FINAL REPORT

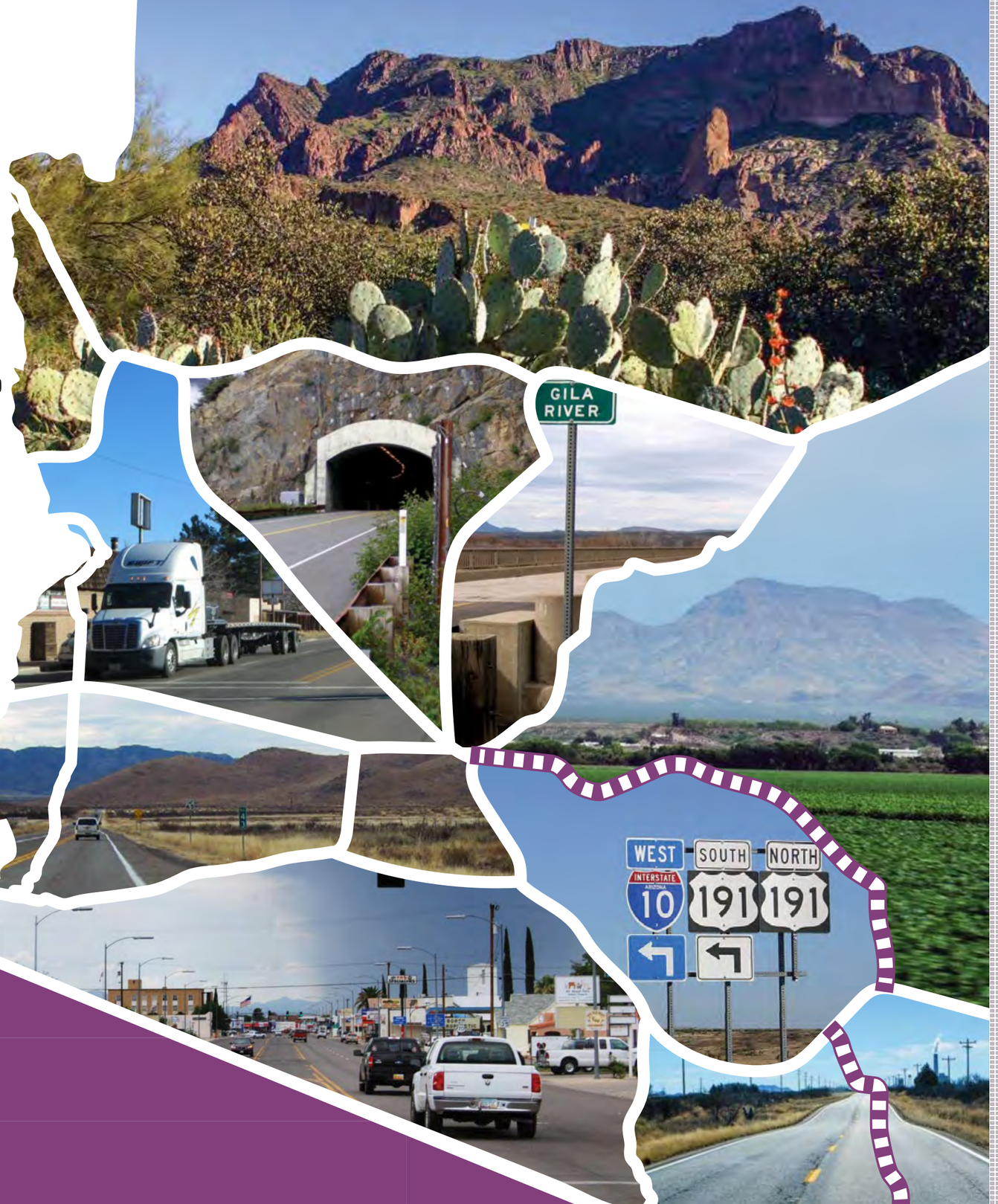
US 60 | US 70 | US 191 Corridor Profile Study

Florence Junction (SR 79 Junction) to Douglas

PREPARED FOR ADOT MARCH 2017

ADOT WORK TASK NO.
MPD 029-16

ADOT CONTRACT NO.
DT11-013154



Prepared by

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ARIZONA DEPARTMENT OF TRANSPORTATION

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ACRONYMS & ABBREVIATIONS

AADT	Average Annual Daily Traffic
ABISS	Arizona Bridge Information and Storage System
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
ASLD	Arizona State Land Department
AZTDM	Arizona Travel Demand Model
BLM	Bureau of Land Management
BQAZ	Building a Quality Arizona
CAG	Central Arizona Governments
CCTV	Closed Circuit Television
CPS	Corridor Profile Study
CR	Cracking Rating
DCR	Design Concept Report
DMS	Dynamic Message Sign
EB	Eastbound
FHWA	Federal Highway Administration
FY	Fiscal Year
HCRS	Highway Condition Reporting System
HERE	Real time traffic conditions database produced by American Digital Cartography Inc.
HPMS	Highway Performance Monitoring System
I	Interstate
IRI	International Roughness Index
ITS	Intelligent Transportation System
LCCA	Life-Cycle Cost Analysis
LOS	Level of Service
LPOE	Land Point of Entry
LRTP	Long Range Transportation Plan
MAG	Maricopa Association of Governments
MAP-21	Moving Ahead for Progress in the 21st Century
MP	Milepost
MPD	Multimodal Planning Division
NB	Northbound
NPV	Net Present Value
OP	Overpass
P2P	Planning to Programming
PA	Project Assessment
PARA	Planning Assistance for Rural Areas
PDI	Pavement Distress Index
PES	Performance Effectiveness Score
PSR	Pavement Serviceability Rating
PTI	Planning Time Index
RTP	Regional Transportation Plan
RWIS	Road Weather Information System
SATS	Small Area Transportation Study
SB	Southbound
SEAGO	South Eastern Arizona Governments Organization
SHSP	Strategic Highway Safety Plan
SOV	Single Occupancy Vehicle
SR	State Route
SVMPO	Sierra Vista Metropolitan Planning Organization
SWAP	State Wildlife Action Plan
TAC	Technical Advisory Committee
TI	Traffic Interchange
TIP	Transportation Improvement Plan
TPTI	Truck Planning Time Index
TTI	Travel Time Index
TTTI	Truck Travel Time Index
UP	Underpass
UPRR	Union Pacific Railroad
USDOT	United States Department of Transportation
V/C	Volume to Capacity Ratio
VMT	Vehicle-Miles Travelled
VPD	Vehicles Per Day
WB	Westbound
WIM	Weigh-in-Motion

EXECUTIVE SUMMARY

INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study (CPS) of US Route 60|US 70 from State Route (SR) 79 to the US 191 Junction and of US 191 from US 70 to the SR 80 Junction (US 60|US 70|US 191). This study examines key performance measures relative to the US 60|US 70|US 191 corridor, and the results of this performance evaluation are used to identify potential strategic improvements. The intent of the corridor profile program, and of ADOT's Planning-to-Programming (P2P) process, is to conduct performance-based planning to identify areas of need and make the most efficient use of available funding to provide an efficient transportation network.

ADOT is conducting eleven corridor profile studies within three separate groupings. The US 60|US 70|US 191 corridor, depicted in **Figure ES-1**, is one of the strategic statewide corridors identified and the subject of this CPS.

Corridor Study Purpose, Goals and Objectives

The purpose of the CPS is to measure corridor performance to inform the development of strategic solutions that are cost-effective and account for potential risks. This purpose can be accomplished by following the process described below:

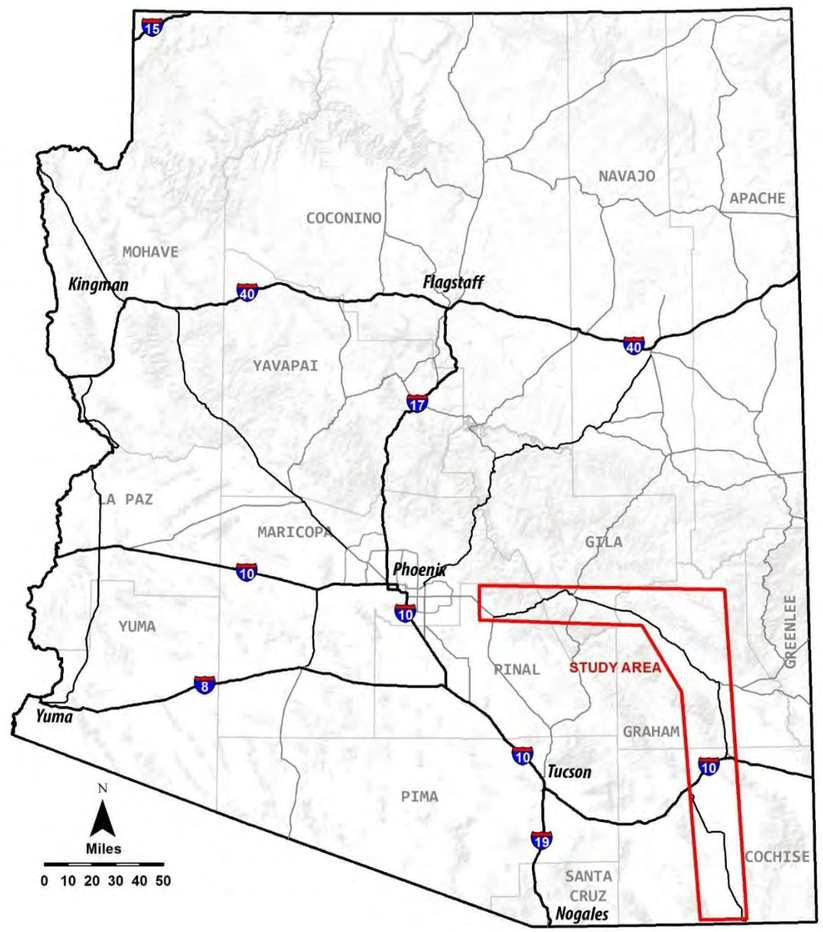
- Inventory past improvement recommendations
- Define corridor goals and objectives
- Assess existing performance based on quantifiable performance measures
- Propose various solutions to improve corridor performance
- Identify specific solutions that can provide quantifiable benefits relative to the performance measures
- Prioritize solutions for future implementation

The objective of the US 60|US 70|US 191 CPS is to identify a recommended set of prioritized potential solutions for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The US 60|US 70|US 191 CPS defines solutions and improvements for the corridor that are evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance.

The following goals are identified as the outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals
- Develop solutions that address identified corridor needs based on measured performance
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure

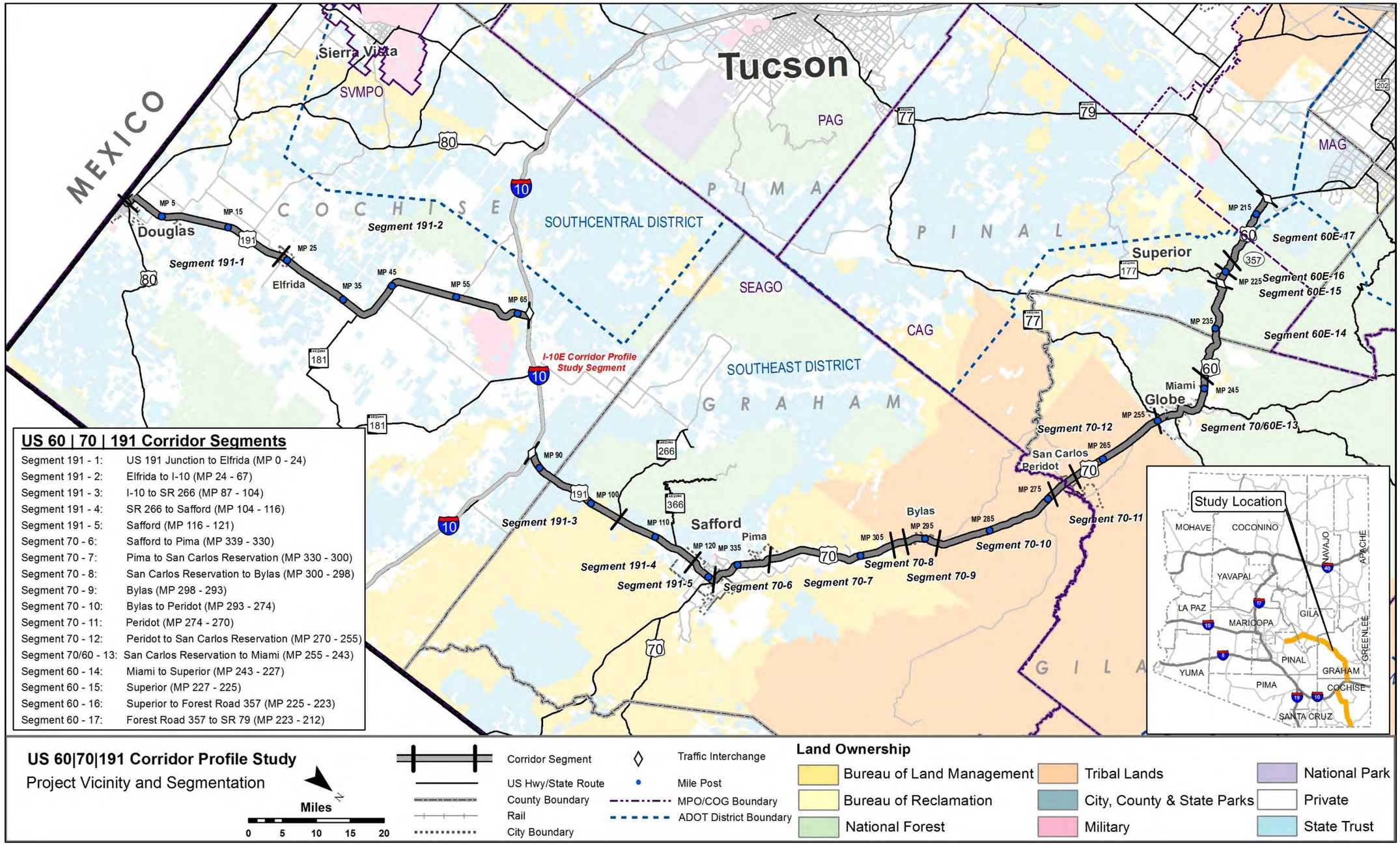
Figure ES-1: Corridor Study Area



Study Location and Corridor Segments

The US 60|US 70|US 191 CPS divides the corridor into seventeen planning segments to facilitate analysis and evaluation. The corridor is segmented at logical breaks where the context changes due to differences in characteristics such as terrain, daily traffic volumes, or roadway typical sections. Corridor segments are shown in **Figure ES-2**.

Figure ES-2: Corridor Location and Segments



CORRIDOR PERFORMANCE

A series of performance measures are used to assess the US 60|US 70|US 191 corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

Corridor Performance Framework

This study uses a performance-based process to define baseline corridor performance, diagnose corridor needs, develop corridor solutions, and prioritize strategic corridor investments. In support of this objective, a framework for the performance-based process was developed through a collaborative process involving ADOT and the CPS consultant teams.

Figure ES-3 illustrates the performance framework, which includes a two-tiered system of performance measures (primary and secondary) to evaluate baseline performance.

Figure ES-3: Corridor Profile Performance Framework

The following five performance areas guide the performance-based corridor analyses:

- Pavement
- Bridge
- Mobility
- Safety
- Freight

The performance measures include five primary measures: Pavement Index, Bridge Index, Mobility Index, Safety Index, and Freight Index. Additionally, a set of secondary performance measures provides for a more detailed analysis of corridor performance. **Table ES-1** provides the complete list of primary and secondary performance measures for each of the five performance areas.

Table ES-1: Corridor Performance Measures

Performance Area	Primary Measure	Secondary Measures
Pavement	**Pavement Index** Based on a combination of International Roughness Index and cracking	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure and structural evaluation rating	• Bridge Sufficiency • Functionally Obsolete Bridges • Bridge Rating • Bridge Hot Spots
Mobility	**Mobility Index** Based on combination of existing and future daily volume-to-capacity ratios	• Future Congestion • Peak Congestion • Travel Time Reliability • Multimodal Opportunities
Safety	**Safety Index** Based on frequency of fatal and incapacitating injury crashes	• Directional Safety Index • Strategic Highway Safety Plan Emphasis Areas • Crash Unit Types • Safety Hot Spots
Freight	**Freight Index** Based on bi-directional truck planning time index	• Recurring Delay • Non-Recurring Delay • Closure Duration • Bridge Vertical Clearance • Bridge Vertical Clearance Hot Spots

Each of the primary and secondary performance measures identified in the table above is comprised of one or more quantifiable indicators. A three-level scale was developed to standardize the performance scale across the five performance areas, with numerical thresholds specific to each performance measure:

Good/Above Average Performance	Rating is above the identified desirable/average range
Fair/Average Performance	Rating is within the identified desirable/average range
Poor/Below Average Performance	Rating is below the identified desirable/average range

The terms “good”, “fair”, and “poor” apply to the Pavement, Bridge, Mobility, and Freight performance measures, which have defined thresholds. The terms “above average”, “average”, and “below average” apply to the Safety performance measures, which have thresholds referenced to statewide averages.

Corridor Performance Summary

Table ES-2 shows a summary of corridor performance for all primary measures and secondary measure indicators for the US 60|US 70|US 191 corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary and secondary measure as shown in **Table ES-2**.

The five areas evaluated are split between “good” (41%), “fair” (29%), and “poor” (31%) ratings. The poorest performing segment is 60-14 which rates as “poor” in bridge, safety, & freight, and “fair” in pavement & mobility. The highest performing segments,191-4, 70-7, 70-8, and 60-17, do not have “poor” performance areas, and 70-8 in the Bylas on the San Carlos Apache Reservation rated the best performance through this segment, which is only two miles in length.

- **Pavement Performance:** All of the 214 miles on the US 60|US 70|US 191 corridor rate as “good” or “fair” for the overall Pavement Index. Due to the significant areas of roughness and pavement cracking, 3 of the 9 segments rate poorly for percentage of area in failure.

- **Bridge Performance:** A total of 48 bridges were included in the evaluation. Four bridges on US 60 are considered structurally deficient, including Queen Creek Bridge (MP 227.71, No. 406), Waterfall Canyon Bridge (MP 229.50, No. 328), Pinto Creek Bridge (MP 238.25, No. 351), and Pinal Creek Bridge (MP 249.64, No. 266).

- **Mobility Performance:** US 60|US 70|US 191 corridor is considered to have two operating environments for evaluating Mobility. These include Urban/Fringe Urban Highway and Rural Highway. Both the current and future capacity is considered “good” with the exception of 60-14 and 60-15, the area between Miami and Superior, which has mountainous terrain.

- **Safety Performance:** Safety performance utilizes the three operating environments for analysis that compare fatal and incapacitating injury crashes to other similar routes statewide. The US 60|US 70|US 191 corridor is mixed between “good” and “poor” ratings. Higher than average fatal crashes occurred on Segments 70-9 and 70-12 through 70-14, with an additional five segments having insufficient crash data.

- **Freight Performance:** The performance of freight mobility is overall “poor” within the US 60|US 70|US 191 corridor. This is primarily due to the high PTI. Traffic counters do not exist in 9 of the 17 segments, which does not allow for the performance to be measured for TTI and PTI for much of the corridor.

Table ES-2: Corridor Performance Summary by Segment and Performance Measure

Segment #	Segment Length (miles)	Pavement Performance Area				Bridge Performance Area				Mobility Performance Area											
		Pavement Index	Directional PSR		% Area Failure	Bridge Index	Sufficiency Rating	% of Deck Area on Functionally Obsolete Bridges	Lowest Bridge Rating	Mobility Index	Future Daily V/C	Existing Hour V/C		Closure Extent (instances/milepost/ year/mile)		Directional TTI (all vehicles)		Directional PTI (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
			NB/ WB	SB/ EB								NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB		
191-1[2*]	24	3.64	3.37	3.37	0%	6.00	89.00	0%	6	0.15	0.17	0.12	0.12	0.03	0.01	1.51	1.30	4.79	7.47	66%	12.5%
191-2[2*]	43	3.06	3.31	3.31	30%	5.37	76.93	0%	5	0.09	0.10	0.07	0.07	0.02	0.00	1.16	1.16	9.83	6.09	100%	16.0%
191-3[2^]	17	3.93	3.94	4.02	3%	6.02	93.91	0%	5	0.04	0.04	0.03	0.03	0.01	0.00	1.39	1.20	9.51	11.62	49%	9.8%
191-4[2^]	12	3.28	3.28	3.28	17%	6.00	69.50	0%	6	0.18	0.20	0.14	0.14	0.03	0.03	N/A	N/A	N/A	N/A	96%	9.3%
191-5[1*]	5	3.28	3.28	3.28	20%	No Bridges				0.33	0.39	0.27	0.28	0.12	0.08	N/A	N/A	N/A	N/A	27%	22.5%
70-6[1*]	9	3.70	3.44	3.44	10%	6.00	69.10	0%	6	0.53	0.69	0.32	0.32	0.02	0.06	N/A	N/A	N/A	N/A	46%	19.0%
70-7[2^]	19	3.43	3.35	3.35	5%	5.77	71.59	0%	5	0.18	0.21	0.13	0.13	0.02	0.00	N/A	N/A	N/A	N/A	73%	16.8%
70-8[2^]	2	3.87	3.78	3.78	0%	6.00	74.00	0%	6	0.12	0.15	0.08	0.08	0.00	0.10	N/A	N/A	N/A	N/A	0%	13.8%
70-9[2^]	5	3.81	3.80	3.80	0%	No Bridges				0.25	0.29	0.16	0.17	0.00	0.04	N/A	N/A	N/A	N/A	26%	12.2%
70-10[2^]	19	3.87	3.55	3.55	5%	7.00	80.00	0%	7	0.17	0.19	0.11	0.11	0.09	0.04	N/A	N/A	N/A	N/A	4%	8.9%
70-11[2^]	4	3.88	3.55	3.55	0%	7.54	82.03	0%	5	0.21	0.26	0.12	0.12	0.10	0.00	N/A	N/A	N/A	N/A	4%	13.7%
70-12[2^]	15	3.97	3.83	3.83	0%	6.00	63.20	0%	6	0.19	0.23	0.13	0.13	0.04	0.31	N/A	1.10	N/A	1.40	23%	12.1%
70|60-13[1*]	12	3.65	3.43	3.34	19%	5.17	78.89	49%	4	0.40	0.46	0.29	0.30	0.00	0.12	1.15	1.31	2.72	3.36	54%	17.0%
60-14[2^]	16	3.43	3.24	3.24	31%	4.56	18.49	0%	4	1.73	2.11	1.22	1.09	0.33	1.57	1.07	1.19	1.47	2.06	49%	15.0%
60-15[2^]	2	3.21	2.92	2.92	50%	6.00	83.70	57%	6	2.76	3.83	1.28	1.30	0.36	1.17	1.08	1.17	1.67	2.30	95%	13.0%
60-16[2^]	2	3.32	3.38	3.38	0%	5.00	86.66	0%	5	0.54	0.71	0.28	0.28	0.50	0.00	1.09	1.00	1.91	1.04	87%	9.0%
60-17[2^]	11	4.30	4.14	4.02	0%	6.42	91.11	0%	5	0.20	0.26	0.11	0.10	0.09	0.05	1.01	1.01	1.16	1.24	96%	10.0%
Weighted Corridor Average		3.57	3.49	3.49	13%	5.56	72.20	3%	5	0.32	0.39	0.22	0.21	0.06	0.17					61%	14%
SCALE																					
Performance Level		Non-Interstate				All				Urban [1] Rural [2]		All				Uninterrupted ^ Interrupted *					All
Good / Above Average		> 3.50			< 5%	> 6.5	> 80	< 12%	> 6	≤ 0.71 (Urban) ≤ 0.56 (Rural)		< 0.22				≤ 1.15 ≤ 1.3		≤ 1.3 ≤ 3.0		> 90%	> 17%
Fair / Average		2.9-3.5			5%- 20%	5.0 - 6.5	50 - 80	12%-40%	5 - 6	0.71 - 0.89 (Urban) 0.56 - 0.76 (Rural)		0.22 - 0.62				1.15 - 1.33 ≤ 1.3		1.3 - 1.5 3.0 - 6.0		90% - 60%	17% - 11%
Poor / Average		< 2.90			> 20%	< 5.0	< 50	> 40%	< 5	> 0.89 (Urban) > 0.76 (Rural)		≥ 0.62				≥ 1.33 ≥ 2.0		≥ 1.5 ≥ 6.0		< 60%	< 11%

