres)	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)
I-10 Mainline Widening Alternatives (1 added lane each direction + HOV lanes from SR 202L to Riggs Road)										
	ML1	No Build	No impact. The study area in Phoenix and Chandler to the Community boundary is in FEMA Flood Zone B-X protected by flood control from a 100-year flood by the Southeast Valley Regional Drainage System. The study area within the Community is Flood Zone D where no flood hazard analysis has been conducted and flood hazards are undetermined (undelineated). The study area south of the Community in Casa Grande is Flood Zone C-X with minimal flood hazard.	No impact. No wetlands or riparian vegetation were identified in the study area. Jurisdictional canals: MP 177.0, Casa Blanca Canal MP 177.1, Unnamed earthen conveyance channel MP 180.2, Southside Canal MP 180.9, Unnamed earthen conveyance channel	No impact. The only water resources in the study area that could be affected, other than the Gila River, which is not part of this I-10 project, are manmade irrigation canals. These include the Casa Blanca Canal at MP 177.0 and an unnamed earthen conveyance channel at MP 177.1, the Southside Canal at MP 180.2, and an unnamed earthen conveyance channel at MP 180.9.	Higher noise levels in peak noise hour for nearby sensitive receptors attributable to larger traffic volumes compared with the existing condition.	Increased traffic congestion could worsen air quality over time.	There would be **no visual change** as viewed from the freeway, cross streets, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	ML2	Median Widening + Ramp Upgrades	Floodplain is undelineated on Community. No 100-year floodplain outside Community.	Alternative crosses 4 jurisdictional canals: MP 177.0, Casa Blanca Canal MP 177.1, Unnamed earthen conveyance channel MP 180.2, Southside Canal MP 180.9, Unnamed earthen conveyance channel None of the canal crossing structures would require modification, and no impacts to any jurisdictional waters are anticipated.	The following cross under I-10 through box culverts or similar conveyances: MP 161.7: Westside IA Level Top Canal MP 161.8: P-MIP Memorial Pipeline MP 162.1: Broadacres Canal (abandoned) MP 162.3: Gila Drain MP 169.7: Westside VA Canal MP 174.1: Old Canal 13 MP 174.5: Unnamed concrete irrigation channel that ties into Canal 13 MP 177.0: Casa Blanca Canal MP 177.1: Unnamed earthen irrigation channel MP 177.8: Unnamed earthen irrigation channel MP 178.4: Unnamed concrete irrigation channel MP 178.6: Unnamed earthen irrigation channel MP 178.7: Unnamed earthen irrigation channel MP 179.5: Unnamed earthen irrigation channel MP 180.2: Southside Canal MP 180.9: Unnamed earthen irrigation channel None of the canals or irrigation channels would be impacted or require long-term modification to existing conditions.	Higher noise levels (than existing) attributable to increased traffic volumes; noise barrier would be recommended for RV Park/Mobile Coach Resort.	Conformance compliant	The change in view from the freeway would be moderate. What is now a vegetated median would become paved, so more urban looking and less rural, including the loss of large trees in the median in many locations. The view change from the cross roads would be minor. The view change from off-site would be minor because the improvements would not be discernible from a distance. From freeway: Moderate From crossroads: Minor From off-site: Minor	No specific sites of concern	No land conversion outside Community. Slivers of land would be acquired resulting in their conversion to a transportation corridor within the Community. Land use category and its conversion to a transportation corridor: ~Existing undeveloped/future industrial: 0.32 acre ~Existing undeveloped/future agriculture: 0.5 acre ~Existing open space/future open space: 0.26 acre Total conversion of land to a transportation corridor = 1.08 acres
	ML3	Outside Widening + Ramp Upgrades	Floodplain is undelineated on Community. No 100-year floodplain.	Alternative crosses 4 jurisdictional canals: MP 177.0, Casa Blanca Canal MP 177.1, Unnamed earthen conveyance channel MP 180.2, Southside Canal MP 180.9, Unnamed earthen conveyance channel The culvert on the unnamed earthen conveyance channel at MP 177.1 would require extension, but no impacts are anticipated at the other 3 canals. Alternative would impact 2.14 acres including 1 jurisdictional canal and 36 ephemeral drainages.	The following cross under I-10 through box culverts or similar conveyances: MP 161.7: Westside IA Level Top Canal MP 161.8: P-MIP Memorial Pipeline MP 162.1: Broadacres Canal (abandoned) MP 162.3: Gila Drain MP 169.7: Westside VA Canal MP 174.1: Old Canal 13 MP 174.5: Unnamed concrete irrigation channel ties into Canal 13 MP 177.0: Casa Blanca Canal MP 177.1: Unnamed earthen irrigation channel MP 177.8: Unnamed earthen irrigation channel MP 178.4: Unnamed concrete irrigation channel MP 178.6: Unnamed earthen irrigation channel MP 178.7: Unnamed earthen irrigation channel MP 179.5: Unnamed earthen irrigation channel MP 180.2: Southside Canal MP 180.9: Unnamed earthen irrigation channel Unnamed earthen irrigation channel at MP 177.1 would require extension of existing culvert. No other canals or irrigation channels would be impacted. All would be protected during the short-term construction phase of the project. No impact to wells	Higher noise levels (than existing) attributable to increased traffic volumes; travel lanes closer to the noise receptors because of outside widening; noise barrier would be recommended for RV Park/Mobile Coach Resort.	Conformance compliant	The change in view from the freeway would be **moderately high**. The wider freeway, from side to side, would be more visually intrusive. All the bridges would likely be replaced or modified; however, the new would be similar to the old, so would not be visually out of character with what exists now. In many locations, the trees in the median would remain, but more would be removed along the outer edges as compared to ML2a and ML2b. The view change from the cross roads would be **minor**. The view change from off-site would be **minor** because of the loss of mature vegetation. From freeway: Moderately High From crossroads: Minor From off-site: Minor	No specific sites of concern	Additional land required: 85.18 acres. All located in the Community. Outside widening mainline design option needs substantially more additional easement. Amounts would be 10' to 30' on each side of I-10 the length of the mainline corridor, beginning just south of the Wild Horse Pass interchange and ending just south of the SR 387/Pinal Avenue interchange. Conversion of most types of existing and planned future land use in the Community to a long-term transportation use for the outside widening of I-10.
Wild Horse Pass/Sundust Road Interchange Options										
	WH1	No Build, Except for ADA Upgrades	No impact	No impact	No impact	Higher noise levels in peak noise hour for nearby sensitive receptors attributable to larger traffic volumes compared with the existing condition.	Increased traffic congestion could worsen air quality over time.	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	WH2	Diverging Diamond Interchange (DDI) with bike & ped accommodations	Floodplain is undelineated on Community.	No impact	The Gila Drain, an SRP irrigation canal, crosses diagonally under I-10 via a 100-foot box culvert. It is within the limits of work for this design option and would be protected during construction.	Improved traffic flow would reduce truck acceleration and deceleration noise. Compared with No Build condition, noise impact would be minimal.	Improved traffic flow and wait times, and thus reduced pollutant emissions.	The change in view from the freeway would be moderate because of the additional bridge and added and relocated ramps. The new ramp alignments would create new, longer fill slopes and loss or relocation of vegetation. The visual change from Wild Horse Pass Boulevard would be moderate - there would be an additional bridge, larger interchange, and a large increase in the amount of pavement. The added and relocated ramps with increased fill slopes and loss of vegetation would also be a moderate change. From off-site, the visual change would be minor because the bridge and ramps would be similar to the existing interchange. From freeway: Moderate From crossroads: Moderate From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing undeveloped/future open space: 0.65 acres ~Existing commercial/future commercial: 0.57 acres ~Existing industrial/future industrial: 0.04 acres Total conversion of land to a transportation corridor = 1.26 acres
	WH3	Displaced Left Turn (DLT) Interchange with bike & ped accommodations	Floodplain is undelineated on Community.	No impact	The Gila Drain, an SRP irrigation canal, crosses diagonally under I-10 via a 100-foot box culvert. It is within the limits of work for this design option and would be protected during construction.	Improved traffic flow would reduce truck acceleration and deceleration noise. Compared with No Build condition, noise impact would be minimal.	Improved traffic flow and wait times, and thus reduced pollutant emissions.	The change in view from the freeway would be minor - the additional ramp/bridge would increase the overall bridge width but would be visually similar to the existing condition; the ramp fill slopes, especially in the northwest quadrant where a new ramp would be located, would extend farther out but would be visually similar to the existing slopes. The visual change from Wild Horse Pass Boulevard would be minor - the bridge would be wider but of similar character. From off-site, the visual change would be minor because the bridge and ramps would be similar to the existing interchange. From freeway: Minor From crossroads: Minor From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 0.21 acre ~Existing industrial/future industrial: 0.86 acre Total conversion of land to a transportation corridor = 1.07 acres

Figure 3-35. Alternatives and options evaluation matrix – environmental

Alternatives and Options Evaluation Matrix - Environmental (Criteria 9-15 of 15)

ALTERNATIVES and OPTIONS			Environmental Impacts						
			Local Businesses (including impacts on billboards)	Socioeconomic Factors (Environmental Justice, local communities)	Biological Resources	Prime and Unique Farmlands	Archaeological Resources	Traditional Cultural Properties (TCP)	Section 4(f) and Section 6(f)
I-10 Mainline Widening Alternatives (1 added lane each direction + HOV lanes from SR 202L to Riggs Road)									
	ML1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
	ML2	Median Widening + Ramp Upgrades	There are no nearby local businesses; no impact. No impacts to billboards.	There are no residences that would require full or partial property acquisition, displacement, relocation, or otherwise be adversely affected. The project would benefit local and regional users of I-10 with improved travel time, access, safety, and driving conditions. There may be short-term temporary impacts during construction, such as travel time delays and access changes.	Low-medium impact. The entire study area is defined by poor to marginal habitat for all species; therefore, impacts would be different intensities of low. Impacts are based on the low-quality habitat removed.	No impact; this mainline design option does not require additional easement.	29 NRHP-eligible resources would be impacted: GR-205 (D), GR-206 (D), GR-393 (D), GR-386 (D), GR-387 (D), GR-473 (D), GR-513 (D), AZ U:13:110(ASM) (D), GR-587 (D), GR-598 (unevaluated, D), GR-832 (D), GR-886 (D), GR-887 (D), GR-914 (D), GR-931 (D), GR-980 (D), GR-1175 (D), GR-1205 (D), GR-1206 (D), GR-1422 (A,D), GR-1528 (D), GR-1689 (D), AZ U:9:96(ASU) (D), AZ U:13:12(ASM) (D), AZ U:13:43(ASM) (D), AZ U:13:96(ASM) (D), AZ U:13:97 (ASM), (D), AZ U:13:98(ASM) (D), AZ U:13:219(ASM) (D). Historically documented linear sites intersected include: Midvale North Branch Canal, Midvale South Branch Canal, prehistoric and historic canals (treated as NRHP eligible under Criterion D) and the GR-1581 (Broadacres Canal) and GR-1612 (Gila Drain), which are both NRHP eligible under Criteria A and D. Construction footprint defined by the I-10 easement/ROW and new ROW. Components of the SCIP are considered mitigated through prior HAER documentation; no further treatment required. The Alternative is within the boundaries of the Hohokam Pima National Monument. Based on CRMP correspondence files and notes on the Hohokam Pima National Monument, the Gila River Indian Community never completed the acquisition of Tribal and allotment lands identified for inclusion in the monument. However, the National Park Service continues to recognize the area as a monument. Anticipate no adverse effect. While the number of sites impacted is equal, it is anticipated that there is less potential for intact cultural deposits within the median due to prior highway construction. Thus, alternatives for widening to the inside are anticipated to have less impacts to cultural archaeological resources than the outside widening alternatives.	Proposed widening is not anticipated to cause new adverse impacts to the 7 TCPs (TCP 5, 6, 7, 14, 18, 26, 30) within the existing I-10 easement. Impacts from the current facility are existing.	Direct use of 7 Section 4(f) TCPs: TCP 5, TCP 6, TCP 7, TCP 14, TCP 18, TCP 26, and TCP 30 Since impacts would be primarily caused from existing I-10, this alternative would not further impact the ability of the TCPs to convey their historic or cultural significance. Therefore, anticipate *de minimis* impact finding for all 7 TCPs. GR-1422 is part of the SCIP system. Although there would be a direct use of this archaeology site, the use would not adversely affect the ability of the site to convey its historic integrity; therefore, the impact is anticipated to be *de minimis*. Hohokam Pima National Monument is a Section 4(f) property. Although there would be a direct use, it is anticipated that the use would be *de minimis* . No direct use of recreational Section 4(f) properties No impacts to Section 6(f) properties
	ML3	Outside Widening + Ramp Upgrades	There are no nearby local businesses; no impact. 15 billboards located within new easement boundary.	There are no residences that would require full property acquisition, displacement, relocation, or otherwise be adversely affected. One residence on the east side of I-10 at MP 174 will require a small sliver land acquisition that would not be near the structure and would not require a relocation. The project would benefit local and regional users of I-10 with improved travel time, access, safety, and driving conditions. There may be short-term temporary impacts during construction, such as travel time delays and access changes.	Low-high impact. The entire study area is defined by poor to marginal habitat for all species; therefore, impacts would be different intensities of low. Impacts are based on the low-quality habitat removed.	Farmland soil type conversion to a transportation use: Unique farmland: 57 acres Irrigated Prime farmland: 15 acres Total: 72 acres Total New Easement: 85.18 acres Land adjacent to the west side of I-10 between MP 164.5 and 168.5 designated as future Agricultural land in the Community. All soils classified as Unique farmland. 12 acres of the 67 acres required for new easement at this location Irrigated prime farmland soil located between MP 177.5 and 180; most active agricultural land in Community located here. System of canals provides irrigation to active agricultural fields. 15 acres of Irrigated Prime farmland soil required for new easement at this location.	29 NRHP-eligible resources would be impacted: GR-205 (D), GR-206 (D), GR-393 (D), GR-386 (D), GR-387 (D), GR-473 (D), GR-513 (D), AZ U:13:110(ASM) (D), GR-587 (D), GR-598 (unevaluated, D), GR-832 (D), GR-886 (D), GR-887 (D), GR-914 (D), GR-931 (D), GR-980 (D), GR-1175 (D), GR-1205 (D), GR-1206 (D), GR-1422 (A,D), GR-1528 (D), GR-1689 (D), AZ U:9:96(ASU) (D), AZ U:13:12(ASM) (D), AZ U:13:43(ASM) (D), AZ U:13:96(ASM) (D), AZ U:13:97 (ASM), (D), AZ U:13:98(ASM) (D), AZ U:13:219(ASM) (D). Historically documented linear sites intersected include: Midvale North Branch Canal, Midvale South Branch Canal, prehistoric and historic canals (treated as NRHP eligible) and the GR-1581 (Broadacres Canal) and GR-1612 (Gila Drain), which are both NRHP eligible under Criteria A and D. Construction footprint defined by the I-10 easement/ROW and new ROW. Components of the SCIP are considered mitigated through prior HAER documentation; no further treatment required. The Alternative is within the boundaries of the Hohokam Pima National Monument. Based on CRMP correspondence files and notes on the Hohokam Pima National Monument, the Gila River Indian Community never completed the acquisition of Tribal and allotment lands identified for inclusion in the monument. However, the National Park Service continues to recognize the area as a monument. Anticipate no adverse effect. While the number of sites impacted is equal, it is anticipated that there is less potential for intact cultural deposits within the median due to prior highway construction. Thus, alternatives for widening to the inside are anticipated to have less impacts to cultural resources than the outside widening alternatives.	Proposed outside widening will introduce new adverse impacts to 7 TCPs (TCP 5, 6, 7, 14, 18, 26, and 30), which are located within the existing I-10 easement and extend out to either or both sides. TCP 9, which is an active O'Odham traditional homesite and residence, could potentially have indirect impacts because this alternative would be approximately 100 feet from the residence associated with TCP 9 (and even closer to the yard).	Direct use of 7 Section 4(f) TCPs: TCP 5, TCP 6, TCP 7, TCP 14, TCP 18, TCP 26, and TCP 30 Because the TCPs extend beyond the existing easement, ML3 would result in greater impacts than either median alternative. ML3 would result in new direct use that would not be *de minimis*. GR-1422 is part of the SCIP system. Although there would be a direct use of this archaeology site, the use would not adversely affect the ability of the site to convey its historic integrity; therefore, the impact is anticipated to be *de minimis*. Hohokam Pima National Monument is a Section 4(f) property. Although there would be a direct use, it is anticipated that the use would be *de minimis* . No impacts to Section 6(f) properties
Wild Horse Pass/Sundust Road Interchange Options									
	WH1	No Build, Except for ADA Upgrades	No impact	No impact	No impact	No impact	No impact	No impact	
	WH2	Diverging Diamond Interchange (DDI) with bike & ped accommodations	A small business plaza is located along Wild Horse Pass Boulevard just east of the I-10/Wild Horse Pass traffic interchange and a gas station is located just to the west. The WH2 design option would not directly affect the businesses on either side of I-10. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	Farmland soil type conversion to a transportation use: Unique farmland: 6.74 acres.	No archaeological resources impacted	No TCPs impacted	No impacts to Section 4(f) resources No impacts to Section 6(f) properties
	WH3	Displaced Left Turn (DLT) Interchange with bike & ped accommodations	A small business plaza is located along Wild Horse Pass Boulevard just east of the I-10/Wild Horse Pass traffic interchange and a gas station is located just to the west. The WH3 design option would not directly affect the businesses on either side of I-10. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Unique farmland: 6.00 acres.	No archaeological resources impacted	No TCPs impacted	No impacts to Section 4(f) resources No impacts to Section 6(f) properties

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 1-8 of 15)							
			Environmental Impacts							
			Floodplain (Acres)	Jurisdictional Waters (Acres)	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)
SR 347 / Queen Creek Road Interchange Options										
	QC1	No Build	No impact	No impact	No impact	No impact	No impact	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	QC2	Diverging Diamond Interchange (DDI) with bike & ped accommodations	Floodplain is undelineated on Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **moderate** because of the additional bridge. The visual change from Queen Creek Road would be **moderate** - there would be an additional bridge, larger interchange, and an increase in the amount of pavement. From off-site, the visual change would be **minor** because, while there would be an additional bridge, from a distance it would blend with the existing bridge. From freeway: Moderate From crossroads: Moderate From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing undeveloped/future commercial: 2.86 acres ~Existing undeveloped/future industrial: 0.95 acre ~Existing undeveloped/future agriculture: 0.95 acre ~Existing undeveloped/future open space: 0.34 acre Total conversion of land to a transportation corridor = 4.34 acres
	QC3	Displaced Left Turn (DLT) Interchange with bike & ped accommodations	Floodplain is undelineated on Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the additional ramp/bridge would increase the overall bridge width but would be visually similar to the existing condition. The visual change from Queen Creek Road would be **minor** - the bridge would be wider but of similar character and the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. From off-site, the visual change would be **minor** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing undeveloped/future commercial: 2.71 acres ~Existing undeveloped/future industrial: 0.03 acre ~Existing undeveloped/future agriculture: 1.56 acres ~Existing undeveloped/future open space: 0.14 acre Total conversion of land to a transportation corridor = 4.44 acres
Riggs Road Interchange Options										
	RR1	No Build	No impact	No impacts	No impact	No impact	No impact	There would be no visual change as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	RR2	Bridge deck rehabilitation	No impact	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would not change. The change in view from Riggs Road would be minor, if not improved, as the new deck would match old deck in material. From off-site, there would be no change because the improvement would not be discernible from a distance. From freeway: No change From crossroads: Minor- improved From off-site: No change	No specific sites of concern	No additional easement required in Community; no change in land use.
	RR3	Bridge deck rehabilitation with shoulder widening	Floodplain is undelineated on Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be minor - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Riggs Road would be minor - the bridge would be wider but of similar materials. From off-site, the there would be no change because the widened bridge would be similar to the existing bridge. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	No additional easement required in Community; no change in land use.
	RR4	Bridge deck rehabilitation with shoulder widening and sidewalks	Floodplain is undelineated on Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be minor - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Riggs Road would be minor - the bridge would be wider but of similar materials; the addition of sidewalks would be a minor visual change but would not be out of context for a typical roadway section. From off-site, the there would be no change because the widened bridge would be similar to the existing bridge. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	No additional easement required in Community; no change in land use.
	RR5	Bridge replacement off of the existing alignment	Floodplain is undelineated on Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be a **moderate change** because the new bridge would be longer than the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Riggs Road would be **minor** - the bridge would be wider but of similar materials. From off-site, there would be **no change**. The new bridge would be similar to the existing bridge. From freeway: Moderate From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing undeveloped/future commercial: 1.61 acres ~Existing undeveloped/future agriculture: 0.20 acres Total conversion of land to a transportation corridor = 1.81 acres

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 9-15 of 15)						
			Environmental Impacts						
			Local Businesses (including impacts on billboards)	Socioeconomic Factors (Environmental Justice, local communities)	Biological Resources	Prime and Unique Farmlands	Archaeological Resources	Traditional Cultural Properties (TCP)	Section 4(f) and Section 6(f)
SR 347 / Queen Creek Road Interchange Options									
	QC1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	QC2	Diverging Diamond Interchange (DDI) with bike & ped accommodations	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	Farmland soil type conversion to a transportation use: Unique farmland: 4.34 acres	2 NRHP-eligible resources would be impacted: GR-392 (D) and AZ U:9:96(ASU) (D)	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
	QC3	Displaced Left Turn (DLT) Interchange with bike & ped accommodations	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Unique farmland: 4.44 acres	2 NRHP-eligible resources would be impacted: GR-392 (D) and AZ U:9:96(ASU) (D)	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
Riggs Road Interchange Options									
	RR1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	RR2	Bridge deck rehabilitation	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	No impact	No archaeological resources impacted	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
	RR3	Bridge deck rehabilitation with shoulder widening	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	No impact	No archaeological resources impacted	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
	RR4	Bridge deck rehabilitation with shoulder widening and sidewalks	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	No impact	No archaeological resources impacted	No TCPs impacted	No direct use of recreational or TCP Section 4(f) properties No impacts to Section 6(f) properties
	RR5	Bridge replacement off of the existing alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 1.81 acres.	No archaeological resources impacted	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 1-8 of 15)							
			Environmental Impacts							
			Floodplain (Acres)	Jurisdictional Waters (Acres)	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)
Goodyear Road Grade Separation Options										
	GY1	No Build	No impact	No impacts	No impact	No impact	No impact	There would be no visual change as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	GY2	Shoulder widening on approaches and bridge	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Goodyear Road would be **minor** - the bridge would be wider but of similar materials. From off-site, there would be **no change** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 1.29 acres Total conversion of land to a transportation corridor = 1.29 acres
	GY3	Bridge replacement off of the existing alignment	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be a **moderate** change because the new bridge would be longer than the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Goodyear Road would be **minor** - the bridge would be wider and longer but of similar materials. Being on a parallel alignment to the current alignment would not be a noticeable visual change. From off-site, there would be **no change** because the new bridge would be similar to the existing bridge. From freeway: Moderate From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 7.23 acres Total conversion of land to a transportation corridor = 7.23 acres
Nelson Road Grade Separation Options										
	NR1	No Build	No impact	No impacts	No impact	No impact	No impact	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	NR2	Shoulder widening on approaches and bridge	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Nelson Road would be **minor** - the bridge would be wider but of similar materials. From off-site there would be **no change** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 2.25 acres Total conversion of land to a transportation corridor = 2.25 acres
	NR3	Full crossroad and bridge replacement	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be a **moderate** change because the new bridge would be longer than the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Nelson Road would be **minor** - the bridge would be wider and longer but of similar materials. From off-site there would be **no change** because the new bridge would be similar to the existing bridge. From freeway: Moderate From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 9.61 acres Total conversion of land to a transportation corridor = 9.61 acres

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 9-15 of 15)						
			Environmental Impacts						
			Local Businesses (including impacts on billboards)	Socioeconomic Factors (Environmental Justice, local communities)	Biological Resources	Prime and Unique Farmlands	Archaeological Resources	Traditional Cultural Properties (TCP)	Section 4(f) and Section 6(f)
Goodyear Road Grade Separation Options									
	GY1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	GY2	Shoulder widening on approaches and bridge	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Unique farmland: 1.29 acres.	No archaeological resources impacted	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
	GY3	Bridge replacement off of the existing alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 7.23 acres.	No archaeological resources impacted	No TCPs impacted	No direct use of Section 4(f) properties No impacts to Section 6(f) properties
Nelson Road Grade Separation Options									
	NR1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	NR2	Shoulder widening on approaches and bridge	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Unique farmland: 2.25 acres.	3 NRHP-eligible resources impacted: GR-931 (D), GR-1469 (D), 1936 Soil Conservation Service Canal (D)	TCP 14 would be impacted. TCP 13 would be adjacent to this option and would likely require protection in place during construction. Option affects access to TCP 15 and TCP 9. Access to TCP 9 and TCP 15 would be restored and potentially improved.	Direct use of TCP 14 Since impacts are primarily caused from existing I-10/Nelson Road grade separation, this option would not further impact the ability of the TCPs to convey their historic or cultural significance. Therefore, anticipate *de minimis* impact finding for TCP 14 No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties
	NR3	Full crossroad and bridge replacement	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 9.61 acres.	4 NRHP-eligible resources impacted: GR-931, GR-1469, Old Mountain Top Canal, 1936 Soil Conservation Service Canal.	TCP 14 would be impacted. TCP 13 would be adjacent to this option and would likely require protection in place during construction. Option affects access to TCP 15 and TCP 9. Access to TCP 9 and TCP 15 would be restored and potentially improved.	Direct use of TCP 14 Since impacts are primarily caused from existing I-10/Nelson Road grade separation, this option would not further impact the ability of the TCP to convey its historic or cultural significance. Therefore, anticipate *de minimis* impact finding for TCP 14. No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 1-8 of 15)							
			Environmental Impacts							
			Floodplain (Acres)	Jurisdictional Waters (Acres)	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)
SR 587/Casa Blanca Road Interchange Options										
	CB1	No Build	No impact.	No impacts	No impact	No impact	No impact	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
	CB2	Add ramp terminal signals and turn lanes only	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor -** ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The change in views from SR 587, Casa Blanca Road, and the on/off ramps would be **minor -** roads would be wider and cut/fill lines moved out but would be similar to the existing condition. From off-site there would be **no change** because the added features would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 8.77 acres Total conversion of land to a transportation corridor = 8.77 acres
	CB3	Add ramp terminal signals, turn lanes, bridge deck rehabilitation, and widening for bike and ped accommodations	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor -** the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from SR 587/Casa Blanca Road would be **minor** - the bridge would be wider but of similar materials and roads would be wider and cut/fill lines moved out but would be similar to the existing condition. From off-site there would be **no change** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 9.55 acres Total conversion of land to a transportation corridor = 9.55 acres
	CB4	CB3 but with bridge replacement off of the existing alignment	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor -** the bridge would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from SR 587/Casa Blanca Road would be **minor -** the bridge would be wider but of similar materials and roads would be wider and cut/fill lines moved out but would be similar to the existing condition. From off-site there would be **no change** because the replacement bridge would be similar to the existing bridge. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 9.00 acres Total conversion of land to a transportation corridor = 9.00 acres
	CB5	Diamond Interchange with 5-legged roundabouts at intersections	Floodplain is undelineated on Community.	0.02 acre (2 ephemeral drainages - currently not jurisdictional)	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **moderate** - while the bridge would be similar to the existing, there would several additional ramps, with the area devoted to ramps much larger than in the existing condition. The change in view from Casa Blanca Road and SR 587 would be **substantial** because of the significant increase in ramps, paving, and the addition of roundabouts. From off-site, the visual change would be **moderate** because a larger area than existing would be devoted to interchange pavement. From freeway: Moderate From crossroads: Substantial From off-site: Moderate	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 17.44 acres Total conversion of land to a transportation corridor = 17.44 acres
	CB6	Diamond Interchange with Casa Blanca Road bypass	Floodplain is undelineated on Community.	0.02 acre (2 ephemeral drainages)	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **substantial** with the addition of a second bridge and several additional ramps, with the area devoted to ramps much larger than the existing condition. The change in view from Casa Blanca Road and SR 587 would be **substantial** because of the significant increase in ramps, paving, and the addition of roundabouts. From off-site, the visual change would be **moderate** because a larger area than existing would be devoted to interchange pavement. From freeway: Substantial From crossroads: Substantial From off-site: Moderate	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 36.60 acres Total conversion of land to a transportation corridor = 36.60 acres
	CB7	Split Diamond Interchange with triangular circulating roadway	Floodplain is undelineated on Community.	0.06 acre (3 ephemeral drainages)	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **substantial** with the addition of a second bridge and several additional ramps, with the area devoted to ramps larger than the existing condition. The change in view from Casa Blanca Road and SR 587 would be **substantial** because of the significant increase in ramps and paving. From off-site, the visual change would be **moderate** because a larger area than existing would be devoted to interchange pavement. From freeway: Substantial From crossroads: Substantial From off-site: Moderate	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 54.05 acres Total conversion of land to a transportation corridor = 54.05 acres

Figure 3-35 (continued). Alternatives and options evaluation matrix - environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 9-15 of 15)						
			Environmental Impacts						
			Local Businesses (including impacts on billboards)	Socioeconomic Factors (Environmental Justice, local communities)	Biological Resources	Prime and Unique Farmlands	Archaeological Resources	Traditional Cultural Properties (TCP)	Section 4(f) and Section 6(f)
SR 587/Casa Blanca Road Interchange Options									
	CB1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	CB2	Add ramp terminal signals and turn lanes only	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Unique farmland: 8.77 acres.	4 NRHP-eligible resources impacted: GR-598 (unevaluated, D), GR-786 (D), GR-886 (D), GR-931 (D), and prehistoric and historic canal alignments (if present) (D).	TCP 18 would be impacted	Direct use of TCP 18 (not de minimis) No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties
	CB3	Add ramp terminal signals, turn lanes, bridge deck rehabilitation, and widening for bike and ped accommodations	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	Farmland soil type conversion to a transportation use: Unique farmland: 9.55 acres.	4 NRHP-eligible resources impacted: GR-598 (unevaluated, D), GR-786 (D), GR-886 (D), GR-931 (D), and prehistoric and historic canal alignments (if present) (D).	TCP 18 would be impacted	Direct use of TCP 18 (not de minimis) No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties
	CB4	CB3 but with bridge replacement off of the existing alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 9.00 acres.	4 NRHP-eligible sites impacted: GR-598 (unevaluated, D), GR-786 (D), GR-886 (D), GR-931 (D), and prehistoric and historic canal alignments, if present (D).	TCP 18 would be impacted	Direct use of TCP 18 (Not *de mimimis*) No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties
	CB5	Diamond Interchange with 5-legged roundabouts at intersections	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 17.44 acres.	9 NRHP-eligible and unevaluated resources impacted: GR-598 (unevaluated, D), GR-786 (D), GR-886 (D), GR-931 (D), AZ U:13:16(ASM) (D), AZ U:13:97(ASM) (D), AZ U:13:98(ASM) (D), prehistoric and historic canal alignments (if present), and AZ U:13:96(ASM) and AZ U:13:249(ASM), which are unevaluated (D)	TCP 18 would be impacted	Direct use of TCP 18 (Not de mimimis) No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties
	CB6	Diamond Interchange with Casa Blanca Road bypass	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 36.60 acres.	11 NRHP-eligible and unevaluated resources impacted: GR-598 (unevaluated, D), GR-786 (D), GR-886 (D), GR-887 (D), GR-931 (D), AZ U:13:16(ASM) (D), AZ U:13:92(ASM), AZ U:13:97(ASM) (D), AZ U:13:98(ASM) (D), prehistoric and historic canal alignments (if present), and AZ U:13:96(ASM) and AZ U:13:249(ASM), which are unevaluated (D)	TCP 18 would be impacted	Direct use of TCP 18 (Not de mimimis) No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties
	CB7	Split Diamond Interchange with triangular circulating roadway	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Unique farmland: 54.05 acres.	8 NRHP-eligible and unevaluated resources impacted: GR-598 (unevaluated, D), GR-786 (D), GR-886 (D), GR-931 (A, D), AZ U:13:16(ASM) (D), AZ U:13:97(ASM) (D), AZ U:13:98(ASM) (D), prehistoric and historic canal alignments (if present), and AZ U:13:96(ASM) and AZ U:13:249(ASM), which are unevaluated.	TCP 18 would be impacted	Direct use of TCP 18 (Not de mimimis) No direct use of recreational Section 4(f) properties No impact to Section 6(f) properties