[1] Urban or Fringe Urban Operating Environment
[2] Rural Operating Environment
^ Uninterrupted
* Interrupted

Table ES-2: Corridor Performance Summary by Segment and Performance Measure (continued)

Segment #	Segment Length (miles)	Safety Performance Area							Freight Performance Area							
		Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Segment Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Freight Index	Directional TTTI (trucks only)		Directional TPTI (trucks only)		Closure Duration (mins/milepost/closed/year/ mile)		Bridge Vertical Clearance (feet)
			NB/WB	SB/EB						NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	
191-1[a*]	24	0.44	0.10	0.78	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.10	1.94	1.60	9.11	11.62	6.78	0.61	No UP
191-2[a*]	43	0.28	0.53	0.03	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.09	1.00	1.54	2.68	19.67	2.41	0.70	22.04
191-3[b^]	17	1.00	0.00	2.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.08	1.34	1.82	8.92	17.43	2.94	0.00	No UP
191-4[a^]	12	0.03	0.07	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	3.37	4.02	No UP
191-5[c*]	5	1.30	1.34	1.25	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	26.32	40.04	No UP
70-6[c*]	9	0.93	1.68	0.18	73%	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	3.96	16.64	No UP
70-7[a^]	19	0.10	0.20	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	2.42	0.00	17.03
70-8[a^]	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	0.00	22.10	No UP
70-9[a^]	5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	0.00	15.52	No UP
70-10[a^]	19	1.88	1.50	2.25	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	21.73	25.56	No UP
70-11[a^]	4	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	N/A	N/A	N/A	27.45	0.00	No UP
70-12[a^]	15	1.67	1.67	1.67	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	N/A	1.14	N/A	2.01	7.71	127.15	No UP
70|60-13[c*]	12	2.09	1.64	2.55	57%	Insufficient Data	Insufficient Data	Insufficient Data	0.19	1.24	1.46	4.29	6.19	0.00	19.07	15.84
60-14[a^]	16	3.23	2.23	4.23	55%	Insufficient Data	Insufficient Data	Insufficient Data	0.43	1.18	1.60	2.34	2.36	68.54	378.72	13.03
60-15[a^]	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.33	1.13	1.25	1.87	4.23	107.46	249.09	16.79
60-16[a^]	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.49	1.14	1.00	2.98	1.12	108.80	0.00	No UP
60-17[b^]	11	0.81	1.28	0.33	42%	Insufficient Data	Insufficient Data	Insufficient Data	0.72	1.07	1.14	1.23	1.54	13.65	19.62	No UP
Weighted Corridor Averages		1.01	0.87	1.15					0.52					13.31	45.89	

SCALE											
Performance Level		2 or 3 Lane Undivided Highway 2, 3 or 4 Lane Divided Highway 4 or 5 Lane Undivided Highway					Uninterrupted Interrupted			All	
Good/Above Average	a b c	≤ 0.94 ≤ 0.77 ≤ 0.80	< 51.2% < 44.4% < 42.4%	< 5.2% < 3.5% < 6.1%	< 18.5% < 16.3% < 6.4%	< 2.2% < 2.4% < 4.7%	> 0.77 > 0.33	<1.15 < 1.30	< 1.3 ≤ 3.0	< 44.18	> 16.5
Fair/Average	a b c	0.94-1.06 0.77-1.23 0.80-1.20	51.2% - 57.5% 44.4% - 54.4% 42.4% - 51.1%	5.2% - 7.1% 3.5% - 7.3% 6.1% - 9.6%	18.5% - 26.5% 16.3% - 26.3% 6.4% - 9.4%	2.2%-4.2% 2.4%-4.5% 4.7%-7.9%	0.67-0.77 0.17-0.33	1.15-1.33 1.30-2.0	1.3-1.5 3.0-6.0	44.18-124.86	16.0-16.5
Poor/Below Average	a b c	≥ 1.06 ≥ 1.23 ≥ 1.20	> 57.5% > 54.4% > 51.1%	> 7.1% >7.3% > 9.6%	> 26.5% > 26.3% > 9.4%	> 4.2% > 4.5% > 7.9%	< 0.67 <0.17	>1.33 > 2.0	> 1.5 > 6.0	> 124.86	<16.0

[a] 2 or 3 Lane Undivided
[b] 2,3 or 4 Lane Divided
[c] 4 or 5 Lane Undivided
^ Uninterrupted
* Interrupted

Note: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings
"No UP" indicates no underpasses are present in the segment

NEEDS ASSESSMENT

Corridor Description

The US 60|US 70|US 191 corridor links the Mexico border at the City of Douglas and the Phoenix metropolitan area to agricultural, mining and recreational activity in southeastern Arizona. In general, all three highways are two-lane facilities designed for relatively modest traffic volumes in a rural setting. At the same time, the corridor offers some unique benefits within the Arizona circulation system that could be leveraged for increased usage as the need arises.

US 191 provides a link between Mexico and Interstate 10 (I-10), the primary east-west interstate corridor along the southern states. As a result, US 191 serves as a major freight corridor for goods moving between Mexico and the United States. Similarly, the combination of US 191 and US 70 between I-10 and Globe offers a critical connection to mining and agricultural interests located in the greater Safford and Globe areas of Graham and Pinal Counties. US 60 between Globe and SR 79 links activities within the corridor to the major population and commerce center of the Phoenix metropolitan area.

Corridor Objectives

Statewide goals and performance measures were established by the ADOT Long-Range Transportation Plan (LRTP), 2010-2035. Statewide performance goals that are relevant to US 60|US 70|US 191 performance areas were identified and corridor goals were then formulated for each of the five performance areas that aligned with the overall statewide goals established by the LRTP. Based on stakeholder input, corridor goals, corridor objectives, and performance results, three “emphasis areas” were identified for the US 60|US 70|US 191 corridor: Mobility, Safety and Freight.

Taking into account the corridor goals and identified emphasis areas, performance objectives were developed for each quantifiable performance measure that identify the desired level of performance based on the performance scale levels for the overall corridor and for each segment of the corridor. For the performance emphasis areas, the corridor-wide weighted average performance objectives are identified with a higher standard than for the other performance areas.

Achieving corridor and segment performance objectives will help ensure that investments are targeted toward improvements that support the safe and efficient movement of travelers on the corridor. Corridor performance is measured against corridor and segment objectives to determine needs – the gap between observed performance and the performance objectives.

Needs Assessment Process

The performance-based needs assessment evaluates the difference between the baseline performance and the performance objectives for each of the five performance areas used to characterize the health of the corridor: Pavement, Bridge, Mobility, Safety, and Freight. The performance-based needs assessment process is illustrated in **Figure ES-4**.

The needs assessment compares baseline corridor performance with performance objectives to provide a starting point for the identification of performance needs. This mathematical comparison results in an initial need rating of None, Low, Medium, or High for each primary and secondary performance measure. An illustrative example of this process is shown in **Figure ES-5**.

The initial level of need for each segment is refined to account for hot spots and recently completed or under construction projects, resulting in a final level of need for each segment. The final levels of need for each primary and secondary performance measure are combined to produce a weighted final need rating for each segment. A detailed review of available data helps identify contributing factors to the need and if there is a high level of historical investment.

Figure ES-4: Needs Assessment Process

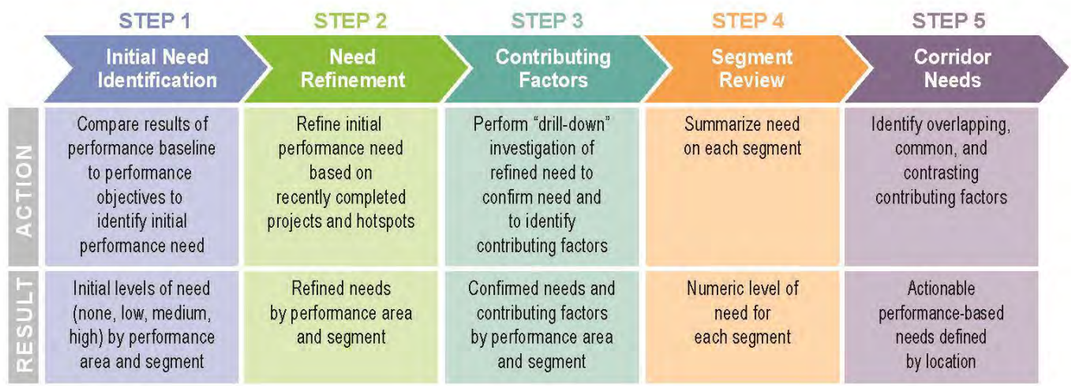


Figure ES-5: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)

Performance Thresholds	Performance Level	Initial Level of Need	Description
6.5	Good	None*	All levels of Good and top 1/3 of Fair (>6.0)
	Good		
	Good		
	Fair		
5.0	Fair	Low	Middle 1/3 of Fair (5.5-6.0)
	Fair	Medium	Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5)
	Poor		
	Poor	High	Lower 2/3 of Poor (<4.5)
	Poor		

**A segment need rating of ‘None’ does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Summary of Needs

Table ES-3 provides a summary of needs for each segment across all performance areas, and the average needs for each segment. A weighting factor of 1.5 is applied to the average need scores of the performance areas identified as emphasis areas (mobility, safety, and freight for the US 60|US 70|US 191 corridor). There are 10 segments with a high average need, seven segments with a medium average need, and 31 segments with a low average need. More information on the identified final needs in each performance area is provided below.

Pavement Needs

- Ten segments (60-15, 60-14, 70|60-13, 70-10, 70-7, 70-6, 191-5, 191-4, 191-3, and 191-2) contain pavement hot spots. Most of the hot spots in Segment 191-2 had recent paving projects that addressed the need. Construction for passing lanes in Segment 60-14 will address some of the current pavement issues. The reconstruction project currently underway for Segment 60-15 will address the pavement issues.
- Segments 70|60-13, 70-10, 70-7, 70-6, 191-3, and 191-2 have final needs of low and Segments 191-4 and 191-5 have final needs of Medium. All other segments on the corridor have a final need of None.

Bridge Needs

- Bridge needs were identified on three segments of the corridor, 43 miles (20%) with a "Medium" level of bridge need and 28 miles (13%) with a "High" level of bridge need.
- Eight bridges showed potential repetitive investment issues and may be candidates for life-cycle cost analysis to evaluate alternative solutions.
- Three bridges have bridge ratings of 4: Pinal Creek Bridge (No. 266), Waterfall Canyon Bridge (No. 328), and Queen Creek Bridge (No. 406).
- One bridge had a bridge rating of 5: Pinal Creek Bridge (No. 36).
- Nine bridges were defined as hot spots since they had multiple bridge ratings of 5 or less.
- Of the nine hot spot bridges, five also showed repetitive investment issues. These included the Pinal Creek Bridge (No. 36), Pinal Creek Bridge (No. 266), Pinto Creek Bridge (No. 351), Waterfall Canyon Bridge (No. 328), and Queen Creek Bridge (No. 406).

Mobility Needs

- Mobility Performance is an Emphasis Area for the US 60| US 70| US 191 corridor, giving it a heavier weight in the analysis.
- A low level of mobility need was identified on 168 miles (79%) of the US 60| US 70| US 191 corridor and a Medium level of mobility need was identified on 33 miles (15%) of the corridor.
- Contributing factors include to reduced mobility performance includes:
  - Closures of the roadway due to flooding (US 191 at MP 53 and MP 66),
  - A concentration of short term closures due to incidents/accidents throughout corridor,
  - A significant number of extended duration closures on US 60 from MP 225 – 228,
  - Mountainous grades with a lack of climbing lanes on US 60 from MP 227 – 243,
  - Limited passing, acceleration and deceleration on rolling terrain on US 70 from MP 255 – 330,
  - Rock-fall on US 60 caused repeated incidents of delay and closures between MP 228 – 248,
  - Weather related delay and closures on US 60 between MP 224-243 due to snow, ice and impassable conditions,
  - Limited bicycle accommodation on much of the corridor, on US 191 from MP 87 – 104 and MP 116 – 121, and US 60/70 from MP 298 – 243.

Safety Needs

- Safety Performance is an Emphasis Area for the US 60| US 70| US 191 corridor, giving it a heavier weight in the analysis.
- A high level of safety need was identified for 67 miles (31%) of the corridor and low level of safety need identified for 37 miles (17%) of the corridor.
- Contributing factors to the safety need include:
  - Fatalities on SB US 191 in the vicinity of MP 91 – 93, which were single vehicle roll over crashes involving high speed.
  - On both US 191 and US 70 in the Safford area, factors included lack of pedestrian lighting and pedestrian facilities, traffic control device reflectivity, intersection geometry, and high traffic volumes.
  - US 70 from Bylas to Peridot, MP 293 – 274, long stretch of rolling terrain with limited passing lanes and rest areas, with safety factors including shoulder conditions and width, traffic control device reflectivity, clear zone slope and obstructions, and intersection geometry.
  - US 60|US 70 from Peridot to Superior, lack of passing and climbing lanes, deceleration lanes, pedestrian facilities, intersection geometry, high traffic volumes in urbanized areas with high volume of trucks and motorcycles from MP 227 - 243
  - US 60|70 from Globe to Superior, MP 227 – 255, high crash rate due to shoulder conditions, shoulder width, high speeds, clear zone slope and obstructions, high traffic volumes.

Freight Needs

- Freight Performance is an Emphasis Area for the US 60| US 70| US 191 corridor, giving it a heavier weight in the analysis.
- A low level of freight needs was identified on 15 miles (7%) of the US 60| US 70| US 191 corridor and a high level of freight need was identified on 116 miles (54%) of the corridor.
- High level of delay related to the Planning Time Index (PTI) contributed to freight needs for NB/SB US 191 MP 0 – 104, EB/WB US 60 MP 225 – 255, and EB US 70 MP 270 – 255.
- The number of closures on US 60| US 70| US 191 due to incidents/accidents or obstructions/ hazards are above statewide average in the following areas:

- o US 191 MP 0 – 67 including flooding at MP 53 and MP 66
- o US 191 MP 43 (Border Patrol Check Point)
- o Concentration of short term closures due to incidents/accidents at the following locations:
  - Incidents/accidents US 191 MP 115 – 120
  - US 60 from MP 233 – 242,
  - US 60 from MP 228 – 231.7 (with a high concentration of incidents at MP 230), and
  - US 60 from MP 224 – 227
- o Significant number of extended duration closures on US 60 from MP 225 – 228
- o Mountainous grades with a lack of passing and climbing lanes on US 60 from MP 227 - 243
- o Limited passing, acceleration and deceleration on rolling terrain on US 70 MP 255 - 330
- o Rock fall on US 60 caused repeated incidents of delay and closures between MP 228 – 248
- o Weather related delay and closures on US 60 between MP 224-243 due to snow, ice and impassable conditions

- Clearance restrictions exist at Pinal SPRR UP MP 253.63 (No. 562, height of 15.84 feet) and Queen Creek Tunnel MP 228.47 (height of 13.03 feet).

Overlapping Needs

Completing projects that address multiple needs presents the opportunity to more effectively improve overall performance. A summary of the overlapping needs that relate to locations with elevated levels of need is provided below.

- Most segments on the corridor have overlapping needs, approximately 205 miles of the 214 miles or 96% of the corridor. The exceptions include Segments 70-8, 70-9 and 60-16. Traffic counters do not exist in Segments 191-4 through 70-11, approximately 75 miles or 35% of the corridor, resulting in insufficient data to calculate needs in the freight performance area for those locations.
- US 191 MP 87 to MP 104 (Segment 191-3) and US 60|70 MP 243 to MP 255 (Segment 70|60-13) have overlapping needs in all five performance areas. These segments comprised 29 of the 214 corridor miles.
- Segment 191-3 has an overall “Medium” need, with some level of need in all performance areas. The greater needs relate to mobility and freight due to high TTI and PTI related to accidents and incidents. A few closures have long durations that impacted the segment need level. Also noteworthy is that this segment is immediately north of I-10 and utilized when traffic is detoured through Safford during I-10 closures.
- Segment 70|60-13 has an overall “High” need and the highest need score in the corridor. Some needs are site specific while others are characteristics of the segment. High bridge needs are related to the Pinal Creek Bridge (No. 36) and Pinal Creek Bridge (No. 266), which are hot spots due to poor structural ratings and exhibit high repetitive investment. High safety needs are due to the more urbanized area with increased volumes and speeds too fast for conditions. High freight needs are due to TTI and PTI times, as well as the US 60 Pinal SPRR at MP 253.63 had low vertical clearance (15.84 feet).
- Segment 60-14 also registers an overall “Medium” need score on the corridor. This segment has significant grades and subsequently suffers from freight and mobility needs related to delay and incidents/accidents associated with the grade. The segment includes 3 hot spot bridges, all of which have repetitive investment histories. The Queen Creek Tunnel, also located in the segment, affects bridge and freight needs with poor deck ratings and low vertical clearance.

Table ES-3: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)																
	191-1	191-2	191-3	191-4	191-5	70-6	70-7	70-8	70-9	70-10	70-11	70-12	70|60-13	60-14	60-15	60-16	60-17
	MP 0-24	MP 24-67	MP 87-104	MP 104-116	MP 116-121	MP 339-330	MP 330-300	MP 300-298	MP 298-293	MP 293-274	MP 274-270	MP 270-255	MP 255-243	MP 243-227	MP 227-225	MP 225-223	MP 223-212
Pavement	None*	Low	Low	Medium	Medium	Low	Low	None*	None*	Low	None*	None*	Low	Low	None*	None*	None*
Bridge	None*	Medium	Low	Low	None*	Low	Low	None*	None*	None*	Low	Low	High	High	Low	None*	Low
Mobility+	Low	Low	Medium	None*	Low	Low	Low	Low	Low	Low	Low	Low	Low	Medium	None*	None*	None*
Safety+	None*	None*	Low	None*	High	Low	None*	N/A	N/A	High	N/A	High	High	Medium	N/A	N/A	None*
Freight+	High	High	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low	High	Medium	Low	Low	None*
Average Need	**0.92**	**1.38**	**1.69**	**0.60**	**2.00**	**1.00**	**0.70**	**0.43**	**0.60**	**1.40**	**0.83**	**1.31**	**2.23**	**2.00**	**0.50**	**0.30**	**0.38**

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as this study.*

+ Identified as an emphasis area for the US 60/US 70US 191 corridor

Average Need Scale	
None*	< 0
Low	0.1-1.0
Medium	1.0-2.0
High	> 2.0

STRATEGIC SOLUTIONS

The principal objective of the CPS is to identify strategic solutions (investments) that are performance-based to ensure that available funding resources are used to maximize the performance of the State's key transportation corridors. One of the first steps in the development of strategic solutions is to identify areas of elevated levels of need as addressing these needs will have the greatest effect on corridor performance. Segments with Medium or High needs and specific locations of hot spots are considered strategic investment areas for which strategic solutions should be developed. Segments with lower levels of need or without identified hot spots are not considered candidates for strategic investment and are expected to be addressed through other ADOT programming processes. US 60|US 70|US 191 strategic investment areas (resulting from the elevated needs) are shown in **Figure ES-6**.

Screening Process

In some cases, needs that are identified do not advance to solutions development and are screened out from further consideration because they have been or will be addressed through other measures including:

- A project is programmed to address this need
- The need is a result of a Pavement or Bridge hot spot that does not show historical investment issues; these hot spots will likely be addressed through other ADOT programming means
- A bridge is not a hot spot but is located within a segment with a Medium or High level of need; this bridge will likely be addressed through current ADOT bridge maintenance and preservation programming processes.
- The need is determined to be non-actionable (i.e., cannot be addressed through an ADOT project)
- The conditions/characteristics of the location have changed since the performance data was collected that was used to identify the need

Candidate Solutions

For each elevated need within a strategic investment area that is not screened out, a candidate solution is developed to address the identified need. Each candidate solution is assigned to one of the following three P2P investment categories based on the scope of the solution:

- Preservation
- Modernization
- Expansion

Documented performance needs serve as the foundation for developing candidate solutions for corridor preservation, modernization, and expansion. Candidate solutions are not intended to be a substitute or replacement for traditional ADOT project development processes where various ADOT technical groups and districts develop candidate projects for consideration in the performance-based programming in the P2P process. Rather, these candidate solutions are intended to complement ADOT's traditional project development processes through a performance-based process to address needs in one or more of the five performance areas of Pavement, Bridge, Mobility, Safety, and Freight. Candidate solutions developed for the US 60|US 70|US 191 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

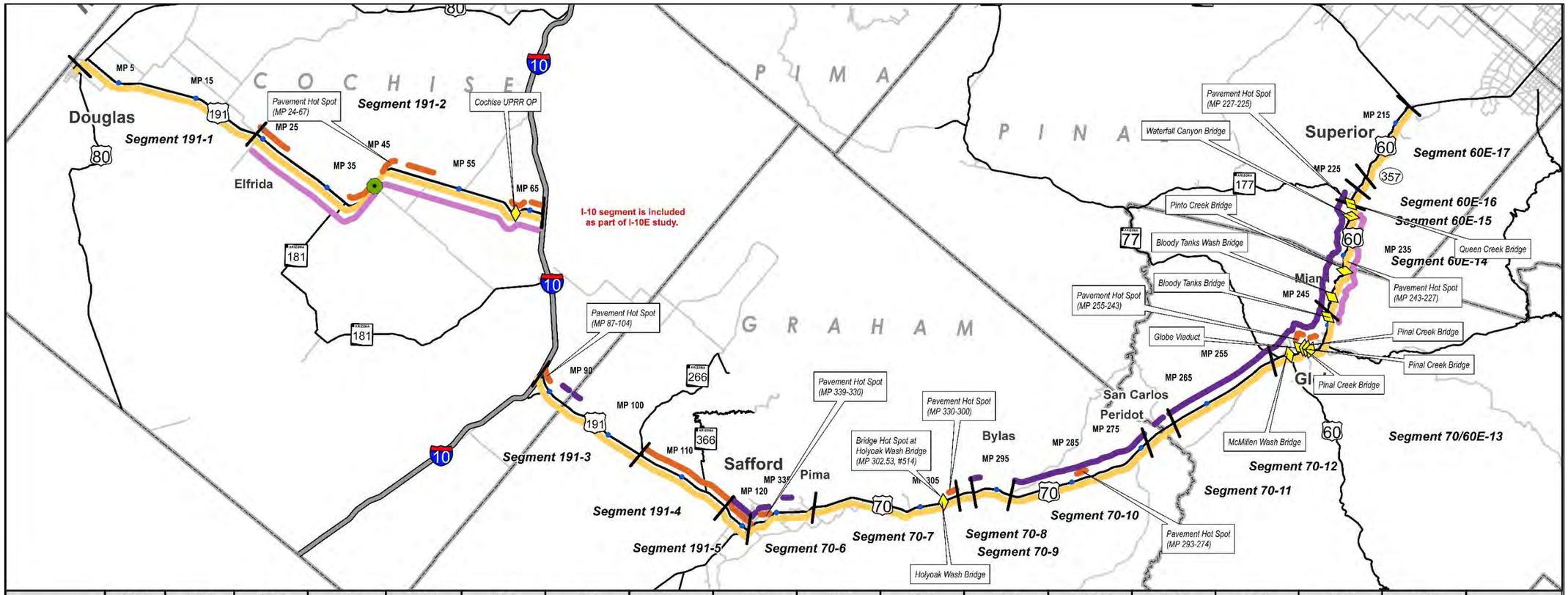
Candidate solutions include some or all of the following characteristics:

- Do not recreate or replace results from normal programming processes
- May include programs or initiatives, areas for further study, and infrastructure projects
- Address elevated levels of need (High or Medium) and hot spots
- Focus on investments in modernization projects (to optimize current infrastructure)
- Address overlapping needs
- Reduce costly repetitive maintenance
- Extend operational life of system and delay expansion
- Leverage programmed projects that can be expanded to address other strategic elements
- Provide measurable benefit

Candidate solutions developed to address an elevated need in the Pavement or Bridge performance areas include two options; rehabilitation or full replacement. These solutions are initially evaluated through a Life-Cycle Cost Analysis (LCCA) to provide insights into the cost-effectiveness of these options so a recommended approach can be identified. Candidate solutions developed to address an elevated need in the Mobility, Safety, or Freight performance areas are advanced directly to the Performance Effectiveness Evaluation. In some cases, there may be multiple solutions identified to address the same area of need.

Candidate solutions that are recommended to expand or modify the scope of an already programmed project are noted and are not advanced to solution evaluation and prioritization. These solutions are directly recommended for programming.

Figure ES-6: Strategic Investment Areas



Performance Area	191-1	191-2	191-3	191-4	191-5	70-6	70-7	70-8	70-9	70-10	70-11	70-12	70|60-13	60-14	60-15	60-16	60-17	Performance Area
	MP 0-24	MP 24-67	MP 87-104	MP 104-116	MP 116-121	MP 339-330	MP 330-300	MP 300-298	MP 298-293	MP 293-274	MP 274-270	MP 270-255	MP 255-243	MP 243-227	MP 227-225	MP 225-223	MP 223-212	
Pavement	-	Hot Spot	Hot Spot	Medium	Medium	Hot Spot	Hot Spot	-	-	Hot Spot	-	-	Hot Spot	Hot Spot	Hot Spot	-	-	Pavement
Bridge	-	Medium	-	-	-	-	Hot Spot	-	-	-	-	-	High	High	-	-	-	Bridge
Mobility+	-	-	Medium	-	-	-	-	-	-	-	-	-	-	Medium	-	-	-	Mobilitv+
Safety+	-	-	-	-	High	-	-	-	-	High	-	High	High	Medium	-	-	-	Safety+
Freight+	High	High	High	-	-	-	-	-	-	-	-	-	High	Medium	-	-	-	Freight+

+ Identified as Emphasis Area for US 60 | US 70 | US 191 Corridor

Note: Figure shows strategic investment areas, which are segments with Medium and High levels of need and locations of hotspots. A"-" symbol indicates a segment level of need of Low or None, which is not considered strategic.

US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction

Strategic Investment Areas

0 5 10 15 20 Miles

Corridor Segment
US Hwy/State Route
County Boundary
City Boundary
Border Patrol Check Point

Performance Area Needs
Pavement
Mobility
Safety
Freight
Bridge

Level of Need
Low
Medium
High

SOLUTION EVALUATION AND PRIORITIZATION

Candidate solutions are evaluated using the following steps: LCCA (where applicable), Performance Effectiveness Evaluation, Solution Risk Analysis, and Candidate Solution Prioritization. The methodology and approach to this evaluation are shown in **Figure ES-7** and described more fully below.

Life-Cycle Cost Analysis

All Pavement and Bridge candidate solutions have two options: rehabilitation/repair or reconstruction. These options are evaluated through an LCCA to determine the best approach for each location where a Pavement or Bridge solution is recommended. The LCCA eliminates options from further consideration and identify which options should be carried forward for further evaluation.

All Mobility, Safety, and Freight strategic investment areas that result in multiple independent candidate solutions are advanced directly to the Performance Effectiveness Evaluation.

Performance Effectiveness Evaluation

After completing the LCCA process, all remaining candidate solutions are evaluated based on their performance effectiveness. This process includes determining a Performance Effectiveness Score (PES) based on how much each solution impacts the existing performance and needs scores for each segment. This evaluation also includes a Performance Area Risk Analysis to help differentiate between similar solutions based on factors that are not directly addressed in the performance system.

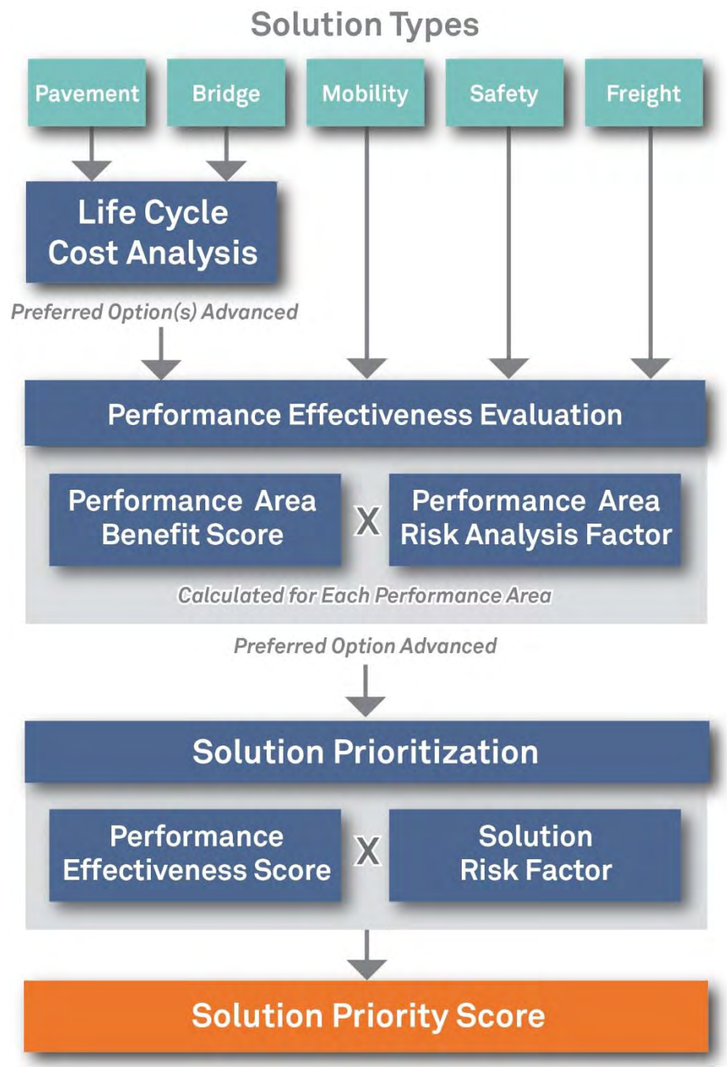
Solution Risk Analysis

All candidate solutions advanced through the Performance Effectiveness Evaluation are also evaluated through a Solution Risk Analysis process. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of the performance failure.

Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score. The candidate solutions are sorted by prioritization score from highest to lowest. The highest prioritization score indicates the candidate solution that is recommended as the highest priority. Solutions that address multiple performance areas tend to score higher in this process.

Figure ES-7: Candidate Solution Evaluation Process



SUMMARY OF CORRIDOR RECOMMENDATIONS

Table ES-4 and **Figure ES-8** show the prioritized candidate solutions recommended for the US 60|US70|US 191 corridor. These solutions will increase the performance of the US 60|US70|US 191 corridor primarily in the Freight Performance Area. Solutions that address multiple performance areas tend to score higher in this process. Other findings include:

- Most of the anticipated improvements in performance are in the Mobility, Safety, and Freight performance areas
- The highest ranking solutions tended to have overlapping benefits in the Mobility, Safety, and Freight performance areas
- The highest priority solutions address needs in the US 60 Superior to Miami area

Other Corridor Recommendations

As part of the investigation of strategic investment areas and candidate solutions, other corridor solutions were also identified that are compatible with the long range vision to increase safety and support truck and freight movements:

- Sign Visibility Study in the Safford area along US 191 is recommended to identify locations with potential to improve retroreflectivity
- Road Safety Assessments are recommended in Peridot, Cutter and Globe to identify safety improvements, specifically pedestrian circulation and access needs in Peridot.
- Access Control Studies in Peridot (MP 270 – 274) and Globe-Miami (MP 243 – 255) are recommended to reduce friction and improve safety
- Recommend Superior to Globe Design Concept Study
- Recommend San Carlos Area (MP 268 – 292) Superelevation Study

Policy and Initiative Recommendations

In addition to location-specific needs, general corridor and system-wide needs have also been identified through the CPS process. While these needs are more overarching and cannot be individually evaluated through the CPS process, it is important to document them. A list of recommended policies and initiatives was developed for consideration when programming future projects not only on US 60|US 70|US 191, but across the entire state highway system where conditions are applicable. The following list, which is in no particular order of priority, was derived from the Round 1, Round 2, and Round 3 CPS:

- Install Intelligent Transportation System (ITS) conduit with all new infrastructure projects
- Prepare strategic plans for Closed Circuit Television (CCTV) camera and Road Weather Information System (RWIS) locations statewide
- Leverage power and communication at existing weigh-in-motion (WIM), dynamic messaging signs (DMS), and call box locations to expand ITS applications across the state
- Consider solar power for lighting and ITS where applicable
- Investigate ice formation prediction technology where applicable
- Conduct highway safety manual evaluation for all future programmed projects
- Develop infrastructure maintenance and preservation plans (including schedule and funding) for all pavement and bridge infrastructure replacement or expansion projects
- Develop standardized bridge maintenance procedures so districts can do routine maintenance work
- Review historical ratings and level of previous investment during scoping of pavement and bridge projects; in pavement locations that warrant further investigation, conduct subsurface investigations during project scoping to determine if full replacement is warranted
- For pavement rehabilitation projects, enhance the amount/level of geotechnical investigations to address issues specific to the varying conditions along the project
- Expand programmed and future pavement projects as necessary to include shoulders
- Expand median cable barrier guidelines to account for safety performance
- Install CCTV cameras with all DMS
- In locations with limited communications, use CCTV cameras to provide still images rather than streaming video
- Develop statewide program for pavement replacement
- Install additional continuous permanent count stations along strategic corridors to enhance traffic count data
- When reconstruction or rehabilitation activities will affect existing bridge vertical clearance, the dimension of the new bridge vertical clearance should be a minimum of 16.25 feet where feasible
- All new or reconstructed roadway/shoulder edges adjacent to an unpaved surface should be constructed with a Safety Edge
- Collision data on tribal lands may be incomplete or inconsistent; additional coordination for data on tribal lands is recommended to ensure adequate reflection of safety issues
- Expand data collection devices statewide to measure freight delay
- Evaluate and accommodate potential changes in freight and goods movement trends that may result from improvements and expansions to the state roadway network

Next Steps

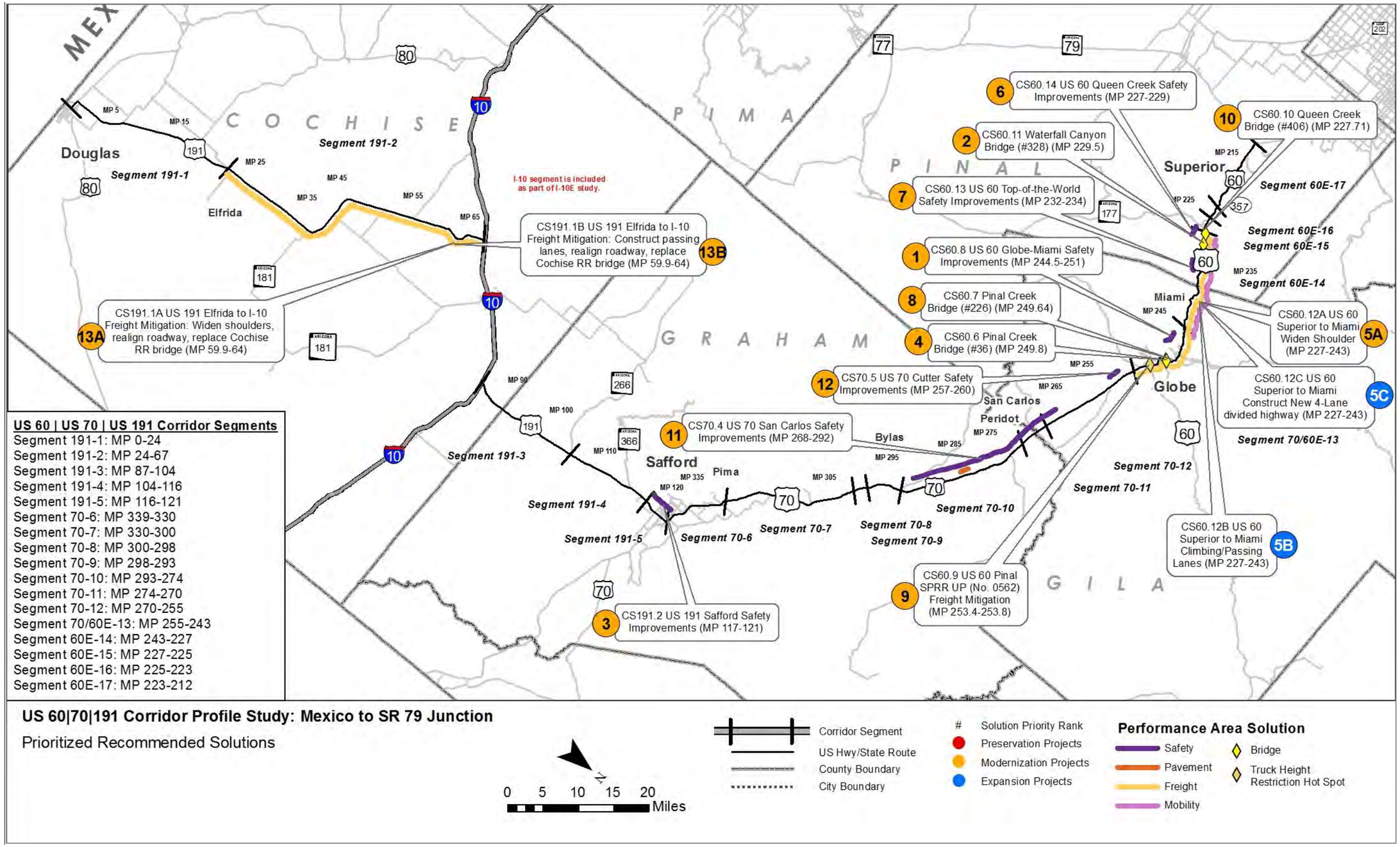
Candidate solutions developed for the US 60|US 70|US 191 corridor will be considered along with other candidate projects in the ADOT statewide programming process. It is important to note that the candidate solutions are intended to represent strategic solutions to address existing performance needs related to the Pavement, Bridge, Mobility, Safety, and Freight performance areas. Therefore, the strategic solutions are not intended to preclude recommendations related to the ultimate vision for the corridor that may have been defined in the context of prior planning studies and/or design concept reports. Recommendations from such studies are still relevant to addressing the ultimate corridor objectives.

Upon completion of all three CPS rounds, the results will be incorporated into a summary document comparing all corridors that is expected to provide a performance-based review of statewide needs and candidate solutions.

Table ES-4: Prioritized Recommended Solutions

Rank	Candidate Solution #	Option	Candidate Solution Name	Candidate Solution Scope	Estimated Cost ($ million)	Investment Category Preservation [P], Modernization [M], Expansion [E]	Prioritization Score
1	60.8	-	US 60 Globe-Miami Safety Improvements	Install lighting Install speed feedback signs (MP 246 - 250) Install warning signs with beacons in advance of SR 188 intersection	$7.7	M	167
2	60.11	-	US 60 Waterfall Canyon Bridge (#328)	Replace Bridge	$1.7	M	153
3	191.2	-	US191 Safford Safety Improvements	US 191/Armory Road Intersection: Install Warning Signs with Beacons, Improve Signal Visibility US 191/Discovery Park Intersection: Improve Signal Visibility, Install Dynamic Speed Feedback Signs US 191/Lone Star Intersection: Install Traffic Signal, Install Warning Signs with Beacons US 191/16th Street Intersection: Install Warning Signs with Beacons	$0.6	M	151
4	60.6	-	US 60 Pinal Creek Bridge (#36)	Replace Bridge	$2.4	M	109
5	60.12	A	US 60 Top-of-the-World to Superior Widen shoulder	Widen Shoulders (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5), Install Rock-Fall Mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75), dynamic weather warning beacons and RWIS. *Note: Queen Creek Tunnel limits omitted from solution (MP 228.3 – 228.5)	$8.4	M	106
		C	*US 60 Top-of-the-World to Superior Construct New 4-lane divided*	*Construct four-lane divided (using 2 existing-lanes for one direction)* *(Cost based upon US 60 Superior to Globe Feasibility Study 2014)*	*$497.8*	*E*	*77*
		B	*US 60 Top-of-the-World to Superior Climbing/ Passing Lanes*	*Widen Shoulders (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5), Install Rock-Fall Mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75); Install Dynamic Weather Warning Beacons and RWIS*	*$66.5*	*E*	*73*
6	60.14	-	US 60 Queen Creek Safety Improvements	Widen Shoulders; Install Warning Signs, Dynamic Speed Feedback Signs, Centerline Rumble Strip, Guardrail (EB and WB)	$3.2	M	106
7	60.13	-	US 60 Top-of-the-World Safety Improvements	Install Warning Signs, Dynamic Speed Feedback Signs, High Visibility Edge Line Striping, Centerline Rumble Strip	$0.2	M	97
8	60.7	-	US 60 Pinal Creek Bridge (#226)	Replace Bridge	$3.1	M	95
9	60.9	-	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	Re-profile roadway to achieve 16.5 feet vertical clearance	$0.6	M	67
10	60.10	-	US 60 Queen Creek Bridge (#406)	Replace Bridge	$8.8	M	58
11	70.4	-	US 70 San Carlos Safety Improvements	Install Centerline Rumble Strip (MP 268-292), Warning Signs with Beacons (MP 278.5, 280, 292), Warning Signs (MP 269, 273), Dynamic Speed Feedback Signs (MP 268, 273, 278.5, 280, 292); Widen Shoulders (MP 270-292); Formalize Pullouts (WB MP 274.5, EB MP 279, EB MP 289, WB 292); Construct Passing Lane (WB MP 282-288 and EB 262-264)	$57.7	M	57
12	70.5	-	US 70 Cutter Safety Improvements	Install Lighting and Center Turn Lane	$3.1	M	16
13	191.1	A	US 191 Elfrida to I-10 Freight Mitigation: Widen shoulders, realign roadway, replace Cochise RR bridge	Realign Roadway, Replace Cochise RR Bridge	$46.7	M	3
		B	*US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge*	*Realign Roadway, Construct Passing Lanes (NB and SB), Replace Cochise RR Bridge*	*$62.7*	*M*	*2*

Figure ES-8: Prioritized Recommended Solutions



1.0 INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study (CPS) of US Route (US) 60|US 70: State Route (SR) 79 to US 191 and US 191: US 70 to SR 80 (US 60|US 70|US 191). The study examines key performance measures relative to the US 60|US 70|US 191 corridor, and the results of this performance evaluation are used to identify potential strategic improvements. The intent of the corridor profile program, and of ADOT's Planning-to-Programming (P2P) process, is to conduct performance-based planning to identify areas of need and make the most efficient use of available funding to provide an efficient transportation network.

ADOT is conducting eleven CPS within three separate groupings.

The first three studies (**Round 1**) began in Spring 2014, and encompass:

- I-17: SR 101L to I-40
- I-19: Nogales to Junction I-10
- I-40: California State Line to I-17

The second round (**Round 2**) of studies, initiated in Spring 2015, include:

- I-8: California State Line to I-10
- I-40: I-17 to New Mexico State Line
- SR 95: I-8 to I-40

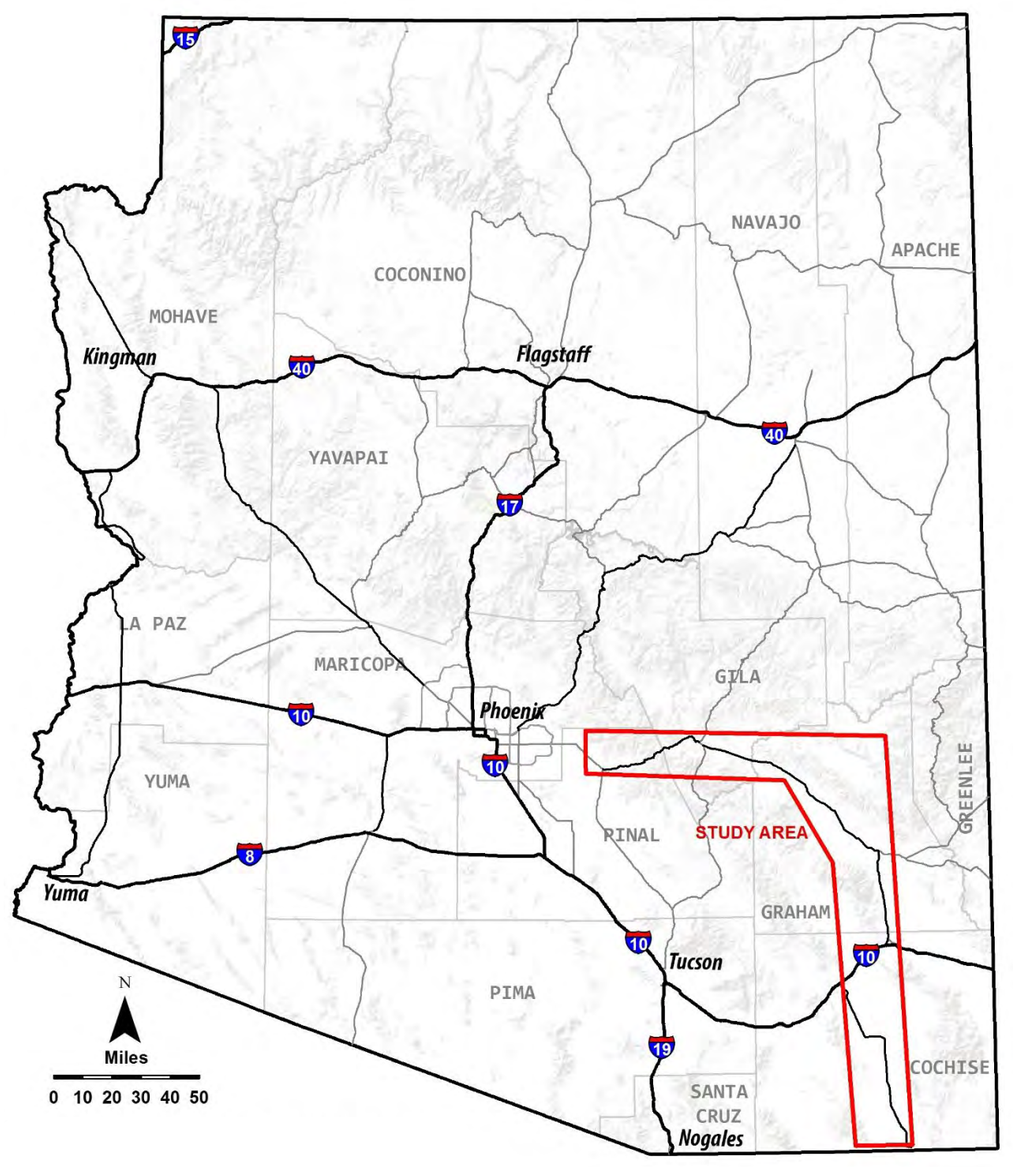
The third round (**Round 3**) of studies, initiated in Fall 2015, include:

- I-10: California State Line to SR 85 and SR 85: I-10 to I-8
- I-10: SR 202L to New Mexico State Line
- SR 87/SR 260/SR 377: SR 202L to I-40
- US 60/US 70: SR 79 to US 191 and US 191: US 70 to SR 80
- US 93/US 60: Nevada State Line to SR 303L

The studies under this program assess the overall health, or performance, of the state's strategic highways. The CPS will identify candidate solutions for consideration in the Multimodal Planning Division's (MPD) P2P project prioritization process, providing information to guide corridor-specific project selection and programming decisions.