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS		Alternatives and Options Evaluation Matrix - Environmental (Criteria 1-8 of 15)							
		Environmental Impacts							
		Floodplain (Acres)	Jurisdictional Waters (Acres)	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)
Gasline Road Grade Separation Options									
GL1	No Build	No impact	No impact	No impact	No impact	No impact	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
GL2	Bridge replacement on current alignment	Floodplain is undelineated on the Community.	0.15 acre (1 ephemeral drainage)	Would impact an unnamed earthen irrigation channel adjacent to the west side of Gasline Road that goes under Gasline Road 300 feet north of I-10. It meets an irrigation canal serving an agricultural field on the east side of Gasline Road. Neither facility would be directly impacted, but would be part of new ADOT easement on each side of Gasline Road. No wells present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be visually similar to the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Gasline Road would be **minor** - the bridge would be wider but of similar materials. From off-site, there would be **no change** because the new bridge would be similar to the existing bridge. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: **Existing agriculture/future mixed use: 2.56 acres **Existing open space/future open space: 1.96 acres Total conversion of land to a transportation corridor = 4.52 acres
GL3	Bridge replacement on parallel alignment	Floodplain is undelineated on the Community.	0.20 acre (1 ephemeral drainage)	Would impact the irrigation canal serving an agricultural field on the east side of Gasline Road. The canal would not be directly impacted but would be part of new ADOT easement. The earthen channel west of Gasline Road would not be impacted. No wells present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be visually similar to the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Gasline Road would be **minor** - the bridge would be wider but of similar materials. Being on a parallel alignment to the current alignment would not be a noticeable visual change. From off-site, there would be **no change** because the new bridge would be similar to the existing bridge. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: **Existing agriculture/future mixed use: 4.95 acres **Existing open space/future open space: 2.05 acres Total conversion of land to a transportation corridor = 7.00 acres
Seed Farm Road Grade Separation/ Interchange Options									
SF1	No Build	No impact	No impact	No impact	No impact	No impact	There would be n**o visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
SF2	Bridge deck rehabilitation with shoulder widening - no interchange	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Seed Farm Road would be **minor** - the bridge would be wider but of similar materials. From off-site, the visual change would be **minor** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: **Existing agriculture/future mixed use: 2.11 acres Total conversion of land to a transportation corridor = 2.11 acres
SF3	New tight diamond interchange with bridge replacement	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **moderate** - a full interchange would be a moderate visual change versus a single overpass bridge with no ramps. The addition of elevated ramps would change views to the east and west and the addition of area devoted to freeway would be larger than the existing. However, the interchange design would be similar to other interchanges on the corridor and so would not be out of context. The change in view from Seed Farm Road would be **moderate** because of the new elevated ramps, widened roadway, and expanded interchange area. From off-site, the visual change would be **minor** because, although the interchange would be larger in area, the elements would be similar to the existing bridge. From freeway: Substantial From crossroads: Moderate From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: **Existing agriculture/future mixed use: 24.91 acres Total conversion of land to a transportation corridor = 24.91 acres
SF4	New spread diamond interchange with bridge replacement	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **substantial** - a full interchange would be a significant visual change versus a single overpass bridge with no ramps. The addition of elevated ramps would change views to the east and west and the addition of area devoted to freeway is substantially larger than the existing. However, the interchange design would be similar to other interchanges on the corridor so would not be out of context. The change in view from Seed Farm Road would be **moderate** because of the new elevated ramps, widened roadway, and expanded interchange area. From off-site, the visual change would be **minor** because, though the interchange would be larger in area, the elements would be similar to the existing bridge. From freeway: Substantial From crossroads: Moderate From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: **Existing agriculture/future mixed use: 42.82 acres Total conversion of land to a transportation corridor = 42.82 acres
SF5	New spread diamond interchange with widened existing bridge	Floodplain is undelineated on the Community.	No jurisdictional waters present.	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **substantial** - a full interchange would be a significant visual change versus a single overpass bridge with no ramps. The addition of elevated ramps would change views to the east and west and the addition of area devoted to freeway is substantially larger than the existing. However, the interchange design would be similar to other interchanges on the corridor so would not be out of context. The change in view from Seed Farm Road would be **moderate** because of the new elevated ramps, widened roadway, and expanded interchange area. From off-site, the visual change would be **minor** because, although the interchange would be larger in area, the elements would be similar to the existing bridge. From freeway: Substantial From crossroads: Moderate From off-site: Minor	No specific sites of concern	Community land use category and its conversion to a transportation corridor: **Existing agriculture/future mixed use: 37.27 acres Total conversion of land to a transportation corridor = 37.27 acres

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS		Alternatives and Options Evaluation Matrix - Environmental (Criteria 9-15 of 15)						
		Environmental Impacts						
		Local Businesses (including impacts on billboards)	Socioeconomic Factors (Environmental Justice, local communities)	Biological Resources	Prime and Unique Farmlands	Archaeological Resources	Traditional Cultural Properties (TCP)	Section 4(f) and Section 6(f)
Gasline Road Grade Separation Options								
GL1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
GL2	Bridge replacement on current alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 4.29 acres. Unique farmland: 0.23 acres.	2 NRHP-eligible resources would be impacted if present: 1936 Soil Conservation Service Canals (D	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
GL3	Bridge replacement on parallel alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 5.77 acres. Unique farmland: 1.23 acres.	2 NRHP-eligible resources would be impacted is present: 1936 Soil Conservation Service Canals (D)	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
Seed Farm Road Grade Separation/ Interchange Options								
SF1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
SF2	Bridge deck rehabilitation with shoulder widening - no interchange	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 2.11 acres.	2 NRHP-eligible resources would be impacted if present: 1936 Soil Conservation Service Canal and SCIP lateral (D)	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
SF3	New tight diamond interchange with bridge replacement	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 24.91 acres.	3 NRHP-eligible resources would be impacted if present: 1936 Soil Conservation Service Canals and SCIP lateral (D)	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
SF4	New spread diamond interchange with bridge replacement	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 42.82 acres.	3 NRHP-eligible resources would be impacted if present: 1936 Soil Conservation Service Canal and SCIP lateral (D)	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
SF5	New spread diamond interchange with widened existing bridge	There are no nearby local businesses; no impact. No billboards impacted.	No direct long-term impacts to residences or residential areas.	Low-medium impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 37.27 acres.	3 NRHP-eligible resources would be impacted if present: 1936 Soil Conservation Service Canals and SCIP lateral (D)	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS		Alternatives and Options Evaluation Matrix - Environmental (Criteria 1-8 of 15)							
		Environmental Impacts							
		Floodplain (Acres)	Jurisdictional Waters (Acres)	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)
Dirk Lay Road Grade Separation Options									
DL1	No Build	No impact	No impact	No impact	No impact	No impact	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impacts	No impact
DL2	Bridge replacement on current alignment	Floodplain is undelineated on the Community.	No impact	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be a **moderate** change because the new bridge would be longer than the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Dirk Lay Road would be **minor** - the bridge would be wider but of similar materials. From off-site, there would be **no change** because the widened bridge would not be discernible from a distance. From freeway: Moderate From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 3.87 acres Total conversion of land to a transportation corridor = 3.87 acres
DL3	Bridge replacement on parallel alignment	Floodplain is undelineated on the Community.	No impact	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be a **moderate** change because the new bridge would be longer than the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Dirk Lay Road would be **minor** - the bridge would be wider and longer but of similar materials. Being on a parallel alignment to the current alignment would not be a noticeable visual change. From off-site, there would be **no change** because the new bridge would be similar to the existing bridge. From freeway: Moderate From crossroads: Minor From off-site: No change	No specific sites of concern	Community land use category and its conversion to a transportation corridor: ~Existing open space/future open space: 7.96 acres Total conversion of land to a transportation corridor = 7.96 acres
SR 387/SR 187/Pinal Avenue Interchange Options									
PA1	No Build	No impact	No impact	No impact	No impact	No impact	There would be **no visual change** as viewed from the freeway, cross street, or off-site. From freeway: No change From crossroads: No change From off-site: No change	No impact	No impact
PA2	Shoulder widening & sidewalk on approaches and bridge, add signals	Floodplain is undelineated on the Community.	No impact	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Pinal Avenue would be **minor** - the bridge would be wider but of similar materials. The addition of sidewalks would be in context with a typical roadway cross section. From off-site, there would be **no change** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	No additional easement required in Community; no change in land use.
PA3	Upgrade ramp terminal capacity, shoulder widening & sidewalk on approaches and bridge, add signals	Floodplain is undelineated on the Community.	No impact	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be wider but would be visually similar to the existing; the ramp fill slopes would extend farther out but would be visually similar to the existing slopes. The visual change from Pinal Avenue would be **minor** - the bridge would be wider but of similar materials. The addition of sidewalks would be in context with a typical roadway cross section. From off-site, there would be **no change** because the widened bridge would not be discernible from a distance. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	No additional easement required in Community; no change in land use.
PA4	Bridge replacement off of the existing alignment, add signals	Floodplain is undelineated on the Community.	No impact	No canals, irrigation channels, or wells are present; no impact.	No nearby sensitive receptors; no impact.	No nearby sensitive receptors; no impact.	The change in view from the freeway would be **minor** - the bridge would be visually similar to the existing; the ramp fill slopes would extend farther in all directions but would be visually similar to the existing slopes. The visual change from Pinal Avenue would be **minor** - the bridge would be wider but of similar materials. The addition of sidewalks would be in context with a typical roadway cross section. Being on a parallel alignment to the current alignment would not be a noticeable visual change. From off-site, there would be **no change** because the new bridge would be similar to the existing bridge. From freeway: Minor From crossroads: Minor From off-site: No change	No specific sites of concern	No additional easement required in Community; no change in land use.

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

ALTERNATIVES and OPTIONS			Alternatives and Options Evaluation Matrix - Environmental (Criteria 9-15 of 15)						
			Environmental Impacts						
			Local Businesses (including impacts on billboards)	Socioeconomic Factors (Environmental Justice, local communities)	Biological Resources	Prime and Unique Farmlands	Archaeological Resources	Traditional Cultural Properties (TCP)	Section 4(f) and Section 6(f)
Dirk Lay Road Grade Separation Options									
	DL1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	DL2	Bridge replacement on current alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 0.85 acres.	2 NRHP-eligible resources would be impacted: AZ U:13:252(ASM)(D) and the Southside Storm Water Channel. The Southside Storm Water Channel was previously mitigated through HAER documentation.	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
	DL3	Bridge replacement on parallel alignment	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	Farmland soil type conversion to a transportation use: Irrigated Prime farmland: 3.75 acres.	2 NRHP-eligible resources would be impacted: AZ U:13:252(ASM)(D) and the Southside Storm Water Channel. The Southside Storm Water Channel was previously mitigated through HAER documentation.	No TCPs impacted	No direct use of Section 4(f) properties No impact to Section 6(f) properties
SR 387/SR 187/Pinal Avenue Interchange Options									
	PA1	No Build	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	PA2	Shoulder widening & sidewalk on approaches and bridge, add signals	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low impact	No impact	No archaeological resources would be impacted	No TCPs impacted; however, TCP 35 would be adjacent to the option and would likely require protection in place during construction.	No direct use of Section 4(f) properties No impact to Section 6(f) properties
	PA3	Upgrade ramp terminal capacity, shoulder widening & sidewalk on approaches and bridge, add signals	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-medium impact	No impact	No archaeological resources sites would be impacted	No TCPs impacted; however, TCP 35 would be adjacent to the option and would likely require protection in place during construction.	No direct use of Section 4(f) properties No impact to Section 6(f) properties
	PA4	Bridge replacement off of the existing alignment, add signals	There are no nearby local businesses; no impact. No billboards impacted.	There are no nearby residences or residential areas; no impact.	Low-high impact	No impact	No archaeological resources impacted	Adverse effect to TCP 35	Direct use of Section 4(f) properties (Not *de minimis*). Drainage box would need to be extended into the quartz outcrop that defines the TCP. No impact to Section 6(f) properties

Figure 3-35 (continued). Alternatives and options evaluation matrix – environmental

Alternatives and Options Evaluation Matrix - Cost ($Millions) and Right of Way

ALTERNATIVES and OPTIONS			COST (Excluding right of way and easements)		RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)			
			Design and Construction Cost ($millions)	Utility Cost ($millions)	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent ROW (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations
I-10 Mainline Widening Alternatives (1 added lane each direction + HOV lanes from SR 202L to Riggs Road)																
	ML1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ML2	Median Widening + Ramp Upgrades	$307 (must also add one of the build options at Gasline and Dirk Lay to make ML2 fit)	$ -	**0.2**	0.0	0.0	0.0	**0.93 4 parcels would require sliver takes at the Queen Creek/SR 347 and Riggs Road TIs.**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ML3	Outside Widening + Ramp Upgrades	$338 (must also add one of each the options at Riggs, Goodyear, Nelson, SR-587/Casa Blanca, Gasline, Seed Farm, Dirk Lay, and SR-387/SR-187 that involve a full bridge replacement to make ML3 fit)	$ -	**42.3**	0.0	0.0	**9.0**	**42.92 190 parcels would be required to provide new ROW for additional ADOT easement.**	0.0	0.0	**6.0**	0.0	0.0	0.0	0.0
Wild Horse Pass / Sundust Road Interchange Options																
	WH1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	WH2	Diverging Diamond Interchange (DDI) with bike & ped accomodations	$ 21.0	$ -	**1.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	WH3	Displaced Left Turn (DLT) Interchange with bike & ped accomodations	$ 13.7	$ -	**1.1**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3-36. Alternatives and options evaluation matrix – cost in 2020 dollars

Alternatives and Options Evaluation Matrix - Cost ($Millions) and Right of Way

ALTERNATIVES and OPTIONS			COST (Excluding right of way and easements)		RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)			
			Design and Construction Cost ($millions)	Utility Cost ($millions)	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent ROW (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations
SR 347 / Queen Creek Road Interchange Options																
	QC1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	QC2	Diverging Diamond Interchange (DDI) with bike & ped accomodations	$ 19.1	$ -	**2.2**	0.0	0.0	0.0	**2.19 3 parcels would be required to provide new ROW for additional ADOT easement.**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	QC3	Displaced Left Turn (DLT) Interchange with bike & ped accomodations	$ 16.9	$ -	**1.8**	0.0	0.0	0.0	**2.64 4 parcels would be required to provide new ROW for additional ADOT easement.**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riggs Road Interchange Options																
	RR1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	RR2	Bridge deck rehabilitation	$ 4.8	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	RR3	Bridge deck rehabilitation with shoulder widening	$ 8.5	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	RR4	Bridge deck rehabilitation with shoulder widening and sidewalks	$ 12.4	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	RR5	Bridge replacement off of the existing alignment	$ 15.6	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3-36 (continued). Alternatives and options evaluation matrix – cost in 2020 dollars

Alternatives and Options Evaluation Matrix - Cost ($Millions) and Right of Way

ALTERNATIVES and OPTIONS			COST (Excluding right of way and easements)		RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)			
			Design and Construction Cost ($millions)	Utility Cost ($millions)	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent ROW (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations
Goodyear Road Grade Separation Options																
	GY1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	GY2	Shoulder widening on approaches and bridge	$ 6.1	$ -	0.0	0.0	0.0	0.0	**1.29 4 parcels would be required to provide new ROW for additional ADOT easement.**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	GY3	Bridge replacement off of the existing alignment	$ 12.0	$ -	**0.3**	0.0	0.0	0.0	**2.68 The same 4 parcels would be affected as the GY2 option.**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nelson Road Grade Separation Options																
	NR1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NR2	Shoulder widening on approaches and bridge	$ 5.2	$ 0.1	**0.5**	**1.0**	0.0	0.0	**1.79 4 parcels would be required to provide new ROW for additional ADOT easement.**	**1.0**	0.0	0.0	0.0	0.0	0.0	0.0
	NR3	Full crossroad and bridge replacement	$ 9.1	$ 0.1	**0.7**	**1.0**	0.0	0.0	**2.02 The same 4 parcels would be affected as the NR2 option.**	**2.0**	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3-36 (continued). Alternatives and options evaluation matrix – cost in 2020 dollars

Alternatives and Options Evaluation Matrix - Cost ($Millions) and Right of Way

ALTERNATIVES and OPTIONS			COST (Excluding right of way and easements)		RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)			
			Design and Construction Cost ($millions)	Utility Cost ($millions)	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent ROW (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations
SR 587 / Casa Blanca Road Interchange Options																
	CB1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CB2	Add ramp terminal signals and turn lanes only	$ 11.8	$ 0.1	1.5	0.0	0.0	0.0	1.42 4 parcels would be required to provide new ROW for additional ADOT easement.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CB3	Add ramp terminal signals, turn lanes, bridge deck rehabilitation, and widening for bike and ped accomodations	$ 16.2	$ 0.1	1.5	0.0	0.0	0.0	1.45 The same 4 parcels would be affected as the CB2 option.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CB4	CB3 but with bridge replacement off of the existing alignment	$ 21.4	$ 0.1	1.3	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CB5	Diamond Interchange with 5-legged roundabouts at intersections	$ 39.1	$ 0.1	12.1	0.0	0.0	0.0	5.35 6 parcels would be required to provide new ROW for additional ADOT easement.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CB6	Diamond Interchange with Casa Blanca Road bypass	$ 49.2	$ 0.1	22.0	0.0	0.0	0.0	14.65 8 parcels would be required to provide new ROW for additional ADOT easement.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CB7	Split Diamond Interchange with triangular circulating roadway	$ 40.2	$ 0.1	47.8	0.0	0.0	0.0	6.25 9 parcels would be required to provide new ROW for additional ADOT easement.	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3-36 (continued). Alternatives and options evaluation matrix – cost in 2020 dollars

Alternatives and Options Evaluation Matrix - Cost ($Millions) and Right of Way

ALTERNATIVES and OPTIONS			COST (Excluding right of way and easements)		RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)			
			Design and Construction Cost ($millions)	Utility Cost ($millions)	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent ROW (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations
Gasline Road Grade Separation Options																
	GL1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	GL2	Bridge replacement on current alignment	$ 14.1	$ 0.5	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	GL3	Bridge replacement on parallel alignment	$ 15.5	$ 0.1	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seed Farm Road Grade Separation / Interchange Options																
	SF1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SF2	Bridge deck rehabilitation with shoulder widening - no interchange	$ 7.5	$ 0.3	2.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SF3	New tight diamond interchange with bridge replacement	$ 26.2	$ 0.5	21.9	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SF4	New spread diamond interchange with bridge replacement	$ 25.7	$ 0.5	39.6	0.0	0.0	1.0	0.27 1 parcel would be required to provide new ROW for additional ADOT easement.	0.37 The same parcel would be affected by the TCE acreage need.	0.0	0.0	0.0	0.0	0.0	0.0
	SF5	New spread diamond interchange with widened existing bridge	$ 19.8	$ 0.3	36.8	0.0	0.0	1.0	0.23 The same parcel would be affected as the SF4 option	0.37 The same parcel would be affected by the TCE acreage need.	0.0	0.0	0.0	0.0	0.0	0.0
Dirk Lay Road Grade Separation Options																
	DL1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DL2	Bridge replacement on current alignment	$ 15.6	$ -	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DL3	Bridge replacement on parallel alignment	$ 16.8	$ -	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3-36 (continued). Alternatives and options evaluation matrix – cost in 2020 dollars

Alternatives and Options Evaluation Matrix - Cost ($Millions) and Right of Way

ALTERNATIVES and OPTIONS			COST (Excluding right of way and easements)		RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)			
			Design and Construction Cost ($millions)	Utility Cost ($millions)	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent Easement (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations	New Permanent ROW (Acres)	Temporary Easements (Acres)	Residential Relocations	Business / Billboard Relocations
SR 387 / SR 187 / Pinal Avenue Interchange Options																
	PA1	No Build	$ -	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PA2	Shoulder widening & sidewalk on approaches and bridge, add signals	$ 10.9	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PA3	Upgrade ramp terminal capacity, shoulder widening & sidewalk on approaches and bridge, add signals	$ 11.0	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PA4	Bridge replacement off of the existing alignment, add signals	$ 15.2	$ -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3-36 (continued). Alternatives and options evaluation matrix – cost in 2020 dollars

○ = Most desirable or least impacts ◐ = Average desirability or average impacts ● = Least desirable or most impacts

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS							COST			RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)				ENVIRONMENTAL IMPACTS																	
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability	Design and Construction Cost	Right of Way / Easement Cost	Utility Cost	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent ROW	Temporary Easements	Residential Relocations	Business / Billboard Relocations	Floodplain	Jurisdictional Waters of the U.S.	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)	Local Businesses (including billboards)	Local communities (environmental justice, residential impacts)	Biological Resources	Prime and Unique Farmlands (soils not just active farming)	Archaeological Resources	Traditional Cultural Properties (TCPs)	Section 4(f) and Section 6(f)
I-10 Mainline Widening Alternatives (1 added lane each direction + HOV lanes from SR 202L to Riggs Road)																																							
	ML1	No Build	●	○	●	●	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	●	○	○	○	○	○	○	○	○	○	○	○
	ML2	Median Widening + Ramp Upgrades	○	◐	○	○	◐	○	●	◐	◐	○	○	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	◐	○	◐	○	○	○	○	○	◐	◐	◐
	ML3	Outside Widening + Ramp Upgrades	○	●	○	◐	●	○	○	●	●	○	●	○	○	●	●	○	○	●	○	○	○	○	◐	◐	◐	●	○	●	○	●	●	◐	○	◐	●	●	●
Wild Horse Pass / Sundust Road Interchange Options																																							
	WH1	No Build, Except for ADA Upgrades	○	○	●	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○
	WH2	Diverging Diamond Interchange (DDI) with bike & ped accomodations	◐	◐	○	○	◐	○	○	●	◐	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	○	○	○	○
	WH3	Displaced Left Turn (DLT) Interchange with bike & ped accomodations	○	◐	○	◐	◐	○	○	◐	◐	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	○	○	○	○
SR 347 / Queen Creek Road Interchange Options																																							
	QC1	No Build	○	○	●	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○
	QC2	Diverging Diamond Interchange (DDI) with bike & ped accomodations	◐	◐	○	○	◐	○	○	●	◐	○	◐	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	○	○
	QC3	Displaced Left Turn (DLT) Interchange with bike & ped accomodations	○	◐	○	◐	◐	○	○	◐	◐	○	◐	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	○	○

Figure 3-37. Alternatives and options evaluation matrix summary

○ = Most desirable or least impacts ◐ = Average desirability or average impacts ● = Least desirable or most impacts

ALTERNATIVES and OPTIONS		ENGINEERING IMPACTS							COST			RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)				ENVIRONMENTAL IMPACTS															
		Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability	Design and Construction Cost	Right of Way / Easement Cost	Utility Cost	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent ROW	Temporary Easements	Residential Relocations	Business / Billboard Relocations	Floodplain	Jurisdictional Waters of the U.S.	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)	Local Businesses (including billboards)	Local communities (environmental justice, residential impacts)	Biological Resources	Prime and Unique Farmlands (soils not just active farming)	Archaeological Resources	Traditional Cultural Properties (TCPs)	Section 4(f) and Section 6(f)
Riggs Road Interchange Options																																						
	RR1	No Build	●	○	◐	◐	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	RR2	Bridge deck rehabilitation	●	○	○	◐	●	○	◐	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	RR3	Bridge deck rehabilitation with shoulder widening	○	●	○	○	●	○	◐	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	RR4	Bridge deck rehabilitation with shoulder widening and sidewalks	○	●	○	○	●	○	◐	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	RR5	Bridge replacement off of the existing alignment	○	◐	○	○	◐	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	○	○	○
Goodyear Road Grade Separation Options																																						
	GY1	No Build	●	○	○	◐	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	GY2	Shoulder widening on approaches and bridge	○	◐	○	○	●	○	○	◐	◐	○	○	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	○	○	○
	GY3	Bridge replacement off of the existing alignment	○	◐	○	○	◐	○	○	●	●	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	◐	○	○	○	◐	○	○	○
Nelson Road Grade Separation Options																																						
	NR1	No Build	●	○	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	NR2	Shoulder widening on approaches and bridge	◐	◐	○	◐	●	◐	○	◐	◐	◐	◐	◐	○	○	●	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	◐	◐
	NR3	Full crossroad and bridge replacement	○	◐	○	○	◐	●	○	●	●	●	◐	◐	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	◐	○	◐	○	○	○	◐	◐	◐	◐

Figure 3-37 (continued). Alternatives and options evaluation matrix summary

○ = Most desirable or least impacts ◐ = Average desirability or average impacts ● = Least desirable or most impacts

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS							COST			RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)				ENVIRONMENTAL IMPACTS															
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability	Design and Construction Cost	Right of Way / Easement Cost	Utility Cost	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent ROW	Temporary Easements	Residential Relocations	Business / Billboard Relocations	Floodplain	Jurisdictional Waters of the U.S.	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)	Local Businesses (including billboards)	Local communities (environmental justice, residential impacts)	Biological Resources	Prime and Unique Farmlands (soils not just active farming)	Archaeological Resources	Traditional Cultural Properties (TCPs)	Section 4(f) and Section 6(f)
SR 587 / Casa Blanca Road Interchange Options																																						
	CB1	No Build	●	○	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○
	CB2	Add ramp terminal signals and turn lanes only	●	◐	◐	◐	○	◐	◐	◐	◐	◐	◐	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	◐	●
	CB3	Add ramp terminal signals, turn lanes, bridge deck rehabilitation, and widening for bike and ped accomodations	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	◐	●
	CB4	CB3 but with bridge replacement off of the existing alignment	◐	◐	◐	◐	◐	◐	◐	●	◐	◐	◐	○	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	◐	●
	CB5	Diamond Interchange with 5-legged roundabouts at intersections	○	●	◐	○	●	●	○	●	◐	●	●	○	○	○	◐	○	○	○	○	○	○	○	○	◐	○	○	○	◐	○	◐	○	○	○	◐	●	◐	●
	CB6	Diamond Interchange with Casa Blanca Road bypass	○	●	○	○	●	●	○	●	●	●	●	○	○	○	●	○	○	○	○	○	○	○	○	◐	○	○	○	●	○	●	○	○	○	●	●	◐	●
	CB7	Split Diamond Interchange with triangular circulating roadway	○	●	○	○	●	◐	○	●	●	◐	●	○	○	○	◐	○	○	○	○	○	○	○	○	◐	○	○	○	●	○	●	○	○	○	●	●	◐	●
Gasline Road Grade Separation Options																																						
	GL1	No Build	●	○	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	GL2	Bridge replacement on current alignment	○	◐	○	○	●	●	○	●	◐	●	◐	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	○	○	◐	○	○	○	◐	○	○	○
	GL3	Bridge replacement on parallel alignment	○	◐	○	○	◐	◐	○	●	●	◐	●	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	○	○	◐	○	○	○	◐	○	○	○
Seed Farm Road Grade Separation / Interchange Options																																						
	SF1	No Build	●	○	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	SF2	Bridge deck rehabilitation with shoulder widening - no interchange	○	◐	◐	○	●	◐	○	◐	◐	◐	◐	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	SF3	New tight diamond interchange with bridge replacement	○	●	○	○	◐	●	◐	●	●	●	●	○	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	◐	○	○	○	◐	○	○	○
	SF4	New spread diamond interchange with bridge replacement	○	●	○	○	◐	●	◐	●	●	●	●	○	○	◐	◐	◐	○	○	○	○	○	○	○	○	○	○	○	●	○	●	○	○	○	●	○	○	○
	SF5	New spread diamond interchange with widened existing bridge	○	●	○	○	●	◐	◐	●	●	◐	●	○	○	◐	◐	◐	○	○	○	○	○	○	○	○	○	○	○	●	○	●	○	○	○	●	○	○	○

Figure 3-37 (continued). Alternatives and options evaluation matrix summary

○ = Most desirable or least impacts ◐ = Average desirability or average impacts ● = Least desirable or most impacts

ALTERNATIVES and OPTIONS			ENGINEERING IMPACTS							COST			RIGHT OF WAY (TRIBAL LAND)				RIGHT OF WAY (ALLOTMENT LAND)				RIGHT OF WAY (NON-TRIBAL LAND)				ENVIRONMENTAL IMPACTS																
			Roadway Design Factors	Drainage Considerations	Traffic Operations in 2040	Safety	Constructability / Maintenance of Traffic	Utility Considerations	Maintenance / Maintainability	Design and Construction Cost	Right of Way / Easement Cost	Utility Cost	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent Easement	Temporary Easements	Residential Relocations	Business / Billboard Relocations	New Permanent ROW	Temporary Easements	Residential Relocations	Business / Billboard Relocations	Floodplain	Jurisdictional Waters of the U.S.	Water Resources	Noise	Air Quality	Visual	Hazardous Materials	Land Use (Existing and Future)	Local Businesses (including billboards)	Local communities (environmental justice, residential impacts)	Biological Resources	Prime and Unique Farmlands (soils not just active farming)	Archaeological Resources	Traditional Cultural Properties (TCPs)	Section 4(f) and Section 6(f)
Dirk Lay Road Grade Separation Options																																							
	DL1	No Build	●	○	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	DL2	Bridge replacement on current alignment	○	●	○	○	●	○	○	●	◐	○	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	○	○
	DL3	Bridge replacement on parallel alignment	○	◐	○	○	◐	○	○	●	●	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	○	○	○	◐	◐	○	○
SR 387 / SR 187 / Pinal Avenue Interchange Options																																							
	PA1	No Build	●	○	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○
	PA2	Shoulder widening & sidewalk on approaches and bridge, add signals	◐	◐	○	◐	●	○	◐	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PA3	Upgrade ramp terminal capacity, shoulder widening & sidewalk on approaches and bridge, add signals	○	◐	○	○	●	○	◐	◐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PA4	Bridge replacement off of the existing alignment, add signals	○	●	○	○	◐	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◐	●

Figure 3-37 (continued). Alternatives and options evaluation matrix summary

3.5 Public and Agency Feedback on Alternatives

Following the completion of the project's alternative development and evaluation phase, it was appropriate to provide an opportunity for the public and agencies to comment on that evaluation, so that feedback could be considered before the selection of a recommended build alternative.

Because of the COVID-19 pandemic, in-person public meetings were not possible, so ADOT held a call-in/online public meeting on November 18, 2020, to collect verbal public comments for the alternatives and options being considered by the study. The purpose of the call-in/online public meeting was to present the range of alternatives and options developed and evaluated in response to the public and agency scoping comments received in the fall of 2019, describe the purpose and need established for the study, and solicit public feedback on I-10 alternatives and crossroad options. The public meeting was advertised extensively to the public through various methods.

The call-in/online public meeting was held from 5:30 p.m. to 7 p.m. on November 18, 2020. There were three ways to join the public meeting. Participants could register in advance by visiting i10wildhorsepasscorridor.com before 4:30 p.m. on November 18, 2020. By registering in advance, members of the public would receive a call at the start of the event inviting them to join. Members of the public could also call at the time of the event to listen to the meeting. The third option to join was by visiting the study website at i10wildhorsepasscorridor.com and clicking on the live meeting link to listen in and watch the presentation. Both methods of joining (over the phone or on the website) provided opportunities for the attendees to ask questions or provide feedback during the meeting. The meeting was held simultaneously in both and English and Spanish. The English public meeting had 51 participants call in and 123 attended online. The Spanish public meeting had one participant call in and three participate online. Total meeting attendance was 178.

A total of 259 comments and/or preferences were logged. Every comment was classified into one or more of the following sentiments/themes, which are summarized in Figure 3-38.

- I-10 Build Support (6 Lanes)
- I-10 Build Support (8 Lanes) – This category referred to members of the public who commented that they want I-10 widened even more than what this study is proposing.
- I-10 No Build Support
- I-10 Congestion/Growth/Safety
- Crossroad/Interchange Build Support
- Crossroad/Interchange No Build Support
- Crossroad and Interchange Congestion/Growth/Safety
- Environmental
- Miscellaneous Design Details
- Request for Information
- I-10 Gila River Bridge Project
- Other

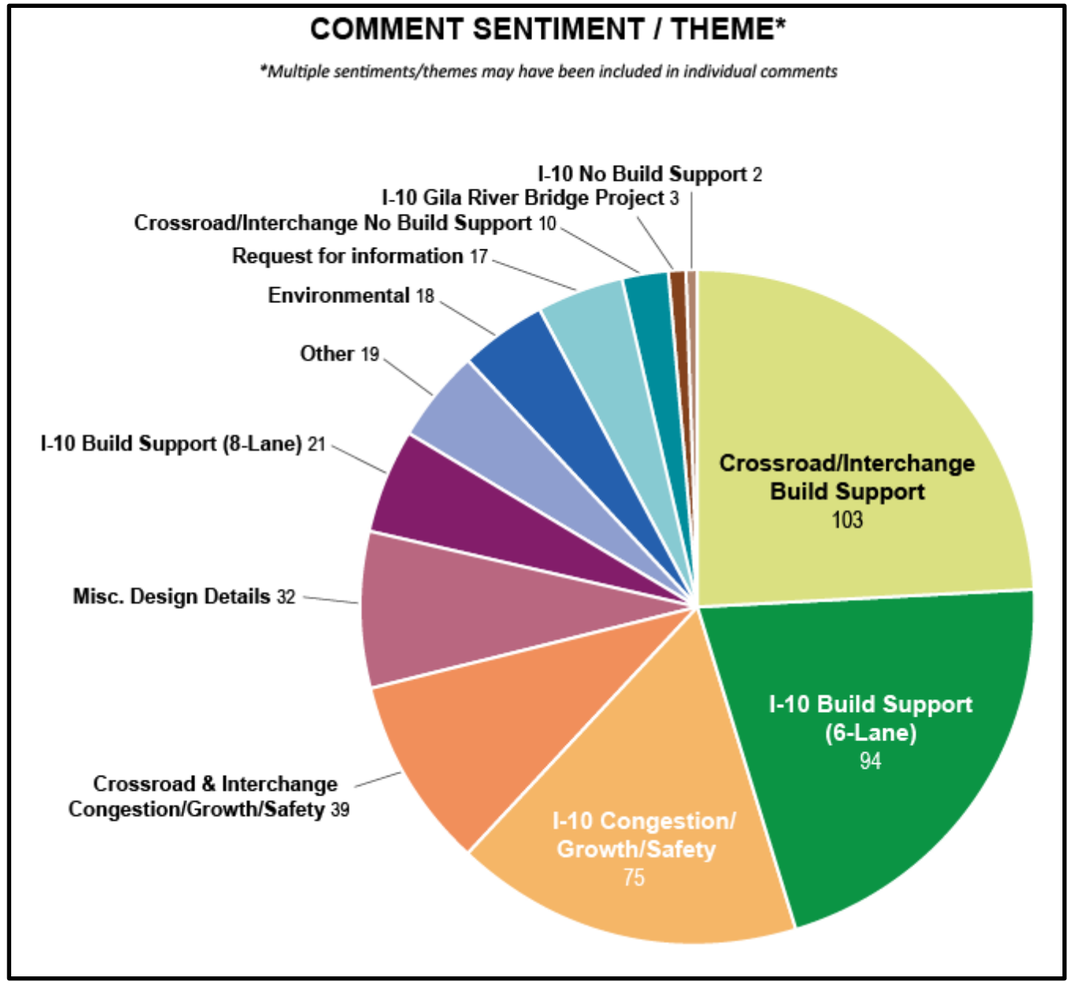

Figure 3-38. Number of public comments by sentiment/theme

Members of the public were also encouraged to identify their alternative and option preferences, if they had one, at each location. Figure 3-39 summarizes which options were supported in the feedback that was received.

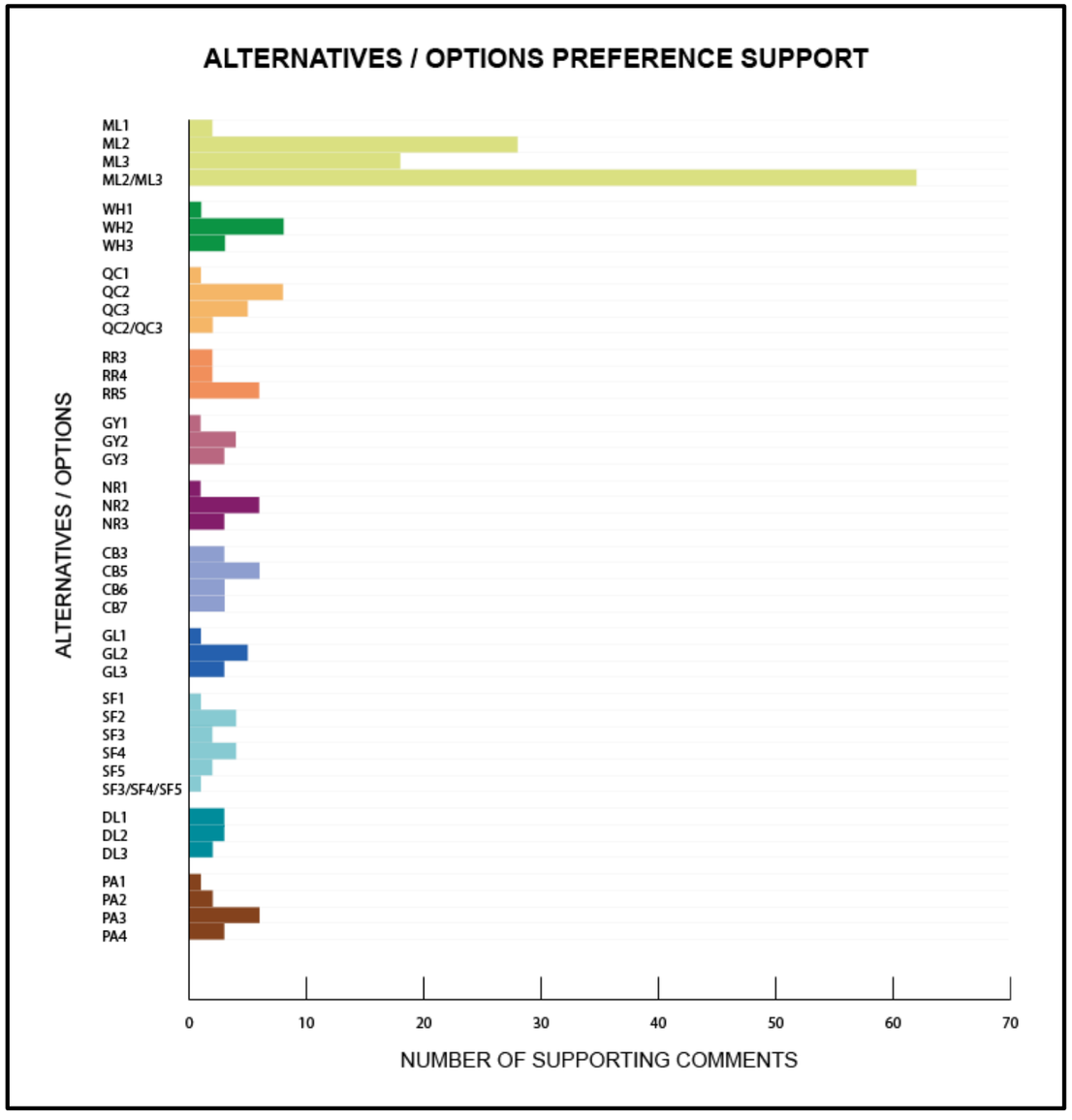

Figure 3-39. Public's alternatives/options preference scores

As this figure shows, there is strong support for build alternatives and options across the study limits. Only Dirk Lay Road showed a strong no-build preference because of the low utilization of that crossing. Therefore, DL4 was ultimately added to the scope of the options being considered at that location.

For options not listed, no preference scores were reported. For alternatives/options that indicate multiple choices (such as ML2/ML3), these indicate that the commenter did prefer a specific build alternative or option but rather wanted one of the build alternatives or options and dismissed the no-build.

A public involvement summary report for the November 18, 2020, virtual public meeting and corresponding public comment period was prepared and is available on the study website linked below for a detailed accounting of how the meeting was planned, advertised, and run, as well as a complete list of the comments received.

- http://i10wildhorsepasscorridor.com/resources.html

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4 Major Design Features (Recommended Build Alternative)

Following the alternatives and options evaluation phase described in Chapter 3, ADOT, the Community, MAG, and BIA assessed the results of the evaluation, considered the public feedback, and collectively agreed on the definition of the Recommended Build Alternative to be carried into the detailed evaluation phase, along with the No-Build Alternative. This decision was shared with FHWA, which did not object to the Recommended Build Alternative definition based on its engineering oversight role for the Interstate corridor. The Recommended Build Alternative consists of the alternatives and options listed in Table 4-1.

Table 4-1. Design alternatives/options making up the Recommended Build Alternative

Location	Recommended Build Alternative/Option
I-10 main line	ML2 – I-10 inside (median) widening
Wild Horse Pass Boulevard TI	WH2 – Diverging diamond interchange
SR 347/Queen Creek Road TI	QC2 – Diverging diamond interchange
Riggs Road TI	RR4 – Crossroad, intersections, and bridge rehabilitation and widening
Goodyear Road	GY2 – Bridge and approach roadway widening
Nelson Road	NR2 - Bridge and approach roadway widening
SR 587/Casa Blanca Road TI	CB6 – Diamond TI with roundabouts with Casa Blanca Road bypass
Gasline Road	GL3 – Bridge replacement on a new alignment with a wider bridge
Seed Farm Road	SF4 – Conversion to a spread diamond TI with a new bridge on a new alignment
Dirk Lay Road	DL4 – Bridge and approach roadway removal and ROW turnback
SR 387/SR 187/Pinal Avenue TI	PA3 – Crossroad, intersections, and bridge widening
ADOT FMS fiber optic trunk line	Build option

This chapter describes the major design features of each of the Recommended Build Alternative's components listed above. It must be noted that the alternatives/options described in Chapter 3 were each equally developed to approximately the 5 percent level of design. Once the Recommended Build Alternative was selected, its design was advanced to the 15 percent (or Stage I) level of design to refine the concepts and to fully understand the design requirements, its associated footprint for the environmental documentation, and the additional ROW that would need to be acquired. All of this information was then measured against the No-Build Alternative. As a result, the information presented in this chapter and Appendix A reflects this advanced level of design, so any differences between the Recommended Build Alternative and what was presented in Chapter 3 can be attributed to the knowledge gained during the design refinement process.

The Recommended Build Alternative documented in this chapter fully satisfies the objectives defined in the study's purpose and need and meets the design requirements of the ADOT *Roadway Design Guidelines* (RDG) and the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*. See Chapter 7 for a discussion of the geometric deficiencies for two existing roads that would not be reconstructed with this project.

4.1 Introduction

The proposed widening of I-10 would initially add a continuous third general purpose lane in each direction toward the median for the entire corridor, and a fourth HOV lane in each direction between SR 202L and Riggs Road, also toward the median. Based on the projected traffic, it is predicted that an ultimate fourth or even fifth general purpose lane would be needed in the future, so the proposed improvements associated with the Recommended Build Alternative, particularly the new bridge spans, would accommodate this potential future widening. The proposed I-10 lanes and shoulders would be 12 feet wide and paved with asphaltic concrete (AC), except in the northern mile or so of the corridor that currently has rubberized asphalt overlaid on Portland cement concrete pavement (PCCP). Entrance and exit ramps would generally be upgraded from a taper-type configuration to a parallel-type configuration at the gores, and all entrance ramps (except for the Seed Farm Road TI entrance ramps, given their low volumes) would be widened to accommodate dual lane ramp metering. Because auxiliary lanes exist only between SR 202L and the SR 347/Queen Creek Road TI, the rest of the corridor will use parallel drop and add lanes to accommodate the parallel-type ramp configurations.

Between SR 202L and Riggs Road, I-10 would be widened to a 3+1 (three general purpose lanes and one HOV lane) configuration in each direction with a closed median divided by a concrete barrier. South of Riggs Road to the southern project limits near milepost 187, only one additional general purpose lane would be constructed in each direction in the median, leaving an open graded median with a cable barrier or comparable barrier system. Additional future widenings could be constructed by closing the median completely, or by widening to the outside, or both, when travel demand demonstrates a need for the additional capacity. South of Riggs Road, two specific locations at Goodyear and Nelson Roads would exist where the median would be closed to a concrete median barrier. To reuse and widen the existing bridges over I-10 at these locations, I-10 would need to be reprofiled lower by about 1 foot to meet vertical clearance requirements. Lowering I-10, while keeping two lanes in each direction open at all times, requires that a four-lane section in each direction be built so that two new lanes on the new profile would be built toward the median, traffic would then shift to those new lanes, and then the two existing lanes would be lowered to match. While this would result in constructing some median pavement that would not be used, this solution avoids the throw-away costs associated with temporary pavement.

Along the corridor, 9 of the 10 crossroads would be improved through either reconstruction/reconfiguration of a TI or widening. The tenth crossroad, Dirk Lay Road, would be removed because its low utilization does not warrant its continued existence. All the crossroad roadway improvements have been determined, through traffic studies, as meeting the future expected demand and would include ADA-compliant facilities for pedestrians and bicyclists. Gasline and Seed Farm Roads have additional accommodations for oversized agricultural equipment serving Gila Farms.

Additionally, ADOT would install an FMS fiber optic trunk line and FMS infrastructure along the corridor. This fiber optic trunk line would be used solely for the purposes of operating and monitoring the highway through the corridor and across the state.

4.2 Design Criteria

The design criteria were developed in accordance with the ADOT RDG and Standard Drawings (all with current revisions and updates as of the publication date of this document), as well the AASHTO *A Policy on Geometric Design of Highways and Streets* (2018) (Green Book) and *Roadside Design Guide* (2011, with 2015 errata). The notable design criteria for the associated road types are presented in Tables 4-2 to 4-4.

Table 4-2. Design controls for I-10 main line

Item	Description
Typical section	See Appendix A
Design year	2050
Design vehicle	WB-67
Design speed	65 mph (SR 202L to milepost 165.20) 75 mph (matching posted speed south of milepost 165.20)
Superelevation	0.06 feet/feet (maximum)
Minimum vertical curve length	800 feet
Maximum horizontal angle break	0º 45’ 00”
Maximum gradient	3% (level terrain)
Horizontal curve	Minimum length = 1,125 feet (15 times the design speed [75 mph]; see RDG Section 203.5) (Spiral transitions are not used.)
Lane width	12 feet
Median shoulder width	12 feet (no additional shy distance added)
Outside shoulder width	12 feet (no additional shy distance added)
Recovery area	ADOT RDG Section 303.2
Cross slope	1.5% (match existing)
Pavement design life	20 years
Drainage (pavement)	50 years (depressed)/10 years (nondepressed)[a]
Barrier type	Outside: Concrete barrier or guardrail (per ADOT Construction Standards) Median: Concrete median barrier (3+1 sections) and median cable barrier (or equivalent) for 3+0 section
Access control	Full
ROW	300 feet (minimum)
Tapers	65:1 – dropping main line lanes added by on-ramp lane Design speed:1 – dropping main line lane or shoulder 25:1 – adding lane or shoulder

[a] While these storms are the design standard for this type of Interstate system, the cross-culvert system under I-10 would be replaced with in-kind capacity to avoid upstream and downstream ponding changes from what has occurred during the last 55 years.

Table 4-3. Design controls for entrance and exit ramps

Item	Entrance ramp – description	Exit ramp – description
Typical section	See Appendix A	See Appendix A
Design year	2050	2050
Design vehicle	WB-67	WB-67
Design speed	60 mph (gore area) 50 mph (ramp body) 35 mph (ramp terminal) 20 mph (DDI and roundabout ramp terminal)	65 mph (gore area) 50 mph (ramp body) 35 mph (ramp terminal) 20 mph (DDI and roundabout ramp terminal)
Superelevation	0.06 feet/feet (maximum)	0.06 feet/feet (maximum)
Minimum vertical curve length	200 feet at crossroad terminus 400 feet elsewhere	200 feet at crossroad terminus 400 feet elsewhere
Maximum horizontal angle break	0º 45’ 00”	0º 45’ 00”
Maximum gradient	4% upgrade/5% downgrade	4% upgrade/5% downgrade
Horizontal curve	Max Dc at gore area is controlled by minimum superelevation breakover criteria of 2 percent (ADOT RDG Section 504.3) Max Dc for 50 mph and 35 mph design speed are 6º 53' and 18º 19', respectively Length = 500 feet minimum for Δ = 5°; increase length by 100 feet for each 1º decrease in Δ	Max Dc at gore area is controlled by minimum superelevation breakover criteria of 2 percent (ADOT RDG Section 504.3) Max Dc for 50 mph and 35 mph design speed are 6º 53' and 18º 19', respectively Length = 500 feet minimum for Δ = 5°; increase length by 100 feet for each 1º decrease in Δ
Road width	Varies at intersection 28 feet (ramp body, excluding shy distance) – all entrance ramps designed to have dual-lane ramp metering provisions (except the Seed Farm TI)	Varies at intersection 22 feet for single-lane exit ramp (gore and ramp body, excluding shy distance) 34 feet for dual-lane exit ramp (gore and ramp body, excluding shy distance)
Lane width	12 feet (except as noted in Section 7.1 of this document)	12 feet (except as noted in Section 7.1 of this document)
Recovery area	ADOT RDG Section 303.2	ADOT RDG Section 303.2
Cross slope	2%	2%
Pavement design life	20 years	20 years
Drainage (pavement)	10 years	10 years
Barrier type	Concrete or guardrail per ADOT Construction Standards	Concrete or guardrail per ADOT Construction Standards
Access Control	Full	Full
ROW	As required	As required

Table 4-4. Design controls for crossroads

Item	Description
Typical section	See Appendix A
Design year	2050
Design vehicle	WB-67
Design speed	55 mph (all grade separations except Gasline Road) 50 mph (Gasline Road – see discussion in Section 4.3.2 for Gasline Road) 45 mph (Riggs Road, Seed Farm Road, Pinal Avenue) 35 mph (Wild Horse Pass Boulevard and SR 347/Queen Creek Road) 25 mph (Casa Blanca Road)
Superelevation	0.06 feet/feet (maximum)
Maximum gradient	5%
Road width	Varies by crossroad
Number of through lanes	Based on traffic analysis
Number of left-turn lanes	Based on traffic analysis
Number of right-turn lanes	Based on traffic analysis
Sidewalk	5 feet 10 feet (multiuse bike and pedestrian path between roundabouts at Casa Blanca Road TI)
Pavement design life	20 years
Drainage (pavement)	10 years
Access control	Per ADOT RDG at interchanges; N/A at grade separations
ROW	Varies
Lane width	12 feet
Road foreslope	3:1 (grade separations) 4:1 (TIs)
Barrier type	Concrete per ADOT Construction Standards (Wild Horse Pass Boulevard and Queen Creek Road) Guardrail per ADOT Construction Standards (Riggs Road, Goodyear Road, Nelson Road, Casa Blanca Road, Gas Line Road, Seed Farm Road, Pinal Avenue)

4.3 Recommended Build Alternative

4.3.1 I-10 Main Line (ML2)

General Description

The Recommended Build Alternative would widen I-10 towards the inside, or median, side of I-10, holding the existing outside edge of pavement as the proposed outside edge. Generally, this concept adds 23 feet of widening in each direction so that one additional 12-foot lane and 12-foot inside and outside shoulders are created. In addition, from SR 202L to Riggs Road, an extra 12 feet is added to create an HOV lane in each direction, closing the median to a concrete median barrier. Ramp gores are also reconstructed into parallel-type entry and exit configurations, and all entrance ramps (except for the Seed Farm Road TI entrance ramps, because of the low volumes) are widened to accommodate dual-lane ramp metering.

Roadway Features

The proposed horizontal alignment for I-10 would remain the same as the existing I-10 centerline. The existing stationing would remain the same, adjusted only slightly to match current surveying control tie points. The proposed I-10 vertical alignment would generally remain the same as the existing I-10 vertical alignment and the I-10 widening would be constructed at a constant cross slope of 1.5 percent, draining to the outside to match existing conditions. At locations where the existing crossroad bridge is being widened or rehabilitated and the I-10 widening would result in the vertical clearance being less than 16-feet, I-10 would be lowered with reprofiling and/or the added lane would be crowned towards the median at a slope of 1.5 percent on each of the directional I-10 roadways. There are two locations, Goodyear Road and Nelson Road, where the existing bridges would be widened, so I-10 would be reprofiled approximately 1-foot lower and crowned towards the median to restore an I-10 vertical clearance of 16-feet. Two other locations, Riggs Road and SR 387/Pinal Avenue have an existing vertical clearance greater than 16-feet but less than 16.5-feet. At both of those locations, the existing bridges would be rehabilitated. To maintain a minimum 16-feet vertical clearance on I-10, the I-10 inside widening would be crowned towards the median at 1.5 percent.

The proposed ramp horizontal alignments in the vicinity of the gores would be realigned to convert them to parallel entrance and exit ramps. They would also be revised to have longer acceleration and deceleration lengths as well as standard superelevation transitions. The proposed ramp vertical alignments would remain as close as possible to the existing alignments, but adequate to support the upgraded horizontal geometry changes. ADOT requested that all entrance ramps be widened to accommodate a dual lane ramp metering condition, even though it may be some time before the ramp metering is ever actually installed in some locations. The Seed Farm Road TI entrance ramps are excluded from this because of their low volumes.

The proposed typical section would vary depending on the location on I-10. North of Riggs Road, I-10 would have an additional 12-foot general purpose lane and a 12-foot HOV lane added in each direction toward the median. Both the inside and outside existing shoulders would also be increased to 12 feet, but by holding the outside edge of pavement. A concrete barrier would be placed in the median separating the directions of traffic. South of Riggs Road, I-10 would add only one 12-foot general purpose lane in each direction toward the median. The inside and outside shoulders would also be increased to 12 feet in width, also by holding the existing outside edge of pavement. A median cable barrier (or equivalent) would extend the length of the median from Riggs Road to the southern project limits. Based on record drawings, the existing cross slope for both the eastbound and westbound directions is 1.5 percent sloped to the outside; however, in the vicinity of the Casa Blanca Road TI, aerial survey shows that I-10 is directionally crowned with up to a 2 percent cross slope. The final designer would need to verify the existing cross slope of I-10. In all areas the Recommended Build

Alternative I-10 widening would match the existing cross slope, except under the Riggs Road, Goodyear Road, and Nelson Road underpasses.

Under the Goodyear Road and Nelson Road underpasses, I-10 would be widened to four 12-foot lanes and 12-foot shoulders for about 2,000 feet centered on each bridge, like the proposed section north of Riggs Road. This full median widening would be for maintenance of traffic and constructability purposes in the area where I-10 needs to be reprofiled to restore vertical clearance under these two bridges. The two new lanes would be constructed in the median on the new I-10 profile and traffic shifted to the new lanes, which would then allow for the reconstruction of the existing I-10 lanes while maintaining two lanes in each direction on I-10. The I-10 directional roadways would also be crowned in these reprofiled segments to mitigate vertical clearance issues at Goodyear and Nelson Roads. A closed median drainage system would be required in these locations to drain the localized sump created by the reprofiling and crowning. Existing culverts affected by the reprofiling would be replaced with a culvert, or culverts, of the same capacity to avoid materially altering the culvert capacity crossing I-10. See Section 4.11, *Drainage*, for a more complete discussion on the project drainage.

For approximately three-quarters of a mile between mileposts 183 and 184, the eastbound and westbound I-10 roadways bifurcate as they pass through the Sacaton Mountains and cut through shallow bedrock. Like the rest of the corridor, all I-10 widening would be done only to the median side of I-10. While a median barrier system would not be required in this segment because of the increased roadway separation, a concrete half barrier along the inside edge of shoulder would still be used through the rock cuts, as it is today, to minimize the rock cut earthwork and to minimize the possibility of additional cultural impacts.

In addition to modifications being performed at all crossroads within the corridor, the Sacaton rest areas would receive modifications to their ramps. On eastbound I-10, the rest area at milepost 182 would have both the entrance and exit ramps modified to a parallel-type ramp. This would include outside widening of I-10 and modifications to the gores. The ramp revisions would extend just beyond the existing gores but would not extend farther into the rest area, avoiding impacts on the rest area itself. On westbound I-10, only the exit ramp from the rest area would be modified to a parallel type. This exit would have similar impacts to those noted above at the eastbound rest area. While a parallel ramp was evaluated for the entrance to the westbound rest area, it was found that the widening that would be required for the ramp would result in a rock cut situation in the area to the south of the rest area. To avoid any rock cuts along the outside of I-10 in this area, the centerline geometry of westbound I-10 was slightly altered to allow all pavement widening to the median side of I-10, but the taper-style westbound exit ramp at the rest area was maintained.

Bridge Features

The only bridges that I-10 passes over in the corridor are the two bridges over the Gila River, and neither are part of this study. A discussion of the Recommended Build Alternative for the 10 crossroad bridges that pass over I-10 is provided in Section 4.5, *Structures*.

Right-of-way Requirements

No new ROW is anticipated to accommodate the Recommended Build Alternative's improvements to I-10. New ROW is required at most of the crossroads, and those are discussed in more detail in Section 4.3.2.

Constructability and Maintenance of Traffic

Most of the I-10 widening would be accomplished with an inside shoulder closure and possibly a lane shift toward the outside, protected by temporary concrete barrier. At Goodyear and Nelson Roads, where I-10 would be lowered by about 1-foot, I-10 would be over widened with a four-lane section in each direction similar to north of Riggs Road. This would allow I-10 to be initially lowered in the widening section and then have traffic shifted to the inside widening while the existing I-10 is lowered, which would all be accomplished with no I-10 closures.

Because there are limited alternative routes, long-term closures or restrictions to I-10 would not be allowed. Short-term I-10 closures, restrictions, or detours would be needed for overhead bridge work (removals, setting girders, concrete deck pours, etc.). Ramp closures for up to several weeks may be needed for ramp reconstruction and ramp gore modifications.

Drainage Features

The Recommended Build Alternative would require drainage modifications that include the addition, relocation, or adjustment of median catch basins to maintain median drainage in accordance with ADOT RDG criteria. ADOT Standard C-15.80 median inlets would be used to intercept median flows along the main line. Additional median drainage inlets could be needed based on median ditch capacity, crossover locations, and roadway profile sag locations. These additional locations would be determined in final design.

The outside edge of pavement for the main line would not change from the existing condition except where the ramp gores would be upgraded from a taper-type to a parallel-type configuration. As with the existing condition, the main line pavement runoff would sheet flow off the roadway and into graded roadside ditches inside of I-10's ROW, or sheet flow out of the ROW as it does today. Off-site drainage patterns would remain largely undisturbed in areas away from ramp and crossroad upgrades. Areas where drainage patterns would be affected by the Recommended Build Alternative are discussed in the subsequent sections of the chapter.

Concrete box culverts along the corridor are assumed to be in good structural condition, but no inspections or condition assessments were performed as part of this study. However, this assumption is backed by the regular inspections that are conducted by ADOT for the larger box culverts that have bridge classifications. In areas where the box culverts do not span the width of the existing open median, the Recommended Build Alternative would make the existing box culverts continuous from the outside edge of pavement to the outside edge of pavement. With the enclosure of the box culverts in the median, area inlets would need to be added in the median flow path to convey the median drainage into the extended box culverts. Since the Recommended Build Alternative would not widen the outside pavement edges except in the areas of TI and ramp configurations, there would be no substantial impacts expected to the existing box culverts outside of the median.

Existing pipe culverts along the I-10 corridor could be structurally deficient because of culvert interior abrasion and interior/exterior corrosion. Concrete pipe culverts can experience concrete cement spalling and wear from abrasive, high-velocity runoff. Sediment-laden stormwater flows can wear down the cement bond with the aggregate and expose the culvert reinforcement. The same sediment flows can cause CMP coatings to be removed, thereby making the metal pipe more vulnerable to soil resistivity and pH characteristics that can cause corrosion in the pipe. This DCR study did not investigate the existing pipe conditions, but the potential for pipes that are damaged or beyond their design service life exists and has been recognized. This recognition is supported by the Wild Horse Pass Boulevard TI construction in 2003. During construction, all the metal pipe culverts under I-10 within the limits of that TI had to be replaced through a construction change order because their condition was found to be poor or even collapsed. Because this I-10 corridor was originally built around the same time using the same materials, it is reasonable to assume that all the metal culverts would need to be replaced as part of the Recommended Build Alternative. To maintain traffic flow and avoid a substantial number of closures on I-10, all pipe replacements would be assumed as a jack-and-bore construction except where I-10 would be reprofiled and the full pavement section would be replaced.

Utility Impacts

No utility impacts are anticipated with the I-10 median widening. However, a more detailed utility impact assessment would be needed as the project design advances.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

4.3.2 Crossroads

The following sections describe the option that was selected at each of the crossroads. The Chapter 3 option designation is shown for reference (for example, WH2) for continuity and was also used as the basis for the design starting point. However, the Recommended Build Alternative has now been advanced to the 15 percent level of design, so some minor differences in lane configurations and layout will be noticeable in some of the crossroad designs. This is a normal part of the design development process, but note that the underlying features of the original options remain intact.

Wild Horse Pass Boulevard TI (WH2)

General Description

The Recommended Build Alternative proposes reconstructing the existing diamond-style TI into a DDI. Most of the improvements would be concentrated on Wild Horse Pass Boulevard and Sundust Road, reconfiguring the crossroad approaches to the TI, reconstructing the ramp terminals, reversing the traffic flow between the ramp terminals, using the existing bridge for the eastbound traffic, and constructing a new adjacent bridge to the south for westbound traffic.

The additional bridge would be constructed to the south of the existing bridge to use the wider existing bridge to accommodate the heavy, directional volumes coming to and from the north with additional turning lanes, as well as to avoid impacts on the Salt River Project (SRP) Gila Drain Irrigation Canal. The new Wild Horse Pass Boulevard bridge profile and spans would approximately match the existing bridge configuration.

Roadway Features

The horizontal alignment of Wild Horse Pass Boulevard would be split into two, with one alignment for each direction of traffic. The horizontal alignments for the ramps would be shifted farther outward to connect into the new crossover TI configuration. The vertical alignment for the eastbound traffic would match the existing road as closely as possible over the existing bridge to allow for its continued use in the new configuration. The vertical alignment for the westbound traffic would roughly match the existing bridge and would be high enough to achieve a minimum vertical clearance of 16.5 feet.

The proposed typical section of this option would be a split roadway, generally using a normal cross slope of 2 percent to the outside (except across the existing bridge). The new configuration would have four eastbound lanes across the existing bridge and three westbound lanes across the new bridge with shoulders across both bridges. The lane configuration on the existing bridge would be set to avoid having the existing bridge crown line located in a vehicle's wheel path. A 5-foot bike lane would be provided for both directions throughout the TI. Pedestrian access through the TI would be provided with 5-foot-wide raised concrete sidewalks on both sides of the road except across I-10, where the sidewalk would be at least 10 feet. This sidewalk would be two-way, located in between the two roadways (the preferred pedestrian treatment within DDIs), and would be separated from traffic by 32-inch-tall roadway barriers. Because this DDI is a conversion of an existing diamond, this pedestrian walkway over I-10 would be located along the south edge of the existing bridge. All the existing and new sidewalk and curb ramps would be ADA-compliant.

Bridge Features

See Section 4.5.5 for the Wild Horse Pass Boulevard Recommended Build Alternative bridge discussion.

Right-of-way Requirements

New ROW would be needed in all four quadrants of the TI and along the crossroad approaches. Approximately 0.9 acre of new ROW and 0.06 acre of temporary construction easement (TCE) would be required. The TCE would be required in the southwest quadrant for the reconstruction of the gas station driveway near the Winners Way intersection. All new ROW and easements would be acquired from tribal land at this TI.

New access control limits would be extended along Wild Horse Pass Boulevard and Stardust Road. On the west side of the TI, full access control would be extended to Winner's Way in the northwest quadrant. In the southwest quadrant, full access control would be extended to the existing gas station driveway, and then right-in/right-out restricted access control would be extended to Winner's Way. In the northeast quadrant, full access control would be extended to Nelson Drive, while in the southeast quadrant, full access control would be extended to the hotel driveway and restricted right-in/right-out access control would extend from the hotel driveway to Nelson Drive. All access control would be acquired from tribal parcels.

Constructability and Maintenance of Traffic

The new adjacent bridge and nearly half of the new TI would be built entirely offline. Traffic shifts and multiple phases would be necessary to complete the asphalt and concrete paving and signal systems to put the new crossover intersections into service. Some short-term lane closures and detours would be necessary on Wild Horse Pass Boulevard for the TI crossover construction and on I-10 for the new bridge construction. The short-term I-10 closures would likely result in I-10 traffic being rerouted through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes such as when the crossover design goes active.

Drainage Features

Drainage improvements would primarily consist of the reconfiguration of the existing on-site drainage system, which consists of curb and gutter and catch basins in the core of the TI and no edge treatment on the crossroad approaches or on the ramps away from the ramp terminals. Improvements to Wild Horse Pass Boulevard TI on-site drainage would include curb and gutter with ADOT Standard C-15.92, C-15.91, and C-15.20 inlets, which would control spread and depth within the roadway and ramp configurations in accordance with the ADOT RDG throughout the TI.

The existing on-site drainage in the northwest, northeast, and southeast quadrants all ultimately drain to the SRP Gila Drain just to the north of the TI. This drainage is conveyed through either ditches, swales, or pipes to the SRP Gila Drain. The southwest quadrant largely drains to a shallow retention basin in that quadrant inside the ADOT ROW. A drainage basin in the southeast quadrant also exists, but it is outside the ADOT ROW and appears to be used primarily as on-site storage for the nearby development. The TI improvements would affect all these facilities (ditches, pipes, swales, and basins), so the final design would have to modify the system to retain the flow patterns, maintain or enhance the storage requirements (using the infield areas), and ensure the outfall volumes to the SRP Gila Drain do not increase.

Utility Impacts

The Wild Horse Pass Road TI recommended option would potentially affect an existing ADOT FMS fiber optic line, an existing Cox Communications fiber optic line, an existing underground electrical line, an existing overhead power line, an existing gas line, and an existing sewer line. The existing FMS and underground electrical lines are near the ramp terminals and have a high chance of impact. The Cox Communication fiber optic line and the overhead power are located either in or near the core of the TI and would likely be affected, while the gas line and the sewer line are both buried and located farther from Wild Horse Pass Boulevard and would have a lower chance of impact. A more detailed utility impact assessment will need to be completed as the project design advances.

Items to be aware of/avoid include:

- Location of existing bridge crown in Recommended Build Alternative configuration to avoid vehicle wheel path
- Gila Drain irrigation canal headwalls in the northwest and northeast quadrants
- Gila Drain irrigation canal maintenance easement in the northwest quadrant
- Exxon gas station driveway on Wild Horse Pass and sign structure in the southwest quadrant
- Impacts to retention/detention basins/swales in the southwest and southeast quadrants
- Final design refinement could alter geometry, intersection layouts, drainage conveyances, etc. to optimize constructability, improve traffic operations, improve maintainability, or avoid or minimize utility impacts.

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

SR 347/Queen Creek Road TI (QC2)

General Description

The Recommended Build Alternative proposes reconstructing the existing diamond-style TI into a DDI. Most of the improvements would be concentrated on SR 347 and Queen Creek Road, reconfiguring the crossroad approaches to the TI, reconstructing the ramp terminals, reversing the traffic flow between the ramp terminals, using the existing bridge for the eastbound traffic, and constructing a new adjacent bridge to the south for the westbound traffic.

The additional bridge would be constructed to the south of the existing bridge to use the wider existing bridge to accommodate the heavy, directional volumes coming to and from the north with additional turning lanes. The new westbound SR 347/Queen Creek Road bridge profile and spans would approximately match the existing Queen Creek Road bridge configuration.

Roadway Features

The horizontal alignment of SR 347/Queen Creek Road would be split into two, with one alignment for each direction of traffic. The horizontal alignments for the ramps would be shifted farther outward to connect to the new crossover intersection configuration. The vertical alignment for the eastbound traffic would match the existing road as closely as possible over the existing bridge to allow for its continued use in the new configuration. The vertical alignment for the westbound traffic would be roughly match the existing bridge and would be high enough achieve a minimum of 16.5 feet of vertical clearance.

The proposed typical section of this option would be a split roadway generally using a normal cross slope of 2 percent to the outside (except across the existing bridge). The proposed configuration would have four eastbound lanes across the existing bridge and three westbound lanes across the new bridge with shoulders across both bridges. The lane configuration on the existing bridge would be set to avoid having the existing bridge crown line located in a vehicle's wheel path. A 5-foot bike lane would be provided for both directions throughout the TI. Pedestrian access through the TI would be provided with 5-foot-wide raised concrete sidewalks on both sides of the road except across I-10, where the sidewalk would be at least 10 feet. This sidewalk would be two-way, located in between the two roadways (the preferred pedestrian treatment within DDIs), and would be separated from traffic by 32-inch-tall roadway barriers. Because this DDI is a conversion of an existing diamond, this pedestrian walkway over I-10 would be located along the south edge of the existing bridge. All the new sidewalk and curb ramps would be ADA compliant.