The US 60|US 70|US 191 corridor, depicted in **Figure 1,** is one of the strategic statewide corridors identified and the subject of this Round 3 CPS.

Figure 1: Corridor Study Area



1.1 Corridor Study Purpose

The purpose of the CPS is to measure corridor performance to inform the development of strategic solutions that are cost-effective and account for potential risks. This purpose can be accomplished by following the process described below:

- Inventory past improvement recommendations
- Define corridor goals and objectives
- Assess existing performance based on quantifiable performance measures
- Propose various solutions to improve corridor performance
- Identify specific solutions that can provide quantifiable benefits relative to the performance measures
- Prioritize solutions for future implementation

1.2 Study Goals and Objectives

The objective of this study is to identify a recommended set of prioritized potential solutions for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The US 60|US 70|US 191 CPS defines solutions and improvements for the corridor that are evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance. Corridor benefits can be categorized by the following three investment types:

- Preservation: Activities that protect transportation infrastructure by sustaining asset condition or extending asset service life
- Modernization: Highway improvements that upgrade efficiency, functionality, and safety without adding capacity
- Expansion: Improvements that add transportation capacity through the addition of new facilities and/or services

This study identifies potential actions to improve the performance of the US 60|US 70|US 191 corridor. Proposed actions are compared based on their likelihood of achieving desired performance levels, life-cycle costs, and cost effectiveness to produce a prioritized list of solutions that help achieve corridor goals.

The following goals are identified as the desired outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals
- Develop solutions that address identified corridor needs based on measured performance
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure

1.3 Corridor Overview and Location

The US 60|US 70|US 191 corridor links the Mexico border at the City of Douglas and the Phoenix metropolitan area to agricultural, mining and recreational activity in southeastern Arizona. The US 60|US 70|US 191 Corridor Profile Study limits extend along US 191 from Douglas to I-10, continuing along US 191 from I-10 to Safford to the junction with US 70, then following US 70 from Safford, passing through the San Carlos Apache Reservation to Globe, and transitioning to the US 60 from Globe, through Superior to Florence Junction at the US 60|SR 79 intersection. In general, all three highways are two-lane facilities designed for relatively modest traffic volumes in a rural setting. At the same time, the corridor offers some unique benefits within the Arizona circulation system that could be leveraged for increased usage as the need arises.

US 191 provides a link between Mexico and Interstate 10 (I-10), the primary east-west interstate corridor along the southern states. As a result, US 191 serves as a major freight corridor for goods moving between Mexico and the United States. Similarly, the combination of US 191 and US 70 between I-10 and Globe offers a critical connection to mining and agricultural interests located in the greater Safford and Globe areas of Graham and Pinal Counties. US 60 between Globe and SR 79 links activities within the corridor to the major population and commerce center of the Phoenix metropolitan area.

The combination of all three highways (US 60|US 70|US 191) creates a potentially significant alternative to I-10 and I-19 for travel in the eastern reaches of Arizona. A seamless connection among the three routes as a reliever could have major implications for improving international, interstate and intrastate trade along with opening access to financial and commercial distribution centers in the Phoenix area. It would also provide enhanced accessibility to tourist and recreational opportunities in southeastern Arizona.

1.4 Corridor Segments

The US 60|US 70|US 191 Corridor is divided into seventeen planning segments for analysis and evaluation. These planning segments allow the corridor to be analyzed at a detailed level so that location-specific needs can be readily identified and compared to other segments on this or other corridors. Segmentation by similar characteristics (e.g., urban/rural surroundings, road width, traffic volumes) allowed the analysis to highlight anomalies or instances of poor performance within the context of each segment. The corridor is segmented at logical breaks where context changes such as terrain, daily traffic volumes, or roadway typical section indicate. Additional segment breaks may occur at major intersections or junctions, where the corridor transitions from rural to urban environments, other similar operating environments, maintenance sections, and at jurisdictional changes. Corridor segments are described in **Table 1** and are shown in **Figure 2**.

Table 1: US 60|US 70|US 191 Corridor Segments

Segment #	Route	Begin	End	Approximate Begin Milepost	Approximate End Milepost	Approximate Length (miles)	Typical Through Lanes (NB/EB, SB/WB)	2014 (2035) Average Annual Daily Traffic Volume (vpd)	Character Description
191-1	US 191	US 191B Junction	Elfrida	0	24	24	1,1	1,952 (2,652)	Starting from MP 0 along US 191, this segment is primarily rural in nature, but is the only route to the Bisbee-Douglas International Airport.
191-2	US 191	Elfrida	I-10	24	67	43	1,1	1,384 (1,727)	Beginning in Elfrida, a census-designated place, this segment connects smaller agricultural communities to each other and I-10.
191-3	US 191	I-10	SR 266	87	104	17	2,2	2,392 (2,887)	No known developments exist along this segment however, it does connect the Arizona State Prison at Fort Grant to I-10 via SR 266.
191-4	US 191	SR 266	Safford City Limit	104	116	12	1,1	4,584 (5,673)	Land along this segment is primarily owned by the Bureau of Reclamation and is therefore undeveloped. The segment begins at SR 266 and ends at approximately the southern limits of Safford. Traffic numbers in this segment increase due to the development south of Safford.
191-5	US 191	Safford City Limit	US 70 Junction	116	121	5	2,2	8,312 (11,891)	This segment starts at approximately the southern limits of Safford and ends at the junction with US 70. The segment is differentiated by jurisdiction and change in route along the corridor rather than any changes in terrain or traffic.
70-6	US 70	US 191 Junction	Pima	339	330	9	2,2	12,630 (23,399)	Beginning at the junction with US 191 in Safford and ending at the northern limit of Pima, this segment has very high traffic volumes which can be attributed to the higher density of surrounding communities and agricultural/mining operations. A large majority of the land abutting the route is privately owned.
70-7	US 70*	Pima	San Carlos Apache Reservation	330	300	19	1,1	3,506 (4,647)	This segment connects the western limit of Pima to the eastern edge of the San Carlos Apache Reservation. A majority of the land abutting US 70 is privately owned and used for agricultural purposes. Milepost equation MP 314.21 Back = MP 325.31 Ahead occurs within this segment.
70-8	US 70	San Carlos Apache Reservation	Bylas	300	298	2	1,1	3,295 (4,932)	Beginning at the eastern limits of the San Carlos Apache Reservation, this short segment terminates at the eastern limits of Bylas.
70-9	US 70	Bylas	Bylas	298	293	5	1,1	3,295 (4,495)	Bylas is a census-designated place within the San Carlos Apache Reservation. The boundary of this segment was determined by the extent of development and not necessarily the jurisdictional limits.
70-10	US 70	Bylas	Peridot	293	274	19	1,1	3,295 (4,504)	This segment begins at the western extent of development in Bylas and extends to the eastern limits of development in Peridot. The segment is within the San Carlos Reservation and has low traffic volume.

AADT = Average Annual Daily Traffic
vpd = vehicles per day

*Milepost equation MP 314.21Back = MP 325.31

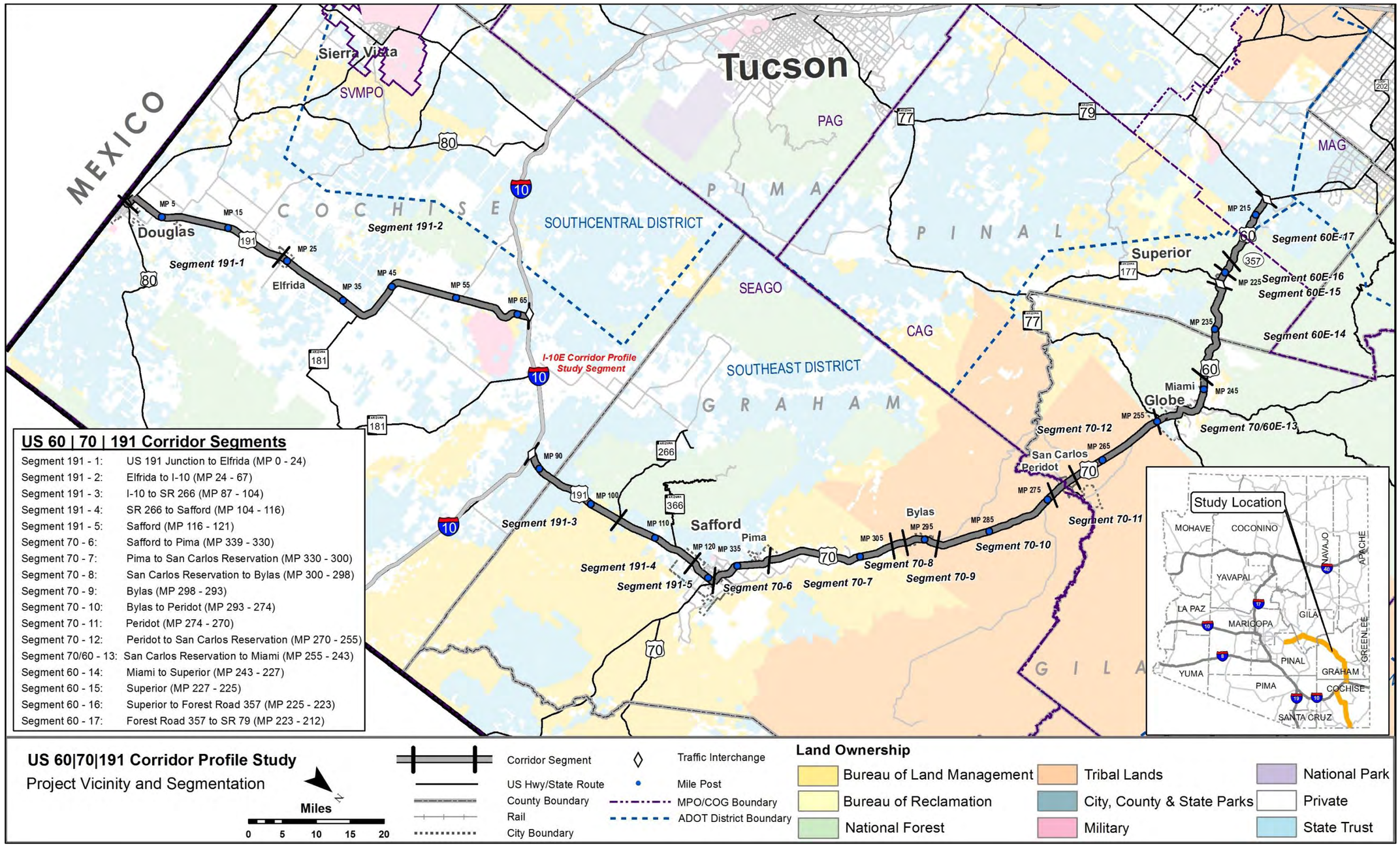
Table 2: US 60|US 70|US 191 Corridor Segments (continued)

Segment #	Route	Begin	End	Approximate Begin Milepost	Approximate End Milepost	Approximate Length (miles)	Typical Through Lanes (NB/EB, SB/WB)	2014 (2035) Average Annual Daily Traffic Volume (vpd)	Character Description
70-11	US 70	Peridot	Peridot	274	270	4	1,1	3,295 (5,355)	The segment starts at the new medical center at the eastern limits of Peridot and extends west to the high school. It is differentiated by Graham/Gila County jurisdiction rather than changes in terrain or traffic.
70-12	US 70	Peridot	San Carlos Apache Reservation	270	255	15	1,1	4,230 (6,359)	Beginning at the Peridot High School and continuing to the western limit of the San Carlos Apache Reservation, this segment is differentiated by jurisdiction rather than any changes in terrain or traffic.
70|60-13	US 70/US 60	San Carlos Apache Reservation	Miami	255	243	12	2,2	11,008 (14,619)	Beginning at the western limits of the San Carlos Apache Reservation, this segment goes through the City of Globe, Claypool and Miami. Although this segment includes US 70 and US 60, there is no change in cross section therefore, the segment is differentiated by jurisdiction rather than any other changes. Higher traffic counts are due to the junction of US 60 and US 70 along with higher traffic counts and the proximity of large mines.
60-14	US 60	Miami	Superior	243	227	16	1,1	9,069 (14,176)	Beginning at the western limits of Miami and extending to the eastern limits of Superior, this segment bisects the Tonto National Forest. The high traffic volume can be attributed to a significant number of regular commuters in both directions (Valley to Globe) and tourist traffic.
60-15	US 60	Superior	Superior	227	225	2	1,1	7,781 (17,588)	This segment starts and ends at approximately the eastern and western limits of Superior. This segment is differentiated by jurisdiction rather than any changes in terrain or traffic.
60-16	US 60	Superior	Forest Road 357	225	223	2	1,1	7,781 (14,924)	This segment is bounded by the Tonto National Forest and is differentiated by the number of thru east and west lanes rather than changes in terrain or jurisdiction.
60-17	US 60	Forest Road 357	SR 79	223	212	11	1,1	9,547 (18,273)	Although this segment is generally flat in nature, it is differentiated by the number of thru lanes, compared to 60-16. Beginning at State Forest Road 357, this segment terminates at the interchange with SR 79.

AADT = Average Annual Daily Traffic
vpd = vehicles per day

*Milepost equation MP 314.21Back = MP 325.31

Figure 2: Corridor Location and Segments



1.5 Corridor Characteristics

The US 60|US 70|US 191 corridor provides primary access to agriculture, mining and recreation areas in the southeastern part of Arizona. The corridor intersects I-10, which provides east and west access to and from the corridor. Beginning in Douglas, just north of the international border, the corridor extends northwest through Safford to Florence Junction, at the edge of the Phoenix metropolitan region, providing a key economic and recreational link in the region and state.

National Context

The southern and northern portions of the corridor both provide connectivity to the national transportation network. The southern portion of the corridor, US 191 south of I-10, provides a link between Mexico and I-10, the main east-west corridor along the southern states. As a result, US 191 serves as a major freight corridor for goods moving between Mexico and the US. The portion of the corridor north of I-10 provides connectivity between major mining and agricultural areas, linking to I-10 for national distribution.

Regional Connectivity

The combination of US 191 and US 70 between I-10 and Globe offers a critical connection to mining and agricultural interests located in the greater Safford and Globe areas of Graham and Pinal Counties. US 60 between Globe and SR 79 ties all the activities within the corridor, along with additional mining and recreational opportunities along US 60, to the major population and commerce center of the Phoenix metropolitan area.

Commercial Truck Traffic

The US 60|US 70|US 191 corridor serves as an important route for agricultural products grown in the Gila River Valley, and for large mining operations near Safford, Miami and Superior. According to ADOT's 2014 Highway Performance Monitoring System (HPMS) data, the average daily commercial truck volumes along the corridor range from less than 100 to nearly 700 trucks per day. Segments with volumes over 250 daily commercial trucks include Segments 191-4 through 191-6, Segment 70|60-13 through 60-15 and Segment 60-17. The high volume of trucks on these segments can be attributed to the large active mines in the Safford and Globe areas, as well as agricultural shipments. Due to the nature of truck traffic, oversize loads are common on this corridor.

The Douglas Port of Entry (POE) is located at the southern end of the corridor. In 2014, this crossing was the second busiest port in Arizona in terms of total number of loaded truck containers, accounting for approximately 9% of all truck crossings within the State. One inspection station is located adjacent to northbound US 191 at MP 1 and includes a weigh-in-motion scale. One permanent border checkpoint is located just north of Elfrida, on northbound US 191 in Segment 191-2. This location requires all vehicles to stop for inspection, which can create some delay with commercial truck traffic.

Commuter Traffic

Commuter traffic on US 60|US 70|US 191 occurs mostly within the urbanized areas of Safford, Globe and Superior, which are the primary economic centers along the corridor. According to the most recent traffic volume data maintained by ADOT, traffic volumes range from approximately 12,500 vehicles per day in the Safford area to approximately 8,000 vehicles per day in the Superior area. Other less urbanized areas, including Elfrida, Bylas and Peridot, average traffic volumes are between 1,000-4,000 vehicles per day.

According to the 2014 5-Year American Community Survey data from the US Census Bureau, 67% of the workforce in the City of Safford, 75% of the workforce in the City of Globe and 80% of the workforce in the Town of Superior drove alone for their daily commutes. Carpooling accounted for 12%-24% of daily commuters. As there are limited transit options in this area, less than 1% of daily commuters used public transportation as a means to get to work. The average commute travel time for these areas is 15-25 minutes. In the less populated areas of Bylas, Elfrida and Miami, there is a lower percentage of the population commuting to work alone, averaging 69%. In Bylas, 10% of commuters used public transportation. Nine percent of daily commuters in Elfrida and 12% of commuters in Miami carpooled. The average commute travel time for these less populated areas is similar to the larger urban areas, 15-25 minutes.

Recreation and Tourism

US 60|US 70|US 191 provides access to many recreational opportunities within the southeastern area of the state, including National Forest, wildlife areas, tribal recreation areas, and parks. The corridor provides access to both the Coronado and Tonto National Forests. The Coronado National Forest is broken up by the National Forest Service into different Ecosystem Management Areas, defined by each mountain range. The Dragoon, Pinaleno and Santa Teresa Ecosystem Management Areas are primarily accessed via US 191 or US 70. Segments 70|60-13 through 60-17 bisect the Tonto National Forest and can be used to access the Salt River and Superstition Mountains via SR 188.

There are numerous other natural areas and parks along the corridor. The Leslie Canyon National Wildlife Refuge is located east of US 191 between Douglas and Elfrida and encompasses over 2,700 acres. The Refuge was established in 1988 to protect two native fish species of the Rio Yaqui watershed. Located west of US 191 between Douglas and Elfrida is the Whitewater Draw Wildlife Area, which is comprised of 1,500 acres and home to over 20,000 Sandhill Cranes during the winter. The park is open from October 15 through March 15.

Mount Graham is located southwest of Safford and is accessible via US 191. Recreational activities include hiking, rock climbing and cross country skiing. In addition to these opportunities, the Mount Graham is home to the University of Arizona Steward Observatory. The observatory was established in 1916 however construction was delayed due to World War I. By 1963, the original 36" diameter telescope was replaced with a smaller one due to the increased light pollution from the expanding Tucson area.

Coolidge Dam and San Carlos Lake are located west of US 70 just south of Peridot. Built between 1924 and 1928, the Coolidge Dam was part of the San Carlos Irrigation Project and is responsible for irrigating 100,000 acres of agricultural land. Recreational uses within the area include fishing and boating on San Carlos Lake and hiking/biking on a 13 mile route along the dam's access road.

The Apache Gold Casino and Resort in Globe is located along Highway. Owned by the San Carlos Apache Tribe the casino includes 600 slot machines, and 200-seat bingo hall, a golf course, 145-room resort with a conference center and an RV park.

The Boyce Thompson Arboretum and State Park is located off of US 60 in Superior. Founded in the 1920's, the park is Arizona's oldest and largest botanical garden encompassing 323-acres and includes over three miles of paths and trails.

In addition to the recreational amenities already mentioned, there are numerous trailheads along the corridor which are accessible through informal pull off areas.

Multimodal Uses

Besides commuter and freight traffic, as previously discussed, the US 60 US 70 US 191 corridor also accommodates alternative modes of transportation. The following section will discuss the existing multimodal options connecting communities along the corridor to each other and the surrounding region.

Freight Rail

The Arizona Eastern Railroad (AZER) extends from Miami to Lordsburg, New Mexico and Clifton to Lordsburg. The line from Miami to Lordsburg follows the Gila River until Bylas, then parallels US 70 into the Safford area, extending from Segment 191-5 through US 70|60-13. There are three at grade crossings along the corridor. The crossings are located at US 191 near MP 121 in Safford, and MP 246 and MP 247 near Miami. Commodities transported include copper, chemicals, and agricultural and forest products.

There is one additional at grade rail road crossing along the corridor. The Magma Arizona Railroad crosses US 60 near MP 215.

Passenger Rail

The "Copper Spike Extension", which traveled from Globe to the Apache Gold Casino Resort on the San Carlos Indian Reservation, was previously used for passenger train service. In 2011, ownership of the line transferred and the line was abandoned

Bicycles/Pedestrians

Cyclists may use state highways unless specifically prohibited, although a majority of the corridor has an effective shoulder width of less than 10 feet on either side. Only Segments 191-3 and 60-17 have shoulder widths greater than 10 feet. Sidewalks are located along portions of the corridor within the urbanized areas. A pedestrian bridge at Fort Thomas provides a grade separated crossing of US 70. Additionally, within the areas of Bylas and Peridot, pedestrian facilities are not continuous on both sides of the roadway and drainage features create discontinuity in the informal, unpaved pedestrian network in these areas. Also, fencing along the roadway in Bylas and Peridot limits pedestrian crossing opportunities, although there are breaks in the fencing. Unpaved trails can also be found along the corridor and are served by informal pullouts.

Bus/Transit

Within the study area there are limited public transit opportunities. There are two local public transportation service providers along the US 60|US 70|US 191 corridor. The San Carlos Apache Nnee Bich'o Nii Public Transit Service provides buses between Safford and Globe with stops in Thatcher, Pima, Fort Thomas, Bylas, Peridot and Globe. There are three routes with an additional Casino Employee Shuttle. Fares range from $2.00-$10.00 round trip. The second service provider is the Cobre Valley Community Transit which serves Miami, Globe and unincorporated portions of Gila County. There are two routes between Miami and Globe, operating Monday through Friday 6:30am to 6:00pm. One way fares are $1.00. The transit provider also offers a Dial-a-Ride service with fares ranging from $1.00-$4.00, depending on distance.

While existing public transportation service providers may currently be limited, several recent planning documents and studies have identified the need to increase intercity and intracity public transit options along the corridor.

No Greyhound or Amtrak stations are located along the corridor. Private shuttle service provides transportation from Safford to Willcox, Benson, Tucson International Airport and Phoenix Sky Harbor Airport.

Aviation

Municipal airports along the corridor are located in Douglas, Safford, San Carlos, and Superior. The Bisbee Douglas International Airport located along US 191 in Douglas is owned by Cochise County and averages 54 aircraft operations per day. Thirty percent of daily operations are military-related and the remainder is general aviation. The Safford Regional Airport is located northeast of the corridor within Safford city limits. The airfield averages 38 aircraft operations per day. The San Carlos Apache Airport is located along US 70 in Globe. It is owned by the San Carlos Apache tribe and averages 36 aircraft operations per week. The Superior Municipal Airfield is located along US 60 near the western boundaries of the town. The airfield averages 200 aircraft operations per year.

Land Ownership, Land Uses and Jurisdictions

As shown **Table 2**, the corridor crosses multiple jurisdictions and land holdings throughout Cochise, Graham, Gila and Pinal Counties. A majority of the land directly abutting the corridor is privately owned. In the vicinity of the corridor, but not immediately adjacent to it, there are significant Bureau of Reclamation, State Trust and National Forest lands.

Population Centers

The major population centers within the US 60|US 70|US 191 corridor are centered around the urbanized areas of Douglas, Safford, Globe and Superior. Table 2 provides a summary of the U.S. Census population for the communities along the corridor. The local municipalities saw little change in population between 2010 and 2014, where several of these municipalities actually decreased in population during the same timeframe. At the county level, the population shift was more noticeable, especially for Cochise and Pinal County. The populations in the communities along the corridor fluctuate significantly with market demands related to mining and agriculture activities. Looking at the projected 2040 population, Douglas, Safford and Bylas will experience the greatest growth. During the same time period, Cochise and Pinal County will also see a large population shift. However, the growth is not focused in the areas along the study corridor.

Major Traffic Generators

Along the corridor, major traffic generators are related to mining and agriculture activities, as well as recreation and local commuter traffic in the urbanized areas of Douglas, Safford, Globe and Superior. Outside of the study area, major traffic generators include the Douglas Port of Entry, which generates significant freight traffic that utilizes US 191 to access I-10. Traffic generated from agricultural activities fluctuates seasonally. Mining related traffic experiences significant fluctuations as mining activity varies based on the global price of copper.