The eastbound ramp gores would be reconstructed to provide parallel exit and entrance ramps, which would improve safety by increasing the merge length and providing additional acceleration and deceleration lengths for vehicles using the TI. The eastbound exit and westbound entrance ramps already use parallel configurations. The DDI would require that the ramp terminals at the crossroad and the crossroad approaches also be reconstructed. On the western approach, a free-flow right-turn lane from SR 347 to eastbound I-10 would be added.

Along SR 347, the Recommended Build Alternative would make provisions to accommodate a future inside widening of one lane in each direction to the west, consistent with the recommendations from a recent MAG SR 347 corridor study. The Queen Creek Road eastern approach would match the existing divided two lanes in each direction configuration. Cattle guards would be installed at the ADOT ROW and connected to ADOT ROW fencing to prevent wild horses and other large wildlife from crossing over or entering I-10.

Bridge Features

See Section 4.5.5 for the SR 347/Queen Creek Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

Additional ROW would be needed in all four quadrants of the TI and along the crossroad approaches. Approximately 6.73 acres of new ROW would be required and split among all four quadrants of the TI. All the new ROW would be acquired from nine allotted parcels.

Due to existing access control at the SR347/Queen Creek Road TI not extending along the crossroad, new access control limits would need to be extended to the west along SR 347 and to the east along Queen Creek Road to protect the integrity of the TI. On the west side along SR 347, full access control would be extended impacting five parcels. On the east side along Queen Creek Road, full access control would be extended impacting three parcels. All access control would be acquired from allotted parcels, which are all being impacted by the new ROW acquisition. The access control location will match the new ROW limits.

Constructability and Maintenance of Traffic

The new adjacent bridge and nearly half of the new TI would be built entirely offline. Traffic shifts and multiple phases would be necessary to complete the asphalt and concrete paving and signal systems to put the new crossover intersections into service. Some short-term lane closures and detours would be necessary on SR 347/Queen Creek Road for the TI crossover construction and on I-10 for the new bridge construction. The

short-term I-10 closures would likely result in I-10 traffic being rerouted through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes, such as when the crossover design goes active.

Drainage Features

Drainage improvements would primarily consist of the reconfiguration of the existing on-site drainage system, which currently consists of a mixture of areas with curb and gutter and spillways and areas with no edge treatments. Improvements to the SR 347/Queen Creak Road on-site drainage would include curb and gutter with ADOT Standard C-15.92, C-15.91, and C-15.20 inlets, which would control spread and depth within the roadway and ramp configurations in accordance with the ADOT RDG throughout the TI. Infield basins would be used to mitigate pavement runoff.

Ramp widening would extend fill slopes farther beyond the existing slope limits but ultimately would not change existing off-site flow patterns. The existing condition of using pipe culverts as a pass-through system from east-to-west under the ramps and main line would be perpetuated in the Recommended Build Alternative.

Utility Impacts

The SR 347/Queen Creek Road TI would affect an overhead power line along its north side west of I-10 and would potentially affect an electrical line that runs along the west side of I-10 and along the SR 347/Queen Creek Road TI eastbound ramps. The Community's Department of Public Works has a proposed waterline that would cross under I-10 in the vicinity of the SR 347/Queen Creek Road TI that would also potentially be affected if built first. A more detailed utility impact assessment would need to be completed as the project design advances.

Items to be aware of/avoid include:

- Future improvements on SR 347 west of I-10
- Location of existing bridge crown in Recommended Build Alternative configuration to avoid vehicle wheel path
- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations.
- Coordination with the Community's Department of Public Works to have the agency place its proposed water line in a location compatible with the Recommended Build Alternative
- Final design refinement could alter geometry, intersection layouts, drainage conveyances, etc. to optimize constructability, improve traffic operations, improve maintainability, or avoid or minimize utility impacts.

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

Riggs Road TI (RR4)

General Description

The Recommended Build Alternative proposes a bridge deck rehabilitation of the existing bridge coupled with a new adjacent bridge to the south and reconstruction of the roadway approaches to accommodate wider shoulders, left-turn lanes, and pedestrians. A new bridge would be needed because widening the existing bridge would reduce the vertical clearance over I-10 to less than 16 feet. All four ramps would be reconstructed in their existing location. The Recommended Build Alternative would also include the replacement of the existing bridge railing, guardrail, pedestrian accommodations/sidewalks, and bike lanes.

Roadway Features

The horizontal and vertical alignment of Riggs Road would remain unchanged with this option. Widening the existing bridge to the full width required would reduce the vertical clearance over I-10 to less than 16 feet; therefore, the Recommended Build Alternative is recommending building a new adjacent bridge for the eastbound direction. The new Riggs Road bridge profile would mimic the existing Riggs Road bridge but would be raised sufficiently to achieve a minimum of 16.5 feet of vertical clearance over I-10. The spans would be set back farther to match the SR 347/Queen Creek Road bridge spans to the north so that future outside widening is not precluded. The new bridge would carry two eastbound lanes to accommodate the heavier, directional volumes coming to and from the north. Because the existing bridge is crowned, the westbound lane configuration would need to be set to avoid having the crown point fall within a vehicle's wheel path. By using the twin bridge configuration, the Recommended Build Alternative would keep Riggs Road open during construction and simplify maintenance of traffic and construction phasing while also preserving corridor infrastructure that still has useful life. Furthermore, the twin bridge configuration also provides ADOT with flexibility to modify the TI configuration in the future if traffic patterns change, or to replace the existing bridge at the end of its design life while using the new bridge to perpetuate the TI operations during that construction.

The Riggs Road TI ramps would be fully reconstructed, and the gores would be reconstructed to provide parallel exit and entrance ramps, which would improve safety by increasing the merge length and providing additional acceleration and deceleration lengths for vehicles using the TI. The proposed lane configuration across the TI would consist of two eastbound lanes and a single westbound lane. Outside of the bridge limits, dedicated left-turn pockets would be added at both intersections with a single left-turn pocket at the eastbound (west side) terminal and dual left-turn pockets at the westbound (east side) terminal.

The design speed for the Riggs Road TI would be 45 mph, which allows for pedestrian facilities to be placed behind raised curb and gutter. Sidewalks and bike lanes would be added in both the eastbound and westbound directions because there are no existing ADA facilities at the Riggs Road TI today. Since barrier would not be needed to protect pedestrians from vehicles, the TI would be reconstructed with side slopes that are not steeper than 4:1. Cattle guards would be installed at the ADOT ROW and connected to ADOT ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Bridge Features

See Section 4.5.5 for the Riggs Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

Approximately 0.38 acre of new ROW would be needed in the southwest and southeast quadrants of the TI along the crossroad approaches, with all the new ROW acquisitions coming from two allotted parcels.

New access control limits would be extended along Riggs Road on both the west and east sides of the TI. A total of four allotted parcels, one parcel in each quadrant of the TI, would be affected by the new access control limits. Each of the affected parcels would continue to have frontage along Riggs Road that would allow for right-in/right-out access and full access.

Constructability and Maintenance of Traffic

The new adjacent bridge and nearly half of the new TI approaches would be built entirely offline. Traffic shifts would be necessary to complete the asphalt and concrete paving and signal systems. Short-term I-10 lane closures and detours would be necessary to set the new bridge girders, pour its deck, remove the old deck on the existing bridge, and pour its replacement. This work would likely be done by rerouting I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Drainage improvements would primarily consist of the reconfiguration of the existing on-site drainage system, which currently consists of curb and gutter and spillways. Improvements to the Riggs Road on-site drainage would include raised curb and gutter with either ADOT Standard C-15.92, C-15.91, and C-15.20 inlets to control spread and depth within the roadway and ramps in accordance with the ADOT RDG. The on-site drainage system would convey the pavement runoff to infield basins.

Utility Impacts

The Riggs Road TI would potentially affect several underground electrical lines that cross I-10 at the TI and run alongside three of the four ramps (northwest, northeast, and southeast quadrants). There is also an overhead power line to the east that would be affected.

Items to be aware of/avoid include:

- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations.
- Final design refinement could alter geometry, intersection layouts, drainage conveyances, etc. to optimize constructability, improve traffic operations, improve maintainability, or avoid or minimize utility impacts.

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

Goodyear Road (GY2)

General Description

The Recommended Build Alternative proposes a roadway and bridge widening to accommodate wider shoulders and pedestrian walkways within the current I-10 easement. The bridge railing and guardrail would also be replaced as part of the widening.

Roadway Features

The Recommended Build Alternative would maintain Goodyear Road as a two-way, two-lane grade separation over I-10 with its horizontal and vertical alignment unchanged. Goodyear Road would be upgraded to meet current barrier and shoulders standards and would have pedestrian and bicycle facilities added. The condition of the existing Goodyear bridge does not necessitate a bridge replacement or rehabilitation; therefore, the Recommended Build Alternative would widen and not replace the existing bridge over I-10. This widening would reduce I-10's vertical clearance to less than 16 feet. The reduced vertical clearance would require I-10 to be reprofiled lower by about 1 foot and each direction crowned inside the existing shoulder stripe. The changes to I-10 would increase the vertical clearance under the Goodyear Road bridge to a minimum of 16.5 feet.

A full discussion of the I-10 reprofiling is included in Section 4.3.1.

Since the design speed is 55 mph on Goodyear Road, the pedestrian facilities would be protected behind concrete barriers on the bridge. Off of the bridge, guardrail would be continued from the concrete barrier to protect the pedestrian facilities from the roadway and 3:1 roadway side slopes behind the pedestrian walkway. Once the fill height is reduced and the roadway side slopes transition to 4:1, the guardrail would end, and the pedestrian facilities would shift onto the Goodyear Road shoulder. At the limits of reconstruction, Goodyear Road shoulders would be tapered down to match the existing 1.5-foot shoulder outside of ADOT ROW. Cattle guards would be installed at the ADOT ROW and connected to ADOT ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Bridge Features

See Section 4.5.5 for the Goodyear Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

Approximately 1.26 acres of new ROW would be needed in all four quadrants of the Goodyear Road grade separation along the crossroad approaches. The new ROW would be acquired from four allotted parcels.

No new access control would be acquired along Goodyear Road.

Constructability and Maintenance of Traffic

Lane or full roadway closures on Goodyear Road would be necessary for the bridge widening. A full closure would need to be approved by the Community, but the low-volume nature of this road may be conducive to a full closure to expedite the construction. Short-term I-10 lane closures and detours would be necessary to set girders and pour the widened deck. Additionally, I-10 traffic must be using the lowered reprofile segment of I-10 prior to the widening of the Goodyear Road bridge to always maintain adequate vertical clearance over the Interstate. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Drainage improvements would consist of embankment curb within the limits of the guardrail similar to existing conditions. Concentrated flow developing along the embankment curb would be collected through an inlet located at the end of the guardrail limits. The runoff would be conveyed through a broken back slope culvert located within the fill section and released to the existing terrain, like the existing conditions drainage. Outside of the limits of guardrail, the pavement drainage would sheet flow off the roadway.

The reprofiling of I-10 under Goodyear Road would require a closed median drainage system to drain the localized sump. I-10 would be crowned with pavement runoff dispersed to the inside and outside of the roadway. Outside pavement runoff would sheet flow into the infield area where it is drained through grading and swales to I-10 cross culverts. The inside lanes would drain into the median where a median area inlet would collect and convey the runoff to either an I-10 cross culvert acting as part of the I-10 pass through system or directly to the downstream side (west side) of I-10.

Utility Impacts

There would be no known utility impacts at Goodyear Road. A more detailed utility impact assessment would need to be completed as the project design advances.

Items to be aware of/avoid include:

- Lowering I-10 under Goodyear Road and its impacts to on- and off-site drainage conveyances.
- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

Nelson Road (NR2)

General Description

The Recommended Build Alternative proposes a roadway and bridge widening to accommodate wider shoulders and pedestrian walkways within the current I-10 easement. The bridge railing and guardrail would also be replaced with this option as part of the widening.

Roadway Features

The Recommended Build Alternative would maintain Nelson Road as a two-way, two-lane grade separation over I-10 with its horizontal and vertical alignment unchanged. Nelson Road would be upgraded to meet current barrier and shoulders standards and would have pedestrian and bicycle facilities added. The condition of the existing Nelson Road bridge does not necessitate a bridge replacement or rehabilitation; therefore, the Recommended Build Alternative would widen and not replace the existing bridge over I-10. This widening would reduce I-10's vertical clearance to less than 16 feet. The reduced vertical clearance would require I-10 to be reprofiled lower by about 1 foot and each direction crowned inside the existing shoulder stripe. The changes to I-10 would increase the vertical clearance under the Goodyear Road bridge to a minimum of 16.5 feet.

A full discussion of the I-10 reprofiling is included in Section 4.3.1.

Nelson Road has a posted speed limit of 55 mph. The three vertical curves (two sag curves and one crest curve) that make up the profile of the grade separation do not meet the stopping sight distance (SSD) for a 55 mph design speed in the existing condition using current AASHTO criteria. There is currently a 45 mph advisory speed sign posted for the crest curve, which is rated as a 54 mph curve based on SSD. It is recommended that the advisory speed limit signs be relocated and placed prior to the sag curves on either side of I-10, which are rated for 52 mph and 54 mph based on the calculated SSD.

Since the design speed is 55 mph on Nelson Road, the pedestrian facilities would be protected with concrete barriers on the bridge. Off of the bridge, guardrail would be continued to protect both the pedestrian facilities and 3:1 roadway side slopes behind the pedestrian walkways. Once the fill height is reduced and the roadway side slopes transition to 4:1, the guardrail would end, and the pedestrian facilities would shift onto Nelson Road's shoulder. At the limits of reconstruction, Nelson Road shoulders would be tapered down to match the existing 1.5-foot shoulder outside of ADOT's ROW. Cattle guards would be installed or maintained at the ADOT ROW and connected to ADOT's ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Bridge Features

See Section 4.5.5 for the Nelson Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

New ROW would be needed in all four quadrants of the Nelson Road grade separation to accommodate the widening of Nelson Road. Approximately 3.73 acres of new ROW and 1.07 acres of TCE would be required. The TCE easement would be required in the southwest and northeast quadrants for the reconstruction of displaced access roads. A total of 2.57 acres of new ROW would be acquired from three allottee parcels. The balance of ROW and all the TCE would be acquired from tribal land.

No new access control would be acquired along Nelson Road.

Constructability and Maintenance of Traffic

Lane or full roadway closures on Nelson Road would be necessary for the bridge widening. A full closure would need to be approved by the Community, but the low-volume nature of this road may allow for the approval of a full closure. Short-term I-10 lane closures and detours would be necessary to set girders and pour the widened deck. Additionally, I-10 traffic must be using the reprofiled segment of I-10 prior to the widening of Nelson Road to always maintain adequate vertical clearance over the Interstate. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Drainage improvements would consist of embankment curb within the limits of the guardrail similar to existing conditions. Concentrated flow developing along the embankment curb would be collected through an inlet located at the end of the guardrail limits. The runoff would be conveyed through a broken back slope culvert located within the fill section and released to the existing terrain, like the existing conditions drainage. Outside of the limits of guardrail, the pavement drainage would sheet flow off the roadway.

Based on information provided by the Community, there appears to be a flooding/water impounding issue along the east side of I-10 near Nelson Road, and predominantly in the southeast quadrant. It is not clear what the source of this off-site flow is; however, this effort has assumed that the I-10 improvements would add additional culverts under I-10 in this area to relieve this flooding and help these flows continue to their natural flow patterns downstream and west of I-10. The final designer is advised to validate this assumption through additional analysis and direct coordination with the Community and ADOT and to address it accordingly.

The reprofiling of I-10 under Nelson Road would require a closed median drainage system to drain the localized sump. I-10 would be crowned with pavement runoff dispersed to the inside and outside of the roadway. Outside pavement runoff would sheet flow into the infield area where it is drained through grading and swales to I-10 cross culverts. The inside lanes would drain into the median where a median area inlet would collect and convey the runoff to either an I-10 cross culvert acting as part of the I-10 pass-through system or directly to the downstream side (west side) of I-10.

Utility Impacts

There would be an impact to an overhead power line on the south side of Nelson Road. A more detailed utility impact assessment would need to be completed as the project design advances.

Items to be aware of/avoid include:

- Lowering I-10 under Nelson Road and its impacts to on- and off-site drainage conveyances
- Existing drainage issues on the eastern side of I-10
- The access road elevation in the northeast quadrant captures flow and does not allow it to reach the I-10 cross culverts, except for one small pipe under the access road. It is not clear if this culvert allows drainage to flow toward I-10 or away from I-10.
- Environmentally sensitive resources exist in the northwest quadrant, so impacts in that quadrant should not extend further than what is proposed.
- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

SR 587/Casa Blanca Road TI (CB6)

General Description

The Recommended Build Alternative proposes to reconfigure the existing partial cloverleaf-style TI into a conventional diamond-style TI while also adding a new Casa Blanca Road bypass roadway by realigning it on its own alignment and crossing over I-10 south of the current TI. The focus of this concept was to separate out Community traffic traveling between Sacaton and Casa Blanca from the TI, providing a convenient local connection across I-10 for the Community while still preserving the Community's access to I-10 and SR 587.

The CB6 option documented in Chapter 3 was the starting point for the Recommended Build Alternative at Casa Blanca Road. During the design refinement process, several changes were made to improve upon the concept. These improvements were made primarily to improve constructability and phasing but also reduced new ROW requirements, cultural impacts, and cost. The concept refinements are explained in more detail below.

Roadway Features

The SR 587/Casa Blanca Road TI serves as both an access point to I-10 and an intersection between SR 587, Casa Blanca Road, and old Highway 93. Traffic studies project that the SR 587/Casa Blanca Road TI will be a heavily used TI along the I-10 corridor. Additionally, when incidents occur on I-10 between SR 587 and SR 202L that require a full closure of I-10, SR 587 serves as an alternative route to I-10 for traffic going to Phoenix. To accommodate the projected traffic demands at this TI and to help mitigate the increase in traffic flow efficiency during I-10 incidents, the Recommended Build Alternative would separate the local Casa Blanca Road traffic from the TI traffic with a bypass and reconfigure the TI.

To separate the local traffic from the TI traffic, Casa Blanca Road would be realigned to cross I-10 on a separate bridge approximately 1,600 feet south of the existing TI to allow local traffic using Casa Blanca Road to bypass the TI. The new Casa Blanca road bridge would be constructed as a four-span bridge to accommodate I-10 and the SR 587/Casa Blanca Road TI ramps to the south. The two interior spans would be constructed wide enough to accommodate up to five 12-foot lanes and two 12-foot shoulders on I-10 in each direction, should that ever be required.

The intersection of the Casa Blanca Road Bypass and the SR 587 TI would be controlled with a roundabout on the west side of I-10. As Casa Blanca Road approaches I-10 from the southeast, the posted speed limit is 55 mph. The Recommended Build Alternative has introduced a series of progressively tightening horizontal and vertical curves to slow traffic approaching the roundabout on the west side of the bypass that may not be visible until drivers are over the bypass bridge. Speed reduction signs would need to be located on Casa Blanca east of I-10 prior to the Casa Blanca Bypass bridge to progressively slow traffic approaching the roundabout.

The existing Casa Blanca Road on the east side of I-10 would be reconfigured into a cul-de-sac with a T intersection with the new Casa Blanca Bypass just east of the new bypass bridge. The cul-de-sac would be constructed to maintain access to as many of the parcels in the southeast quadrant of the Casa Blanca TI as is feasible. On the west side of I-10 and south of the roundabout, old Highway 93 would be realigned into a T intersection with the new Casa Blanca Road Bypass.

Within the limits of reconstruction, the Casa Blanca Road Bypass would have a cross section consisting of two 12-foot lanes, an 8-foot shoulder, and sidewalks on both sides. On the bridge, the pedestrian facilities would be protected by barrier. Off of the bridge, guardrail would be continued to protect both the pedestrian facilities and 3:1 roadway side slopes behind the pedestrian walkways. Within the limits of barrier, a 2-foot shy distance would be added to the shoulder widths. Once the fill height is reduced and the slopes transition to 4:1, the guardrail would end and the pedestrian facilities would run adjacent to the Casa Blanca Road Bypass shoulder until the start of the curbed section for the roundabouts on the west side of I-10 or the intersection with the old Casa Blanca Road cul-de-sac on the east side of I-10. Cattle guards would be installed on either side of the Casa Blanca Bypass bridge to prevent wild horses and other large animals from crossing over or entering I-10.

The SR 587/Casa Blanca Road TI's current configuration is a partial cloverleaf configuration with hook ramps that terminate at stop sign-controlled intersections. Within the TI between the ramp terminals, the existing cross section is a two-way, two-lane road with 1.5-foot shoulders and no pedestrian or bicycle facilities. The Recommended Build Alternative would reconstruct this TI as a spread diamond TI with teardrop-style multilane roundabouts replacing the stop sign-controlled intersections at the ramp terminals. The proposed SR 587 cross section between the ramp terminal roundabouts would consist of two lanes in each direction with a 2-foot inside and outside shoulders and divided by a raised median. The design speed for SR 587 between the roundabouts would be 25 mph, which would allow for pedestrian facilities to be placed behind raised curb and gutter. The lower design speed is justified given the presence of the roundabouts. Accommodations would be made to keep bicyclists out of the roundabouts by widening the raised sidewalks to 10 feet and designating them as multiuse paths. The multiuse paths would be constructed in both the northbound and southbound directions. Since barrier would not be needed to protect the multiuse paths from vehicles, the TI would be reconstructed with side slopes that are no steeper than 4:1. Cattle guards would be installed at the ADOT ROW and connected to the ADOT ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Given the condition and configuration of the existing Casa Blanca Road bridge, the Recommended Build Alternative would replace the existing bridge with a new bridge instead of rehabilitating the existing structure. The new bridge would be constructed south of the existing to minimize the amount of new ROW needed in the northwest quadrant and to provide better entry and departure angles for the roundabout controlling the eastbound ramps. A temporary retaining wall would be needed to stabilize the existing bridge during construction of the new bridge. With the new bridge, the vertical clearance over I-10 would increase to a minimum of 16.5 feet. The new bridge would be a two-span bridge and the face of abutment would be offset 30 feet from the outside edge of I-10 so that each span could accommodate five 12-foot lanes and two 12-foot shoulders in each direction, should it ever be required.

All four ramps would be fully reconstructed with the SR 587/Casa Blanca Road TI Recommended Build Alternative configuration. The ramps would be constructed as parallel entrance and exit ramps. The eastbound entrance and westbound exit ramps would be extended to the south under the end spans of the proposed Casa Blanca Bypass bridge. This configuration would allow the bypass bridge to have shorter spans over I-10 and a

reduced structure depth. The length of the westbound exit ramp also provides additional vehicle storage during I-10 incidents that divert vehicles onto SR 587. A right-turn bypass slip ramp would also be constructed at the westbound exit ramp terminal to bypass the roundabout for vehicles going north to SR 587. While the proposed westbound exit is one lane, the end span for the westbound exit ramp would be constructed to accommodate a future two-lane exit. The eastbound entrance ramp would require a 900-foot-long retaining wall between the ramp and I-10 on account of the departure angle out of the roundabout and the proximity of I-10.

The layout of the proposed TI may look odd at first glance, but the layout was developed to accommodate a possible phased construction from the existing configuration, should it be required. It is for this reason that the most northern and most southern roundabouts are forced to be located at the existing ramp terminal intersections. Should a phased implementation not be required, the final designer may want to explore other roundabout locations along the proposed SR 587 geometry to further simplify constructability, so long as the revisions stay within the footprint established by this document. In addition, the layout considered the constructability regarding how to construct the new bridge and roadways away from the existing roadways to the extent possible, while reducing the skew required for the new SR 587 bridge.

Bridge Features

See Section 4.5.5 for the SR 587/Casa Blanca Road TI and Casa Blanca Bypass Road bridge discussion for the Recommended Build Alternative.

Right-of-way Requirements

Approximately 18.02 acres of new ROW would be needed throughout the proposed SR 587/Casa Blanca Road TI and the Casa Blanca Road Bypass improvements. No TCE is required for the Casa Blanca improvements. A total of 10.18 acres of new ROW would be acquired from 14 allottee parcels and the balance of the ROW would be acquired from tribal land.

With the improvements proposing to reconfigure the Casa Blanca Road TI, the existing access control for the TI would need to be completely changed to accommodate the new configuration. New access control would be needed along SR 587, Casa Blanca Road, and the Casa Blanca Road Bypass. All the access control at the SR 587/Casa Blanca TI would be full access control. The parcels affected with the change in access control consist of 14 allotted parcels and tribal land. None of the affected parcels would lose access from a public road.

Constructability and Maintenance of Traffic

The proposed SR 587/Casa Blanca Road TI configuration and roundabout locations have been set to accommodate either a phased or complete implementation of the Recommended Build Alternative. The phased implementation would upgrade the existing TI by constructing roundabouts at both existing TI ramp terminals. The Casa Blanca Bypass road and bridge could be part of the TI terminal upgrade phase, phased separately, or constructed with the ultimate TI bridge reconstruction. When the ultimate TI configuration is constructed, the southernmost roundabout would be used for the Casa Blanca Road Bypass intersection with SR 587 and the eastbound ramps would be reconstructed into a diamond configuration and shifted closer to I-10 to terminate in a new roundabout. The westbound ramps would also be reconstructed in a diamond configuration and would terminate in the roundabout that had been constructed in the earlier phase. These phasing opportunities provide ADOT and the Community some flexibility on how and when to construct the TI improvements based on available funding.

Alternatively, if the ultimate TI configuration is constructed at one time, traffic control would be substantial to reconfigure this TI. While there are substantial portions of the reconfiguration that can be constructed offline, including both the proposed Casa Blanca Bypass and SR 587 bridges and the Casa Blanca Bypass realignment, lane and shoulder closures would be needed around the existing intersections to convert them to roundabouts. Short-term closures would also be needed for the new crossroad alignment tie-in points. Some closures of up to several weeks may be required for each of the four ramp reconstructions as well as for Casa Blanca Road and old Highway 93. Short-term I-10 lane closures and/or detours would be necessary to set girders and pour the new bridge decks and to remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

With the reconfiguration of the SR 587/Casa Blanca Road TI and the addition of the Casa Blanca Bypass, the Recommended Build Alternative drainage improvement would primarily focus on capturing and conveying on-site drainage to the TI infield basins and reestablishing the existing flow patterns. The Recommended Build Alternative would have an on-site system for the roundabouts and roadway between the roundabouts using curb and gutter with ADOT Standard C-15.92, C-15.91, and C-15.20 inlets to control spread and depth in accordance with the ADOT RDG. Multiple culverts would need to be constructed under I-10 and the proposed TI ramps to reestablish the existing flow patterns.

The ramps and Casa Blanca Bypass would primarily handle on-site drainage through sheet flow into the existing desert drainage patterns. Areas with guardrail would be the exception because the guardrail would have embankment curb to collect and convey the pavement drainage to an area inlet at the guardrail end section. The runoff would then be conveyed through a broken back slope culvert located within the fill section and released either into drainage basins or existing terrain, depending on the location.

Off-site flow patterns would be maintained through a series of pass-through culverts. There would be a large area available between the ramps and main line for storage and release of on-site stormwater, controlling the additional pavement runoff. Pavement runoff would be discharged through available cross culverts under the I-10 main line and ramps and returned to the surrounding terrain as part of the pass-through drainage system along the I-10 corridor.

Based on information provided by the Community, there may be a flooding/water impounding issue along the east side of Casa Blanca Road and SR 587 on the east side of I-10. The proposed TI reconfiguration provides an opportunity with some new infield areas to potentially help redirect and store some of these off-site flows. This document assumes that some additional culverts would be added to address this condition, but the final designer should coordinate this with the Community and ADOT directly after some additional drainage analysis and address it accordingly.

Utility Impacts

This option would potentially affect an overhead power line that runs along SR 587, a dual gas line that crosses under SR 587 east of and roughly parallel to I-10, and a telephone line that crosses under I-10 south of the existing bridge. There would also be impacts to several of the lighting electrical conduits that run throughout the TI. A more detailed utility impact assessment would need to be completed as the project design advances.

Items to be aware of/avoid include:

- This TI exists in an area with environmental sensitivity, so any ground-disturbing activity associated with this area should be mindful of the environmental mitigation measures in the NEPA document.
- Potential for phased construction
- Potential for off-site drainage issues that could influence the drainage design

- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations
- Temporary roadway closures should be carefully considered as it applies to access and potential I-10 detour events that often happen with no notice.
- The geometric design of the Casa Blanca Road Bypass should carefully consider the decreasing design speeds as it approaches the roundabout. In addition, the southbound SR 587 high-speed approach to the northernmost roundabout should be carefully designed as well.
- Final design refinement could alter geometry, intersection layouts, drainage conveyances, etc. to optimize constructability, improve traffic operations, improve maintainability, or avoid or minimize utility impacts.

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

Gasline Road (GL3)

General Description

Gasline Road is a north-south oriented roadway that crosses I-10 at a large skew angle at the north end of Gila Farms. Because of this, the existing bridge was built with a five-span configuration to keep span lengths as short as possible, but this resulted in bridge piers just outside of both the inside and outside shoulders. As a result, the existing Gasline Road bridge would need to be replaced rather than widened like Goodyear and Nelson Roads to be compatible with the I-10 corridor widening. The Recommended Build Alternative for the bridge replacement is to construct a new bridge on a parallel alignment to the east of the existing bridge, primarily to be able to keep the existing bridge open for Gila Farm activities.

Roadway Features

The proposed horizontal alignment of this option would be offset to the east of the existing alignment to avoid the existing twin gas lines, an irrigation facility, and an existing overhead powerline that run parallel and west of the existing roadway. The vertical alignment would be similar to the existing alignment, except that the proposed vertical alignment would be raised by several feet to account for the increased structure depth of the bridge and to restore 16.5 feet of vertical clearance over I-10.

The new vertical alignment at Gasline Road would provide a design speed of 50 mph. This is because Gasline Road crosses I-10 on a north-south alignment, creating a highly skewed crossing with I-10 as it does today. To minimize new ROW, the skew angle was maintained, but the bridge spans had to dramatically increase compared to the existing bridge to accommodate the I-10 improvements, and therefore the depth of the structure depth increased, pushing the proposed profile nearly 8 feet higher than the existing bridge. Increasing the design speed to 55 mph to match the other grade separations would have expanded the footprint even more and increased the ROW acquisitions accordingly. This additional impact seemed unnecessary considering the predominant use of this crossing.

The new bridge would be a two-span bridge and the face of abutment would be offset 30 feet from the outside travel lane edge to accommodate future outside I-10 widening, should it ever be required. Because of the existing bridge piers conflicting with the median widening, the existing Gasline Road bridge would need to be demolished prior to the completion of the I-10 widening.

The proposed typical section would be a two-way, two-lane crowned roadway with a normal cross slope of 2 percent to the outside. The new crossing would have shoulders that could be used for bikes as well as for wide farm equipment that may cross I-10 within Gila Farms. Since the design speed is 50 mph on Gasline Road, the pedestrian facilities would be protected with concrete barrier on the bridge. Off of the bridge, guardrail would be continued to protect both the pedestrian facilities and 3:1 roadway side slopes. Once the fill height is reduced and the slopes transition to 4:1, the guardrail would end, and the pedestrian walkways would shift onto Gasline Road's shoulder. At the limits of reconstruction, Gasline Road's shoulders would be tapered down to the existing 1.5-foot shoulder to match the existing roadway section outside of ADOT's ROW. Cattle guards would be installed at the ADOT ROW and connected to ADOT's ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Bridge Features

See Section 4.5.5 for the Gasline Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

New ROW would be needed in all four quadrants along the crossroad approaches to accommodate the shift to the east and widening of Gasline Road. The Gasline Road widening would displace access roads in the southwest and northeast quadrants, which would be reconstructed by the project. Irrigation channels and structures would also need to be reconstructed in the northwest and northeast quadrants. TCEs would be required for the reconstruction of the access roads and irrigation infrastructure in the southwest, northwest, and northeast quadrants. Approximately 4.50 acres of new ROW and 2.0 acres of TCEs would be needed for the Gasline Road improvements. All the ROW and TCEs would be acquired from tribal land.

No new access control would be acquired along Gasline Road.

Constructability and Maintenance of Traffic

The new bridge and portions of the roadway approaches would be built entirely offline. Partial lane closures would likely be needed given the elevation difference between the existing and proposed Gasline Road profiles. The new approach embankment would encroach on and cover part of the existing approaches. Short-term Gasline Road closures would be needed for the final geometric tie-ins. Short-term I-10 lane closures would be necessary to set girders, pour the new bridge deck, and then remove the existing bridge. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Drainage improvements would consist of embankment curb to collect and convey pavement drainage within the limits of the guardrail similar to existing conditions. Concentrated flow developing along the embankment curb would be collected through an inlet located at the end of the guardrail limits. The runoff would be conveyed through a broken back slope culvert located within the fill section and released to the existing terrain, like the existing condition drainage. Outside of the limits of guardrail, the pavement drainage would sheet flow off the roadway.

There is an existing 36-inch x 22-inch CMP under I-10 that would be affected by the new fill slopes and would need to be reconstructed. Additionally, there are three 48-inch concrete drainage culverts crossing under the Gasline Road embankment on the west side of I-10. These culverts would need to be extended to perpetuate the drainage flow patterns toward the north under Gasline Road. The off-site flows that concentrate along I-10 at Gasline Road are attributable to the existing runoff patterns associated the Sacaton Mountains located southwest of Gasline Road.

Utility Impacts

The Gasline Road reconstruction would potentially affect the underground telephone line and the underground irrigation line that cross I-10 to the east of the crossroad. Given the height of the new fill, it is possible that the irrigation ditches and overhead powerlines on the west side of Gasline Road would be affected on the approaches away from I-10. The two underground gas lines to the west of Gasline Road should not be affected by the roadway improvements. A more detailed utility impact assessment would need to be completed as the project design advances.

Items to be aware of/avoid include:

- Construction phasing to maintain Gasline Road during construction
- Access roads in the southwest, northwest, and northeast quadrants
- Irrigation infrastructure in the southwest, northwest, and northeast quadrants
- Two 10-inch natural gas lines and other utilities that run parallel to and on the west side of Gasline Road that should be avoided
- Three 48-inch concrete drainage culverts crossing Gasline Road on the west side of I-10
- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

Seed Farm Road (SF4)

General Description

Seed Farm Road, sometimes referred to as Indian Road 24, is currently a grade separation with no access to I-10. In response to requests by the Community, and consistent with long-range transportation planning documents done for the area including MAG's 2009 *Interstate 8 and Interstate 10 Hidden Valley Transportation Framework Study*, the Recommended Build Alternative would convert Seed Farm Road to a new spread diamond-type TI with I-10. The Recommended Build Alternative would also replace the bridge to the south of the existing bridge but retain the same skew angle over I-10 that exists today to minimize the ROW footprint of the spread diamond ramps. A spread diamond configuration was chosen over a tight diamond configuration because a spread diamond TI is a more appropriate and context-sensitive choice for a rural TI.

Roadway Features

The proposed Seed Farm Road horizontal alignment would shift to the south and would retain the same skew across I-10 that exists today. Large-radius reversing curves on either side of the bridge would complete the tie-in locations. Four new ramps would be added to convert the crossroad into a TI. The ramp terminals would be over 1,100 feet apart. A horizontal shift to the south was preferred compared to the north to avoid affecting an existing overhead power line, although the ramp construction may still require some modifications to that facility but should be avoided if possible.

The proposed vertical alignment would crest over I-10 and would be set high enough to provide a minimum of 16.5 feet of vertical clearance over I-10. The proposed ramp profiles would largely stay flat and at-grade for the length of the ramp.

The ramp terminals are expected to be stop sign-controlled intersections given the relatively low volumes. Furthermore, the stop sign-controlled intersections avoid using signal mast arms or roundabouts that could be challenging for wide or tall agricultural equipment to pass through.

The proposed typical section would be a two-way, two-lane crowned roadway with a normal cross slope of 2 percent to the outside. The proposed Seed Farm Road would have shoulders and raised sidewalks. The sidewalk and curb ramps would be ADA compliant. The proposed shoulders would provide a location for bikes to cross over I-10 and accommodate wide agricultural equipment to cross I-10 between the Gila Farm fields.

The Seed Farm Road TI would have a design speed of 45 mph, so the pedestrian facilities would be behind raised curb and gutter and would not be barrier protected. The TI would be reconstructed with side slopes that are not steeper than 4:1. Cattle guards would be installed at the limits of ADOT ROW and connected to ADOT's ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Seed Farm Road is used by Gila Farms and cannot be closed for construction. To facilitate Seed Farm Road being open throughout construction, the new bridge would be constructed parallel to the existing bridge. During the construction of the new bridge, temporary retaining walls may be needed to support the existing bridge abutments. Replacing the existing Seed Farm Road bridge would increase its vertical clearance over I-10 to a minimum of 16.5 feet, which is greater than the existing bridge, and the new bridge would be a two-span bridge with the face of abutments offset 30 feet from the outside edge of the I-10 travel lane to allow for future I-10 widening, should they ever be needed.

Outside of the existing ADOT ROW limits, Seed Farm Road is unpaved because its primary use today is to operate Gila Farms. With the introduction of a new TI at I-10, It is expected that traffic volumes would increase on this roadway, especially between I-10 and Sacaton. To mitigate negative air quality impacts (particularly particulate pollution), ADOT requested that the Community commit to paving Seed Farm Road between I-10 and Sacaton for approximately 2 miles prior to the TI opening. No concerns were raised by the Community regarding this request.

Bridge Features

See Section 4.5.5 for the Seed Farm Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

Approximately 38.70 acres of new ROW would be needed, split among all four quadrants along the crossroad approaches and the new TI ramps. The Seed Farm Road TI construction would affect access roads and irrigation infrastructure in all four quadrants, which would require 8.79 acres of TCEs to reconstruct those facilities. All the new ROW and TCEs would be acquired from tribal land. It must be noted that one allotted parcel does exist in the area near the gore area of the proposed eastbound exit ramp. The proposed TI design purposefully avoids impacts to this parcel to facilitate the implementation plan described in Chapter 6.

In existing condition, Seed Farm Road does not have full or right-in/right-out access control. With the improvements converting Seed Farm Road from a grade separation to a TI, access control would need to be added to protect the integrity of the TI. Full and right-in/right-out access control would be added to all four quadrants along Seed Farm Road. All access control would be acquired from tribal parcels.

Constructability and Maintenance of Traffic

Seed Farm Road would be open for most of the construction period because most of the proposed improvements could be built offline and away from existing traffic. Seed Farm Road would only need to be closed briefly for the geometric tie-in points along either end of the improvements. Short-term I-10 lane closures or detours would be necessary to set girders, pour the new bridge deck, and remove the existing bridge. Constructing the ramps before the bridge work could provide a convenient I-10 detour route for these activities that require I-10's closure. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

With Seed Farm Road being converted from a grade separation to a full diamond TI, the drainage improvements would require a complete reconfiguration of on-site drainage infrastructure. Within the limits of ADOT's ROW, curb and gutter with ADOT Standard C-15.92, C-15.91, and C-15.20 inlets would be used to control spread and depth within the roadway in accordance with ADOT's RDG. The on-site drainage system would convey the pavement runoff to basins between I-10 and the ramps. Drainage outfalls from the infield basins, if needed, would need to be coordinated during final design.

Off-site flow patterns would be reestablished through a series of pass-through culverts located through the crossroad and ramp embankments. There is a large area available between the ramps and main line for potential storage of on-site runoff.

Utility Impacts

The Seed Farm Road reconstruction would affect the 4-inch gas line on the south side of Seed Farm Road and the irrigation ditches/pipes that exist in all four quadrants of the new Seed Farm Road TI. The overhead power line to the north of existing Seed Farm Road would likely only be affected in the location where the new ramps cross the overhead power line. A more detailed utility impact assessment would need to be completed as the project design advances.

Items to be aware of/avoid include:

- Construction phasing to keep Seed Farm Road open during construction, and to build the ramps early to provide an I-10 detour for those bridge activities that require I-10 closures
- Access roads in all four quadrants
- Irrigation infrastructure in all four quadrants
- Relocation of Terrace Road on east side of I-10
- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations
- Coordination with the Community to have Seed Farm Road paved east of the TI into Sacaton before the TI opens to traffic
- Final design refinement could alter geometry, intersection layouts, drainage conveyances, etc. to optimize constructability, improve traffic operations, improve maintainability, or avoid or minimize utility impacts.

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

Dirk Lay Road (DL4)

General Description

The existing Dirk Lay Road grade separation is rarely, if ever, used by the Community; the roadways leading to this crossing are not maintained by the Community, nor are they continuous to the north through Gila Farms; and the existing five-span bridge configuration is not compatible with the Recommended Build Alternative for the I-10 main line. As a result, the Recommended Build Alternative would remove the bridge, approach roadways and embankments; restore the area back to a native desert condition; and return the associated crossroad ROW back to the Community.

Roadway Features

The bridge would be demolished and all associated elements, including abutments, wingwalls, and roadway approaches, would be removed. The approach roadway embankments would also be removed down to the native ground levels and restored as close as possible to the native ground conditions, resulting in no traces of the crossing.

Removal of the Dirk Lay Road bridge would need to happen prior to the I-10 widening because of the existing bridge span configuration. Earthwork from the embankment removal would be reused elsewhere in the project corridor, most likely for construction of the Seed Farm Road TI.

Bridge Features

See Section 4.5.5 for the Dirk Lay Road Recommended Build Alternative bridge discussion.

Right-of-way Requirements

The Recommended Build Alternative would return approximately 8.45 acres of ROW back to the Community. This would all occur within tribal land.

Access control does not exist along Dirk Lay Road and no changes would be made to access control at Dirk Lay Road.

Constructability and Maintenance of Traffic

Short-term I-10 lane closures would be necessary to remove the existing bridge. Alternatively, temporary median crossovers could be constructed to keep one lane open each direction while the bridge is removed half at a time. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Natural desert sheet-flow drainage patterns would be restored in the area to the extent possible.

Utility Impacts

There would be no utility impacts with this option.

Items to be aware of/avoid include:

- Desert restoration plan
- Modifications to the existing ADOT access control fencing

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

SR 387/SR 187/Pinal Avenue TI (PA3)

The Recommended Build Alternative proposes a deck widening for the existing bridge, coupled with a new second bridge adjacent to and north of the existing bridge. The Recommended Build Alternative also proposes the reconstruction of the roadway approaches to accommodate an additional eastbound lane, wider shoulders, pedestrian facilities, and left-turn lane pockets at the ramp terminals. If the existing bridge were widened to accommodate the necessary width of the proposed cross section, the vertical clearance would fall well below 16 feet; therefore, a new bridge was needed for half of the roadway to minimize the widening impacts of the existing bridge. All four ramps would either be widened or partially realigned, although all generally follow the existing ramp alignments. The Recommended Build Alternative would also include the replacement of the existing bridge railing and guardrail.

Roadway Features

The proposed SR 387/SR 187/Pinal Avenue TI would expand its current diamond configuration consisting of a single two-lane bridge into a three-lane (two eastbound and one westbound), twin bridge diamond configuration. The additional directional volumes for the eastbound lanes, as well as the increased volumes for the northbound turn lanes, would require additional roadway width over I-10. The existing bridge would carry two eastbound lanes and would be widened to meet the proposed lane, shoulder, and sidewalk width requirements. A new bridge would be constructed north of the existing bridge for the single westbound lane, shoulders, and sidewalks. The new bridge profile would be slightly elevated compared to the existing bridge because of the longer spans of the new bridge compared to the existing bridge, with the two profiles reconnecting on either side of the bridge. The majority of the widening within this TI occurs to the north to avoid impacts to nearby environmentally sensitive areas, particularly in the southeast quadrant.

The free-flow right-turn movement from the eastbound exit ramp to southbound Pinal Avenue would remain and would need to be realigned due to the shifting of the eastbound (west side) intersection 150 feet to the east. The westbound (east side) intersection of the TI has shifted north to accommodate the additional eastbound through lane and two left-turn lanes, resulting in a tie-in point to the existing roadway that is north of the SR 387/SR 187 intersection. This shift in location of the intersection elevates the intersection and all related elements. The ramp terminals would be signal-controlled intersections. The ramp gores on I-10 would be reconstructed to provide parallel ramps for both entrance and exit ramps. This configuration increases the merge length and provides additional acceleration and deceleration for vehicles using the ramps.

The proposed typical section would be a two-way crowned roadway with a normal cross slope of 2 percent to the outside. In the new configuration, the roadway would have three through lanes (one westbound and two eastbound), a single left-turn lane at the eastbound (west side) intersection, and dual left-turn lanes at the westbound (east side) intersection. The proposed crossroad would have shoulders and raised sidewalks. The sidewalk and curb ramps would be ADA compliant. The proposed shoulders would provide a location for bikes to cross over I-10.

The SR 387/SR 187/Pinal Avenue TI would have a design speed of 45 mph, so the pedestrian facilities would be behind a raised curb and gutter and not barrier protected. The TI would be constructed with side slopes that are 4:1 or flatter. Cattle guards would be installed at the limits of ADOT ROW and connected to ADOT's ROW fencing to prevent wild horses and other large animals from crossing over or entering I-10.

Bridge Features

See Section 4.5.5 for the SR 387/SR 187/Pinal Avenue TI Recommended Build Alternative bridge discussion.

Right-of-way Requirements

Approximately 0.3 acre of new ROW would be needed for improvements in the northwest and northeast quadrants along the crossroad approaches. All new ROW would be acquired from tribal land.

Access control exists at the SR 387/SR187/Pinal Avenue TI. The improvements would extend the full access control limits in all four quadrants and right-in/right-out access control in the northwest and southwest quadrants. All access control would be acquired from tribal parcels.

Constructability and Maintenance of Traffic

The new bridge and nearly half of the new TI approaches would be built entirely offline. Once the new bridge is constructed, traffic would need to be shifted to the new bridge so that the existing bridge can be widened. Traffic shifts would be necessary to complete the asphalt and concrete paving and signal systems. Short-term I-10 lane closures and detours would be necessary to set bridge girders and to remove and pour bridge decks. This work would likely be done by detouring the I-10 traffic through the existing TI ramp terminals. Advance traffic control notification to the public would be needed prior to restrictions, closures, or major traffic control changes.

Drainage Features

Drainage improvements would primarily consist of the reconfiguration of the existing on-site drainage system, which currently consists of curb and gutter and spillways. Improvements to the crossroad's on-site drainage would include curb and gutter with ADOT Standard C-15.92, C-15.91, and C-15.20 inlets to control stormwater spread and depth in accordance with the ADOT RDG. The on-site drainage system would convey the pavement runoff to infield basins.

Off-site flow patterns would be maintained a series of pass-through culverts located in the crossroad and ramp embankments. There are two 10-foot x 6-foot box culverts under the crossroad that would need to be extended on account of the proposed crossroad widening. If needed, there is a large area available between the ramps and main line for potential storage of on-site runoff.

Utility Impacts

The SR 387/SR 187/Pinal Avenue TI reconstruction would potentially affect ADOT underground power and ADOT irrigation lines, primarily at the reconstruction of the ramp terminals. On the east side of I-10, there is a 6-inch water line that may be affected by the widening of the roadway approach. A more detailed utility impact assessment will need to be completed as the project design advances.

Items to be aware of/avoid include:

- Environmentally sensitive areas in the southeast quadrant of the TI
- Extension of drainage culvert at the east intersection

- With the expected growth in Casa Grande, the TI design should consider additional future modifications to accommodate additional demand, including more lanes or even a future conversion to a DDI.
- Cattle guards placed across both approaches, and compatibility of the cattle guards with the proposed bike and pedestrian accommodations
- Final design refinement could alter geometry, intersection layouts, drainage conveyances, etc. to optimize constructability, improve traffic operations, improve maintainability, or avoid or minimize utility impacts.

All new bridges over I-10 would accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10 with 16.5 feet of minimum vertical clearance over all lanes and shoulders.

See Appendix A for plan exhibits and the separate and more detailed 15 percent level Stage I roll plot PDF file accompanying this report depicting the Recommended Build Alternative.

ADOT Freeway Management System Fiber Optic Trunk Line Build Option

The Recommended Build Alternative proposes the build option for the ADOT FMS fiber optic trunk line. This would involve the installation of one or more multiduct conduits inside the existing western I-10 ROW line. ADOT's FMS fiber line would be located entirely within the existing I-10 easement. Pull boxes would be installed at an interval recommended by the fiber optic manufacturer or based on recommendations from the ADOT maintenance group. The trunk line would include occasional crossings under I-10 to connect FMS infrastructure located along the westbound (east side) of I-10.

It is anticipated that the conduit construction would require at least four installation methods over the 26-mile corridor. Over 90 percent of the corridor installation would be done via a direct bury plowed installation, which is a fast, cost-effective, and low-impact method of construction. In areas where the proposed conduit would cross under existing embankments or active roadways, a directional drill method would be employed. Through the Sacaton Mountains and the rock cuts that exist for about three-quarters of a mile, the conduit would either be rock drilled or rock trenched in this area, although it is unclear at this time which would be more viable without further geotechnical investigations. Finally, the last installation method would be conduit hangers under the I-10 bridges that cross over the Gila River (which is not part of this study but merits mentioning).

There is a possibility that a joint use trench may be used with this FMS conduit that could also be used in the future by Gila River Telecommunications, Inc. (GRTI), a tribal-owned business enterprise. Many technical and legal challenges would need to be overcome before this could occur and they are outside the scope of this project, but it is worth noting because conversations are actively underway pursuing this opportunity.

4.4 Earthwork

The proposed I-10 widening project and modifications to the crossroads and TIs were modeled to determine earthwork quantities. A summary of the estimated earthwork quantities, broken down by the I-10 main line and each crossroad, is shown in Table 4-5. Note that the balance calculations in Table 4-5 are computed by row for the convenience of this discussion, and not by implementation segment/phase as shown in Chapter 6. The earthwork balance would ultimately be determined by how the project segments/phases are packaged for construction, so values could increase or decrease depending on the project delivery packages.

Overall, the project is a borrow project with over 562,000 cubic yards (CY) of borrow needed to fill in the I-10 median and another 1,020,000 CY of net borrow for the 10 crossroads. It is assumed that all the excavation from the project is acceptable material and can be reused as embankment on the project. There is an assumed overall shrink of 15 percent for all excavation sourced from the main line and crossroads; however, there is a small section of the I-10 excavation through the Sacaton Mountain rock cuts that will swell, so that should be factored into the final design earthwork balance, which will reduce the borrow quantities slightly.

A specific borrow source has not been identified; however, there are commercial sand and gravel sources available in the vicinity of the I-10 corridor along the Gila River. Consequently, it is not anticipated that the borrow would have to be transported any more than 20 miles one-way, and all haul is expected to occur with legal loads.

Table 4-5. Estimated project earthwork quantities

Location	Total excavation (roadway/overexcavation/ drainage) (cubic yards)	Shrink (-15%)/ swell (10%) (cubic yards)	Embankments (cubic yards)	Net in-place borrow (+) or waste (-) (cubic yards)
I-10 main line	124,086	(1,595)	684,570	562,079
Wild Horse Pass Boulevard TI	39,025	(5,854)	148,073	114,902
SR 347/Queen Creek Road TI	12,160	(1,824)	230,100	219,764
Riggs Road TI	4,842	(726)	47,300	43,184
Goodyear Road	1,488	(223)	35,810	34,545
Nelson Road	868	(130)	32,780	32,042
SR 587/Casa Blanca Road TI and Casa Blanca Bypass	11,095	(1,664)	312,427	302,996
Gasline Road	6,310	(947)	80,500	75,137
Seed Farm Road TI	14,400	(2,160)	190,000	177,760
Dirk Lay Road	46,545	(6,982)	0	(39,563)
SR 387/SR 187/Pinal Avenue TI	2,450	(368)	59,900	57,818
Fiber optic trunk line	0	0	0	0
Total	**263,269**	**(22,472)**	**1,821,460**	**1,580,663**

4.5 Structures

This section describes the initial bridge study for the modification of existing bridge structures and new bridge structures proposed as part of the Recommended Build Alternative. All existing and new bridge structures for the project are underpasses crossing over I-10. The study includes recommendations for rehabilitating and/or widening existing underpass structures and replacing existing bridge structures, where required.

4.5.1 Introduction

The Recommended Build Alternative would affect bridge structures at all 10 crossroads within the project limits, 6 of which are TIs. Six existing structures require modifications, rehabilitation, and/or widening to meet current

design standards and to accommodate the project's lane, shoulder, and pedestrian requirements. Four existing structures would be rehabilitated (deck, barrier, or both), three existing structures would be widened, three existing structures would be replaced, one existing structure would be removed without replacement, and eight new structures would be added. All new bridges would be able to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it every be needed.

This study includes an evaluation of potential structural alternatives for modifying the existing bridge structures and for new bridge structure types. Alternatives were evaluated for their ability to maintain minimum vertical clearances during construction, minimum final vertical clearance, maintenance of traffic during construction, constructability, aesthetics, construction costs, and minimizing impacts to the road profile grade, utilities, as well as ROW. Sites with unique characteristics are discussed at the specific bridge crossing section.

4.5.2 Existing Bridge Structures Modification Considerations

All existing bridge superstructures are multi span Steel I-girders built in the 1960s except the two furthest northern structures at Wild Horse Pass Boulevard and SR 347/Queen Creek Road, which are precast prestressed AASHTO I-girders constructed within the last 30 years. The existing bridge structures data are summarized in Section 1.3.7. A copy of the most recent existing bridge inspection reports is provided in Appendix H.

Because the condition of each existing bridge is unique, numerous meetings were held with ADOT Bridge group during the evaluation process to determine existing bridge rehabilitation and widening criteria listed below as well as its application.

Existing Bridge Barriers

All existing bridges that have the bridge barrier that predate the Jersey and F-shape bridge concrete barrier are to be replaced with the 38-inch Single Slope bridge concrete barrier and transition (SD 1.10) in the current ADOT bridge standard details. None of the affected bridges in the project limits have jersey concrete barrier. The 38-inch Single Slope bridge barrier meets MASH 16 requirements for TL 4. The ADOT Bridge Group Standard 34-inch F-Shape bridge concrete barriers meet TL4 crash test level requirements of NCHRP 350.

Existing Bridge Deck

Deck replacement shall be considered if existing bridge deck has a National Bridge Inventory (NBI) condition rating 6 or lower, the presence of exposed rebar, or heavy efflorescence present at the deck soffit. In cases where deck replacement is warranted, the deck thickness shall meet the requirements of the current *ADOT Bridge Design Guidelines*.

Existing Superstructure Main Elements

Existing superstructure main elements, such as girder capacity, shall be evaluated when loading on the element is modified from that of the existing condition. The final designer shall consult with ADOT Bridge Group for design direction if the element exceeds its design capacity or is overstressed.

4.5.3 New Bridge Structures and Bridge Widening Alternatives

The primary bridge superstructure types used for the Phoenix urban freeway system include the cast-in-place post-tensioned (CIP PT) concrete box girder, the AASHTO precast prestressed concrete I-girder, and occasional use of steel I-girders. All three structure types have been historically used for bridge widening construction depending on the existing bridge type and specific site characteristic.

Existing bridges within this project are either steel I-girders or precast prestressed concrete I-girders, and all the existing bridges which require widening are steel I-girder bridges.

Cast-in-place Post-tensioned Concrete Box Girder

CIP PT box girder bridges are widely used in both Phoenix and Tucson due to their shallow superstructure depth, ability to accommodate long span requirements, flexibility with complex superstructure geometry such as curved or flared bridges, and their aesthetically pleasing slender shape.

CIP PT box girders are a feasible alternative for new bridge structures on this project but was not selected as the recommended alternative for new bridges or for bridge widenings for the following reasons:

- All new and existing bridge structures have simple geometry and reasonable span lengths that can be easily accommodated by steel girders and precast prestressed concrete girders.
- CIP PT box girder construction over live traffic, which would be the case for this project, is generally less cost effective than AASHTO I-girder construction over live traffic.
- The falsework requirement would significantly increase I-10 closure time, traffic impacts, and construction related safety risks for workers as well as the traveling public.
- All existing structures, which require widening are steel I-girders. The CIP PT box girder stiff superstructure is incompatible with the steel I girder's flexible superstructure for widening consideration.
- A minimum vertical clearance of 16.5 feet is desired over I-10 traffic during construction. The added depth due to the falsework requirement would make this an unfeasible alternative for widening of the existing bridges, which currently have vertical clearances below 16.5 feet.
- CIP PT box girder would be aesthetically incompatible with the existing steel I-girder or precast AASHTO I-girder bridges.

Steel Girders

Steel girders are not traditionally selected for new bridge construction in Arizona area because steel is typically not cost competitive to concrete due to the long fabrication and delivery schedule and because steel bridges require additional maintenance. As a result, the steel girder superstructure alternative was eliminated from the conceptual consideration for the new bridge structures of this project.

For existing steel I-girder bridge widenings, steel I-girders are an excellent alternative and typically used to maintain structural compatibility due to flexibility and temperature change to name just a few.

Since all the existing structures that need to be widened in this project are steel I-girders, the steel I-girder superstructure alternative is a feasible (and most likely) option for all bridge widenings associated with this project.

Advantages of using steel I-girders for the widening of the existing steel girder bridges include the following:

- **Matching Existing Bridge**: This superstructure configuration is similar to the existing bridges and would match the existing structural behavior and bridge aesthetic.
- **Vertical Clearance**: All existing steel girders have 36 ksi yield strength. Higher yield strength steel I-girders could be used for the widening to reduce girder depth to maintain the final vertical clearance over I-10, if desired.

- **Reduces Traffic Impacts and Safety Concerns**: The girder placement and deck construction would require only short duration closures of I-10 traffic, especially compared to CIP Box Girder types, which minimizes construction related safety concerns and traffic impacts and eliminates falsework.

Disadvantages of using steel I-girders for the widening of the existing steel I-girder bridges include the following:

- **I-10 Closure Duration**: A slightly longer I-10 closure time would be required compared to precast concrete I-girder construction to allow for the installation of new steel cross frame members to the existing girder.

Precast Prestressed Concrete I-Girders/Beams

Many bridges in the Maricopa Regional Freeway System were constructed using precast prestressed concrete I-girders and the newer Wild Horse Pass and SR 347/Queen Creek bridges on I-10 are two examples. Both AASHTO I-girders and Bulb-Tee girders are feasible superstructure types. Precast I-girder bridges in Arizona have mainly consisted of AASHTO I-girders up until the past five to ten years. During that time, Bulb-Tee girders have become a popular alternative. Bulb-Tee girders became widely used after the recent completion of South Mountain Freeway due to the girder's lighter section, efficient structural section, and capacity to accommodate longer span lengths than the AASHTO I-girder. Bulb-Tee girders have also become cost competitive compared to AASHTO I-girders with multiple local suppliers owning the girder formwork.

Advantages of using precast sections for new structure construction include the following:

- **Reduces Traffic Impacts and Safety Concerns**: The use of precast girders eliminates the need for falsework. The girder erection and deck construction would require much shorter duration closures of I-10 when compared to CIP box girder construction; thereby, reducing construction related safety concerns and traffic impacts.
- **Reduces Construction Time**: The construction of precast girders takes less time than that of post-tensioned box girder.
- **Cost Saving**: Precast girder/beam structures are typically more cost effective when constructed over traffic, waterways, railroads, or other obstacles that preclude the use of falsework or soffit fill. They also provide a significant cost saving over steel alternatives.
- **Aesthetic Similarity with Existing Bridge**: This superstructure type is similar to the newest bridges along the corridor, which would preserve continuity with the corridor bridge aesthetics.

Disadvantages of using precast concrete sections for new structure construction include the following:

- **Superstructure Depth**: A precast girder bridge will require a deeper superstructure section than CIP PT box girder, which results in a higher vertical profile and larger embankments on the approaches.

Precast prestressed concrete I-girders/box beams were considered for bridge widenings on this project. Its structural flexibility is much closer to that of steel I-girders than the precast box beam. Because of its benefits, it is a feasible option for the conceptual evaluation of bridge widenings.

Advantages of using precast I-girder sections for existing steel I-girder bridge widenings include the following:

- **Cost Saving**: Precast concrete I-girder widenings would be more cost effective than steel I-girder widenings.
- **Reduce Construction Time**: Precast I-girders erection and deck construction would require only short duration closure of I-10 by eliminating the need to install new steel cross-frame members between the new and existing girders.

Disadvantages of using precast sections for existing steel I-girder bridge widenings include the following:

- **Vertical Clearance and Cost**: ADOT requires the widened structure final vertical clearance shall be the lesser of 16.5 feet or matching the existing vertical clearance. All three bridges requiring widening in this project have minimum vertical clearances less than 16.5 feet. A precast I-girder bridge will require a deeper superstructure section than a steel I-girder for the bridge widenings, which would reduce the existing minimum vertical clearance, below ADOT Bridge's minimum requirement. This challenge could be mitigated by lowering the I-10 main line profile or raising the existing roadway profile and jacking up the existing superstructure. Either of these options would significantly increase the cost.
- **Structural Incompatibility**: The flexibility of precast concrete I-girder sections, while similar, is still different than steel I-girders and steel I-girders are more sensitive to temperature change. As a result, the steel I-girder expands and contracts at a different rate than precast concrete I-girders. This difference in thermal properties could cause structural compatibility issues between the existing and widened structure.

Structure Alternative Recommendation

The following recommendation is used for the bridge cost estimates and the preliminary drawings included in Appendix A:

Superstructure:

- **Existing Steel Bridge Widenings**: A steel I-girder superstructures will be assumed for its structural compatibility advantage, its ease of construction over traffic, and its ability to meet final vertical clearance requirements.
- **New Bridges**: A precast prestressed concrete Bulb-Tee girder superstructure will be assumed for its cost effectiveness, its ease of construction over traffic, and its reduced maintenance requirements.

Substructure:

- **Existing Steel Bridge Widening**: All substructure modifications required for the bridge widenings are assumed to match the existing substructure elements except that the concrete drilled shafts would be used in lieu of steel piles at the existing abutment locations.
- **New Bridges**: The initial study assumes new bridges adjacent to the more recently constructed existing bridges such as Wild Horse Pass Boulevard TI underpass and SR 347/Queen Creek Road TI underpass would have similar substructure configurations as the existing structures. All new bridges at other crossings would assume stub abutments founded on drilled shafts with mechanically stabilized earth (MSE) walls behind the abutments to support the roadway embankment. This type of abutment is similar to the newer existing abutment system used within the corridor. The piers would consist of a dropped cap supported on round columns founded on spread footings.

4.5.4 Design Assumptions and Constructability Requirements

The initial evaluation of preferred alternatives for existing bridge structures rehabilitations, widening, and new bridge are based on the following requirements and design assumptions:

Vertical Clearance

A minimum vertical clearance of 16.5 feet, or the existing vertical clearance (whichever is less), over active traffic lanes is desirable during construction. Bridge widening alternatives shall provide 16.5', or the existing

vertical clearance (whichever is less), over I-10 in the final condition. All new structures shall have a minimum of 16.5' vertical clearance.

Concrete Strength

The ADOT Bridge Design Guidelines limit the initial compressive concrete strength to 5 ksi and final (28-day) concrete compressive strength to 6.5 ksi for precast girders constructed within the Phoenix Metropolitan area. ADOT Bridge Group has approved initial compressive concrete strength to 7 ksi and final compressive strengths up to 9 ksi for final design of this project.

Design Codes

ADOT Bridge Group's current policies are as follow:

- Existing bridge barrier replacement and/or deck rehabilitation would use existing bridge design specification or AASHTO Standard Specifications 17th edition for bridges previously designed using the AASHTO Standard Specifications.
- Widening of existing bridges shall be designed to use Load and Resistance Factor Design (LRFD), as amended by the *ADOT Bridge Design Guidelines*, for existing bridges that were previously designed using the *AASHTO Standard Specifications*.
- New bridge structures shall be designed in accordance with the current *ADOT Bridge Design Guidelines*.

Design Loads

- The existing bridge structures were originally designed for HS-20 live loading, some are with provisions for an additional 25 pounds per square foot of deck area for a future wearing surface. The widened structures and new structure should be designed for the HL-93 live load and additional future wearing surface in accordance with the current *ADOT Bridge Design Guidelines*.

Epoxy Concrete Overlay

One of the existing bridges (Goodyear Road) that is proposed to be widened as part of this project have a 1-inch epoxy concrete overlay. The overlay is not required to be extended with the bridge deck widenings.

Bridge Aesthetics

The existing Wild Horse Pass Boulevard bridge is the only existing bridge which has aesthetic treatment consisting of an aesthetic pattern on the blade columns.

The initial study assumes that the new Wild Horse Pass Boulevard bridge would match the substructure aesthetic treatment of the existing structure. All other new bridges in the corridor will assume piers consisting of concrete caps on round columns which is consistent with the older existing bridges.

The final bridge aesthetics should be addressed by the final designer of the bridges in conjunction with ADOT and the other applicable project stakeholders.

Maintenance of Traffic Operations

Minimizing impacts to the traveling public will be an important consideration in the bridge widening and new bridge type selection.

4.5.5 Summary of the Recommended Alternative Bridges

A summary of the new bridges and bridge modifications associated with the Recommended Build Alternative is presented in Table 4-6. A preliminary feasible alternative was selected at each location for cost estimating and preliminary drawing purposes. It is based upon the information known at the time of this report. A more detailed structure evaluation and selection process will be performed during the final design phase of the project.