There are currently operational mines in Superior, Globe-Miami, and north of Safford, with plans for increases in mining activity in the vicinity of Superior. These mining activities generate traffic related to employment, and induced activity related to the increase in population in the local communities. In some cases, shift workers may live temporarily in housing near the mine while their families live in another community, where the mine workers commute home on off days. Due to the shift work related to the mines, there are not typical peak-hour and weekday commute patterns. The mines also generate significant truck traffic, including oversized loads related to mining equipment.

Tribes

Segments 70-8 through 70-12 bisect the San Carlos Apache Reservation.

Wildlife Linkages

The Arizona State Wildlife Action Plan (SWAP) provides a 10-year vision for the entire state, identifying wildlife and habitats in need of conservation, insight regarding the stressors to those resources, and suggested actions that can be taken to alleviate those stressors. Using the HabiMap Tool developed by Arizona Game and Fish Department (AGFD), which is an interactive database of the information included in the SWAP, the following wildlife considerations were identified in relation to the US 60|US 70|US 191 corridor:

- Wildlife waters are located to the north of US 60 near Superior and on both sides of US 191 between Safford and I-10

Table 3: Current and Future Population

Community	2010 Population	2015* Population	2040 Population	% Change 2010-2040	Total Growth
Cochise County	**131,346**	**134,166**	**173,377**	**32%**	**42,031**
Douglas	17,378	16,974	20,447	18%	3,069
Elfrida	459	285	-	-	-
Graham County	**37,220**	**38,569**	**51,887**	**39%**	**14,667**
Safford	9,566	9,627	12,006	26%	2,440
Pima	2,387	2,428	3,171	33%	784
Bylas	1,962	2,069	2,909	48%	947
Peridot	973	1,026	1,443	48%	470
Gila County	**53,565**	**54,148**	**58,735**	**10%**	**5,170**
San Carlos	4,038	4,059	4,220	5%	182
Globe	7,533	7,544	8,092	7%	559
Miami	1,837	1,837	1,837	0%	0
Pinal County	**376,369**	**414,999**	**934,939**	**148%**	**558,570**
Superior	2,835	2,952	3,830	35%	995

Source: U.S. Census, Arizona Department of Administration – Employment and Population Statistics

- Willcox Playa/Cochise Important Bird Area is located along the eastern side of US 191 from approximately MP 60 continuing north to I-10
- A majority of the US 60|US 70|US 191 corridor bisects allotments/pastures, except along US 70 on the San Carlos Reservation and along US 191 south of US 181
- State Land holdings exist within the corridor, primarily along US 191 between Safford and I-10
- US Forest Service Land is located along US 60 and US 70 between SR 79 and SR 77
- Potential Wildlife Linkages exist along US 60 between SR 79 and SR 77 and along US 191 between SR 366 and I-10
- The Species and Habitat Conservation Guide indicates sensitive habitats exist along the corridor except a portion of US 70 which bisects the San Carlos Reservation
- “Species of Greatest Conservation Need” are identified along the corridor except a portion of US 70 which bisects the San Carlos Reservation
- A moderate level of “Species of Economic and Recreational Importance” are identified along the corridor except a portion of US 70 that bisects the San Carlos Reservation

Corridor Assets

The US 60|US 70|US 191 corridor links regionally important communities in the southwestern part of the state to Mexico, I-10 and the Phoenix metropolitan area. The southern portion of US 191 connects the Douglas Port of Entry to I-10 and is an important route for freight. The corridor is also a vital route between the large mining and agricultural activities within the Gila River Valley and the rest of the state. The Transportation Assets Map (Figure 3) shows key features that are available to the travelling public today.

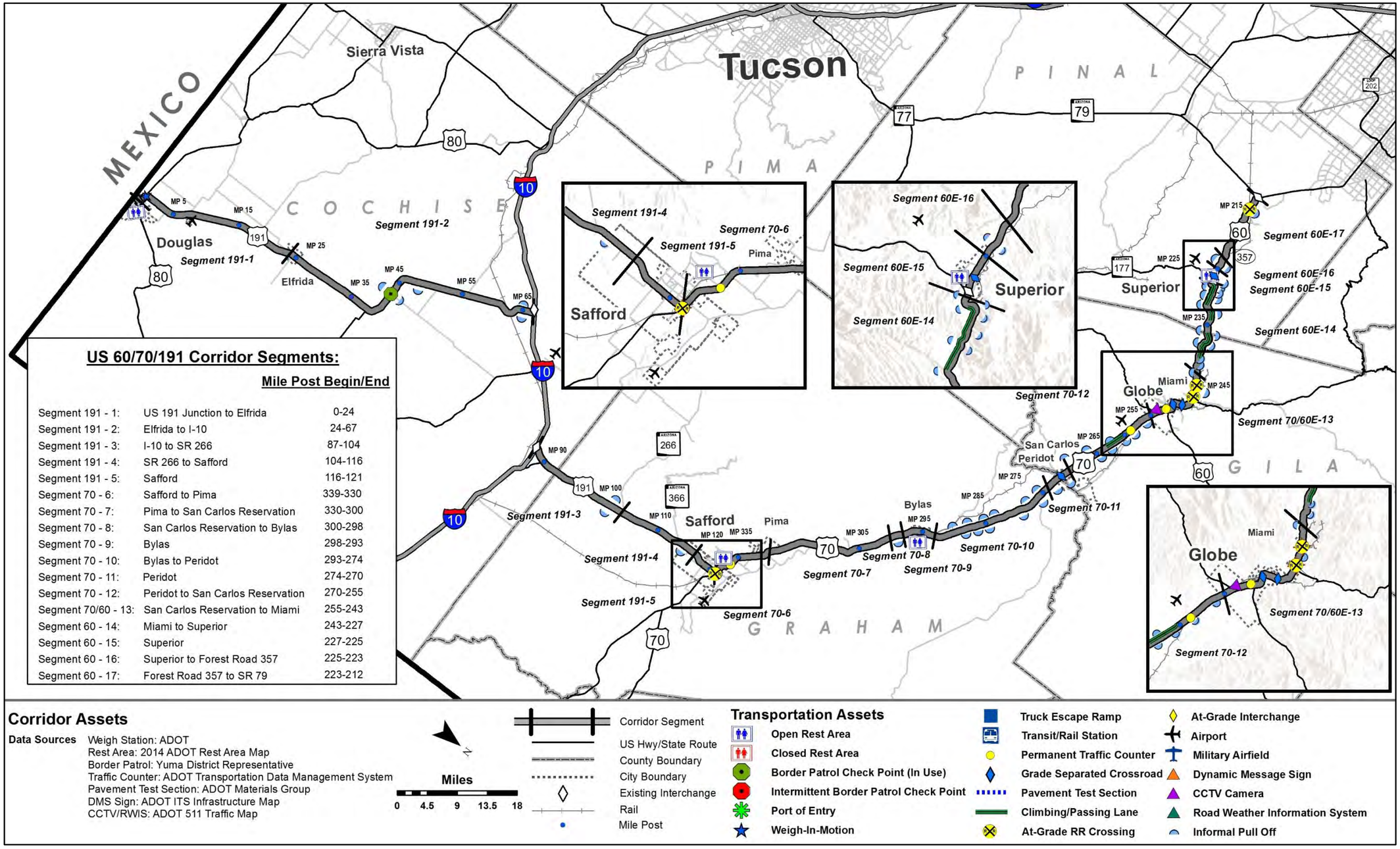
Limited public transportation services are offered within the region. These services either don't span the entire corridor or are only operated on a limited basis. While population changes have not been significant over the last few years, numerous transportation studies have identified a need for intercity and intracity transit services along the corridor.

The majority of assets are located along the most densely populated portions of the corridor near the Safford and Globe areas. In addition to the one Border Patrol check point, one weigh-in-motion scale and four public rest stops already discussed, there are three permanent traffic counters along the corridor, located at MP 337 and MP 254 on US 70 and MP 252 on US 60. There is one short climbing/passing lane for eastbound traffic on US 70 in Segment 70-12, while Segment 60-14 has numerous climbing and passing lanes for both directions. There are several grade-separated crossroads and at-grade railroad crossings along the corridor but they are primarily located near the urbanized areas.

Along the US 60|US 70|US 191 corridor ADOT operates four rest areas. The Douglas Rest Area is located at the southwest corner of US 191 and SR 80 at MP 0. The Safford Park Rest Area is located along the east side of US 70 at MP 338. The third rest area is the Bylas Rest Area along the west side US 70 at MP 296. The fourth rest area is the Superior Rest Area located along the east side of US 60 at MP 226 and serves the eastbound traffic. There are also a number of informal pullouts along the corridor.

There is one closed circuit television (CCTV) camera located along US 70 east of Globe to monitor traffic, as well as one dynamic message sign in the same vicinity currently in design.

Figure 3: Corridor Assets



US 60/70/191 Corridor Segments:

		Mile Post Begin/End
Segment 191 - 1:	US 191 Junction to Elfrida	0-24
Segment 191 - 2:	Elfrida to I-10	24-67
Segment 191 - 3:	I-10 to SR 266	87-104
Segment 191 - 4:	SR 266 to Safford	104-116
Segment 191 - 5:	Safford	116-121
Segment 70 - 6:	Safford to Pima	339-330
Segment 70 - 7:	Pima to San Carlos Reservation	330-300
Segment 70 - 8:	San Carlos Reservation to Bylas	300-298
Segment 70 - 9:	Bylas	298-293
Segment 70 - 10:	Bylas to Peridot	293-274
Segment 70 - 11:	Peridot	274-270
Segment 70 - 12:	Peridot to San Carlos Reservation	270-255
Segment 70/60 - 13:	San Carlos Reservation to Miami	255-243
Segment 60 - 14:	Miami to Superior	243-227
Segment 60 - 15:	Superior	227-225
Segment 60 - 16:	Superior to Forest Road 357	225-223
Segment 60 - 17:	Forest Road 357 to SR 79	223-212

Corridor Assets

Data Sources
Weigh Station: ADOT
Rest Area: 2014 ADOT Rest Area Map
Border Patrol: Yuma District Representative
Traffic Counter: ADOT Transportation Data Management System
Pavement Test Section: ADOT Materials Group
DMS Sign: ADOT ITS Infrastructure Map
CCTV/RWIS: ADOT 511 Traffic Map

Miles
0 4.5 9 13.5 18

- Corridor Segment
- US Hwy/State Route
- County Boundary
- City Boundary
- Existing Interchange
- Rail
- Mile Post

Transportation Assets

- Open Rest Area
- Closed Rest Area
- Border Patrol Check Point (In Use)
- Intermittent Border Patrol Check Point
- Port of Entry
- Weigh-In-Motion
- Truck Escape Ramp
- Transit/Rail Station
- Permanent Traffic Counter
- Grade Separated Crossroad
- Pavement Test Section
- Climbing/Passing Lane
- At-Grade RR Crossing
- At-Grade Interchange
- Airport
- Military Airfield
- Dynamic Message Sign
- CCTV Camera
- Road Weather Information System
- Informal Pull Off

1.6 Corridor Stakeholders and Input Process

A Technical Advisory Committee (TAC) was created, which was comprised of representatives from key stakeholders. TAC meetings were held at key milestones to present results and obtain feedback. In addition, several meetings were also conducted with key stakeholders between October 2015 and December 2016.

Key stakeholders for this study include:

- South Eastern Arizona Governments Organization (SEAGO)
- Central Arizona Governments (CAG)
- ADOT Southeast District
- ADOT South Central District
- ADOT Technical Groups
- Arizona Game and Fish Department (AGFD)
- Arizona State Land Department (ASLD)
- Federal Highway Administration (FHWA)

Several Working Papers were developed during the course of the CPS. The Working Papers were provided to the TAC for review and comment.

1.7 Prior Studies and Recommendations

This section provides a summary of previous studies and plans and their recommendations that are relevant to the IUS 60|US 70|US 191 CPS.

Framework and Statewide Studies

- ADOT Bicycle and Pedestrian Plan Update
- ADOT Five-Year Transportation Facilities Construction Program 2016 - 2020
- ADOT Climbing and Passing Lane Prioritization Study
- Arizona Key Commerce Corridors
- Arizona Multimodal Freight Analysis Study
- Arizona Ports of Entry Study
- Arizona State Airports System Plan
- Arizona State Rail Plan
- Arizona Statewide Dynamic Message Sign Master Plan
- Arizona Statewide Rail Framework Study
- Arizona Statewide Shoulders Study
- Arizona Roadway Departure Safety Implementation Plan (RDSIP)
- Arizona Wildlife Action Plan / Arizona Wildlife Linkages Assessment
- Building a Quality Arizona (BQAZ)
- Eastern Arizona Framework Study
- FHWA Freight Analysis Framework
- MAG 2035 RTP
- What Moves You Arizona? Long-Range Transportation Plan 2010-2035

Regional Planning Studies

- Arizona – Sonora Border Master Plan
- Bi-National Border Transportation Infrastructure Needs Study
- Gila County Rail Passenger Study
- Graham County Transit Feasibility Study
- Pinal County Comprehensive Plan Update
- Pinal County Open Space and Trails Master Plan
- Pinal County Regionally Significant Routes for Safety and Mobility Study
- Pinal County Transit Feasibility Study
- Pinal Creek Trail Conceptual Plan
- Safford General Plan
- SEAGO Transportation Coordination plan Update
- SR 80 & US 191 Oversized Load Study

Planning Assistance for Rural Areas (PARA) and Small Area Transportation Studies (SATS)

- Cobre Valley Comprehensive Transportation Study
- City of Douglas Small Area Transportation Study
- Gila County Small Area Transportation Study
- Gila County Transportation Study
- Graham County Alternate Route Study
- Graham County/ Safford/ Thatcher/ Pima Small Area Transportation Study
- San Carlos Apache Tribe Transit Feasibility Study

Design Concept Reports (DCR) and Project Assessments (PA)

- US 60 Florence Junction – Superior DCR
- US 60 Superior – Globe Feasibility Study
- US 60 Superior – Globe Scoping (MP 222 – MP 258)
- US 70 Bylas Road Safety Assessment
- US 70 Segment 1 Pima – Thatcher Final DCR
- US 70 Segment 2 Thatcher – Safford Final DCR
- US 191 Douglas to I-10 Final DCR
- US 191 I-10 to SR 266 Final DCR
- US 191 Jct SR 266 to US 70 Final Corridor Selection Report
- US 191 Whitewater Draw to Thompson Rd Final DCR
- US 60 Passing Lanes (Miami-Superior) Final PA

Table 3: Corridor Recommendations from Previous Studies

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization[M], Expansion [E])			Status of Recommendation			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)	
1	2	2	0	DMS sign north and southbound		√				N	Arizona Statewide DMS Plan
2	7	N/A	N/A	Bisbee Douglas International Airport improvements	√			2017-2019		N	ADOT Five Year Program
3	67.5	67.5	0	Reconstruct interchange with I-10		√				N	Arizona Key Commerce Corridors
4	87	121	34	Reconstruct to 4 lane divided highway I-10 to US 70			√			N	BQAZ Eastern Arizona Framework Study
5	90	90	0	DMS sign southbound		√				N	Arizona Statewide DMS Plan
6	104	121	17	Alternate Route			√			N	Graham County SATS/US 191 Alternative Route Study/US 191 Jct. SR 266 to US 70 Corridor Selection
7	104.6	121	16.4	Local public transit service		√				N	Graham County SATS
8	110.9	116	5.1	Restripe to 5 lanes between Atresia Road and Lebanon Road			√	2018-2023		N	Graham County SATS
9	110.9	118	4.4	Widen to 4 lanes between Artesia Road and Armory Road			√	2008-2013		N	Graham County SATS
10	114	114	0	SR 366 and Swift Trail Road Intersection Improvement		√		2008-2013		N	Graham County SATS
11	114	118	4	Pavement preservation	√			2016		Y	ADOT Five Year Program
12	116	116	0	DMS sign northbound		√				N	Arizona Statewide DMS Plan
13	118	118	0	Armory Road Intersection Improvement		√		2008-2013		N	Graham County SATS
14	119	119	0	Discovery Park Boulevard Intersection Improvement		√		2008-2013		N	Graham County SATS
15	120	121	1	Restripe to 5 lanes between 11th Street and US 70			√	2008-2013		N	Graham County SATS
16	121	N/A	N/A	Extend Highway North US 70 to 8th Street			√	2018-2023		N	Graham County SATS
17	121	N/A	N/A	Safford Regional Airport improvements	√	√	√	2016 - 2020		N	ADOT Five Year Program

Table 3: Corridor Recommendations from Previous Studies (continued)

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization[M], Expansion [E])			Status of Recommendation			Document
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)	
18	339	339	0	Intersection Improvement		√		2008-2013		N	Graham County SATS
19	339	338	1	Safety /Intersection Improvements		√		2018		N	ADOT Five Year Program
20	339	328	11	Provide enhanced local transit in Safford/Pima/Thatcher			√			N	Eastern Arizona Framework Study Graham County Transit Feasibility Study
21	339	328	11	Provide Complete Streets in Safford/Pima/Thatcher		√				N	Eastern Arizona Framework Study
22	339	253	86	Widen roadway to 4 lanes between US 191 and Globe			√			N	Eastern Arizona Framework Study/BQAZ
23	337	337	0	Intersection Improvement		√		2008-2013		N	Graham County SATS
24	335.8	335.8	0	Intersection Improvement		√		2008-2013		N	Graham County SATS
25	335.7	335.7	0	Intersection Improvement		√		2008-2013		N	Graham County SATS
26	335.6	335.6	0	Intersection Improvement		√		2008-2013		N	Graham County SATS
27	335.5	335.5	0	Traffic signal or roundabout		√		2008-2013		N	Graham County SATS
28	330	329	1	Construct Pedestrian Bridge Extension		√		2017	H8397 01C	Y	ADOT Five Year Program
29	312.25	312.25	0	Add Center Turn Lane Bryce-Eden Road			√			N	Graham County SATS
30	300	299	1	Bridge Replacement and Rehabilitation	√			2016	H8547 01C	Y	ADOT Five Year Program
31	300	291	9	Pathway, entry monument and intersection improvements		√		2016	H8031 01C H7637 01C	Y	ADOT Five Year Program
32	298	294	4	Construct continuous two-way left turn lane			√			N	Road Safety Assessment US 70
33	298	294	4	Install street name signs for all intersections		√				N	Road Safety Assessment US 70
34	298	294	4	Evaluate 50 MPH speed limit		√				N	Road Safety Assessment US 70

Table 3: Corridor Recommendations from Previous Studies (continued)

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization[M], Expansion [E])			Status of Recommendation			Document
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)	
35	298	294	4	Pedestrian Safety improvements – Pedestrian crossings, warning signs/flashing lights, ADA compliant pedestrian gates		√				N	Road Safety Assessment US 70
36	297.7	296.5	1.1	Eliminate passing zone through Bylas		√				N	Road Safety Assessment US 70
37	297	294	3	Repair 4 street lights west of rest area, 3 lights between MP 294 and 295 and 1 between MP 267 and 297		√				N	Road Safety Assessment US 70
38	296.5	296.5	0	Curb installation on north side of US 70		√				N	Road Safety Assessment US 70
39	296.5	296.5	0	Realign intersection		√				N	Road Safety Assessment US 70
40	295.5	294.6	0.9	Eliminate passing zone through Bylas		√				N	Road Safety Assessment US 70
41	288	282	6	Tier 2 priority westbound climbing lane		√				N	ADOT Climbing and Passing Lane Prioritization Study
42	288	281	7	Tier 2 priority westbound passing lane		√				N	ADOT Climbing and Passing Lane Prioritization Study
43	271	269	2	Construct passing lanes		√		2018		N	ADOT Five Year Program
44	271	251	20	Passenger rail service along Arizona Eastern Railway from Globe to San Carlos			√			N	Gila County Rail Passenger Study
45	270	267	3	Tier 2 priority east and westbound passing lane		√				N	ADOT Climbing and Passing Lane Prioritization Study
46	264	262	2	Tier 2 priority eastbound climbing lane		√				N	ADOT Climbing and Passing Lane Prioritization Study
47	259	259	0	San Carlos Apache Airport improvements	√	√	√	2016 - 2020		N	ADOT Five Year Program
48	254	254	0	Intersection Study at SR 70 and SR 77		√		2015		N	Cobre Valley Comprehensive Transportation Study
49	254	235.5	0.5	Widen to four-lane roadway		√	√	2020		N	Cobre Valley Comprehensive Transportation Study
50	253.75	253.75	0	Rehabilitate Southern Pacific bridge		√		2020		N	Cobre Valley Comprehensive Transportation Study

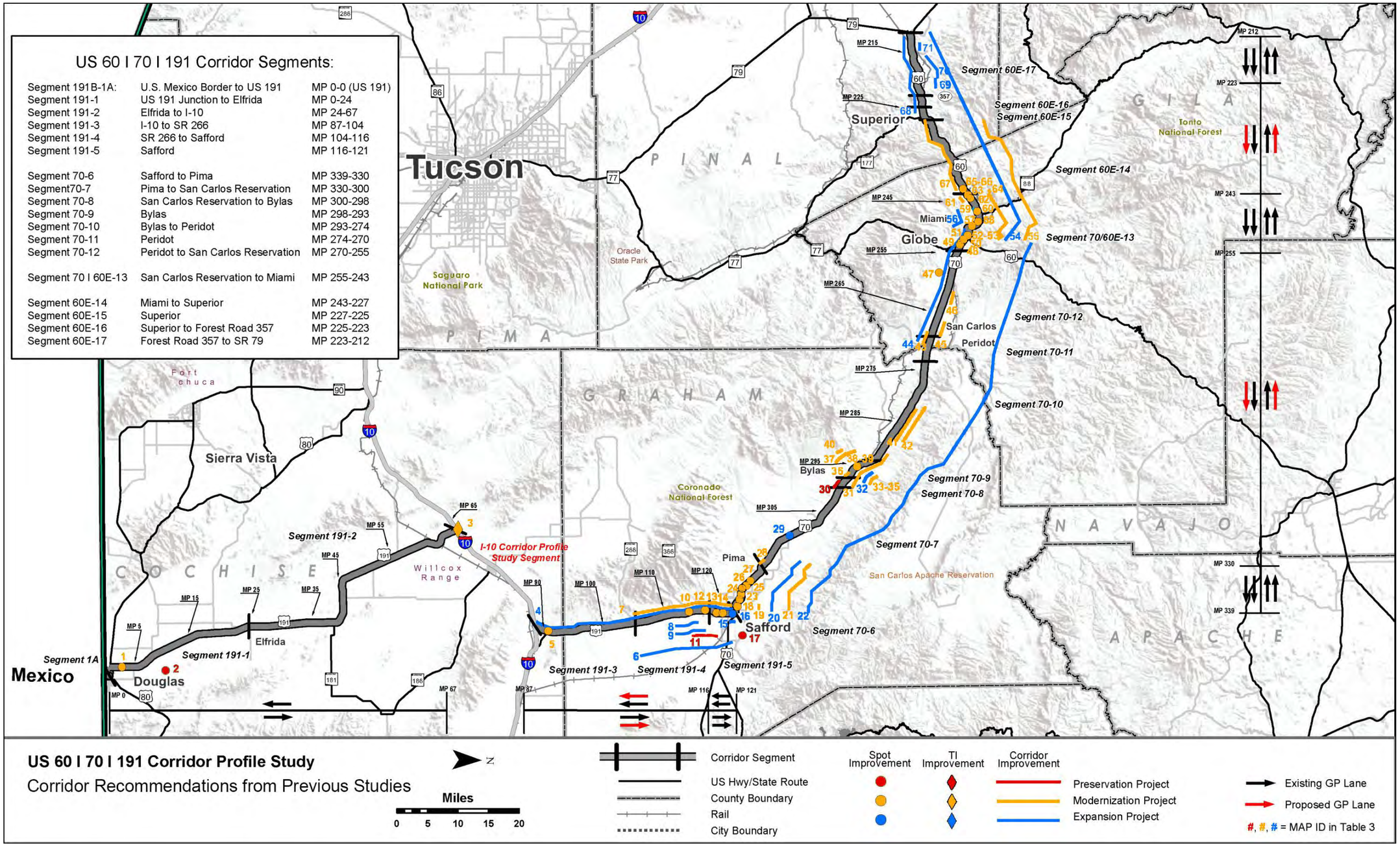
Table 3: Corridor Recommendations from Previous Studies (continued)