Table 4-6. Summary of the Recommended Alternatives bridges

Location	Structure name	No. of spans	Total structure width *widening width **deck replacement width	Structure length	Proposed modification	Proposed minimum vertical clearance
Wild Horse Pass Boulevard TI	Wild Horse Pass Blvd TI underpass eastbound (existing) SN 02612	2	105'-5"	278'- 6 1/4"	Barrier replacement, median island and raised sidewalk removal, barrier installation for sidewalk, and restriping	Same as existing
	Wild Horse Pass TI underpass westbound (new)	2	47'-10"	264'- 0 1/8"	New precast prestressed concrete I-girder bridge	16.5'
SR 347/ Queen Creek Road TI	SR 347/Queen Creek Rd TI underpass eastbound (existing) SN 02302	2	99'-2"	263'- 8"	Barrier replacement, median island and raised sidewalk removal, barrier installation for sidewalk, and restriping	Same as existing
	SR 347/Queen Creek Rd TI underpass westbound (new)	2	47'-10"	264'- 0"	New precast prestressed concrete I-girder bridge	16.5'
Riggs Road TI	Riggs Road TI underpass westbound (existing) SN 01148	4	31'-2"	300'- 9 1/4"	Barrier replacement and deck rehabilitation	Same as existing
	Riggs Road TI underpass eastbound (new)	2	41'-7"	264'-11 1/2"	New precast prestressed concrete I-girder bridge	16.5
Goodyear Road	Goodyear Rd TI underpass (existing) SN 01149	4	60'-9" *36'-5"	300'- 9 1/4"	Bridge widening	16.5'
Nelson Road	Nelson Rd TI underpass (existing) SN 01213	4	60'-9" *34'-11"	292'-4 1/2"	Bridge widening	16.5'

Table 4-6. Summary of the Recommended Alternatives bridges

Location	Structure name	No. of spans	Total structure width *widening width **deck replacement width	Structure length	Proposed modification	Proposed minimum vertical clearance
SR 587/ Casa Blanca Road TI	SR 587/Casa Blanca Rd TI underpass (existing) SN 01214	4	35'-2"	298' - 5 3/4"	Bridge removal	N/A
	SR 587/Casa Blanca Rd TI underpass (new)	2	82'-4"	234'-3 1/8"	New precast concrete I-girder bridge	16.5’
	Casa Blanca Rd Bypass underpass (new)	4	60'-9"	365'-8"	New precast concrete I-girder bridge	16.5’
Gasline Road	Gasline Rd underpass (existing) SN 01215	5	31'-2"	450'-4 1/8"	Bridge removal	N/A
	Gasline Rd underpass (new)	2	60'-9"	368' - 0"	New precast prestressed concrete I-girder bridge	16.5'
Seed Farm Road TI	Seed Farm Rd underpass (existing) SN 01216	4	31'-2"	292'-4 1/2"	Bridge removal	N/A
	Seed Farm Rd TI underpass (new)	2	48'-4"	265'-11 5/8”	New precast prestressed concrete I-girder bridge	16.5’
Dirk Lay Road	Dirk Lay Rd underpass (existing) SN 01150	5	31'-2"	470'-4 1/4"	Bridge removal	N/A
SR 387/ SR 187/ Pinal Avenue TI	SR 387/SR 187/Pinal Avenue underpass eastbound (existing) SN 01151	4	41'-9" *6’-7” **4’	287'-1"	Barrier replacement, bridge widening, and partial deck replacement	16.25'
	SR 387/SR 187/Pinal Avenue underpass Westbound (New)	2	29'-7"	254' - 8 5/8"	New precast prestressed concrete girder bridge	16.5’

The drawings of the recommended alternatives can be found in Appendix A, and a detailed cost estimate for each location can be found in Appendix B.

Unless noted otherwise, it is anticipated that all or part of the existing concrete deck overhangs on the existing bridges would be removed to allow the widened portion of the bridge to be connected to the existing superstructure.

Wild Horse Pass Boulevard TI Underpass (Existing, Str. No. 2612, As-Built Milepost 162.54)

Existing Bridge Condition

Wild Horse Pass Boulevard TI underpass was constructed in 2004 under ADOT project number 202-C-501. The April-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 41, the Operating Rating as 85, and a structure sufficiency rating of 92.50.

The existing roadway on the structure consists of three westbound lanes and four eastbound lanes separated by a raised median. The bridge has a normal crown cross-slope of 2 percent that slopes down toward the edge of the deck. The structure has an 88-foot-0-inch clear roadway width and a 105-foot-5-inch out-to-out width, which includes combination pedestrian-traffic bridge railing with fence and a raised sidewalk on each side of the bridge.

The bridge horizontal alignment is on a tangent and skewed at 3.95 degrees from the existing I-10 median centerline. The existing structure is a two-span precast prestressed AASHTO I girder structure with span lengths of 136 feet-9 inches and a structure length of 278-feet-6¼ inches.

The existing substructure is comprised of stub abutments, with 3:1 slope paving, supported on drilled shafts at the abutments and a concrete cap supported by four bladed columns founded on a spread footing at the pier. The existing vertical clearance to I-10 is listed as 16.84 feet.

Proposed Bridge Modification

The existing bridge would be repurposed to serve eastbound traffic only after the new adjacent bridge is built. The existing deck would be restriped for four 15-foot wide lanes for eastbound traffic, a bike lane, a shoulder, and a two-way pedestrian walkway.

A modified 38-inch single slope inboard concrete barrier would be placed adjacent to the bike lane to barrier separate the two-way pedestrian walkway on the south side of the bridge. The location of the crown of the roadway would not be altered. The existing raised concrete median would be removed along with the northern combination pedestrian traffic bridge railing with fence and raised sidewalk which would be replaced with a 38-inch single slope concrete barrier.

Site-specific Issues

There are no site-specific issues for this bridge.

Wild Horse Pass TI Underpass WB (New)

Location

The proposed westbound Wild Horse Pass Boulevard TI underpass would cross I-10 approximately 52 feet south of the existing Wild Horse Pass Blvd TI underpass (Str. No. 2612, milepost 162.54), measured along the I-10 median centerline.

Proposed Condition

The proposed horizontal alignment would be on a tangent and is skewed at approximately 4.3 degrees from the existing I-10 median centerline. The proposed structure would have two equal 129-foot-6-inch spans and total length of 264-foot-1/8 inches. The proposed roadway on the structure would consist of three 12-foot westbound lanes with one 4-foot shoulder and one 5-foot shoulder, with a clear roadway width of 45 feet. The proposed superstructure width would also include two 38-inch single-slope barriers for a total bridge width of 47 feet-10 inches.

The proposed substructure would match the existing bridge which would consist of stub abutments founded on drilled shafts. The proposed 2:1 slope paving would be used in lieu of the existing 3:1 slope paving to provide a shorter structure for cost saving purpose. The piers would consist of a dropped cap supported on blade columns founded on spread footings to match the existing bridge.

Site-specific Issues

Existing underground electrical and fiber optic conduit is present within the proposed area. Final designer will need to verify potential conflicts with the proposed structure.

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed.

The span configuration of this bridge would be set to match the new Queen Creek Rd TI underpass WB to economize girder cost.

SR 347/Queen Creek Road TI Underpass (Existing, Str. No. 2302, As-Built Milepost 164.50)

Existing Bridge Condition

The SR 347/Queen Creek Road TI underpass was constructed in 1991 under ADOT project number IR-10-3(325). The March-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 41, the Operating Rating as 99, and a structure sufficiency rating of 86.40.

The existing roadway on the structure consists of four eastbound and three westbound lanes separated by a 4-foot wide raised median. The bridge has a normal crown cross-slope of 2 percent that slopes down toward the edge of the deck. The structure has a 92-foot-0-inch clear roadway width and a 99-foot-2-inch out to out width, which includes an ADOT Type A Barrier with fence on each side of the bridge.

The bridge horizontal alignment is on a tangent and is not skewed in respect to the existing I-10 median centerline. The existing structure is a two-span precast prestressed AASHTO I-girder structure with span lengths of 129 feet-6 inches and a structure length of 263 feet-8 inches.

The existing substructure is comprised of stub abutments, with 2:1 slope paving, supported on drilled shafts at the abutments and a concrete cap supported by four rounded columns founded on a spread footing at the pier. The existing vertical clearance to I-10 is listed as 16.71 feet.

Proposed Existing Bridge Modification

The existing bridge would be repurposed to serve eastbound traffic only after the new adjacent bridge is built. The existing deck would be restriped for four 15-foot wide lanes for eastbound traffic, a bike lane, a shoulder, and a two-way pedestrian walkway.

The existing raised concrete median would be removed along with the northern ADOT Type A Barrier with fence which would be replaced with a 38-inch single slope concrete barrier. A modified 38-inch single slope inboard concrete barrier would be placed adjacent to the bike lane to accommodate the two-way pedestrian walkway on the south side of the bridge. The location of the crown of the roadway would not be altered.

Site-specific Issues

There are no site-specific issues for this bridge.

SR 347/Queen Creek Road Underpass WB (New)

Location

The proposed westbound Queen Creek Road TI underpass would cross I-10 approximately 36 feet south of the existing SR 347/Queen Creek Road TI underpass (Str. No. 2302, milepost 164.50), measured along the I-10 median centerline.

Proposed Condition

The proposed horizontal alignment would be on a tangent and would not be skewed with respect to the existing I-10 median centerline. The proposed structure would have two equal 129-foot-6-inch spans and total length of 264 feet. The proposed roadway on the structure would consist of three 12-foot westbound lanes with one 4-foot shoulder and one 5-foot shoulder, with a clear roadway width of 45 feet. The proposed superstructure width would also include two 38-inch single-slope barriers for a total bridge width of 47 feet-10 inches.

The proposed substructure would be on stub abutments founded on drilled shafts with 2:1 slope paving, like the proposed Wild Horse Pass Boulevard structure. The piers would consist of a dropped cap supported on round columns founded on spread footings.

Site-specific Issues

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed.

Riggs Road TI Underpass (Existing, Str. No. 01148, As-Built Milepost 167.47)

Existing Bridge Condition

The Riggs Road TI underpass was constructed in 1967 under ADOT project number I-10-3(36)161. The June-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 44, the Operating Rating as 73, and a structure sufficiency rating of 53.10.

The existing roadway on the structure consists of two 12-foot lanes with two 1-foot shoulders with one lane in each direction of travel, for a clear road width of 26 feet. The bridge has a 7.5-inch thick concrete deck and a normal crown cross-slope of 1.5 percent that slopes downward toward the edge of the deck. The structure has a 26-foot-0-inch clear roadway width and an out-to-out width of 31 feet-2 inches, which includes a 2-foot-7-inch wide barrier on each side of the bridge which is comprised of a concrete curb, parapet, and rail.

The bridge horizontal alignment is on a tangent and is skewed at approximately 30 degrees from the existing I-10 median centerline. The existing structure is a four span steel I-girder bridge with span lengths of 55 feet-0 inches, 93 feet-0 inches, 93 feet-0 inches, and 55 feet-0 inches for a total structure length of 300 feet-9¼ inches.

The existing substructure are stub abutments on driven steel piles and a dropped cap supported on square columns founded on spread footings for the piers.

The existing minimum vertical clearance to I-10 is 16.02 feet and occurs at the inside shoulder of the westbound roadway, according to the Vertical & Horizontal Clearance Diagram dated 2-05-2019.

Proposed Existing Bridge Modification

The existing bridge would be repurposed to serve westbound traffic only after the new adjacent bridge is built. This proposed roadway would have one 5-foot-7-inch left shoulder, one 17-foot lane (a combination of a 12-foot lane and 5 feet for a right shoulder and/or bike use), and a 6-foot raised sidewalk.

The existing bridge barrier on both sides would be replaced with an ADOT combination pedestrian traffic bridge rail with fence on the north side and with a 38-inch single slope concrete barrier on the south side.

ADOT requested the Polyester Polymer Concrete (PPC) overlay to be applied to the existing deck. Final designer shall investigate upgrading the existing deck top concrete cover to meet the current design standard. It appears that the existing girders may have excess capacity to accommodate the additional loads. The existing girders appear to have experienced collision damage with traffic and the capacity of the existing structure should be assessed as part of the final design.

Site-specific Issues

Final designer to evaluate if adjustments are needed to the existing crown line to avoid vehicle wheel paths, and whether the structure can accommodate a new deck top concrete cover.

Riggs Road TI Underpass EB (New)

Location

The proposed westbound Riggs Road TI underpass would cross I-10 approximately 8 feet south of the existing Riggs Road TI underpass (Str. No. 01148, milepost 167.47), measured along the I-10 median centerline.

Proposed Condition

The proposed horizontal alignment would be on a tangent and would be skewed at approximately 33 degrees to the existing I-10 median centerline. The proposed structure would have two equal 129-foot-6-inch spans and total length of 264 feet-11½ inches. The proposed roadway on the structure would consists of two 12-foot eastbound lanes with a 6-foot sidewalk and 5-foot shoulder on the south side of the bridge and one 4-foot shoulder on the north side, with a clear roadway width of 33 feet. The proposed superstructure width would also include a combination pedestrian traffic bridge railing with fence on the south and a 38-inch single-slope barrier on the north, for a total bridge width of 41 feet-7 inches.

The proposed substructure would be stub abutments founded on drilled shafts with MSE walls behind the abutments to support the roadway. A dropped cap supported on round columns founded on spread footings would be proposed for the pier.

Site-specific Issues

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed.

Goodyear Road Underpass (Existing Str No 01149, As-Built Milepost 169.85)

Existing Bridge Condition

The Goodyear Road underpass was constructed in 1967 under ADOT project number I-10-3(38). The June-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 36, the Operating Rating as 59, and a structure sufficiency rating of 99.00.

The existing roadway on the structure consists of two 13-foot lanes with one lane in each direction of travel, for a clear road width of 26 feet. The bridge has a 7-inch thick concrete deck and a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The structure has a clear roadway width of 26 feet-0 inches and an out-to-out width of 31 feet-2 inches, which includes a 2-foot-7-inch wide barrier on each side of the bridge that is comprised of a concrete curb, parapet, and rail. According to the bridge evaluation report from ADOT's Bridge Management Group, there is a 1-inch epoxy concrete overlay on the deck.

The bridge horizontal alignment is on a tangent and is skewed at approximately 33 degrees from the existing I-10 median centerline. The existing structure is a four span steel girder bridge with span lengths of 55 feet-0 inches, 93 feet-0 inches, 93 feet-0 inches, and 55 feet-0 inches for a total structure length of 300 feet-9¼ inches.

The existing substructure uses stub abutments on driven steel piles and a dropped cap supported on rounded columns founded on spread footings for the piers.

The existing minimum vertical clearance to I-10 is 16.12 feet and occurs at the inside shoulder of the eastbound roadway, according to the Vertical & Horizontal Clearance Diagram dated 2-06-2019.

Proposed Existing Bridge Modification

The widened bridge would consist of two 12-foot lanes with one for each direction of travel, as well as two 10-foot shoulders for a total clear roadway width of 44 feet. Inboard 38-inch single slope barriers would be placed adjacent to the shoulders, providing a 6-foot sidewalk and an ADOT combination pedestrian traffic bridge rail with fence on both sides of the structure for a total out-to-out width of 60 feet-9 inches.

The superstructure widening would be assumed to be widened-in-kind with two additional steel plate I-girders at each side of the existing structure. The pair of new girders on each side could be assembled together off site to minimize erection time and eliminate the need of stability system before the deck pour. The new substructure will consist of a cap supported by a rounded column founded on spread footings, at each side of the widening for the pier. The widened abutment will match the existing abutment, but in lieu of driven piles, concrete drilled shafts will be used.

Site-specific Issues

To mitigate the existing substandard vertical clearance resulting from the widening, I-10 would be reprofiled lower by about one foot and would be crowned in each direction to achieve the desirable minimum vertical clearance of 16.5 feet.

Nelson Road Underpass (Existing Str No 01213, As-Built Milepost 174.63)

Existing Bridge Condition

The Nelson Road underpass was constructed in 1967 under ADOT project number I-10-3(40). The June-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 36, the Operating Rating as 60, and a structure sufficiency rating of 95.00.

The existing roadway on the structure consists of two 13-foot lanes with one lane in each direction of travel, for a clear road width of 26 feet. The bridge has a 7-inch thick concrete deck and a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The structure has a clear roadway width of 26 feet with an out-to-out width of 31 feet-2 inches, which includes a 2-foot-7-inch wide barrier on each side of the bridge that is comprised of a concrete curb, parapet, and rail. According to the bridge evaluation report from ADOT's Bridge Management Group, there is a 1-inch epoxy concrete overlay on the deck.

The existing substructure uses stub abutments on driven steel piles and a hammerhead pier founded on spread footings is provided at the piers.

The bridge horizontal alignment is on a tangent and is skewed at 33.1 degrees from the existing I-10 median centerline. The existing structure is a four span steel I-girder bridge with span lengths of 51 feet-6 inches, 92 feet-6 inches, 92 feet-6 inches, and 51 feet-6 inches for a total structure length of 292 feet-4½ inches.

The existing minimum vertical clearance to I-10 is 16.15 feet and occurs at the inside shoulder of the westbound roadway, according to the Vertical & Horizontal Clearance Diagram dated 2-07-2019.

Proposed Existing Bridge Modification

The widened bridge would consist of two 12-foot lanes with one for each direction of travel, as well as two 10-foot shoulders for a total clear roadway width of 44 feet. Inboard 38-inch single slope barriers would be placed adjacent to the shoulders, providing sufficient room for a 6-foot sidewalk and an ADOT combination pedestrian traffic bridge rail with fence on both sides of the structure for a total out-to-out width of 60 feet-9 inches.

The superstructure widening would be assumed to be widened-in-kind with two additional steel plate I-girders on each side of the existing structure. The pair of new girders on each side could be assembled together off site to minimize erection time and eliminate the need of stability system before the deck pour. The new substructure would consist of a cap supported by a rounded column founded on spread footings, at each side of the widening pier. The widened abutment will match the existing abutment, but in lieu of driven piles, concrete drilled shafts will be used.

Site-specific Issues

To mitigate the existing substandard vertical clearance resulting from the widening, I-10 would be reprofiled lower by about one foot and would be crowned in each direction to achieve the desirable minimum vertical clearance of 16.5 feet.

SR 587/Casa Blanca Road TI Underpass (Existing, Str. No. 01214, As-Built Milepost 175.81)

Existing Bridge Condition

The existing SR 587/Casa Blanca Road TI underpass was constructed in 1967 under ADOT project number I-10-3(42). The June-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 36, the Operating Rating as 58, and a structure sufficiency rating of 80.40

The existing roadway on the structure consists of two 12-foot lanes and two 3-foot shoulders with one lane in each direction of travel, for a clear road width of 30 feet. The bridge has a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The existing superstructure width on each side also includes a 2-foot-7-inch wide curb and parapet with handrail, for a total bridge width of 31 feet-2 inches.

The bridge horizontal alignment is on tangent and skewed at approximately a 37-degree angle from existing I-10. The existing structure is a four span steel I-girder bridge with spans of 52 feet-6 inches, 94 feet-6 inches, 94 feet-6 inches, and 52 feet-6 inches for a total structure length of 298 feet-5¾ inches.

The existing substructure are stub abutments on driven steel piles and a hammerhead pier founded on piles. It appears that the original barriers have been either replaced or modified and the SI&A sheet lists the clear roadway width as 30.7 feet.

The existing minimum vertical clearance to I-10 is 16.11 feet and occurs at the inside shoulder of the eastbound roadway, according to the Vertical & Horizontal Clearance Diagram dated 5-31-2020.

Proposed Conditions

The existing bridge would be removed and replace with a new structure nearby.

SR 587/Casa Blanca Road TI Underpass (New)

Location

The proposed SR 587/Casa Blanca Road TI underpass would be a new diamond TI that would cross I-10 approximately 54 feet south of the existing SR 587/Casa Blanca Road TI underpass (Str No. 01214, milepost 175.81), measured along the I-10 median centerline.

Proposed Condition

The proposed horizontal alignment would be on a tangent and would be skewed at approximately 18 degrees to the existing I-10 median centerline. The proposed structure would have two equal 114-foot-6-inch spans and a total length of 234 feet-3 1/8. The proposed roadway on the structure would consists of two 12-foot eastbound and westbound lanes separated by two 2-foot shoulders and a 4-foot raised median, for a total clear roadway width of 56 feet. The proposed superstructure would have a 10-foot raised multiuse path on each side of the bridge and would also include a combination pedestrian traffic bridge railing with fence on both sides of the structure, for a total bridge width of 82 feet-4 inches.

The proposed substructure would use stub abutments founded on drilled shafts with MSE walls behind the abutments to support the roadway, and a dropped cap supported on round columns founded on drilled shafts for the pier.

Site-specific Issues

There appears to be existing underground fiber optic facilities and underground ADOT electrical facilities which may require relocation to eliminate conflicts with the proposed substructure. A higher level of utility mapping is needed to confirm the potential conflicts.

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I--10, should it ever be needed.

Casa Blanca Road Bypass Underpass (New)

Location

The proposed Casa Blanca Road Bypass underpass crosses I-10 approximately 1,600 feet south of the existing SR 587/Casa Blanca Road TI underpass (Str No. 01214, milepost 175.81), measured along the I-10 median

centerline. The new bridge structure would separate local Community traffic from the TI traffic by realigning the existing Casa Blanca Road to the south of the new TI.

Proposed Condition

The proposed horizontal alignment would be on a tangent and would be skewed at approximately 28 degrees to the existing I-10 median centerline. The proposed structure has four spans of 75 feet-0 inches, 105 feet-0 inches, 105 feet-0 inches, and 75 feet-0 inches for a total structure length of 365 feet-8 inches. The proposed roadway on the structure would consist of two 12-foot lanes with one lane in each direction of travel, and two 10-foot shoulders for a clear road width of 44 feet. Inboard 38-inch single slope barriers would be placed adjacent to the shoulders, providing sufficient room for a 6-foot sidewalk and an ADOT combination pedestrian traffic bridge rail with fence on both sides of the structures, for a total out-to-out width of 60 feet-9 inches.

The proposed substructure would be stub abutments founded on drilled shafts with MSE walls behind the abutments to support the roadway and a dropped cap supported on round columns founded on drilled shafts for the piers.

Site-specific Issues

The interior spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed. The end spans would accommodate a two-lane eastbound entrance ramp and a two-lane westbound exit ramp to the proposed SR 587/Casa Blanca Road TI.

Gasline Road Underpass (Existing, Str. No. 01215, As-Built Milepost 177.76)

Existing Bridge Condition

The Gasline Road underpass was constructed in 1967 under ADOT project number I-10-3(40). The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 35, the Operating Rating as 58, and a structure Sufficiency Rating of 93.8.

The existing roadway on the structure consists of two 13-foot lanes with one lane in each direction of travel, for a clear road width of 26 feet. The bridge has a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The bridge also includes a 2-foot-7-inch wide curb and parapet with handrail, for a total bridge width of 31 feet-2 inches.

The bridge horizontal alignment is on tangent and skewed at approximately a 57-degree angle to the existing I-10 centerline. The existing structure is a five span steel I-girder bridge with spans of 79 feet-0 inches, 98 feet-6 inches, 88 feet-0 inches, 98 feet-6 inches, and 79 feet-0 inches for a total structure length of 450 feet-41/8 inches.

The existing substructure uses stub abutments on driven steel piles. A dropped cap supported on round columns founded on drilled shafts with a belled-out bottom is provided at the piers.

The span arrangement of the existing bridge is incompatible with proposed widening of I-10 because piers 3 and 4 fall within the proposed I-10 roadway. As a result, a bridge replacement is required.

Proposed Conditions

The existing bridge would be removed and replaced with a new structure.

Gasline Rd Underpass (New)

Location

The proposed Gasline Road structure would cross I-10 just to the east side of the existing Gasline Road Underpass (Str No. 1215, milepost 177.76).

Proposed Conditions

The proposed horizontal alignment would be on tangent, parallel to the existing bridge and skewed at approximately a 57-degree angle from existing I-10. The proposed structure would have two equal 178-foot-6-inch spans with a total length of 368 feet. The proposed roadway on the structure would consist of two 12-foot lanes with one lane in each direction of travel and 10-foot outside shoulders, for a clear road width of 44 feet. The proposed superstructure width on each side would also include a modified 38-inch single-slope barrier, a 6-foot sidewalk and a pedestrian rail with fence, for a total bridge width of 60 feet-9 inches.

The proposed substructure would be stub abutments founded on drilled shafts with MSE walls behind the abutments to support the roadway and a dropped cap supported on round columns founded on drilled shafts for the pier.

Site-specific Issues

Several existing utilities run parallel to existing Gasline Road, crossing both above and below I-10. Two existing underground gas lines and one existing overhead electrical are located to the west side of existing Gasline Road. Existing underground irrigation is located approximately 65 feet east of the existing Gasline Road construction centerline and directly under the proposed structure. This irrigation line would need to be relocated. Existing overhead telephone may be located east of existing Gasline Road, but no poles were observed on site. If this telephone line is found below ground and south of the existing road, it also might conflict with the proposed structure and would need to be relocated.

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed.

Seed Farm Road Underpass (Existing, Str. No. 01216, As-Built Milepost 179.39)

Existing Bridge Condition

The existing Seed Farm Road underpass was constructed in 1967 under ADOT project number I-10-3(40). The June-2021 ADOT Structure Inventory and Appraisal (SI&A) form lists the LFR Inventory Rating as 36, the Operating Rating as 59, and a structure sufficiency rating of 85.00.

The existing roadway on the structure consists of two 13-foot lanes with one lane in each direction of travel, for a clear road width of 26 feet. The bridge has a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The bridge also includes a 2-foot-7-inch wide curb and parapet with handrail, for a total bridge width of 31 feet-2 inches. According to the bridge evaluation report from ADOT's Bridge Management Group, there is a 1-inch epoxy concrete overlay on the deck.

The bridge horizontal alignment is on tangent and skewed at a 33.1-degree angle to the existing I-10 centerline. The existing structure is a four span steel I-girder bridge with spans of 51 feet-6 inches, 92 feet-6 inches, 92 feet-6 inches, and 51 feet-6 inches for a total structure length of 292 feet-4½ inches.

The existing substructure uses stub abutments on driven steel piles and a dropped cap supported on round columns founded on drilled shafts with a belled-out bottom for the piers.

The existing minimum vertical clearance to I-10 is 16.18 feet and occurs at the inside shoulder of the westbound roadway, according to the Vertical & Horizontal Clearance Diagram dated 5-31-2020.

Proposed Conditions

The existing bridge would be removed and replaced with a new structure.

Seed Farm Road Underpass (New)

Location

The proposed Seed Farm Road underpass would cross I-10 approximately 53 feet south of the existing Seed Farm Road underpass (Str No. 01216, milepost 179.39), measured along the I-10 median centerline.

Proposed Condition

The proposed horizontal alignment would be on a tangent and would be skewed at 33.1 degrees to the existing I-10 median centerline. The proposed structure would have two equal 130-foot-0-inch spans with a total structure length of 265 feet-11 5/8 inches. The proposed roadway on the structure would consist of two 12-foot lanes with one lane in each direction of travel, and two 5-foot shoulders for a clear road width of 34 feet. The proposed superstructure would have a 6-foot raised sidewalk on each side of the bridge and would also include a combination pedestrian traffic bridge railing with fence on both sides of the structure, for a total bridge width of 48 feet-4 inches.

The proposed substructure would be stub abutments on drilled shafts with MSE walls behind the abutments to support the roadway and a dropped cap supported on round columns founded on drilled shafts for the pier.

Site-specific Issues

There appears to be existing an underground gas line just north of the proposed structure crossing under I-10 which may need to be protected in place, however, a higher level of utility mapping is needed to confirm its location.

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed.

Dirk Lay Rd Underpass (Existing, Str. No. 01150, As-Built Milepost 181.44)

Existing Bridge Condition

The Dirk Lay Road underpass was constructed in 1967 under ADOT project number I-10-3(42). The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 40, the Operating Rating as 67, and a structure Sufficiency Rating of 94.

The existing roadway on the structure consists of two 13-foot lanes with one lane in each direction of travel, for a clear road width of 26 feet. The bridge has a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The existing superstructure width on each side also includes a 2-foot-7-inch wide curb and parapet with handrail, for a total bridge width of 31 feet-2 inches.

The bridge horizontal alignment is on tangent and skewed at approximately a 57-degree angle to the existing I-10 centerline. The existing structure is a five span steel I-girder bridge with spans of 89 feet-0 inches, 97 feet-6 inches, 90 feet-0 inches, 97 feet-6 inches, and 89 feet-0 inches for a total structure length of 470 feet-4¼ inches.

The existing substructure uses stub abutments on driven steel piles and a dropped cap supported on square columns founded on spread footings is provided at the piers.

The existing minimum vertical clearance to I-10 is 16 feet-3¼ inches and occurs along the inside shoulder of the eastbound roadway.

Proposed Conditions

The existing bridge would be removed and not replaced.

SR 387/SR 187/Pinal Avenue TI Underpass (Existing, Str. No. 01151, As-Built Milepost 185.26)

Existing Bridge Condition

The existing SR 387/SR 187/Pinal Avenue Underpass (Str No. 1151, milepost 185.26) was constructed in 1967 under ADOT project number I-10-3(42). The bridge barriers were replaced in 1991 under ADOT project number I-10-3(230). The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 40, the Operating Rating as 67, and a structure Sufficiency Rating of 72.8.

The existing roadway on the structure consists of two 12-foot lanes and two 3-foot shoulders with one lane in each direction of travel, for a clear road width of 30 feet. The bridge has a normal crown cross-slope of 1.5 percent that slopes down toward the edge of the deck. The existing superstructure width on each side also includes a modified 32-inch F-shape barrier, for a total bridge width of 35 feet-2 inches.

The bridge horizontal alignment is on tangent and skewed at 29.4-degree angle to the existing I-10 centerline. The existing structure is a four span steel I-girder bridge with spans of 51 feet-0 inches, 90 feet-3 inches, 90 feet-3 inches, and 51 feet-0 inches for a total structure length of 287 feet-1 inch.

The existing substructure uses stub abutments on driven steel piles and a dropped cap supported on square columns founded on spread footings is provided at the piers.

The existing minimum vertical clearance to I-10 is 16 feet-7¼ inches and occurs along the inside shoulder of the westbound roadway.

Proposed Existing Bridge Modification

The widened bridge would carry the northbound roadway and consist of one 4-foot left shoulder, one 12-foot lane and one 17-foot lane (a combination of a 12-foot lane and 5 feet for a right shoulder and/or bike use) for a clear road width of 33 feet. The superstructure width would also include a 38-inch single-slope barrier on the north side and a 6-foot sidewalk and pedestrian rail with fence on the south side, for a total bridge width of 41 feet-9 inches.

The superstructure widening would be assumed to be widened-in-kind with one additional steel plate I-girder on the south side of the bridge. Widening-in-kind would provide approximately 16 feet-3 inches minimum vertical clearance over I-10. A reduced section depth with higher grade steel could be provided to maintain the preferred 16.5 feet minimum vertical clearance. In this case, differential defections would need to be carefully evaluated between the existing and new steel plate I-girders. The final designers should conduct further investigation and consult with ADOT Bridge Group to develop a preferred strategy.

The substandard existing barrier on the north side will be replaced with a 38-inch single slope concrete barrier. Since the existing barrier has been replaced once, ADOT's conventional barrier replacement of not modifying the existing deck might not be feasible. As a result, the north 4-foot overhang is assumed to be replaced-in-kind

for the purpose of capturing cost. The final designer should further investigate the cost benefit of keeping or replace the original overhang.

The new substructure types are assumed to match the existing and be skewed at a 29.4-degree angle to the existing I-10 centerline.

Site-specific Issues

Existing underground electrical conduit is located below I-10, offset approximately 5 feet from the inside edge of the roadway near pier 1 of the existing bridge. No other utilities are known to exist on or above the existing roadways at the existing SR 387/SR 187/Pinal Avenue bridge crossing.

SR 387/SR 187/Pinal Avenue TI Underpass Eastbound (New)

Location

The proposed SR 387/SR 187/Pinal Avenue eastbound structure would cross I-10 to the north side of the existing SR 387/SR 187/Pinal Ave underpass (Str No. 1151, milepost 185.26).

Proposed Conditions

The proposed horizontal alignment would be on tangent, parallel to the existing bridge and skewed at a 29.4-degree angle to the existing I-10 centerline. The proposed structure would have two equal 124-foot-6-inch spans with a total structure length of 254 feet-8 5/8 inches. The proposed roadway on the structure would consist of one 17-foot lane (a combination of a 12-foot lane and 5 feet for a right shoulder and/or bike use) and one 4-foot left shoulder, for a clear road width of 21 feet. The proposed superstructure width would also include a 38-inch single-slope barrier on the south side and a 6-foot sidewalk and pedestrian rail with fence on the north side, for a total bridge width of 29 feet-7 inches.

The proposed substructure would be stub abutments founded on drilled shafts with MSE walls behind the abutments to support the roadway embankment and a dropped cap supported on round columns founded on spread footings for the pier.

Site-specific Issues

Existing underground electrical conduit is located below I-10, offset approximately 5 feet from the inside edge of the roadway near pier 1 of the existing bridge. No other utilities are known to exist on or above the existing roadways at the existing SR 387/SR 187/Pinal Avenue bridge crossing.

The two spans would be set to accommodate five 12-foot lanes and two 12-foot shoulders in each direction on I-10, should it ever be needed.

4.6 Miscellaneous Structure (Retaining Walls, Sound Walls, and Concrete Box Culverts)

4.6.1 Retaining Walls

MSE retaining walls that continue from the new bridge wingwall are relatively short, if needed; therefore, the cost is included as part of bridge cost estimate.

There is an 800-foot segment of retaining wall between the proposed SR 587/Casa Blanca Road TI eastbound entrance ramp and the I-10 main line. Both cast-in-place concrete or MSE retaining wall systems are feasible alternatives for this wall. Both wall types have been constructed in the nearby Phoenix urban freeway system. To be consistent with the wall type behind the new bridge abutments, an MSE wall is the assumed wall system for this wall for cost estimating purposes.

4.6.2 Sound Walls

No noise receivers exist along or within the limits of the project; therefore, no new sound barriers have been identified as necessary under this DCR.

4.6.3 Reinforced Concrete Box Culvert

There are numerous existing RCBC within the project limits that would require modification to support the features of the Recommended Build Alternative. Some of these are large enough to have bridge classifications and some are not, but all are noted in Tables 4-7 and 4-8 for reference, along with their proposed modifications, if any. A copy of the most recent existing RCBC inspection reports is provided in Appendix H.