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization[M], Expansion [E])			Status of Recommendation			Document
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)	
51	253	253	0	DMS sign eastbound		√				N	Arizona Statewide DMS Plan
52	252	243	9	Speed Limit Study		√		2015		N	Cobre Valley Comprehensive Transportation Study
53	252	243	9	Construct new sidewalks on north side		√		2020		N	Cobre Valley Comprehensive Transportation Study
54	252	212	40	Construct alternative alignment/Widen to 4 lanes			√	2030		N	Cobre Valley Comprehensive Transportation Study /BQAZ
55	252	227	25	Priority Paved Shoulder Opportunity		√				N	ADOT Statewide Bicycle and Pedestrian Plan Update
56	251	246	5	Passenger rail service along Arizona Eastern Railway from Miami to Globe			√			N	Gila County Rail Passenger Study
57	250.75	250.75	0	Replace Maple Street Bridge		√		2020		N	Cobre Valley Comprehensive Transportation Study
58	249.9	249.9	0	Rehabilitate Pinal Creek bridge		√		2020		N	Cobre Valley Comprehensive Transportation Study
59	247	246.5	0.5	Access Management Study		√		2015		N	Cobre Valley Comprehensive Transportation Study
60	247	247	0	DMS Sign Eastbound		√				N	Arizona Statewide DMS Plan
61	245.5	243	2.5	Implement access management through Miami		√		2030		N	Cobre Valley Comprehensive Transportation Study
62	244.6	244.6	0	Intersection improvements at Latham Boulevard		√		2020		N	Cobre Valley Comprehensive Transportation Study
63	244.5	244.5	0	Add exclusive turn lanes on US 60		√		2020		N	Cobre Valley Comprehensive Transportation Study
64	244.25	244	0.25	Restripe to a five-lane section		√		2020		N	Cobre Valley Comprehensive Transportation Study
65	243.75	243.75	0	Rehabilitate Bloody Tanks Wash bridge		√		2020		N	Cobre Valley Comprehensive Transportation Study
66	242	242	0	Re-align intersection		√		2030		N	Cobre Valley Comprehensive Transportation Study
67	242	227	15	East and Westbound Shoulder Improvement		√				N	Statewide Shoulders Study

Table 3: Corridor Recommendations from Previous Studies (continued)

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization[M], Expansion [E])			Status of Recommendation			Document
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)	
68	226	213	13	Regional part-time bus service between Florence Junction and Superior; park-and-ride in the vicinity of Florence Junction			√			N	Pinal County Transit Feasibility Study
69	222.3	219.9	2.4	Picket Post- Construct new EB lanes parallel to existing, between Reymert Wash and Queen Creek			√			Y	US 60 Florence Jct – Superior DCR and EA
70	219.9	216.3	3.6	Gonzales Pass- Construct new EB lanes west of the summit, construct new WB lanes east of the summit			√			Y	US 60 Florence Jct – Superior DCR and EA
71	215	214	1	Queen Valley TI- Construct full access controlled, grade-separated interchange over Queen Valley Rd and the Arizona Magma RR			√			Y	US 60 Florence Jct – Superior DCR and EA
-	N/A	N/A	0	Bridge Infrastructure Improvements East of SR 177	√					N	Arizona Key Commerce Corridor
-	N/A	N/A	0	Bridge Infrastructure Improvements between SR 177 and SR 77	√					N	Arizona Key Commerce Corridor
-	N/A	N/A	0	Bridge Infrastructure Improvements at Globe	√					N	Arizona Key Commerce Corridor

Figure 4: Corridor Recommendations from Previous Studies



2.0 CORRIDOR PERFORMANCE

This chapter describes the evaluation of the existing performance of the US 60|US 70|US 191 corridor. A series of performance measures are used to assess the corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

2.1 Corridor Performance Framework

This study uses a performance-based process to define baseline corridor performance, diagnose corridor needs, develop corridor solutions, and prioritize strategic corridor investments. In support of this objective, a framework for the performance-based process was developed through a collaborative process involving ADOT and the CPS consultant teams.

Figure 5 illustrates the performance framework, which includes a two-tiered system of performance measures (primary and secondary) to evaluate baseline performance. The primary measures in each of five performance areas are used to define the overall health of the corridor, while the secondary measures identify locations that warrant further diagnostic investigation to delineate needs. Needs are defined as the difference between baseline corridor performance and established performance objectives.

Figure 5: Corridor Profile Performance Framework

The following five performance areas guide the performance-based corridor analyses:

- Pavement
- Bridge
- Mobility
- Safety
- Freight

These performance areas reflect national performance goals stated in Moving Ahead for Progress in the 21st Century (MAP-21):

- Safety: To achieve a significant reduction in traffic fatalities and serious injuries on all public roads
- Infrastructure Condition: To maintain the highway infrastructure asset system in a state of good repair
- Congestion Reduction: To achieve a significant reduction in congestion on the National Highway System
- System Reliability: To improve the efficiency of the surface transportation system
- Freight Movement and Economic Vitality: To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development
- Environmental Sustainability: To enhance the performance of the transportation system while protecting and enhancing the natural environment
- Reduced Project Delivery Delays: To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion

The MAP-21 performance goals were considered in the development of ADOT's P2P process, which integrates transportation planning with capital improvement programming and project delivery. Since the P2P program requires the preparation of annual transportation system performance reports using the five performance areas adopted for the CPS, consistency is achieved in the performance measures used for various ADOT analysis processes.

The performance measures include five primary measures: Pavement Index, Bridge Index, Mobility Index, Safety Index, and Freight Index. Additionally, a set of secondary performance measures provides for a more detailed analysis of corridor performance.

Each of the primary and secondary performance measures is comprised of one or more quantifiable indicators. A three-level scale was developed to standardize the performance scale across the five performance areas, with numerical thresholds specific to each performance measure:

Good/Above Average Performance	Rating is above the identified desirable/average range
Fair/Average Performance	Rating is within the identified desirable/average range
Poor/Below Average Performance	Rating is below the identified desirable/average range

Table 4 provides the complete list of primary and secondary performance measures for each of the five performance areas.

Table 4: Corridor Performance Measures

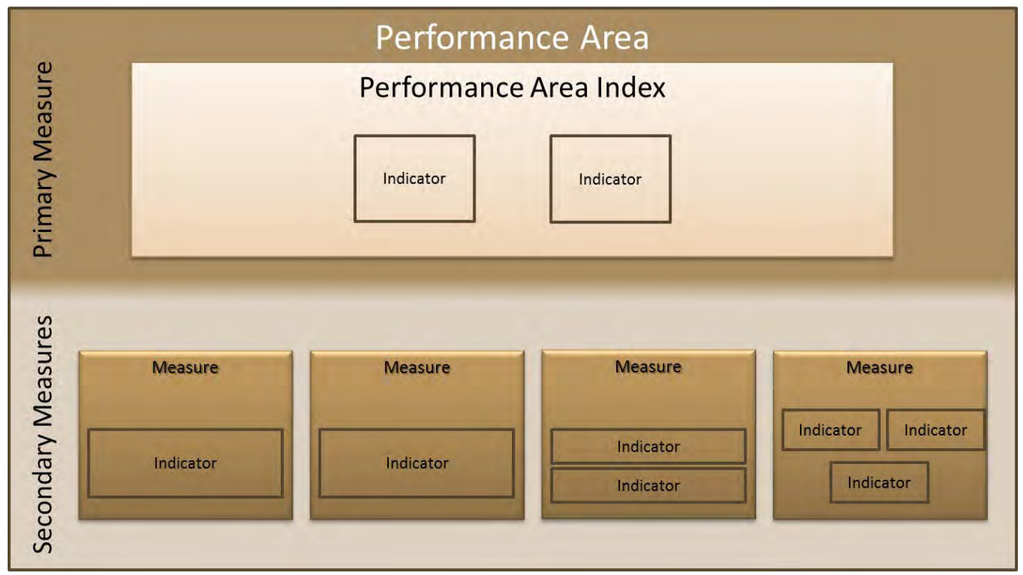
Performance Area	Primary Measure	Secondary Measures
Pavement	**Pavement Index** Based on a combination of International Roughness Index and cracking	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure and structural evaluation rating	• Bridge Sufficiency • Functionally Obsolete Bridges • Bridge Rating • Bridge Hot Spots
Mobility	**Mobility Index** Based on combination of existing and future daily volume-to-capacity ratios	• Future Congestion • Peak Congestion • Travel Time Reliability • Multimodal Opportunities
Safety	**Safety Index** Based on frequency of fatal and incapacitating injury crashes	• Directional Safety Index • Strategic Highway Safety Plan Emphasis Areas • Crash Unit Types • Safety Hot Spots
Freight	**Freight Index** Based on bi-directional truck planning time index	• Recurring Delay • Non-Recurring Delay • Closure Duration • Bridge Vertical Clearance • Bridge Vertical Clearance Hot Spots

The general template for each performance area is illustrated in **Figure 6**.

The guidelines for performance measure development are:

- Indicators and performance measures for each performance area should be developed for relatively homogeneous corridor segments
- Performance measures for each performance area should be tiered, consisting of primary measure(s) and secondary measure(s)
- Primary and secondary measures should assist in identifying those corridor segments that warrant in-depth diagnostic analyses to identify performance-based needs and a range of corrective actions known as solution sets
- One or more primary performance measures should be used to develop a Performance Index to communicate the overall health of a corridor and its segments for each performance area; the Performance Index should be a single numerical index that is quantifiable, repeatable, scalable, and capable of being mapped; primary performance measures should be transformed into a Performance Index using mathematical or statistical methods to combine one or more data fields from an available ADOT database
- One or more secondary performance measure indicators should be used to provide additional details to define corridor locations that warrant further diagnostic analysis; secondary performance measures may include the individual indicators used to calculate the Performance Index and/or “hot spot” features

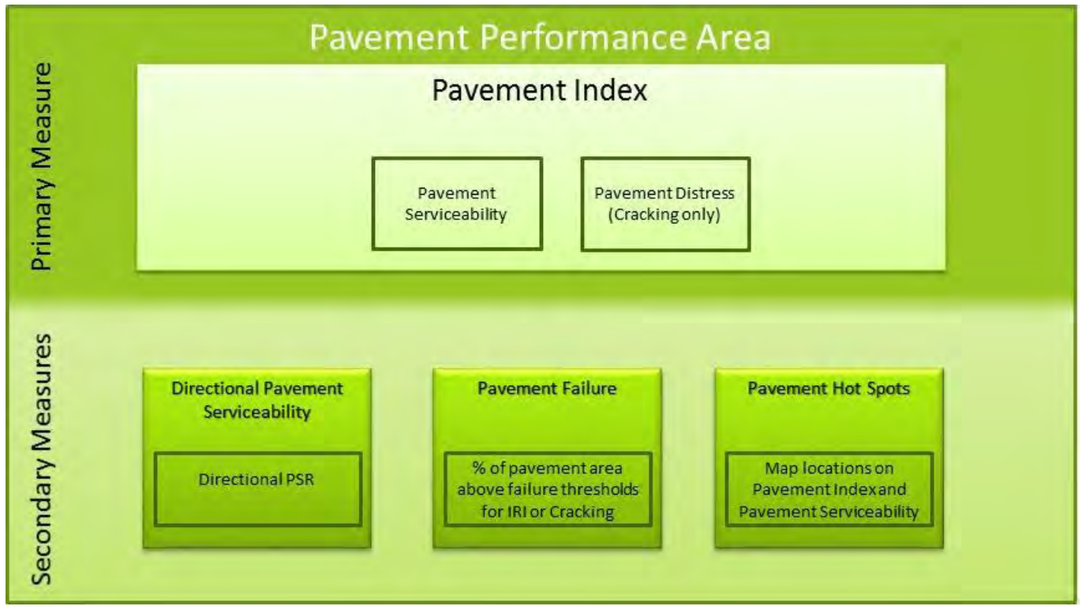
Figure 6: Performance Area Template



2.2 Pavement Performance Area

The Pavement performance area consisted of a primary measure (Pavement Index) and three secondary measures, as shown in **Figure 7**. These measures assess the condition of the existing pavement along the US 60|US 70|US 191 corridor. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C.**

Figure 7: Pavement Performance Measures



Primary Pavement Index

The Pavement Index is calculated using two pavement condition ratings: the Pavement Serviceability Rating (PSR) and the Pavement Distress Index (PDI).

The PSR is extracted from the International Roughness Index (IRI), a measurement of pavement roughness based on field-measured longitudinal roadway profiles. The PDI is extracted from the Cracking Rating (CR), a field-measured sample from each mile of highway.

Both the PSR and PDI use a 0 to 5 scale with 0 representing the lowest performance and 5 representing the highest. The Pavement Index for each segment is a weighted average of the directional ratings based on the number of travel lanes. Therefore, the condition of a section with more travel lanes will have a greater influence on the resulting segment Pavement Index than the condition of a section with fewer travel lanes.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the Pavement performance area, the relevant operating environments are designated as interstate and non-interstate segments. For US 60|US 70|US 191, all segments are considered the non-interstate operating environment.

Secondary Pavement Measures

Three secondary measures provide an in-depth evaluation of the different characteristics of pavement performance.

Directional Pavement Serviceability

- Weighted average (based on number of lanes) of the PSR for the pavement in each direction of travel

Pavement Failure

- Percentage of pavement area rated above failure thresholds for IRI or Cracking

Pavement Hot Spots

- A Pavement “hot spot” exists where a given one-mile section of roadway rates as being in “poor” condition
- Highlights problem areas that may be under-represented in a segment average. This measure is recorded and mapped, but not included in the Pavement performance area rating calculations

Pavement Performance Results

The Pavement Performance Index provides a high-level assessment of the pavement condition for the corridor and for each segment. The three secondary measures provide more detailed information to assess pavement performance.

Based on the results of the analysis, the following pavement conditions were observed on US 60|US 70|US 191:

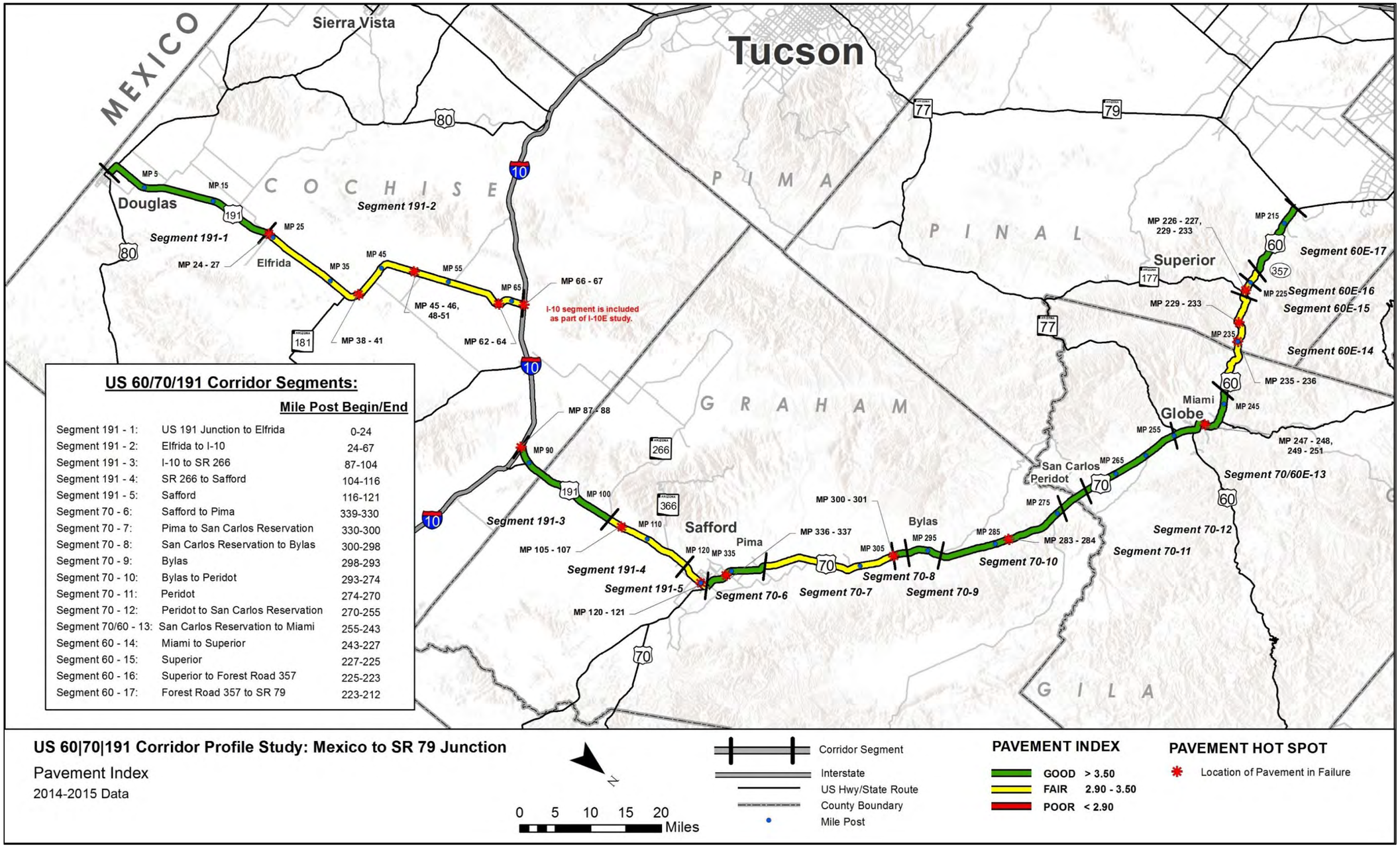
- Based on the weighted average of the Pavement Index, the pavement is in "good" condition on 10 of the 17 segments studied and "fair" condition for the remaining 7 segments.
- Segments 191-2, 60-14 and 60-15 included several miles of failure hot spots, including 13 miles on US 191 between MP 24 and MP 67. Both excessive pavement roughness and cracking were evenly identified in Segment 191-2. In Segments 60-14 and 60-15, the primary cause for pavement failure was related to excessive roughness.
- Pavement Failure evaluation assesses the percentage of lane miles considered in failure throughout the corridor. Three segments exceed the 20% worse than average performance threshold. These include Segment 191-2 (30%), Segment 60-14 (31%), and Segment 60-15 (50%). It is important to note that Segment 60-15 in Superior is only 2 miles in length. Between MP 226 and MP 227 showed excessive roughness.
- Segment 191-2 yielded the lowest Pavement Index and the lowest PDI (cracking) scores.

Table 5 summarizes the Pavement performance results for the US 60|US 70|US 191 corridor. **Figure 8** illustrates the primary Pavement Index performance and locations of pavement hot spots along the US 60|US 70|US 191 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 5: Pavement Performance

Segment #	Segment Length (miles)	Pavement Index	Directional PSR		% Area Failure
			NB/WB	SB/EB	
191 - 1	24	3.64	3.37	3.37	0%
191 - 2	43	3.06	3.31	3.31	30%
191 - 3	17	3.93	4.02	3.94	3%
191 - 4	12	3.28	3.28	3.28	17%
191 - 5	5	3.28	3.28	3.28	20%
70 - 6	9	3.70	3.44	3.44	10%
70 - 7	19	3.43	3.35	3.35	5%
70 - 8	2	3.87	3.78	3.78	0%
70 - 9	5	3.81	3.80	3.80	0%
70 - 10	19	3.87	3.55	3.55	5%
70 - 11	4	3.88	3.55	3.55	0%
70 - 12	15	3.97	3.83	3.83	0%
70|60 - 13	12	3.65	3.43	3.34	19%
60 - 14	16	3.43	3.24	3.24	31%
60 - 15	2	3.21	2.92	2.92	50%
60 - 16	2	3.32	3.38	3.38	0%
60 - 17	11	4.30	4.14	4.02	0%
Weighted Corridor Average		3.57	3.49	3.49	13%
SCALE					
Performance Level		**Non-Interstate**			
Good/ Above Average Performance		> 3.50			< 5%
Fair/ Average Performance		2.9 - 3.5			5%-20%
Poor/ Average Performance		< 2.90			> 20%

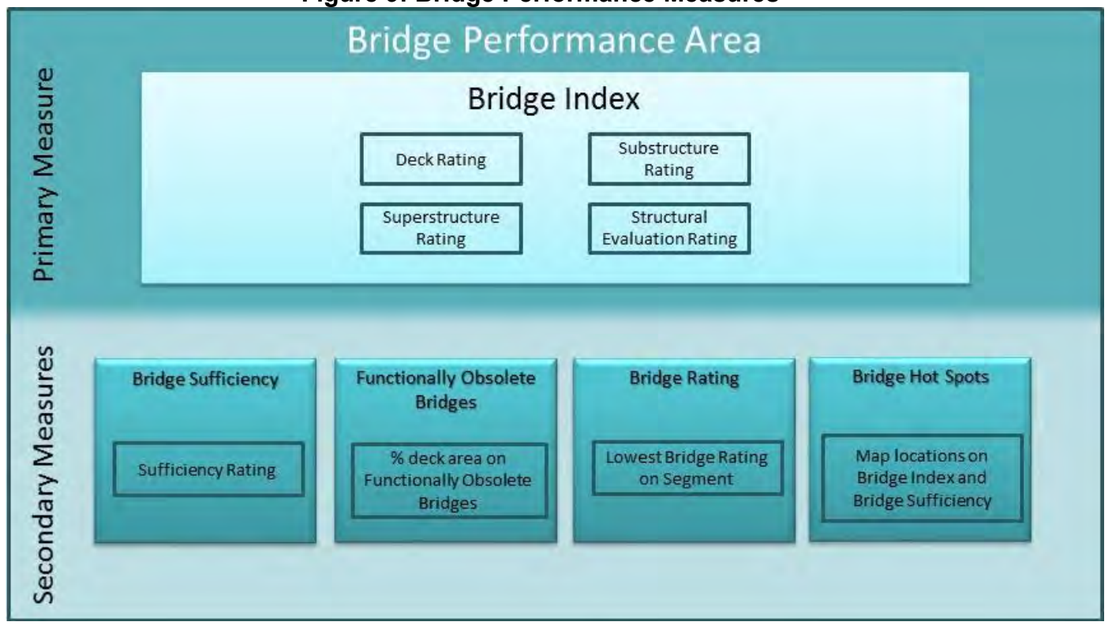
Figure 8: Pavement Performance



2.3 Bridge Performance Area

The Bridge performance area consists of a primary measure (Bridge Index) and four secondary measures, as shown in **Figure 9**. These measures assess the condition of the existing bridges along the US 60|US 70|US 191 corridor. Only bridges that carry mainline traffic or bridges that cross the mainline are included in the calculation. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C.**

Figure 9: Bridge Performance Measures



Primary Bridge Index

The Bridge Index is calculated based on the use of four different bridge condition ratings from the ADOT Bridge Database, also known as the Arizona Bridge Information and Storage System (ABISS). The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating. These ratings are based on inspection reports and establish the structural adequacy of each bridge. The performance of each individual bridge is established by using the lowest of these four ratings. The use of these ratings, and the use of the lowest rating, is consistent with the approach used by the ADOT Bridge Group to assess the need for bridge rehabilitation. The Bridge Index is calculated as a weighted average for each segment based on deck area.

Secondary Bridge Measures

Four secondary measures provide an in-depth evaluation of the characteristics of each bridge:

Bridge Sufficiency

- Multipart rating includes structural adequacy and safety factors as well as functional aspects such as traffic volume and length of detour
- Rates the structural and functional sufficiency of each bridge on a 100-point scale

Functionally Obsolete Bridges

- Percentage of total deck area in a segment that is on functionally obsolete bridges
- Identifies bridges that no longer meet standards for current traffic volumes, lane width, shoulder width, or bridge rails
- A bridge that is functionally obsolete may still be structurally sound

Bridge Rating

- The lowest rating of the four bridge condition ratings (substructure, superstructure, deck, and structural evaluation) on each segment
- Identifies lowest performing evaluation factor on each bridge

Bridge Hot Spots

- A Bridge “hot spot” is identified where a given bridge has a bridge rating of 4 or lower or multiple ratings of 5 between the deck, superstructure, and substructure ratings
- Identifies particularly low-performing bridges or those that may decline to low performance in the immediate future

Bridge Performance Results

The Bridge Index provides a top-level assessment of the structural condition of bridges on the US 60|US 70|US 191 corridor, and for each corridor segment. The three secondary measures provide more detailed information to assess the bridge condition for each segment. A total of 48 major structures classified as bridges were included in the analysis. Major structures that are classified as Reinforced Concrete Box Culverts (RCBC) were not considered. Overall, based on the Bridge Index, all segments show "fair" performance.

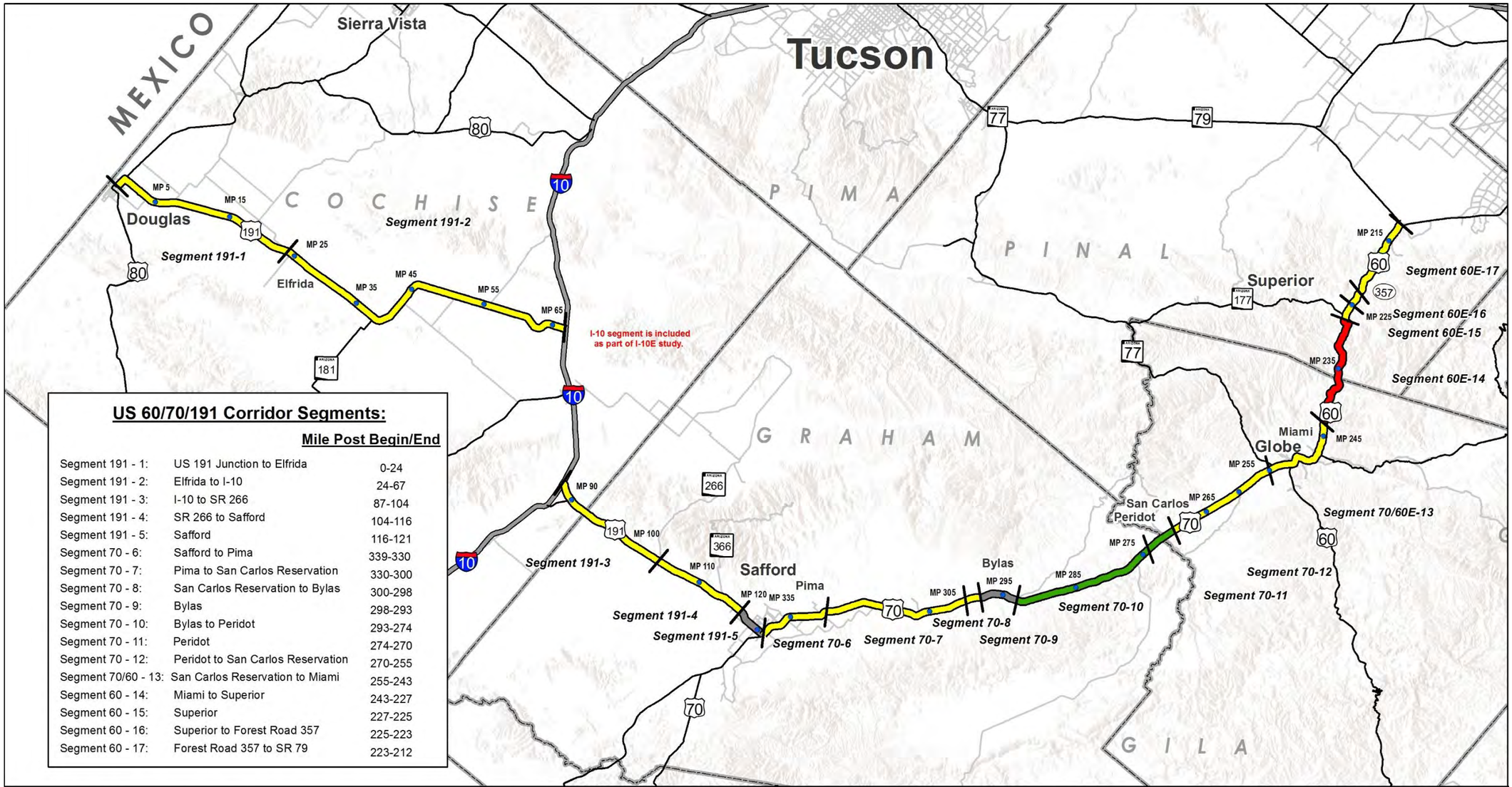
- The majority of segments fall within the "Fair" performance rating for the Bridge Index, which consists of the deck, substructure, superstructure and structural ratings. The ratings ranged from 4.56 to 7.54 out of 9.
- Segment 60-14 has the poorest Bridge Index at a 4.56 rating. This is due to three bridges within the segment being structurally deficient (see fourth bullet) and a tunnel with a deck rating of 5.
- Bridge Sufficiency ratings per segment range from "Good" to "Poor". The weighted averaged values range from 36.03 to 93.91 out of 100.
- Four bridges have been rated as structurally deficient, all of which are on US 60. At MP 227.71, the Queen Creek Bridge (No. 406) has deck, substructure, superstructure and structural evaluation ratings of 4. The Waterfall Canyon Bridge (MP 229.50, No. 328) has superstructure and structural evaluation ratings of 4. The poorest rated bridge is the Pinto Creek Bridge (No. 351) at MP 238.25, which has deck, substructure, superstructure and structural evaluation ratings of 4. At MP 249.64, the Pinal Creek Bridge (No. 266) has deck, substructure and structural evaluation ratings of 4.
- Two of the 17 analysis segments on the corridor exceed the threshold for "Poor" performance as Functionally Obsolete Bridges by current ADOT design standards. These include Segments 70|60-13 (49% bridge area comprised of the Globe Viaduct) and 60-15 (57% bridge area comprised of the Stone Avenue Overpass and Route 177 TI Underpass).
- Three bridges have multiple ratings of 5 for the deck, substructure, superstructure and structural evaluation.
- Queen Creek Tunnel (MP 228.47, No. 407) located on US 60 approximately 1.6 miles east of the SR 177 junction is a major feature on the corridor that was not evaluated within the performance framework for structural integrity (it is considered in freight performance for the vertical clearance secondary measure). This unique feature (located within Segment 60-14) will require isolated consideration throughout the Corridor Profile Study process to include its contribution to corridor condition and needs. According to the NBI data provided by the ADOT Bridge Group, the deck condition (N59) has a rating of 5. With this 5 (fair) rating, the tunnel will be considered a hot spot under bridge performance.

Table 6 summarizes the bridge performance results for the US 60|US 70|US 191 corridor. **Figure 10** illustrates the primary bridge index performance and locations of bridge hot spots along US 60|US 70|US 191. Maps for each secondary measure can be found in **Appendix A.**

Table 6: Bridge Performance

Segment #	Segment Length (miles)	# of Bridges	Bridge Index	Sufficiency Rating	% of Deck Area on Functionally Obsolete Bridges	Lowest Bridge Rating
191 - 1	24	1	6.00	89.00	0%	6
191 - 2	43	2	5.37	76.93	0%	5
191 - 3	17	2	6.02	93.91	0%	5
191 - 4	12	1	6.00	69.50	0%	6
191 - 5	5	0	No Bridges			
70 - 6	9	1	6.00	69.10	0%	6
70 - 7	19	8	5.77	71.59	0%	5
70 - 8	2	1	6.00	74.00	0%	6
70 - 9	5	0	No Bridges			
70 - 10	19	1	7.00	80.00	0%	7
70 - 11	4	2	7.54	82.03	0%	5
70 - 12	15	1	6.00	63.20	0%	6
70|60 - 13	12	11	5.17	78.89	49%	4
60 - 14	16	5	4.56	36.03	0%	4
60 - 15	2	3	6.00	83.70	57%	6
60 - 16	2	2	5.00	86.66	0%	5
60 - 17	11	7	6.42	91.11	0%	5
Weighted Corridor Average			5.56	72.20	3%	5
SCALE						
Performance Level		**All**				
Good			> 6.5	> 80	< 12%	> 6
Fair			5.0 - 6.5	50 - 80	12%-40%	5 - 6
Poor			< 5.0	< 50	> 40%	< 5

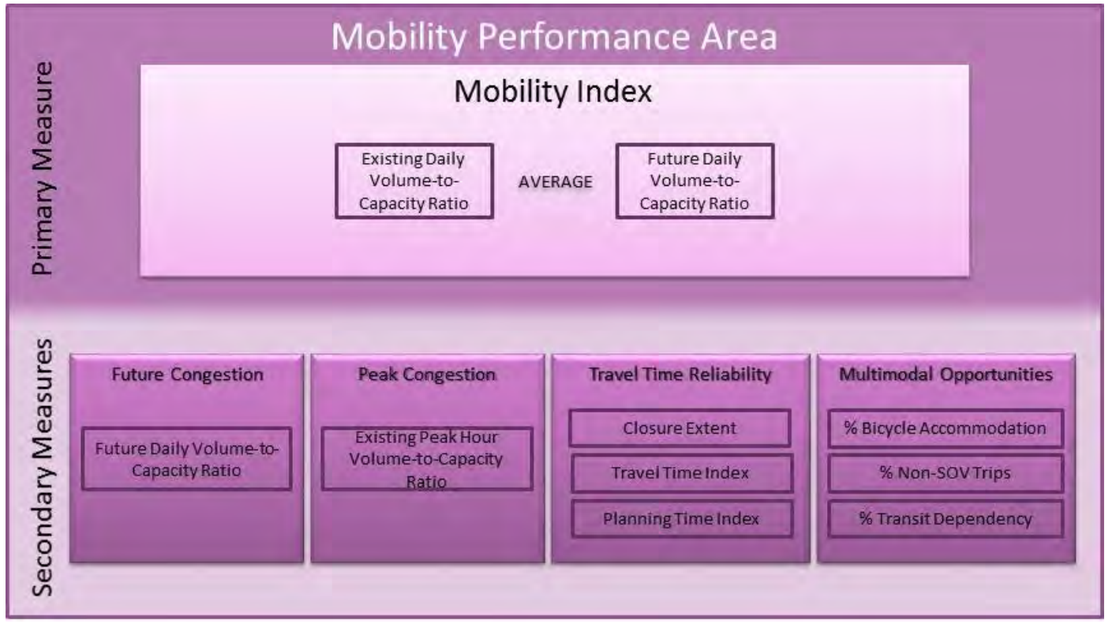
Figure 10: Bridge Performance



2.4 Mobility Performance Area

The Mobility performance area consists of a primary measure (Mobility Index) and four secondary measures, as shown in **Figure 11**. These measures assess the condition of existing mobility along the US 60|US 70|US 191 corridor. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C.**

Figure 11: Mobility Performance Measures



Primary Mobility Index

The Mobility Index is an average of the existing (2014) daily volume-to-capacity (V/C) ratio and the future (2035 AZTDM) daily V/C ratio for each segment of the corridor. The V/C ratio is an indicator of the level of congestion. This measure compares the average annual daily traffic (AADT) volume to the capacity of the corridor segment as defined by the service volume for level of service (LOS) E. By using the average of the existing and future year daily volumes, this index measures the level of daily congestion projected to occur in approximately ten years (2025) if no capacity improvements are made to the corridor.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the Mobility performance area, the relevant operating environments are urban vs. rural setting and interrupted flow (e.g., signalized at-grade intersections are present) vs. uninterrupted flow (e.g., controlled access grade-separated conditions such as a freeway or interstate highway). For US 60|US 70|US 191, the following operating environments were identified:

- Urban Interrupted (Segments 5-6; 13)
- Rural Uninterrupted (Segments 3-4; 7-12; 14-17)
- Rural Interrupted (Segments 1-2)

Secondary Mobility Measures

Four secondary measures provide and in-depth evaluation of operational characteristics of the corridor:

Future Congestion – Future Daily V/C

- The future (2035 AZTDM) daily V/C ratio. This measure is the same value used in the calculation of the Mobility Index
- Provides a measure of future congestion if no capacity improvements are made to the corridor

Peak Congestion – Existing Peak Hour V/C

- The peak hour V/C ratio for each direction of travel
- Provides a measure of existing peak hour congestion during typical weekdays

Travel Time Reliability– Three separate travel time reliability indicators together provide a comprehensive picture of how much time may be required to travel within the corridor:

- Closure Extent:
  - The average number of instances a particular milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel; a weighted average was applied to each closure that takes into account the distance over which the closure occurs
  - Closures related to crashes, weather, or other incidents are a significant contributor to non-recurring delays; construction-related closures were excluded from the analysis
- Directional Travel Time Index (TTI):
  - The ratio of the average peak period travel time to the free-flow travel time (based on the posted speed limit) in a given direction
  - The TTI recognizes the delay potential from recurring congestion during peak periods; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics

- Directional Planning Time Index (PTI):
  - The ratio of the 95th percentile travel time to the free-flow travel time (based on the posted speed limit) in a given direction
  - The PTI recognizes the delay potential from non-recurring delays such as traffic crashes, weather, or other incidents; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics
  - The PTI indicates the amount of time in addition to the typical travel time that should be allocated to make an on-time trip 95% of the time in a given direction

Multimodal Opportunities – Three multimodal opportunity indicators reflect the characteristics of the corridor that promote alternate modes to the single occupancy vehicle (SOV) for trips along the corridor:

- % Bicycle Accommodation:
  - Percentage of the segment that accommodates bicycle travel; bicycle accommodation on the roadway or on shoulders varies depending on traffic volumes, speed limits, and surface type
  - Encouraging bicycle travel has the potential to reduce automobile travel, especially on non-interstate highways
- % Non-SOV Trips:
  - The percentage of trips (less than 50 miles in length) by non-SOVs
  - The percentage of non-SOV trips in a corridor gives an indication of travel patterns along a section of roadway that could benefit from additional multimodal options
- % Transit Dependency:
  - The percentage of households that have zero or one automobile and households where the total income level is below the federally defined poverty level
  - Used to track the level of need among those who are considered transit dependent and more likely to utilize transit if it is available

Mobility Performance Results

The Mobility Index provides a high-level assessment of mobility conditions for the corridor and for each segment. The four secondary measures provide more detailed information to assess mobility performance.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the mobility performance area, the relevant operating environments included urban or rural locations, as well as interrupted flow (where signalized at-grade intersections are present) and uninterrupted flow (grade-separated).

Based on the results of this analysis, the following observations were made:

- Overall, based on the weighted average of the Mobility Index, the traffic operations are in "good" condition. Segment 60-14 and 60-15 rated "poor" due to high V/C ratios caused by the mountainous grade, which decreases the overall throughput.
- Existing peak hour traffic operations are "good" throughout the corridor, except for Segment 60-14 and 60-15 which is rated as "poor".
- Future traffic operations are anticipated to be "good" throughout the corridor, with the exception being "poor" in Segment 60-14 and 60-15 and "fair" in 60-16.
- Most of the corridor performed "good" in measuring closures for travel time reliability. Segments 60-14, 60-15 and 60-16 showed "fair" performance in the westbound direction, Segment 70-12 showed "fair" performance in the eastbound direction, and Segments 60-14 and 60-15 showed "poor" performance in the eastbound direction, with Segment 60-14 having the highest number of closures.
- TTI measures generally show "good" along the corridor, with the exceptions of "poor" performance in the northbound direction of Segment 191-3, and "fair" performance in northbound Segment 191-1, southbound Segment 191-3, and eastbound segments 70|60-13, 60-14, and 60-15. However, 9 northbound/westbound segments and 8 southbound/eastbound segments are lacking permanent traffic counters and could not be analyzed.
- PTI measures generally show "poor" along the corridor, with four northbound/westbound segments rating "poor" and two segments rating "fair", and in the southbound/eastbound direction five segments rating "poor" and two rating "fair". As with the TTI measurement, the PTI could not be analyzed in 9 northbound/westbound segments and 8 southbound/eastbound segments are lacking permanent traffic counters and could not be analyzed.
- A majority of the corridor shows "poor" or "fair" performance for non-SOV trips meaning that many vehicles carry only a single occupant.
- Socioeconomic characteristics along the corridor show the potential for transit dependency as measured by income and vehicle availability. Most of the corridor falls within the statewide average for these characteristics.
- Ten segments show a "poor" performance for accommodation of bicycles due to lack of sufficient shoulder width. Bicycle accommodation is "good" on Segments 191-2, 191-4, 60-15, and 60-17 and "fair" for Segments 191-1, 70-7 and 60-16.

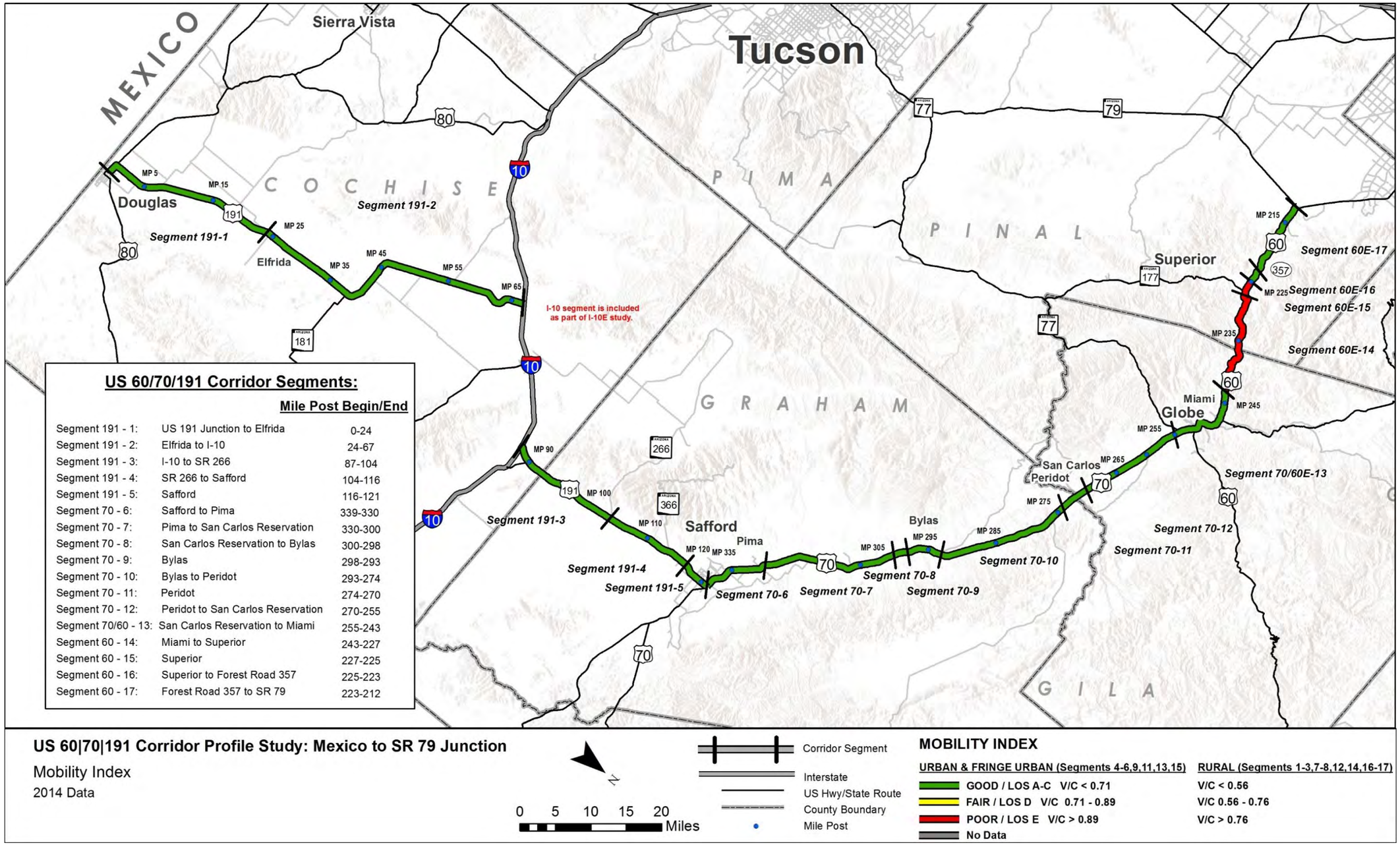
Table 7 summarizes the Mobility performance results for the US 60|US 70|US 191 corridor. **Figure 12** illustrates the primary Mobility Index performance along the US 60|US 70|US 191 corridor. Maps for each secondary measure can be found in Appendix A.

Table 7: Mobility Performance

Segment #	Segment Length (miles)	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent (instances/mile/year)		Directional TTI (all vehicles)		Directional PTI (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
				NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB		
191 - 1	24	0.15	0.17	0.12	0.12	0.03	0.01	1.51	1.30	4.79	7.47	66%	12.5%
191 - 2	43	0.09	0.10	0.07	0.07	0.02	0.00	1.16	1.16	9.83	6.09	100%	16.0%
191 - 3	17	0.04	0.04	0.03	0.03	0.01	0.00	1.39	1.20	9.51	11.62	49%	9.8%
191 - 4	12	0.18	0.20	0.14	0.14	0.03	0.03	N/A	N/A	N/A	N/A	96%	9.3%
191 - 5	5	0.33	0.39	0.27	0.28	0.12	0.08	N/A	N/A	N/A	N/A	27%	22.5%
70 - 6	9	0.53	0.69	0.32	0.32	0.02	0.06	N/A	N/A	N/A	N/A	46%	19.0%
70 - 7	19	0.18	0.21	0.13	0.13	0.02	0.00	N/A	N/A	N/A	N/A	73%	16.8%
70 - 8	2	0.12	0.15	0.08	0.08	0.00	0.10	N/A	N/A	N/A	N/A	0%	13.8%
70 - 9	5	0.25	0.29	0.16	0.17	0.00	0.04	N/A	N/A	N/A	N/A	26%	12.2%
70 - 10	19	0.17	0.19	0.11	0.11	0.09	0.04	N/A	N/A	N/A	N/A	4%	8.9%
70 - 11	4	0.21	0.26	0.12	0.12	0.10	0.00	N/A	N/A	N/A	N/A	4%	13.7%
70 - 12	15	0.19	0.23	0.13	0.13	0.04	0.31	N/A	1.10	N/A	1.40	23%	12.1%
70|60 - 13	12	0.40	0.46	0.29	0.30	0.00	0.12	1.15	1.31	2.72	3.36	54%	17.0%
60 - 14	16	1.73	2.11	1.22	1.09	0.33	1.57	1.07	1.19	1.47	2.06	49%	15.0%
60 - 15	2	2.76	3.83	1.28	1.30	0.36	1.17	1.08	1.17	1.67	2.30	95%	13.0%
60 - 16	2	0.54	0.71	0.28	0.28	0.50	0.00	1.09	1.00	1.91	1.04	87%	9.0%
60 - 17	11	0.20	0.26	0.11	0.10	0.09	0.05	1.01	1.01	1.16	1.24	96%	10.0%
Weighted Corridor Average		0.32	0.39	0.22	0.21	0.06	0.17					61%	14.0%

SCALE					
Performance Level	**Urban/Fringe:** Segments 5-6; 13 **Rural:** Segments 1-4; 7-12; 14-17	**All**	**Uninterrupted:** Segments 3-4; 7-12; 14-17 **Interrupted:** Segments 1-2; 5-6; 13		**All**	
Good	≤ 0.71 ≤ 0.56	≤ 0.22	≤ 1.15 ≤ 1.3	≤ 1.3 ≤ 3.0	> 90%	> 17%
Fair	0.71 - 0.89 0.56 - 0.76	0.22 - 0.62	1.15 - 1.33 1.3 - 2.0	1.3 - 1.5 3.0 - 6.0	60% - 90%	11% - 17%
Poor	> 0.89 > 0.76	≥ 0.62	≥ 1.33 ≥ 2.0	≥ 1.5 ≥ 6.0	< 60%	< 11%

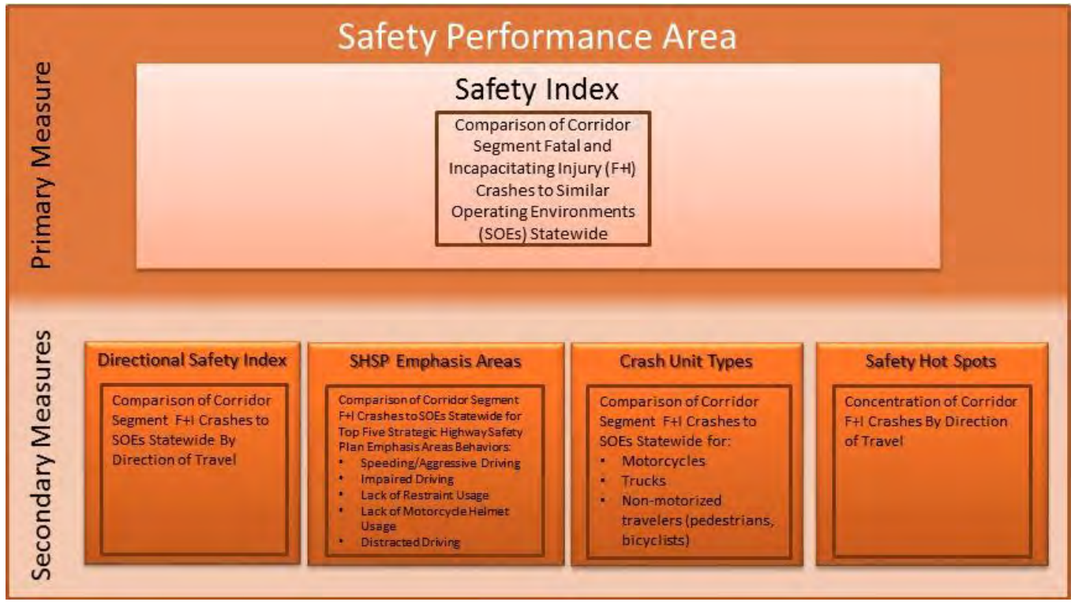
Figure 12: Mobility Performance



2.5 Safety Performance Area

The Safety performance area consists of a primary measure (Safety Index) and four secondary measures, as illustrated in **Figure 13**. All measures relate to crashes that result in fatal and incapacitating injuries, as these types of crashes are the emphasis of the ADOT Strategic Highway Safety Plan (SHSP), FHWA, and MAP-21. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C.**

Figure 13: Safety Performance Measures



Primary Safety Index

The Safety Index is based on the bi-directional frequency and rate of fatal and incapacitating injury crashes, the relative cost of those types of crashes, and crash occurrences on similar roadways in Arizona. According to ADOT's 2010 Highway Safety Improvement Program Manual, fatal crashes have an estimated cost that is 14.5 times the estimated cost of incapacitating injury crashes ($5.8 million compared to $400,000).