Table 4-7. I-10 main line reinforced concrete box culvert inventory and modifications

I-10 med station	ADOT structure no.	LT/ RT	Skew	Cells (no.)	Size	Length	Type	Modification
915+16	06043		0°	3	10'x7'	683'	RCBC	None
1127+30	05422		0°	3	10'x3'	195'	RCBC	None
1202+02	05424		0°	3	10'x3'	195'	RCBC	Extension
1240+33	05426		0°	3	10'x3'	195'	RCBC	None
1244+20	05428		0°	3	10'x3'	195'	RCBC	None
1253+00	06033		0°	3	10'x3'	195'	RCBC	None
1383+00	05430		0°	2	10'x6'	192'	RCBC	None
1680+33	N/A		36°30' RT	1	10'x8'	440'	RCBC	None
1682+95	N/A		0°	1	16'x14'	160'	RCBC	Connect Across I-10 Median
1845+42	N/A		45°30' RT	1	6'x7'	530'	RCBC	None
1846+79	N/A		36°25' RT	1	10'x8'	540'	RCBC	None
1849+47	N/A		0°	1	16'x14'	158'	RCBC	Connect Across I-10 Median
1889+10	05433	RT	60°	6	10'x8'	156'	RCBC	Connect Across I-10 Median
1890+10	05432	LT	60°	6	10'x8'	155'	RCBC	Connect Across I-10 Median
1929+48	05434		0°	2	10'x4'	197'	RCBC	Extension
1962+55	N/A		30° LT	2	8'x3'	221'	RCBC	Extension
1967+95	N/A		0°	2	8'x4'	192'	RCBC	Extension
1973+95	N/A		0°	1	10'x8'	191'	RCBC	None
2026+15	05437	LT	30° LT	4	10'x5'	148'	RCBC	Extension
2027+90	05436	RT	30° LT	4	10'x5'	78'	RCBC	None
2049+80	N/A	RT	30° RT	1	10'x5'	97'	RCBC	Extension
2050+35	N/A	LT	0°	1	10'x5'	80'	RCBC	Extension
2065+50	05438		0°	3	10'x8'	192'	RCBC	None
2083+00	05440		0°	3	10'x7'	193'	RCBC	None
2160+10	05442		0°	2	10'x3'	192'	RCBC	None
2168+00	05444		30° LT	2	10'x3'	220'	RCBC	None
2193+95	05446		0°	3	10'x3'	235'	RCBC	None

Table 4-8. Crossroads reinforced concrete box culvert inventory and modifications

Pinal Avenue Station	ADOT structure no.	LT/RT	Skew	Cells (No.)	Size	Length	Type	Modification
27+44	N/A		0°	1	10'x6'	96'	RCBC	Extension
32+80	N/A		0°	1	8'x3'	40'	RCBC	Extension

4.7 Geotechnical Design Considerations

Based on existing geotechnical data obtained from previous projects, subsurface soils to a depth of about 25 feet below the existing ground surface generally consist of stratified deposits of both coarse- and fine-grained soils comprised of clayey sands, silty sands, silty clayey sands, sandy clays, silty clay, silty gravelly sand, sandy silt, and clayey silt.

The foundation data sheets for the Chandler Boulevard TI underpass bridge on I-10 indicate stratified deposits of both coarse-and fine-grained soils including clayey sand, silty clay, sandy clay, silty clayey sand, and silty sand, to the maximum depth of exploration of about 80 feet below the ground surface.

The foundation data sheets for the SR 347/Queen Creek Road TI bridge indicate stratified deposits of both coarse- and fine-grained soils including silty sand, silty clay, clayey sand, silty gravelly sand, sandy silt, and clayey silt. The hollow-stem auger borings were advanced to a maximum depth of exploration of about 70 feet below the ground surface for this bridge.

The subsurface conditions along the corridor consist mainly of soil with bedrock outcrops near the Gila River and at the southern end of the project, especially through the Sacaton Mountains. Based on a review of geologic maps, cross checked with Google Earth images, the approximate I-10 station limits within which bedrock could be encountered in shallow excavations within the ROW are as follows:

- Station 1466+00 +/- to 1470+00 +/-
- Station 2025+00 +/- to 2041+00 +/-
- Station 2067+00 +/- to 2083+00 +/-

Based on Google Earth photos of the existing cut slopes, the exposed rock appears to be slightly to moderately weathered, and the fracture/joint spacing ranges from wide to very close. The cut slopes are relatively planar. There is possible evidence of blast-hole traces (half-casts) in the cut slope faces, and remnant ledges from ripping in the eastbound cut slopes. Based on the existing cut slopes, blasting will likely be required for widening of these existing rock cuts.

According to the Geologic Map of the Sacaton Mountains, Pinal County, Arizona (AZGS, June 1996), the existing northeast-southwest oriented ridges through which the southern two cut areas are located is comprised predominately of the Sacaton Peak Granite (a metamorphic rock unit) with quartz-porphyritic dikes (intrusive igneous rock unit containing large porphyritic crystals of quartz) oriented along the axis of the ridge. The Sacaton Peak Granite (map unit Kg in AZGS, 1996) is described as medium-grained, equigranular quartz monzonite to granite. The unit weathers to form steep, rugged buttes covered with medium tan-colored boulders. The quartz-porphyritic dikes (map unit TKq in AZGS, 1996) consist of equigranular to plagioclase and quartz porphyritic quartz monzonite, to quartz monzodiorite with a medium to fine-grained matrix.

Bedrock also is exposed along a short section of I-10 north of the Gila River near Milepost 173. There is an exposed rock cut on the northeast side of the highway between approximate stations 1466+00 and 1470+00. Based on Google Earth photos there appears to be exposed bedrock in the I-10 median within a portion of those limits. It is unclear if the proposed widening can be performed without excavating additional bedrock in this area. It is assumed that a minor amount of rock excavation and blasting may be required for this area. However, this section is not part of this study and will be included as part of the Gila River bridge replacement project.

Additional investigation of the bedrock in potential cut areas should be planned during the final design phase of this project to determine the rock properties relating to design and rock excavation. Geophysical surveys should be included to determine the bedrock depth, contours, and strength.

Based on available near-surface soil mapping, the soils along the corridor pose a moderate to high risk for the corrosion of uncoated steel and a low to high risk for the corrosion of concrete. The final design geotechnical investigation should include soil sampling and laboratory testing to evaluate the corrosion potential along the corridor.

The soils within the project corridor are anticipated to provide adequate support for shallow spread footing foundations for retaining walls and culvert structures. Spread footings for bridge foundations may be a viable alternative to drilled shaft foundations depending on the design loads and settlement tolerance. Spread footings may be a good alternative for smaller, low-traffic volume bridge crossings. A moderate depth of over-excavation and recompaction (about 5 feet or less) should be anticipated to be required beneath spread footing foundations. Drilled shaft foundation excavations will likely encounter granular soils that will slough and ravel, such that surface casing and other stabilization methods such as wet-method construction with drilling slurry may be required.

The proposed improvements will require the construction of new roadway embankment. Earthwork will require keying-in the new embankment to the existing embankment side-slopes. Foundation subgrade preparation for the new embankment will require over-excavation and recompaction to a depth of 3 feet, and embankments over 10 feet tall may require a greater depth of over-excavation. The final geotechnical investigation should evaluate subgrade conditions and identify areas where more extensive subgrade preparation and over-excavation are required.

4.8 Pavement Design Considerations

The existing pavement for nearly all of the corridor consists of asphaltic concrete (AC) pavement. Existing Portland cement concrete pavement (PCCP) extends from the north end of the project to approximately milepost 163.52 on I-10 eastbound and to milepost 163.14 on I-10 westbound. Based on the available pavement history data obtained from ADOT, we know that the existing AC pavement section thickness varies along the corridor, and the existing AC pavement component thicknesses are unclear. ADOT Project H8192 01C, completed in 2016, included AC pavement rehabilitation and widening from Wild Horse Pass Boulevard to Riggs Road and included a pavement section of 9 inches of AC over 12 inches of aggregate base (AB) for the new widening construction. Additional investigation of the existing pavement including pavement coring and subgrade sampling and testing should be included in the final design phase of the project. Based on the recent project, a pavement section comprised of 9 inches of AC over 12 inches of AB is a good minimum assumption for the widening design.

The pavement history data also indicates that select material with thickness varying from 11 to 26 inches was constructed below the AC/AB section at various locations along the corridor. Based on this information, it should be assumed that subgrade improvement, in the form of over-excavation and replacement, reinforcement with geogrid, or other mitigation will be required for the widening.

4.9 Right-of-Way and Access Control

New ROW and access control would be required for the Recommended Alternative. Approximately 36 unique allotted parcels and 30 tribal land parcels would be affected, with a total net acquisition area of approximately 73 acres between SR 202L and SR 387/SR 187/Pinal Avenue. The 73 acres of net ROW would include about 8.5 acres that ADOT would return to the Community when the Dirk Lay Road bridge and approach roadways are removed. Approximately 13 additional acres would be needed in the form of TCEs to reconstruct access roads and irrigation structures that would be affect by construction of the Recommended Alternative. An estimated 1,858 fractional owners have been identified that are associated with the 36 allotted parcels. All of the TIs on the corridor would require modifications to the existing access control. Because of existing access conditions, the access control requirements, in accordance with the ADOT RDG, would , would not be able to be met at all of the TIs. The access control modifications will impact 29 allotted parcels and 13 tribal land parcels. Two allotted parcels at Riggs Road would only be affected by access control changes and have no ROW area acquisitions. Table 4-9 lists the location, ownership, quantity, and type of ROW/easement that would be required for the Recommended Build Alternative.

Table 4-9. ROW and TCE requirements for the Recommended Build Alternative

Location	Ownership	Number of parcels	Number of allotted fractional owners	Type of easement	Quantity (acres)	Control of access	
						Full/ Restricted[c] needed	Variance required
Wild Horse Pass Boulevard TI	Tribal	4	N/A	ROW	0.90	Yes/Yes	Yes
Wild Horse Pass Boulevard TI	Tribal	1	N/A	TCE	0.06	N/A	N/A
SR 347/Queen Creek Road TI	Allottee	9	408	ROW	6.74	Yes/Yes	Yes
Riggs Road TI	Allottee	4	64	ROW	0.38	Yes/Yes	Yes
Goodyear Road	Allottee	4	302	ROW	1.26	No	No
Nelson Road	Tribal	1	N/A	ROW	1.17	No	No
Nelson Road	Tribal	1	N/A	TCE	0.49	N/A	N/A
Nelson Road	Allottee	5	102	ROW	7.71	No	No
Nelson Road	Allottee	1	25	TCE	1.45	N/A	N/A
SR 587/Casa Blanca Road TI and Casa Blanca Bypass	Tribal	4	N/A	ROW	7.88	Yes/Yes	Yes
SR 587/Casa Blanca Road TI and Casa Blanca Bypass	Allottee	14	982	ROW	11.48	Yes/Yes	Yes
Gasline Road	Tribal	4	N/A	ROW	4.50	No	No
Gasline Road	Tribal	3	N/A	TCE	2.00	N/A	N/A
Seed Farm Road TI	Tribal	4	N/A	ROW	38.70	Yes/Yes	Yes
Seed Farm Road TI	Tribal	4	N/A	TCE	8.79	N/A	N/A
Dirk Lay Road	Tribal	2	N/A	ROW	-8.45	No	No
SR 387/SR 187/Pinal Avenue TI	Tribal	2	N/A	ROW	0.30	Yes/Yes	Yes
Total	**—**	**66[a]**	**1,883**	**—**	**85.36[b]**	**—**	**—**

[a] includes 36 allotted parcels and 30 tribal parcels
[b] includes 12.78 acres of TCE and 72.58 acres of ROW
[c] one right-in, right-out access only for 1,320 feet

4.10 Traffic Design

The following sections describe the proposed concepts for guide signs, pavement marking, traffic signals, lighting, FMS, and vehicle counting system elements. The traffic design concepts were developed based on the guidelines presented in the following documents:

- *Manual on Uniform Traffic Control Devices* (MUTCD) (FHWA 2009)
- *Arizona Supplement to the MUTCD* (ADOT 2009)
- ADOT *Traffic Signals and Lighting Standard Drawings* (2021, with updates)
- ADOT *Signing and Marking Standard Drawings* (2019, with updates)
- ADOT *ITS Design Guide* (current edition)
- ADOT *Traffic Engineering TGP* (2015, with updates)

This document provides only a high-level overview of the project's traffic design features because they will continue to be refined through final design.

Guide Signs

The proposed freeway widening does not affect any of the existing roadside guide signs or overhead sign structures, except for the cantilever sign structure just north of the eastbound exit ramp to SR 347/Queen Creek Road. Guide signs mounted on crossroad bridges will be replaced or relocated as necessary. New guide signs will be required approaching several TI exit ramps that are being reconfigured. Wild Horse Pass Boulevard and SR 347/Queen Creek Road will require overhead guide signs while the SR 587/Casa Blanca Road, Seed Farm Road, and SR 387/SR 187/Pinal Avenue TIs will require new ground mounted roadside guide signs. New signs will also be needed for the freeway route number with cardinal directions and destination cities and for lane assignments at entrance ramp approaches.

Other Signs

With the proposed widening occurring in the median of I-10, regulatory, warning, and other ground-mounted guide sign locations should not be impacted along I-10 except in areas where the ramps would be converted from a taper-type to a parallel-type configuration, where I-10 would be re-profiled to increase vertical clearance under Goodyear Road and Nelson Road, the reconfiguration of the SR 587/Casa Blanca Road TI, and the new TI at Seed Farm Road. All required sign locations will be verified during final design for I-10, the entrance and exit ramps, and on the crossroads and TIs within the corridor.

Pavement Marking

The conceptual pavement marking plan for delineating the freeway main line general purpose, HOV, entrance and exit ramps, and the crossroad lanes is included in the Stage I (15 percent) project roll plot PDF and as shown in the exhibits in Appendix A. At the proposed diverging diamond TIs, it is also recommended there be advance in-lane pavement markings identifying lanes that provide access to I-10.

Traffic Signals

New traffic signals will be installed at the following TI ramp and crossroad intersections:

- Wild Horse Pass Boulevard TI (DDI)
- SR 347/Queen Creek Road TI (DDI)
- Riggs Road TI
- SR 387/SR 187/Pinal Avenue TI

The final signal design, including ownership and maintenance responsibilities, would be determined during final design, and documented in intergovernmental agreements (IGAs).

Lighting

The freeway lighting design approach will fall into two categories. Between SR 202L and Riggs Road, I-10 will utilize urban freeway lighting standards, including continuous median mounted lights supplemented with full ramp, crossroad, and underdeck lighting. South of Riggs Road, the corridor will utilize the rural design lighting standards which will be limited to ramp terminal and gore lighting.

FMS

The freeway management system infrastructure will include a continuous fiber optic backbone envisioned to be installed inside the existing west side ROW fence connecting the existing FMS fiber backbones endpoints located between the Wild Horse Pass and SR 347/Queen Creek TI on the north and about one half a mile south of the southern Community boundary, both along the west side ROW lines. In addition, dynamic message signs, CCTV cameras, and weight in motion infrastructure will be installed along the corridor per ADOT's design guidelines.

4.11 Drainage

4.11.1 On- and Off-site Drainage Design Criteria

The drainage evaluation for the I-10 improvements is based on the requirements of Chapter 600 of the ADOT RDG. Notable items include:

- As presented in the ADOT RDG Table 603.2B, the pavement drainage systems shall be designed for a 50-year storm frequency at depressed road locations. For nondepressed roads, the storm drain system shall be designed for a 10-year frequency. While these storms are the design standard for this type of Interstate system, the cross-culvert system under I-10 would be replaced with in-kind capacity to avoid upstream and downstream ponding changes from what has occurred during the last 55 years.
- As presented on Table 603.2C, allowable spread on all roads shall not exceed the road gutter width, shoulder, and/or distress lane. On roads with more than one lane in each direction, the spread may encroach upon on-half of the adjacent lane for a 10-year storm frequency.
- The allowable spread should meet the criteria given in Table 603.2C; one-lane ramps shall have a 12-foot unponded width. Allowable spread on two-lane ramps shall not exceed the road gutter width, shoulder, and on-half of the adjacent lane for a 10-year storm frequency.
- Allowable ponding depth on highways shall not exceed the curb height for a 10-year storm frequency.
- The capacity of detention basins and ditches that are parallel to the road and serve to convey road drainage should be designed to meet the requirements of the 10-year storm frequency. Detention basins and ditches that intercept off-site flows should be designed for a 50-year storm frequency except where other conditions require a greater storm frequency.
- The 100-year storm frequency is also checked to ensure that there are no adverse impacts to properties adjacent to the freeway ROW.
- As needed, existing culverts would be replaced with a culvert, or culverts, of the same capacity to avoid materially altering the culvert capacity crossing I-10.

4.11.2 Existing Pipe Culvert Conditions and Suggested Replacements

As noted in Chapter 1, there is a high probability that the original corrugated metal pipe culverts built with the original I-10 construction have severally deteriorated over the 50+ years, and most will likely need to be replaced. Table 4-10 provides the location of all circular, elliptical, or arch pipe culvert crossings and provides suggested sizes and number of circular replacement culvert pipes that could be installed via trenchless methods like jack and bore. The replacement culverts are assumed to be the same flow area and does not consider pipe invert elevations relative to design pavement section and soil cover. Pipe cover under the I-10 roadway is limited and in locations where a direct pipe size replacement is not possible (due to extra height requirement from the jack and bore procedure), smaller diameter pipes are used in conjunction with more barrels to maintain the same capacity. Final design shall survey the existing cross culverts flowlines and propose diameters and the number of culverts necessary that meet the required pipe backfill depths below pavement subgrade and convey the required flows.

All new pipe culvert replacements would require pipe end sections or concrete headwalls as well as energy dissipators and erosion control measures at the upstream and downstream end of the crossing. Jack and bored culverts would require steel casing sleeves for the length of the pipe spanning under the freeway pavement from launch pit to receiving pit. The diameter of the steel casing would be 12-inches greater than the outside diameter of the culvert conduit inside of it.

Steel boring casings would need to be used under eastbound and westbound sections of the existing freeway pavement. The lengths shown in Table 4-10 are approximate and shall be confirmed in final design. Median berms used above pipes as DPS access and turnaround locations will need to be reconfigured with the new pipes and the median widening. The pipe culvert summary in Table 4-10 does not consider the need to abandon in place the existing culvert(s) crossing or re-aligning the wash approaches and exits from the new culvert locations which may end up being offset from the natural streambed location. The new culvert pipe material shall be in accordance with ADOT Pipe Selection Guidelines and selected during final design.

Table 4-10. Existing pipe culvert inventory and suggested replacements

I-10 med station	Exist, cells (no.)	Existing size	Existing length	Existing type	New cells (no.)	New circular size	New culvert length[a]	New jack and bore casing length[b]	Median inlet C-15.80
920+10	New Culvert				1	36”	105’	0’	0
929+23	1	24”	258’	C.M.P.	No changes needed				
937+25	1	24”	240’	C.M.P.	No changes needed				
945+32	1	30”	233’	C.M.P.	No changes needed				
948+20	1	30”	220’	C.M.P.	No changes needed				
954+41	1	30”	216’	C.M.P.	No changes needed				
959+17	1	30”	228’	C.M.P.	No changes needed				
964+15	1	30”	235’	C.M.P.	No changes needed				
984+15	1	30”	226’	C.M.P.	2	30”	226’	120’	0
986+17	1	30"	226'	C.M.P.	2	30"	226'	120’	0
996+17	1	30”	218’	C.M.P.	2	30"	218’	120’	1
1002+67	1	30”	235’	C.M.P.	2	30"	238’	120’	1
1007+97	1	30”	289’	C.M.P.	2	30"	299’	150’	1
1013+89	1	30”	198’	C.M.P.	1	30"	198’	120’	1
1017+89	1	30"	198'	C.M.P.	1	30"	198'	120’	0
1028+90	1	36"X22"	196’	C.M.P.A.	3	18"	201’	120’	1
1033+43	New Culverts				8	30"	305’	150’	0
1040+70	1	30"	217’	C.M.P.	7	30"	236’	120’	0
1046+66	1	36"X22"	202'	C.M.P.A.	21	18"	219’	120’	0
1050+16	1	36"X22"	190'	C.M.P.A.	6	18"	204’	120’	0
1061+17	1	30”	194’	C.M.P.	2	30"	194’	120’	1
1064+17	1	30"	195'	C.M.P.	2	30"	195’	120’	0
1070+17	1	30"	205'	C.M.P.	2	30"	205’	120’	0
1077+15	1	30"	202'	C.M.P.	2	30"	201’	120’	0

Table 4-10. Existing pipe culvert inventory and suggested replacements

I-10 med station	Exist, cells (no.)	Existing size	Existing length	Existing type	New cells (no.)	New circular size	New culvert length[a]	New jack and bore casing length[b]	Median inlet C-15.80
1083+17	1	30"	205'	C.M.P.	2	30"	205’	120’	0
1093+16	1	30”	196’	C.M.P.	2	30"	196’	120’	1
1096+66	1	30"	190'	C.M.P.	2	30"	192’	120’	0
1105+66	1	30”	218’	C.M.P.	2	30"	218’	120’	1
1109+12	1	36"x22"	213’	C.M.P.A.	1	30"	213’	120’	1
1117+10	1	29"x18"	200’	C.M.P.A.	2	18"	200’	120’	1
1124+60	1	29"x18"	200’	C.M.P.A.	1	24"	200’	120’	1
1130+11	1	29"x18"	195’	C.M.P.A.	1	24"	195’	120’	1
1133+59	1	29"x18"	200’	C.M.P.A.	1	24"	200’	120’	1
1136+60	1	36"x22"	200’	C.M.P.A.	2	24"	200’	120’	1
1143+60	1	36"x22"	205’	C.M.P.A.	2	24"	205’	120’	1
1151+09	1	36"x22"	205’	C.M.P.A.	1	30"	213’	120’	1
1156+59	1	30”	204’	C.M.P.	1	30"	220’	120’	1
1157+60	1	30”	204’	C.M.P.	1	30”	227’	120’	0
1180+00	1	30”	193’	C.M.P.	2	30”	225’	120’	0
1198+40	1	30”	214’	C.M.P.	1	30"	227’	120’	1
1201+40	1	30”	218’	C.M.P.	1	30”	218’	120’	0
1207+90	1	30”	202’	C.M.P.	1	30"	202’	120’	1
1210+90	1	30”	200’	C.M.P.	1	30"	200’	120’	1
1219+91	1	36"x22"	202’	C.M.P.A.	2	24"	202’	120’	1
1223+91	1	36"x22"	202’	C.M.P.A.	3	18"	202’	120’	1
1232+91	1	36"x22"	208’	C.M.P.A.	3	18"	208’	120’	1
1236+88	1	29"x18"	203’	C.M.P.A.	2	18"	203’	120’	1
1242+81	2	43”x27”	207’	C.M.P.A.	2	36"	207’	120’	1

Table 4-10. Existing pipe culvert inventory and suggested replacements

I-10 med station	Exist, cells (no.)	Existing size	Existing length	Existing type	New cells (no.)	New circular size	New culvert length[a]	New jack and bore casing length[b]	Median inlet C-15.80
1248+82	2	43"X27"	214’	C.M.P.A.	2	36"	214’	120’	1
1254+81	2	43"X27"	215’	C.M.P.A.	3	30"	215’	120’	1
1260+79	2	43"X27"	208’	C.M.P.A.	5	24"	208’	120’	1
1266+79	2	43"X27"	219'	C.M.P.A.	2	36"	218’	120’	0
1272+78	2	43"X27"	203'	C.M.P.A.	5	24"	203’	120’	0
1278+78	2	43"X27"	210'	C.M.P.A.	2	36"	210’	120’	0
1284+78	2	43"X27"	203'	C.M.P.A.	2	36"	203’	120’	0
1290+79	2	43"X27"	190'	C.M.P.A.	5	24"	190’	120’	0
1296+78	2	43"X27"	188'	C.M.P.A.	8	18"	193’	120’	0
1306+85	2	50"X31"	235'	C.M.P.A.	11	18"	201’	120’	0
1310+64	2	43"X27"	202'	C.M.P.A.	8	18"	201’	120’	0
1316+80	2	43"X27"	194’	C.M.P.A.	8	18"	194’	120’	1
1322+67	2	43"X27"	202'	C.M.P.A.	8	18"	201’	120’	0
1328+61	2	43"X27"	201’	C.M.P.A.	8	18"	201’	120’	1
1334+57	3	43"X27"	201’	C.M.P.A.	12	18"	201’	120’	1
1340+68	2	43"X27"	201’	C.M.P.A.	8	18"	201’	120’	1
1346+67	2	43"X27"	199’	C.M.P.A.	8	18"	199’	120’	1
1352+66	2	43"X27"	197’	C.M.P.A.	5	24"	197’	120’	1
1358+78	2	43"X27"	208’	C.M.P.A.	3	30"	208’	120’	1
1370+77	2	58"X36"	207’	C.M.P.A.	6	30"	207’	120’	1
1377+78	2	58"X36"	214’	C.M.P.A.	4	36"	214’	120’	1
1394+55	3	43"X27"	201’	C.M.P.A.	12	18"	201’	120’	1
1404+17	2	48”	462’	C.M.P.	2	48"	462’	350’	1
1410+85	2	36”	203’	C.M.P.	2	36"	203’	120’	1
1416+79	2	43"X27"	204’	C.M.P.A.	3	30"	204’	120’	1

Table 4-10. Existing pipe culvert inventory and suggested replacements

I-10 med station	Exist, cells (no.)	Existing size	Existing length	Existing type	New cells (no.)	New circular size	New culvert length[a]	New jack and bore casing length[b]	Median inlet C-15.80
1422+79	2	43"X27"	205’	C.M.P.A.	5	24"	205’	120’	1
1428+79	2	43"X27"	206’	C.M.P.A.	3	30"	206’	120’	1
1434+80	2	43"X27"	199’	C.M.P.A.	5	24"	199’	120’	1
1441+68	2	43"X27"	199’	C.M.P.A.	8	18"	199’	120’	1
1447+66	2	43"X27"	201’	C.M.P.A.	8	18"	201’	120’	1
1461+57	2	58"X36"	269’	C.M.P.A.	Part of Gila River Bridge Replacement Project				
1510+00	1	24”	121’	R.C.P.	Part of Gila River Bridge Replacement Project				
1529+00	1	24”	113’	R.C.P.	2	1-30” 1-36”	30”-206’ 36”-216’	120’	1
1563+00	1	36”x22”	245’	C.M.P.A.	2	30”	240’	120’	0
1569+00	1	36”x22”	250’	C.M.P.A.	1	30”	255’	130’	0
1575+00	1	36”x22”	245’	C.M.P.A.	1	30”	245’	130’	0
1581+00	1	36”x22”	220’	C.M.P.A.	1	30”	215’	120’	0
1587+43	1	36”	250’	R.C.P.	1	36”	250’	130’	0
1593+00	1	36”x22”	215’	C.M.P.A.	2	24”	235’	120’	0
1602+05	2	26”x22”	335’	C.M.P.A.	6	18”	333’	190’	0
1605+50	1	36”x22”	235’	C.M.P.A.	2	24”	220’	120’	0
1614+00	1	43”x27”	353’	C.M.P.A.	3	24”	330’	190’	0
1639+71	1	36”x22”	271’	C.M.P.A.	2	24”	270’	140’	0
1645+00	1	36”x22”	238’	C.M.P.A.	1	30”	250’	130’	0
1651+00	1	36”x22”	250’	C.M.P.A.	1	30”	236’	120’	0
1657+00	1	36”x22”	230’	C.M.P.A.	1	30”	215’	120’	0
1663+00	1	36”x22”	211’	C.M.P.A.	2	24”	340’	200’	0
1669+00	1	36”x22”	211’	C.M.P.A.	1	30”	235’	120’	0
1674+63	1	30”	281’	R.C.P.	1	30”	245’	130’	0
1696+00	1	36”x22”	124’	C.M.P.A.	1	30”	133’	120’	1

Table 4-10. Existing pipe culvert inventory and suggested replacements

I-10 med station	Exist, cells (no.)	Existing size	Existing length	Existing type	New cells (no.)	New circular size	New culvert length[a]	New jack and bore casing length[b]	Median inlet C-15.80
1709+00	1	36”x22”	104’	C.M.P.A.	1	30”	110’	60’	1
1722+00	1	36”x22”	388’	C.M.P.A.	4	18”	365’	200’	0
1738+00	1	36”x22”	108’	C.M.P.A.	1	30”	120’	60’	1
1745+30	1	36”x22”	228’	C.M.P.A.	4	18”	220’	120’	0
1753+00	1	36”x22”	102’	C.M.P.A.	1	30”	115’	60’	1
1768+00	2	36”x22”	570’	C.M.P.A.	4	24”	355’	200’	0
1782+00	1	36”x22”	102’	C.M.P.A.	1	30”	120’	60’	1
1795+20	1	36”x22”	93’	C.M.P.A.	1	30”	105’	60’	1
1808+54	1	36”x22”	241’	C.M.P.A.	2	24”	208’	120’	0
1820+00	1	36”x22”	97’	C.M.P.A.	1	30”	170’	120’	1
1831+00	1	36”x22”	100’	C.M.P.A.	1	30”	120’	60’	1
1858+00	2	36”x22”	245’	C.M.P.A.	2	30”	250’	130’	0
1867+00	2	36”x22”	245’	C.M.P.A.	2	30”	230’	120’	0
1874+50	1	36”x22”	245’	C.M.P.A.	1	30”	240’	120’	0
1880+00	1	36”x22”	245’	C.M.P.A.	1	30”	225’	120’	0
1901+20	1	36"x22"	96'	C.M.P. Arch	2	24	96’	60’	0
1917+35	2	48"	261'	C.M.P.	4	36	246’	130’	0
1921+85	2	42"	246'	C.M.P.	4	30	237’	120’	0
1934+95	2	50"x31"	252'	C.M.P. Arch	6	24	251’	130’	0
1940+45	2	42"	235'	C.M.P.	4	30	255’	130’	0
1945+92	2	42"	233'	C.M.P.	4	30	253’	130’	0
1951+35	3	50"x31"	264'	C.M.P. Arch	9	24	254’	130’	0
1979+95	1	48"	225'	C.M.P.	2	36	235’	120’	0
1985+45	2	52"x31"	237'	C.M.P. Arch	6	24	264’	130’	0

Table 4-10. Existing pipe culvert inventory and suggested replacements

I-10 med station	Exist, cells (no.)	Existing size	Existing length	Existing type	New cells (no.)	New circular size	New culvert length[a]	New jack and bore casing length[b]	Median inlet C-15.80
2005+95	2	58"X36"	219'	C.M.P. Arch	8	24	203’	120’	0
2013+55	2	42"	309'	C.M.P.	4	30	309’	150’	0
2018+68	1	42"	150'	C.M.P.	2	30	142’	60’	0
2019+38	1	42"	116'	C.M.P.	2	30	132’	60’	0
2062+75	1	24"	112'	C.M.P.	1	24	115’	60’	0
2074+60	1	60"	244'	C.M.P.	2	48	232’	120’	0
2094+25	1	24"	106'	C.M.P.	1	24	104’	60’	0
2105+20	1	24"	116'	C.M.P.	1	24	126’	60’	0
2118+65	1	24”	93’	C.M.P.	1	24	97’	60’	0
2119+10	1	24"	226'	C.M.P.	1	24	237’	120’	0
2132+00	2	43"x27"	218'	C.M.P. Arch	5	24	246’	120’	0
2138+45	2	43"x27"	212'	C.M.P. Arch	5	24	225’	120’	0
2144+80	2	43"x27"	197'	C.M.P. Arch	5	24	200’	120’	0
2153+45	3	50"x31"	206'	C.M.P. Arch	9	24	221’	120’	0
2173+75	1	42"	218'	C.M.P.	2	30	225’	120’	0
2182+65	2	42"	244'	C.M.P.	4	30	248’	120’	0
2187+50	2	54"	226'	C.M.P.	4	42	216’	120’	0
2200+75	2	42"	239'	C.M.P.	4	30	230’	120’	0

Note: Culvert stationing is to existing culvert crossing. New culverts may have to shift for constructability.
[a] Multiply the number of barrels by the culvert length to get the total replacement length for quantities.
[b] Multiply the number of barrels by the jack and bore casing length to get the total casing length for quantities.

4.11.4 Existing Box Culvert Extensions

Concrete box culverts along the corridor are assumed to be in good structural condition as some are bridge class culverts that undergo regular inspections. There are no significant impacts expected to existing box culverts as the Recommended Build Alternative does not extend pavement edges beyond the width of the existing headwall or wingwalls except in areas near the reconfigured entrance and exit ramps, some of which will require minor extension of the box culvert inlet and outfall. All box culverts that do not currently extend across the median would need to be lengthened across the median and median inlets added at the flow path of the median ditch. The final designer should inspect culvert conditions and make recommendations for replacement where required. See Table 4-11 for a listing of box culvert extensions for the recommended alternative.

Table 4-11. Proposed box culvert extension summary

I-10 med station	LT/RT	Skew	Cells (no.)	Size	Length	Type	Length of extension	Structures required[a]
1202+00	LT	0°	3	10'x3'	195'	Box culvert	10'	HW/WW
1202+00	RT	0°	3	10'x3'	195'	Box culvert	12'	HW/WW
1682+95	LT	0°	1	16'x14'	94'	Box culvert	35'	MDI
1682+95	RT	0°	1	16'x14'	94'	Box culvert	35'	MDI
1849+47	LT	0°	1	16'x14'	97'	Box culvert	35'	MDI
1849+47	RT	0°	1	16'x14'	97'	Box culvert	35'	MDI
1889+10	RT	60° RT	6	10'X8'	156'	Box culvert	34'	MDI
1890+10	LT	60° RT	6	10'x8'	155'	Box culvert	34''	MDI
1929+48	RT	0°	2	10'x4'	197'	Box culvert	22'	HW/WW
1962+55	LT	30°	2	8'x3'	221'	Box culvert	9'	HW/WW
1967+95	RT	60° LT	2	8'x4'	192'	Box culvert	9'	HW/WW
2026+15	LT	30° LT	4	10'x5'	148'	Box culvert	20'	HW/WW
2049+80	RT	30° RT	1	10'x5'	97'	Box culvert	10'	HW/WW
2050+35	LT	0	1	10'x5'	80'	Box culvert	14'	HW/WW

[a] HW = headwall, WW = wingwall, MDI = median drainage inlet

4.11.5 Stormwater Water Quality and Permitting

Applicable state, local, and tribal agency criteria for stormwater municipal separate storm sewer system (MS4) permitting shall be met for the corridor improvements. The corridor improvements would be in areas with natural wash crossings that would need to be protected from construction activity sediment runoff and postproject condition pollutants like suspended solids and hydrocarbons. The construction phase of the project would use best management practice (BMP) temporary soil erosion protection measures like embankment waddles, straw logs, rock check dams, soil blankets, sediment basins, and other soil stabilization measures to prevent sediment movement outside of the work areas of the project.

Post project BMP stormwater quality measures like infiltration ditches and infiltration basins located in the ROW for control of postconstruction runoff and treat stormwater for water quality benefits before discharging to the local waterways was discussed in detail with the Community. It was noted that no water treatment facilities currently exist in the I-10 corridor. It was also noted that most of the areas on the outside of I-10 would not be disturbed by the Recommended Build Alternative improvements and that adding water quality treatment facilities along the freeway would greatly increase the project footprint. The Community has concurred that such treatment for this project should be limited to infield areas only of disturbance and should not be added to the corridor otherwise. Therefore, along the I-10 main line corridor, stormwater treatment would not be required. See Appendix I for the technical memorandum and consensus by the Community regarding this water quality coordination effort.

4.12 Multimodal Considerations

There are currently no existing multimodal facilities or services within the project limits other than at the Wild Horse Pass Boulevard TI where pedestrian facilities exist and possibly community vanpools. The Recommended Build Alternative would construct pedestrian facilities and make accommodations for bicyclists at all the crossroads within the limits of ADOT ROW. These facilities would primarily take the form of walkways or raised sidewalks for pedestrians and roadway shoulders for bicyclists. Additionally, the Recommended Build Alternative would extend the existing HOV lanes on I-10 from the SR 202L to Riggs Road.

The proposed Recommended Build Alternative would only add to or enhance multimodal features and would in no way discourage those multimodal options that exist or operate today.

4.13 Design Exceptions and Deviations

No design exceptions or variances would be anticipated for the main line of I-10 within the project limits.

Both the existing Goodyear Road and Nelson Road grade separations over I-10 are proposed to remain with the Recommended Build Alternative. Consequently, the horizontal and vertical geometry of these crossroads would not change, and neither of these crossroads' vertical alignments conform to the current version of AASHTO for a 55 mph design speed.

According to the 1969 record drawings, Goodyear Road had a design speed of 55 mph using the AASHTO requirements applicable in 1969. Using the current version of AASHTO and using the existing vertical curve lengths and grades, the existing sag vertical curve on the west side approach has an available speed of 54 mph (511 feet of SSD) and the east approach sag curve has an available speed of 51 mph (471 feet of SSD). The recommended alternative only proposes that Goodyear Road would be widened and that the existing the vertical geometry would not be modified.

According to the 1969 record drawings, no design speed was noted for Nelson Road; however, it is reasonable to assume it was also 55 mph since Nelson Road has a posted speed of 55 mph. Using the current version of AASHTO and using the existing vertical curve length and grades, the three existing vertical curves are all less than 55 mph. The sag vertical curve on the west approach has an available speed of 50 mph (451 feet of SSD). The crest vertical curve over I-10 has an available speed of 51 mph (473 feet of SSD). The sag vertical curve on the east approach has an available speed of 51 mph (475 feet of SSD). Currently, there is a 45 mph advisory speed limit sign approaching the I-10 crossing. The recommended alternative only proposes that Nelson Road would be widened and that the vertical geometry would not be modified.

See Chapter 7 for a more complete discussion on design exceptions and Appendix J for the *AASHTO Controlling Design Criteria Report*.

4.14 Intergovernmental Agreements

The total number of IGAs has not yet been determined during this study and would need to be finalized for the corridor during the various final design activities. However, the following is a summary of what is known now, or what we speculate could be needed:

- **ISA/JPA 14-0004637-I**: Environmental Support and Cost Reimbursement – this existing IGA has been in place since 2014 between ADOT and the Community and will expire on August 5, 2025. The scope and labor classifications associated with this existing IGA can be used as a mechanism to reimburse the Community for the assistance they provide to ADOT regarding cultural resources and biology. This assistance can include research, investigations, recovery, and mitigations if necessary. This study has used this IGA for the cultural coordination and research work in the corridor to date. It is envisioned this IGA would continue to be used should this project be constructed, possibly for monitoring, recovery, or mitigation.
- **ROW Support**: Proposed IGA between ADOT and the Community for the Community to support ADOT in the ROW acquisition process, especially for the allotted lands and the landowner consent process.
- **Maintenance Limits Agreement**: Potential IGA between ADOT and the Community (and/or Maricopa County Department of Transportation) to clearly define maintenance responsibilities of the ADOT-owned, Community-owned, and County-owned roadways within the project limits. This IGA can also be used to define ownership and maintenance responsibilities for traffic signals systems.
- **Project Enhancements**: Potential IGA between ADOT and the Community (or other entity) to define enhancements beyond ADOT's standard freeway elements that could added to the construction contract, if needed. This could include aesthetic enhancements or future utility provisions (such as Gila River Telecommunications, Inc.), to name just a few possibilities.

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5 Itemized Cost Estimate

A detailed itemized construction cost estimate was prepared for each of the build alternatives and options considered. Section 5.1 discusses the currently programmed funding for the I-10 corridor project (excluding the programmed funds for the Gila River Bridge replacement project, which is a separate project). Section 5.2 provides the cost estimate for the Recommended Build Alternative/Options developed in June 2023 using the ADOT Management Consultant's latest cost estimate template and unit price information (used as applicable). Future maintenance costs are discussed in Section 5.3. Section 5.4 provides the detailed cost estimates for the build alternative and options that were considered but ultimately not selected for inclusion in the Recommended Build Alternative.

5.1 Programmed Funding

Funding for this project is anticipated to come from a variety of sources including federal, state, and regional funding. At the time of this document, the project is not fully funded, but steps are being taken at many levels of government to secure this funding. Table 5-1 lists the funding that has been allocated to date. It is important to note that this program changes regularly and thus could change at any time. It is estimated that approximately $100 million is still unfunded for the Recommended Build Alternative at the time of this publication.

Table 5-1. Programmed funding

Segment	Funding type	Fiscal years	Funding amount
SR 202L (milepost 161) to Maricopa-Pinal County line (milepost 168.7), about 1.2 miles south of Riggs Road	MAG Regional Transportation Plan Freeway Program	2019, 2020, 2022, 2023, 2025	$220,991,113
SR 202L to SR 387 corridor (complete project except for Gila River Bridge replacements)	Federal, Local, and Arizona state funds	2019, 2020, 2021, 2023, 2024, 2025	$580,148,887
		Total	**$801,140,000**

5.2 Cost Estimate of the Recommended Build Alternative/Options

The estimated cost in 2023 dollars for the Recommended Build Alternative, which is described in detail in Chapter 4 of this document, can be found in Table 5-2. Note that a detailed cost estimate for the anticipated ROW is not included in this estimate. Acquiring ROW and easements across a sovereign Native American nation is challenging and complex from a legal and valuation perspective. Therefore, no ROW estimate is attempted for this document; however, acreage is provided instead as a proxy metric for context.

Note that Table 5-2 does not include the costs associated with the Gila River Bridge replacement, and the associated approach roadways, because that project is a separate ADOT study/project (F0270).

Table 5-2 is sorted by segments that correspond to the segments identified in the implementation plan in Chapter 6 of this document.

Table 5-2. Cost estimate of the Recommended Build Alternative (FY 2023 $)

Build alternative/ options	Construction cost (2023 $)	Utility relocation cost (2023 $)	Design cost (2023 $) [a]	New ROW including TCE (acres); cost unknown	Total project cost (2023 $), excluding ROW
SR 202L (milepost 161) to Maricopa-Pinal County line (milepost 168.7) – Implementation Segment 2A					
ML2 (7.7 miles)	$177,393,900	$0	$13,267,100	0.0	$190,661,000
WH2	$26,444,300	$2,214,000	$1,973,400	0.96	$30,631,700
QC2	$36,846,400	$1,107,000	$2,750,700	6.73	$40,704,100
RR4	$24,140,300	$553,500	$1,804,000	0.38	$26,497,800
Segment total	**$264,824,900**	**$3,874,500**	**$19,795,200**	**8.07**	**$288,494,600**
Maricopa-Pinal County line (milepost 168.7) to north of Gasline Road (milepost 177) – Implementation Segment 3 (excluding the I-10 Gila River Bridge replacement project, F0270 – Implementation Segment 1B)					
ML2 (8.3 miles)	$159,388,100	$0	$8,309,500	0.0	$167,697,600
GY2	$10,350,300	$0	$773,200	1.26	$11,123,500
NR2	$8,955,100	$1,937,300	$39,400	10.82	$10,931,800
CB6	$57,716,100	$2,214,000	$253,200	19.36	$60,183,300
Segment total	**$236,409,600**	**$4,151,300**	**$9,375,300**	**31.44**	**$249,936,200**
North of Gasline Road (milepost 177) to southern project limits (milepost 187) – Implementation Segment 1A					
ML2 (10 miles)	$139,119,000	$0	$613,500	0.0	$139,732,500
GL3	$20,405,300	$1,704,800	$89,600	6.50	$22,199,700
SF4	$31,353,100	$1,195,600	$137,600	47.49	$32,686,300
DL4	$2,068,400	$0	$9,100	–8.45[b]	$2,077,500
PA3	$25,653,900	$166,100	$112,600	0.3	$25,932,600
Segment total	**$218,599,600**	**$3,066,500**	**$962,400**	**45.84**	**$222,628,500**
Corridor-wide ADOT FMS fiber optic trunk line and infrastructure					
Fiber optic/FMS build	$16,370,300	$0	$1,163,100	0.0	$17,533,000
Corridor total	**$736,204,400**	**$11,092,300**	**$31,296,000**	**85.35**	**$778,592,300**

[a] design costs for project elements for the Gila River Bridge south have already been expended and are therefore not included in this table.
[b] acreage to be returned to Gila River Indian Community

5.3 Estimate of Future Maintenance Costs

The projected annual maintenance cost for this 26-mile segment of I-10 was calculated to provide future budgeting guidance for ADOT's Central and Southcentral Maintenance Districts.

Approximately 15 miles of the 26-mile project (or about 57 percent) falls within the ADOT Central Maintenance District boundary. The calculation included an average pavement width of 144 feet (including general purpose, HOV, and auxiliary lanes and shoulders) between SR 202L and the SR 587/Casa Blanca Road TI. Using a current annual maintenance cost per lane-mile of approximately $24,000 for the assumed opening year of 2027, the ADOT Central Maintenance District annual maintenance cost would be approximately $2.9 million in 2027 dollars. Note this value excludes the maintenance costs of the Gila River Bridge, included under another study/project (F0270).

Approximately 11 miles of the 26-mile project (or about 43 percent) falls within the ADOT Southcentral Maintenance District boundary. The calculation included an average pavement width of 120 feet (including general purpose lanes and shoulders) between the SR 587/Casa Blanca Road TI and the southern end of the project (milepost 187). Using a current annual maintenance cost per lane-mile of approximately $24,000 for the assumed opening year of 2027, the Southcentral Maintenance District annual maintenance cost would be approximately $1.6 million in 2027 dollars.

5.4 Detailed Cost Estimates of Other Alternatives/Options Considered

During the alternatives/options development and evaluation process in 2020, project costs were developed for all the build alternatives and options developed for the corridor as a measure for comparison. All estimates were developed to the same level. All values listed are in 2020 dollars, matching the timeframe under which they were developed. These values have not been updated to 2022 dollars to remain consistent with what was shared during the public involvement process in late 2020.

The estimated project cost of the alternatives and options that were considered, but ultimately not selected for inclusion in the recommended alternative, are summarized in Table 5-3.

Table 5-3. Costs of the other alternatives/options considered, but not selected (2020 $)

Build alternative/ options	Construction cost (2020 $)	Utility relocation cost (2020 $)	Design cost (2020 $)	ROW (acres); cost unknown	Total project cost (2020 $), excluding ROW
ML3	$308,100,000	$0	$29,900,000	85.2	$338,000,000
WH3	$12,500,000	$0	$1,200,000	1.1	$13,700,000
QC3	$15,400,000	$0	$1,500,000	4.4	$16,900,000
RR2	$4,400,000	$0	$400,000	0.0	$4,800,000
RR3	$7,900,000	$0	$600,000	0.0	$8,500,000
RR5	$14,300,000	$0	$1,300,000	0.0	$15,600,000
GY3	$10,900,000	$0	$1,100,000	3.0	$12,000,000
NR3	$8,200,000	$100,000	$800,000	5.7	$9,100,000
CB2	$10,700,000	$100,000	$1,000,000	2.9	$11,800,000
CB3	$14,700,000	$100,000	$1,400,000	3.0	$16,200,000
CB4	$19,200,000	$100,000	$2,100,000	2.6	$21,400,000
CB5	$35,600,000	$100,000	$3,400,000	17.5	$39,100,000
CB7	$36,600,000	$100,000	$3,500,000	54.1	$40,200,000
GL2	$12,400,000	$500,000	$1,200,000	3.9	$14,100,000
SF2	$6,600,000	$300,000	$600,000	2.1	$7,500,000
SF3	$23,400,000	$500,000	$2,300,000	21.9	$26,200,000
SF5	$17,700,000	$300,000	$1,800,000	37.0	$19,800,000
DL2	$14,200,000	$0	$1,400,000	1.6	$15,600,000
DL3	$15,300,000	$0	$1,500,000	2.0	$16,800,000
PA2	$9,900,000	$0	$1,000,000	0.0	$10,900,000
PA4	$13,800,000	$0	$1,400,000	0.0	$15,200,000

6 Implementation Plan

As noted in Chapter 5, the majority of the I-10 corridor project is funded for construction; however, a portion of the project is still unfunded. The I-10 bridge replacements project over the Gila River is funded in fiscal year 2023, although this is a separate environmental and engineering study from the overall corridor study. The segment of I-10 from SR 202L to Riggs Road has about $221 million funded from MAG in fiscal years 2019, 2020, 2022, 2023, and 2025. Finally, ADOT has allocated $580 million to the balance of the corridor spread across fiscal years 2019, 2020, 2021, 2023, 2024, and 2025.

Given the need for additional funding to meet the proposed I-10 improvements, an implementation plan was developed to serve as a roadmap for projects to be approved and constructed based on the completion of this DCR and the corresponding EA. Furthermore, having consensus on an implementation plan helps the project stakeholders identify I-10 construction segments to advance if there were additional federal funding and/or federal grant application opportunities that could be applied toward the I-10 improvement needs. It should be noted that if all the remaining funding could be identified at one time, this implementation plan may not be necessary, although it could help define and sequence construction contracts to avoid contractor overlap issues.

Any implementation plan must consider numerous factors in its development. The following list describes the major considerations and their applicability to this project:

- **Funding limitations**: This corridor is not currently fully funded, and the balance of the funding is likely to come from numerous sources spread over many fiscal years. Furthermore, general economic cycles could also positively or negatively impact funding availability. Therefore, separating the project into smaller segments for purposes of implementation helps accommodate partial funding amounts over time.
- **Schedule constraints**: Beyond funding cash flow constraints, the most important schedule constraint is the ROW acquisition timeline for the corridor; specifically, acquiring allotted parcels is anticipated to take significantly longer than acquiring tribal-owned parcels. This will have a significant impact on determining how fast the proposed improvements can commence.
- **Independent utility and logical termini**: Because this four-lane section of I-10 is surrounded by six-lane sections, it acts as a 26-mile bottleneck today. Any proposed implementation plan should only strive to shrink this bottleneck length and to avoid creating two separate bottlenecks. In other words, the implementation plan should either build from both ends toward the middle, or from one end to the other. This would satisfy each segment's independent utility and logical termini requirements.
- **Satisfying purpose and need**: Building any subset of the proposed corridor improvements will incrementally satisfy the project's purpose and need. No element of the project would be contrary to the purpose and need.
- **Constructability and maintenance of traffic**: Each segment should be constructable and would ideally not interfere with another project's contractor activities. Because I-10 is a 26-mile linear project, breaking the proposed improvements into smaller linear segments creates a relatively clean match point between two adjacent segments. Maintenance of traffic within and between the segments should be manageable and not confusing for the drivers.
- **Environmental impacts and mitigations**: Each proposed segment of work should be a subset of the total project defined and cleared in the NEPA document for the corridor. Each segment should not create substantial additional impacts to either the human or natural environment that cannot be mitigated. And any mitigation defined in the corridor NEPA document that applies to each segment should be applied to that smaller segment.

Considering these factors, the implementation plan has established that the timeliness of project delivery is most likely based on the critical timelines for the ROW acquisition for the underlying tribal and allotted land ownership. Therefore, this implementation plan is best described as a ROW-constrained plan, meaning that the construction would occur as fast as the grants of ROW could be secured. The implementation plan factors in the tribal and allotted land acquisition process and the potential timing associated with the approval of the needed easement/ROW for the I-10 improvements. For example, there are segments along I-10 with an underlying tribal land ownership with no allotted land interests and other segments with both tribal and allotted land ownership. This plan focuses on first delivering the segments that have only tribal ownership, recognizing that those segments could have their ROW acquisition processes completed earlier than segments with allotted land ownership.

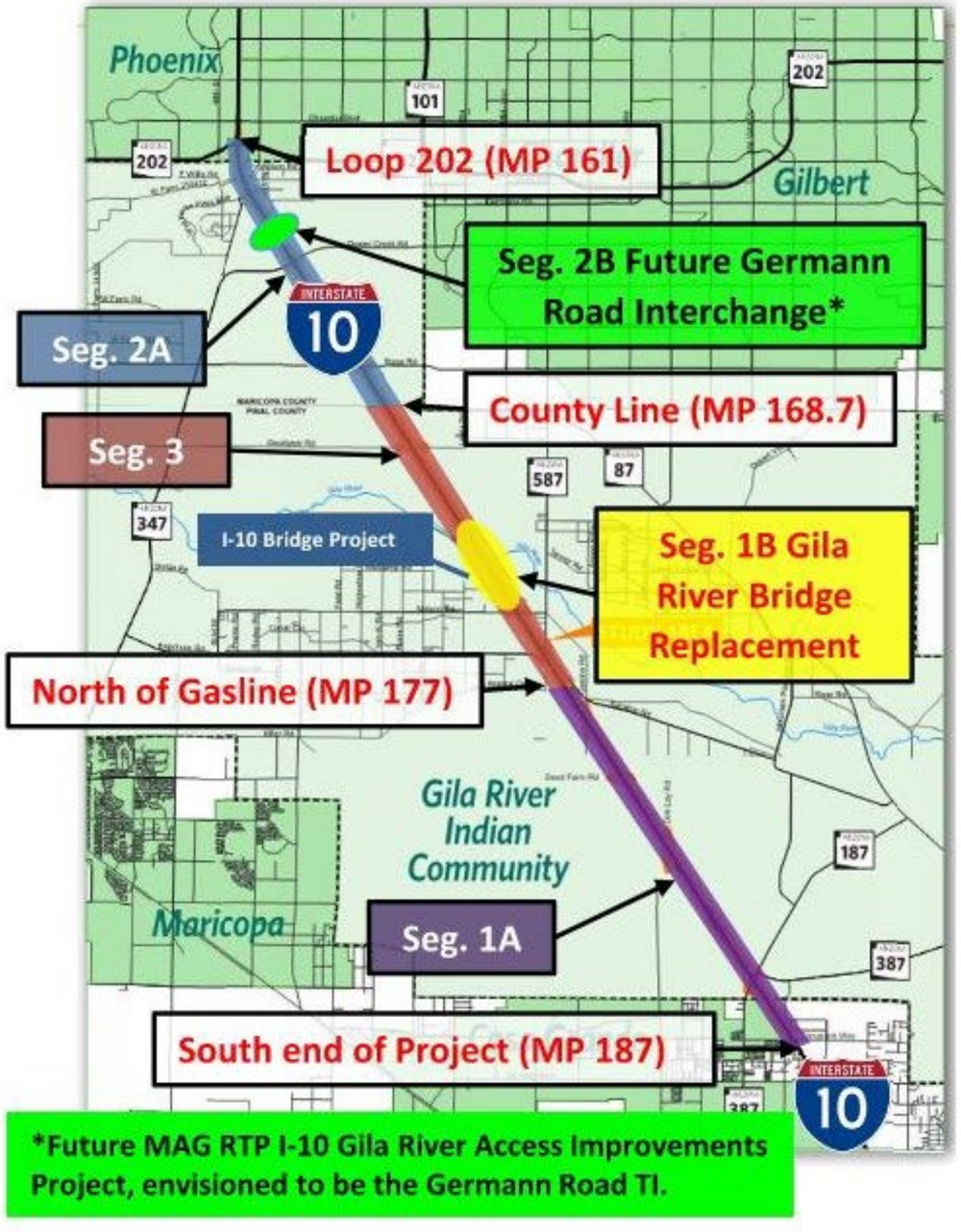
Based on this information, the study team developed a proposed implementation plan (Figure 6-1) that breaks down the I-10 corridor with proposed implementation segments while showing the underlying tribal and allotted land ownership. The following is a summary of the implementation segments:

- **Segment 1A**: I-10, North of Gasline Road to South of SR 387, including all crossroads in this segment (Gasline Road, Seed Farm Road, the removal of Dirk Lay Road, and SR 387/Pinal Avenue). **Segment 1B** includes the I-10 Bridge replacement over the Gila River. Both segments have tribal land only with no allotted parcel interests. ADOT would start the easement/ROW acquisition process with the Community immediately after the I-10 corridor environmental document is complete for Segment 1A and the I-10 Bridge replacement environmental document is complete for Segment 1B. This is also appropriate from a construction standpoint as the two segments are physically separated from each other so there should be no contractor interaction problems. Additionally, getting Segment 1B started as early as possible would be ideal because of the long construction duration needed to construct the new bridges over the Gila River.
- **Segment 2A**: I-10, Loop 202 to Riggs Road, including Wild Horse Pass, SR 347/Queen Creek Road, and Riggs Road. This segment is contingent on the MAG Regional Transportation Plan budgeting all three simultaneously. Recognizing the importance of this segment to the Community to facilitate the development contemplated in the Wild Horse Pass Development Authority Master Plan, MAG has committed to prioritizing and completing this segment as expeditiously as possible. MAG has programmed funds for construction in fiscal year 2025. This segment includes both tribal land and allotted lands with 13 allotted parcels with 472 landowners. As with Segment 1A, ADOT would start the easement/ROW acquisition process for tribal and allotted lands for Segment 2A, working closely with the Community on the allottee consent and BIA processes, immediately after the I-10 corridor environmental document is complete. Therefore, the initiation of construction of this segment will be delayed until completion of the ROW acquisition process (given the need for allotted landowner consent and BIA approvals). Had this ROW acquisition process not been required, ADOT could construct Segment 2A sooner, possibly even before other segments that avoid allotted parcel acquisitions or that do not yet have construction funding secured (e.g., Segment 1A).

- **Segment 2B:** I-10; Germann Road interchange. This proposed interchange was identified in the recently completed Wild Horse Pass Development Authority Master Planning effort. This proposed interchange is not included in the current scope of the I-10; SR 202L to SR 387 study process as it has not yet been included in the MAG Regional Transportation Plan. However, from a corridor implementation perspective, it is important to recognize the potential construction of this interchange could occur during, or shortly after the corridor improvements are made once any environmental study on the proposed Germann Road interchange is completed. Consequently, neither Segment 1B (I-10 Bridge Replacement over the Gila River) nor Segment 2B (I-10; Germann Road Interchange) are part of this study but are nonetheless considered in the overall implementation of the corridor. The MAG Regional Transportation Plan does include the "I-10 Gila River Access Improvements Project," which sets aside funding for the proposed Germann Road interchange.
- **Segment 3**: I-10 from south of Riggs Road to north of Gasline Road including all crossroad in this segment (Goodyear Road, Nelson Road, and SR 587/Casa Blanca Road). This segment includes both tribal and allotted lands with 24 allotted parcels and 1,411 landowners. Due to the large number of allotted landowners, the easement/ROW acquisition process for Segment 3 is expected to take the longest of all the segments to complete. Even though the acquisition process would start at the completion of the I-10 corridor environmental documents like the other segments, Segment 3 would be the last segment to go to construction. Furthermore, scheduling Segment 3 later allows Segment 1B (I-10 Bridges over the Gila River) to be completed before Segment 3 starts, avoiding overlapping contractor issues.
- **ADOT Freeway Management System Fiber Optic Trunk Line**: The construction of the fiber optic line could be done in one of two ways. Each of the segments noted above could construct its corresponding length of fiber optic trunk line, or this could be a stand-alone project for the entire length, although it should be noted it cannot be completed until Segment 1B is complete.

It is currently envisioned that the proposed crossroad and TI improvements would be constructed concurrently with the corresponding I-10 main line segment construction. However, while undesirable, funding constraints may ultimately require separating the crossroads and TIs from the I-10 main line improvements.

This implementation plan depicts one possible strategy for how to efficiently deliver this large project as soon as possible. It must be noted that many future influences beyond the control of this project or the stakeholders involved could alter this plan. As an example, program funding does and will continue to change to accommodate budgetary constraints and available funding sources, and this will likely affect how this corridor's construction would ultimately be sequenced. As a result, the information presented here is meant to primarily be as a framework for prioritization and is subject to change over time. The preferred option for ADOT remains constructing the entire corridor improvements at one time if funding were available.



Segment 1A	Tribal	Tribal TCE	Allotted	Allot. Owners
Gasline	4	3	0	0
Seed Farm	4	4	0	0
Dirk Lay (Turnbacks)	2	0	0	0
SR 387/Pinal	2	0	0	0
Total	**12**	**7**	**0**	**0**
Segment 1B	**Tribal**	**Tribal TCE**	**Allotted**	**Allotted Owners**
Bridge Replacement	0-1	0	0	0
Total	**0-1**	**0**	**0**	**0**
Segment 2A	**Tribal**	**Tribal TCE**	**Allotted**	**Allotted Owners**
Wild Horse Pass	4	1	0	0
SR 347/Queen Creek	0	0	9	408
Riggs	0	0	4	64
Total	**4**	**1**	**13**	**472**
Segment 2B	**Tribal**	**Tribal TCE**	**Allotted**	**4**
Germann Rd. (Future)*	0-1	0	6-12	Varies
Total	**0-1**	**0**	**6-12**	**Varies**
Segment 3	**Tribal**	**Tribal TCE**	**Allotted**	**Allotted Owners**
Goodyear	0	0	4	302
Nelson	1	0	5	102
Nelson TCE	0	1	1	25
SR 587/Casa Blanca	4	0	14	982
Total	**5**	**1**	**24**	**1411**

Figure 6-1. Proposed implementation plan

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7 AASHTO Controlling Design Criteria and Design Exceptions

The Recommended Alternative would expand I-10 and upgrade the associated crossroads and TIs using the design criteria listed in Section 4.2 of this document, which are based on both AASHTO guidance and ADOT's RDG criteria.

See Appendix J for the project's formal *AASHTO Controlling Design Criteria Report*, documenting the existing conditions.

7.1 AASHTO Non-Conforming Geometric Design Elements

The improvements are being made to existing facilities; however, AASHTO design exceptions are generally not anticipated on I-10 or the TIs.

Both the existing Goodyear Road and Nelson Road grade separations over I-10 are proposed to remain with the Recommended Alternative. Consequently, the horizontal and vertical geometry of these crossroads would not change, and neither of these crossroads' vertical alignments conform to the current version of AASHTO's Green Book, which calls for a 55 mph design speed.

According to the 1969 record drawings, Goodyear Road had a design speed of 55 mph. Using the current version of AASHTO and the existing vertical curve lengths and grades, the existing sag vertical curve on the western approach has an available speed of 54 mph (511 feet of stopping sight distance). On the eastern approach, the sag curve has an available speed of 51 mph (471 feet of stopping sight distance). The Recommended Alternative proposes that Goodyear Road only be widened, and the existing vertical geometry would not be modified.

According to the 1969 record drawings, no design speed was noted for Nelson Road; however, it is reasonable to assume it was also 55 mph since Nelson Road has a posted speed of 55 mph. Using the current version of AASHTO and the existing vertical curve length and grades, the three existing vertical curves are all less than 55 mph. The sag vertical curve on the western approach has an available speed of 50 mph (451 feet of stopping sight distance). The crest vertical curve over I-10 has an available speed of 51 mph (473 feet of stopping sight distance). The sag vertical curve on the eastern approach has an available speed of 51 mph (475 feet of stopping sight distance). Currently, there is a 45 mph advisory speed limit sign approaching the I-10 crossing. The Recommended Alternative proposes that Nelson Road only be widened, and the existing vertical geometry would not be modified.

7.2 AASHTO Design Exceptions

There are no known AASHTO design exceptions needed for the I-10 improvements.

7.3 ADOT Roadway Design Guide Non-Conforming Geometric Design Elements

The vertical alignment issues noted in Section 7.1 for Goodyear and Nelson Roads are also ADOT RDG non-conforming geometric design elements.

7.4 ADOT Design Exceptions

ADOT design exceptions would be needed for the vertical alignments of both Goodyear and Nelson Roads.

7.5 ADOT Design Variances

Given the existing access conditions along the crossroads that will have TIs, ADOT control of access requirements in accordance with the ADOT RDG will not be achieved at all the TIs. Table 7-1 documents where ADOT design variances would be required for control of access.

Table 7-1. Control of access requirements for the Recommended Build Alternative

Location	Quadrant	Exit/Entrance	Standard distance in feet (Full/RIRO[a])	Design distance in feet (Full/RIRO[b])	Variance required (Full/RIRO[a])
Wild Horse Pass Boulevard TI	NW	Exit	990/1320	1025/0	No/Yes
	SW	Entrance	330/1320	680/185	No/Yes
	NE	Entrance	330/1320	720/380	No/Yes
	SE	Exit	660/1320	570/510	Yes/Yes
SR 347/Queen Creek Road TI	NW	Exit	990/1320	SR 347 to West full C/A	No/No
	SW	Entrance	330/1320	SR 347 to West full C/A	No/No
	NE	Entrance	330/1320	900/0	No/Yes
	SE	Exit	660/1320	900/0	No/Yes
Riggs Road TI	NW	Exit	660/1320	660/315	No/Yes
	SW	Entrance	330/1320	330/640	No/Yes
	NE	Entrance	330/1320	330/485	No/Yes
	SE	Exit	660/1320	545/204	Yes/Yes
SR 587/Casa Blanca Road TI	NW	Exit	660/1320	750/0 (WB CB) 875/0 (EB CB Bypass)	No/Yes
	SW	Entrance	330/1320	1350/0	No/No
	NE	Entrance	330/1320	530/0	No/Yes
	SE	Exit	660/1320	400/0	Yes/Yes
Seed Farm Road TI	NW	Exit	660/1320	500/410	Yes/Yes
	SW	Entrance	330/1320	515/410	No/Yes
	NE	Entrance	330/1320	635/555	No/Yes
	SE	Exit	660/1320	630/555	Yes/Yes
SR 387/SR 187/Pinal Avenue TI	NW	Exit	660/1320	660/560	No/Yes
	SW	Entrance	330/1320	365/1190	No/No
	NE	Entrance	330/1320	635/0	No/Yes
	SE	Exit	660/1320	350/0	Yes/Yes

[a] right-in/right-out access – single access point allowed within 1,320 feet of TI
[b] right-in/right-out distance measured from the end of the full access control

8 Social, Economic, and Environmental Concerns and Mitigation

An EA, along with supporting technical reports, has been prepared for the proposed I-10: SR 202L to SR 387 project as part of the preliminary design and engineering process, in accordance with NEPA, Council on Environmental Quality regulations, and ADOT's *NEPA EA and EIS Guidance* (2019).

The EA identified and evaluated potential impacts on the social, economic, natural, and cultural environment that could result from construction of the proposed I-10 improvements. Also contained in the EA are mitigation measures to be incorporated into the project's final design and construction documents. The mitigation measures listed in the EA may not be modified without prior written approval from ADOT.

The Draft EA and DCR was available for review by the public, agencies, local elected and government officials, the Community, organizations, and other interested stakeholders during a public comment period that included an in-person and virtual public hearing. The Draft EA, Draft DCR, and other studies conducted for the proposed I-10 improvements were posted to the study website, where they were viewed by the public for comment:

i10wildhorsepasscorridor.com

Pertinent comments received on the Draft EA and DCR were incorporated, as appropriate, in the Final EA and DCR. After public comments had been answered or addressed, the Final EA and DCR was also posted to the study website.

The following resources or areas of impact were evaluated in the I-10: SR 202L to SR 387 EA:

- land ownership, jurisdiction, and land use
- social and economic considerations
- cultural resources
- Section 4(f) resources
- air quality
- noise
- utilities
- visual resources
- floodplains and drainage
- Sections 404, 401, and 402 of the Clean Water Act and National Pollutant Discharge Elimination System
- biological resources
- prime and unique farmland
- hazardous materials
- materials sources and waste materials
- secondary impacts
- cumulative impacts

The project is being prepared in cooperation with the Community, BIA, FHWA, and MAG. The study evaluated and assessed the benefits and impacts of a range of feasible alternatives and options, including a no-build alternative and no-build options. It also identifies mitigation to offset potential impacts.

The I-10 main line build alternative, TI and crossroad build options, and fiber optic trunkline build option chosen by ADOT with consensus from the Community represents the Recommended Build Alternative for the I-10 improvements. ADOT evaluated the alternatives and options in close coordination with the Community[1] and other key stakeholders. A detailed evaluation of the Recommended Build Alternative's potential social, economic, and environmental impacts is presented in the EA in Part IV, *Affected Environment, Environmental Consequences, and Mitigation*, based on the refined designs presented in the DCR.

[1] The Community documented its consensus with the Recommended Build Alternative in a letter dated June 3, 2021.

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