Each corridor segment is rated on a scale by comparing the segment score with the average statewide score for similar operating environments. Since crash frequencies and rates vary depending on the operating environment of a particular roadway, statewide values were developed for similar operating environments defined by functional classification, urban vs. rural setting, number of travel lanes, and traffic volumes.

For US 60|US 70|US 191, the following operating environments were identified:

- 2 or 3 Lane Undivided Highway (Segments 1-2; 4; 7-12; 14-16)
- 4 or 5 Lane Undivided Highway (Segments 5-6; 13)
- 2, 3 or 4 Lane Divided Highway (Segments 3; 17)

Secondary Measures

Four secondary measures provide an in-depth evaluation of the different characteristics of safety performance:

Directional Safety Index

- This measure is based on the directional frequency and rate of fatal and incapacitating injury crashes

SHSP Emphasis Areas

ADOT's 2014 SHSP identified several emphasis areas for reducing fatal and incapacitating injury crashes. This measure compared rates of crashes in the top five SHSP emphasis areas to other corridors with a similar operating environment. The top five SHSP emphasis areas related to the following driver behaviors:

- Speeding and aggressive driving
- Impaired driving
- Lack of restraint usage
- Lack of motorcycle helmet usage
- Distracted driving

Crash Unit Types

- The percentage of total fatal and incapacitating injury crashes that involves crash unit types of motorcycles, trucks, or non-motorized travelers is compared to the statewide average on roads with similar operating environments

Safety Hot Spots

- The hot spot analysis identifies abnormally high concentrations of fatal and incapacitating injury crashes along the study corridor by direction of travel

Safety Performance Results

The Safety Index provides a high-level assessment of safety performance for the corridor and for each segment. The four secondary measures provide more detailed information to assess safety performance.

The scale for ratings for all of the Safety performance measures depend on the crash history on similar statewide operating environments. Based on the results of this analysis, the following observations were made:

- Overall, based on the weighted average of the Safety Index, the corridor rates in "average performance" condition
- Five segments have insufficient data to determine the Safety Index.
- Seven of the segments perform above average or average and the remaining are "below average performance" in the Safety Index
- Most of the segments have insufficient data to assess the percent of fatal and incapacitating injury crashes involving SHSP top 5 emphasis area behaviors, however Segments 70-6 and 70|60-13 perform below average.

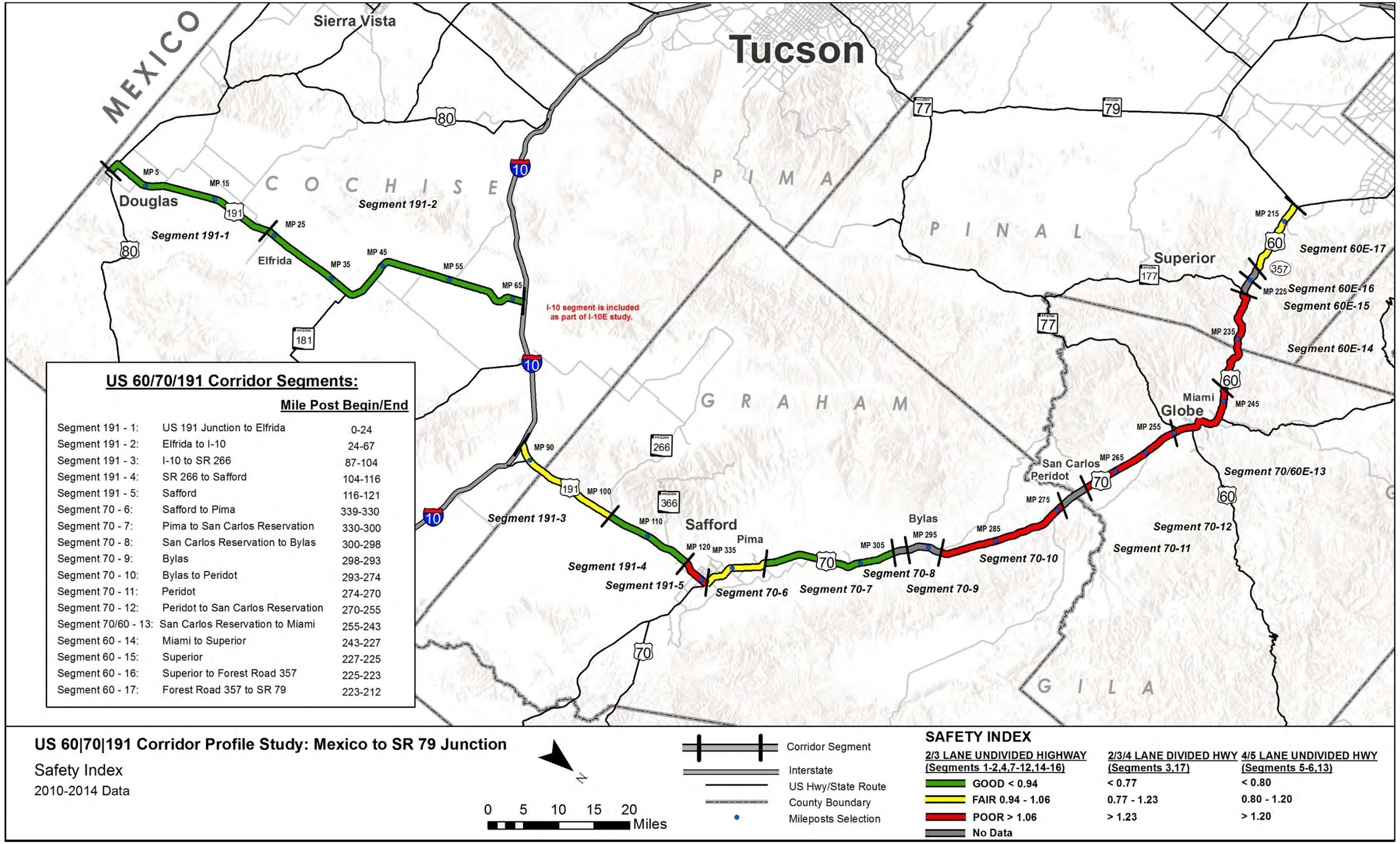
Table 8 summarizes the Safety performance results for the US 60|US 70|US 191 corridor. **Figure 14** illustrates the primary Safety Index performance and locations of Safety hot spots along the US 60|US 70|US 191 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 8: Safety Performance

Segment #	Segment Length (miles)	Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors
			NB/WB	SB/EB	
191 - 1	24	0.44	0.10	0.78	Insufficient Data
191 - 2	43	0.28	0.53	0.03	Insufficient Data
191 - 3	17	1.00	0.00	2.00	Insufficient Data
191 - 4	12	0.03	0.07	0.00	Insufficient Data
191 - 5	5	1.30	1.34	1.25	Insufficient Data
70 - 6	9	0.93	1.68	0.18	73%
70 - 7	19	0.10	0.20	0.00	Insufficient Data
70 - 8	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
70 - 9	5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
70 - 10	19	1.88	1.50	2.25	Insufficient Data
70 - 11	4	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
70 - 12	15	1.67	1.67	1.67	Insufficient Data
70|60 - 13	12	2.09	1.64	2.55	56%
60 - 14	16	3.23	2.23	4.23	55%
60 - 15	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
60 - 16	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
60 - 17	11	0.81	1.28	0.33	42%
Weighted Corridor Average		1.01	0.87	1.15	
SCALE					
Performance Level		**2 or 3 Lane Undivided Highway:** Segments 1-2; 4; 7-12; 14-16 **2, 3 or 4 Lane Divided Highway:** Segments 3; 17 **4 or 5 Lane Undivided Highway:** Segments 5-6; 13			
Above Average		≤ 0.94 ≤ 0.77 ≤ 0.80			< 51.2% < 44.4% < 42.4%
Average		0.94-1.06 0.77-1.23 0.80-1.20			51.2% - 57.5% 44.4% - 54.4% 42.4% - 51.1%
Below Average		≥ 1.06 ≥ 1.23 ≥ 1.20			> 57.5% > 54.4% > 51.1%

Note: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings.

Figure 14: Safety Performance



2.6 Freight Performance Area

The Freight performance area consists of a single primary measure (Freight Index) and five secondary measures, as illustrated in **Figure 15**. All measures related to the reliability of truck travel as measured by observed truck travel time speed and delays to truck travel from freeway closures or physical restrictions to truck travel. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C.**

Figure 15: Freight Performance Measures

Primary Freight Index

The Freight Index is a reliability performance measure based on the PTI for truck travel. The Truck Planning Time Index (TPTI) is the ratio of the 95th percentile truck travel time to the free-flow truck travel time. The TPTI reflects the extra buffer time needed for on-time delivery while accounting for non-recurring delay. Non-recurring delay refers to unexpected or abnormal delay due to closures or restrictions resulting from circumstances such as crashes, inclement weather, and construction activities.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the Freight performance area, the relevant operating environments are interrupted flow (e.g., signalized at-grade intersections are present) and uninterrupted flow (e.g., controlled access grade-separated conditions such as a freeway or interstate highway).

For US 60|US 70|US 191, the following operating environments were identified:

- Urban Interrupted (Segments 5-6; 13)
- Rural Uninterrupted (Segments 3-4; 7-12; 14-17)
- Rural Interrupted (Segments 1-2)

The Freight performance area includes five secondary measures that provide an in-depth evaluation of the different characteristics of freight performance:

Recurring Delay (Directional Truck Travel Time Index (TTTI))

- The ratio of the average peak period truck travel time to the free-flow truck travel time (based on the posted speed limit up to a maximum of 65 miles per hour) in a given direction
- The TTTI recognizes the delay potential from recurring congestion during peak periods; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics

Non-Recurring Delay (Directional TPTI)

- The ratio of the 95th percentile truck travel time to the free-flow truck travel time (based on the posted speed limit up to a maximum of 65 miles per hour) in a given direction
- The TPTI recognizes the delay potential from non-recurring delays such as traffic crashes, weather, or other incidents; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics
- The TPTI indicates the amount of time in addition to the typical travel time that should be allocated to make an on-time trip 95% of the time in a given direction

Closure Duration

- The average time (in minutes) a particular milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel; a weighted average is applied to each closure that takes into account the distance over which the closure occurs

Bridge Vertical Clearance

- The minimum vertical clearance (in feet) over the travel lanes for underpass structures on each segment

Bridge Vertical Clearance Hot Spots

- A Bridge vertical clearance “hot spot” exists where the underpass vertical clearance over the mainline travel lanes is less than 16.25 feet and no exit/entrance ramps exist to allow vehicles to bypass the low clearance location
- If a location with a vertical clearance less than 16.25 feet can be avoided by using immediately adjacent exit/entrance ramps rather than the mainline, it is not considered a hot spot

Freight Performance Results

The Freight Index provides a high-level assessment of freight mobility for the corridor and for each segment. The five secondary measures provide more detailed information to assess freight performance.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the freight performance area, the relevant operating environments included interrupted flow (where signalized at-grade intersections are present) and uninterrupted flow (roads with only controlled access grade-separated conditions such as a freeway or interstate highway).

Based on the results of this analysis, the following observations were made:

- Overall, based on the weighted average of the Freight Index, the freight mobility is in "poor" condition, although nine segments did not have a calculated Freight Index due to lack of data.
- The segments show varied performance in the Freight Index, TTTI and TPTI. The TPTI measures "poor" for the majority of the corridor in both directions of travel.
- A majority of the segments show "good" performance in the closure performance measure
- Segments 70-12, 60-14, 60-15, and 60-16 have the longest duration of closures
- Two locations have vertical clearance restrictions that cannot be by-passed, including one bridge in Segment 70|60-13 and the Queen Creek Tunnel in Segment 60-14

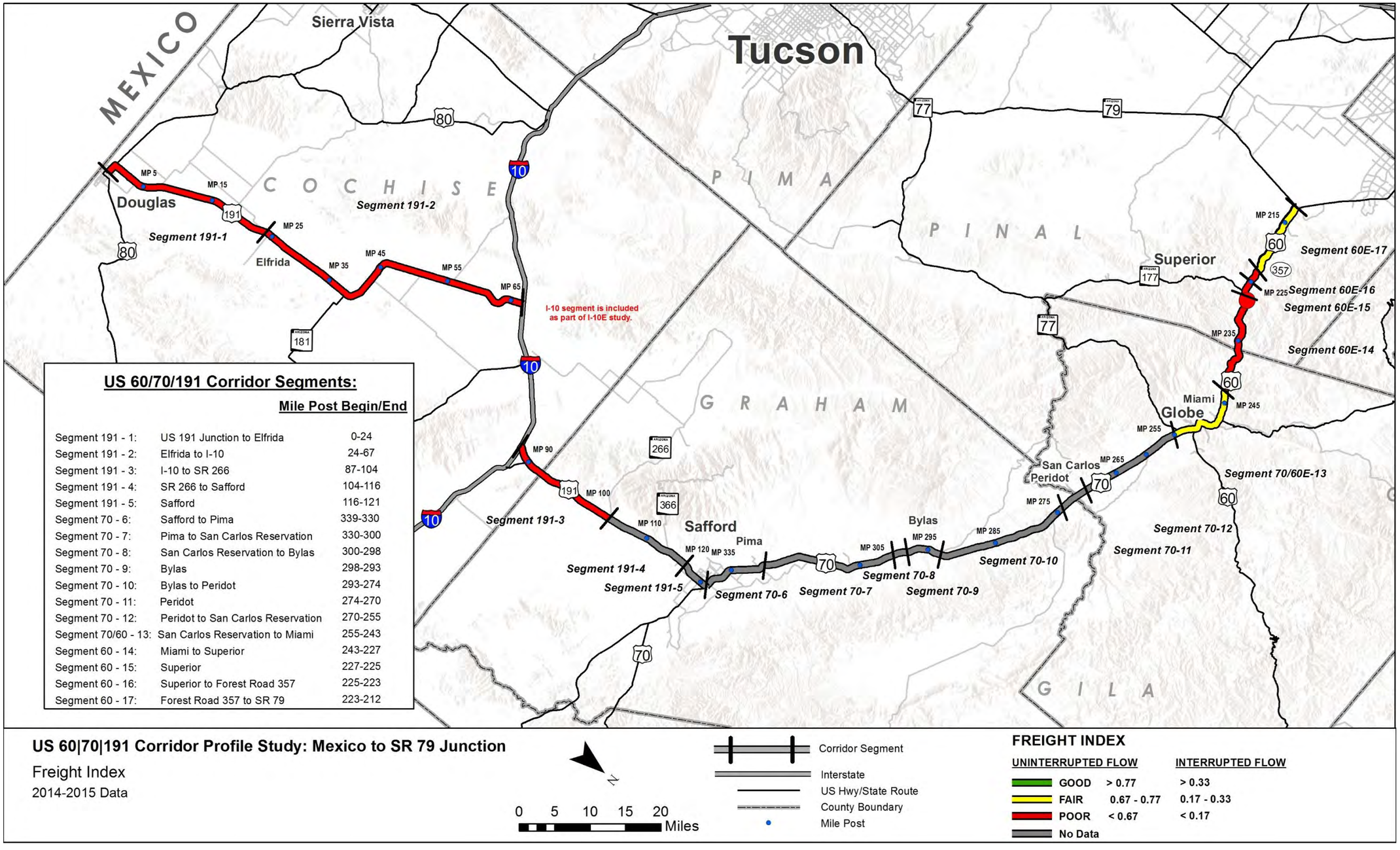
Table 9 summarizes the Freight performance results for the US 60|US 70|US 191 corridor. **Figure 16** illustrates the primary Freight Index performance and locations of freight hot spots along US 60|US 70|US 191. Maps for each secondary measure can be found in **Appendix A.**

Table 9: Freight Performance

Segment #	Segment Length (miles)	Freight Index	Directional Truck TTTI		Directional Truck TPTI		Closure Duration (minutes/milepost/year/mile		Vertical Bridge Clearance (feet)
			NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	
191 - 1	24	0.10	1.94	1.60	9.11	11.62	6.78	0.61	No UP
191 - 2	43	0.09	1.00	1.54	2.68	19.67	2.41	0.70	22.04
191 - 3	17	0.08	1.34	1.82	8.92	17.43	2.94	0.00	No UP
191 - 4	12	N/A	N/A	N/A	N/A	N/A	3.37	4.02	No UP
191 - 5	5	N/A	N/A	N/A	N/A	N/A	26.32	40.04	None
70 - 6	9	N/A	N/A	N/A	N/A	N/A	3.96	16.64	No UP
70 - 7	19	N/A	N/A	N/A	N/A	N/A	2.42	0.00	17.03
70 - 8	2	N/A	N/A	N/A	N/A	N/A	0.00	22.10	No UP
70 - 9	5	N/A	N/A	N/A	N/A	N/A	0.00	15.52	None
70 - 10	19	N/A	N/A	N/A	N/A	N/A	21.73	25.56	No UP
70 - 11	4	N/A	N/A	N/A	N/A	N/A	27.45	0.00	No UP
70 - 12	15	N/A	N/A	1.14	N/A	2.01	7.71	127.15	No UP
70|60 - 13	12	0.19	1.24	1.48	4.29	6.19	0.00	19.07	15.84
60 - 14	16	0.43	1.18	1.60	2.34	2.36	68.54	378.72	13.03
60 - 15	2	0.33	1.13	1.25	1.87	4.23	107.46	249.09	16.79
60 - 16	2	0.49	1.14	1.00	2.98	1.12	108.80	0.00	No UP
60 - 17	11	0.72	1.07	1.14	1.23	1.54	13.65	19.62	No UP
Weighted Corridor Average		0.52					13.31	45.89	

SCALE					
Performance Level	**Uninterrupted:** Segments 3-4; 7-12; 14-17 **Interrupted:** Segments 1-2; 5-6; 13			**All**	
Good	> 0.77 > 0.33	< 1.15 < 1.30	< 1.3 < 3.0	< 44.18	> 16.5
Fair	0.67-0.77 0.17-0.33	1.15-1.33 1.30-2.0	1.3-1.5 3.0-6.0	44.18-124.86	16.0-16.5
Poor	< 0.67 < 0.17	> 1.33 > 2.0	> 1.5 > 6.0	> 124.86	< 16.0

Figure 16: Freight Performance



2.7 Corridor Performance Summary

Based on the results presented in the preceding sections, the following general observations were made related to the performance of the US 60|US 70|US 191 corridor:

- **Overall performance** within all five areas evaluated is split between "good" (41%), "fair" (29%) and "poor" (31%) ratings.
- **Pavement Performance:** All of the 214 miles on the US 60|US 70|US 191 corridor rate as "good" or "fair" for the overall Pavement Index. Due to the significant areas of roughness and pavement cracking, 3 of the 9 segments rate poorly for percentage of area in failure.
- **Bridge Performance:** A total of 48 bridges were included in the evaluation. Four bridges on US 60 are considered structurally deficient, including Queen Creek Bridge (MP 227.71, No. 406), Waterfall Canyon Bridge (MP 229.50, No. 328), Pinto Creek Bridge (MP 238.25, No. 351), and Pinal Creek Bridge (MP 249.64, No. 266).
- **Mobility Performance:** US 60|US 70|US 191 corridor is considered to have two operating environments for evaluating Mobility. These include Urban/Fringe Urban Highway and Rural Highway. Both the current and future capacity is considered "good" with the exception of Segments 60-14 and 60-15, the area between Miami and Superior, which has mountainous terrain.
- **Safety Performance:** Safety performance utilizes the three operating environments for analysis that compare fatal and incapacitating injury crashes to other similar routes statewide. The US 60|US 70|US 191 corridor is mixed between "good" and "poor" ratings. Higher than average fatal crashes occurred on Segments 70-9 and 70-12 through 70-14, with an additional five segments having insufficient crash data.
- **Freight Performance:** The performance of freight mobility is overall "poor" within the US 60|US 70|US 191 corridor. This is primarily due to the high PTI. Traffic counters do not exist in 9 of the 17 segments, which does not allow for the performance to be measured for TTI and PTI for much of the corridor.
- **Poorest Performing Segment:** Segment 60-14 rated lower in performance than the other segments in the corridor. Bridge, Safety and Freight Indices all rated as "poor" performance. Pavement and Mobility Indices measured as "fair".
- **Highest Performing Segments:** Segments 191-4, 70-7, 70-8 and 60-17 do not have any "poor" performance areas. Segment 70-8, in the Bylas area on the San Carlos Apache Reservation, rated the best performance though this segment is only 2 miles in length.

Figure 17 shows the percentage of the US 60|US 70|US 191 corridor that rates either "good/above average performance", "fair/average performance", or "poor/below average performance" in each Index.

Table 10 shows a summary of all primary and secondary performance measures for the US 60|US 70|US 191 corridor. A weighted average rating (based on the length of the segment) was calculated for each primary and secondary measure – this is shown in the last row of **Table 10**. The weighted average ratings are summarized in **Figure 18** which also provides a brief description of each performance measure. **Figure 18** represents the average for the entire corridor, and any given segment or location could have a higher or lower rating than the corridor average.

Figure 17: Performance Summary by Primary Measure

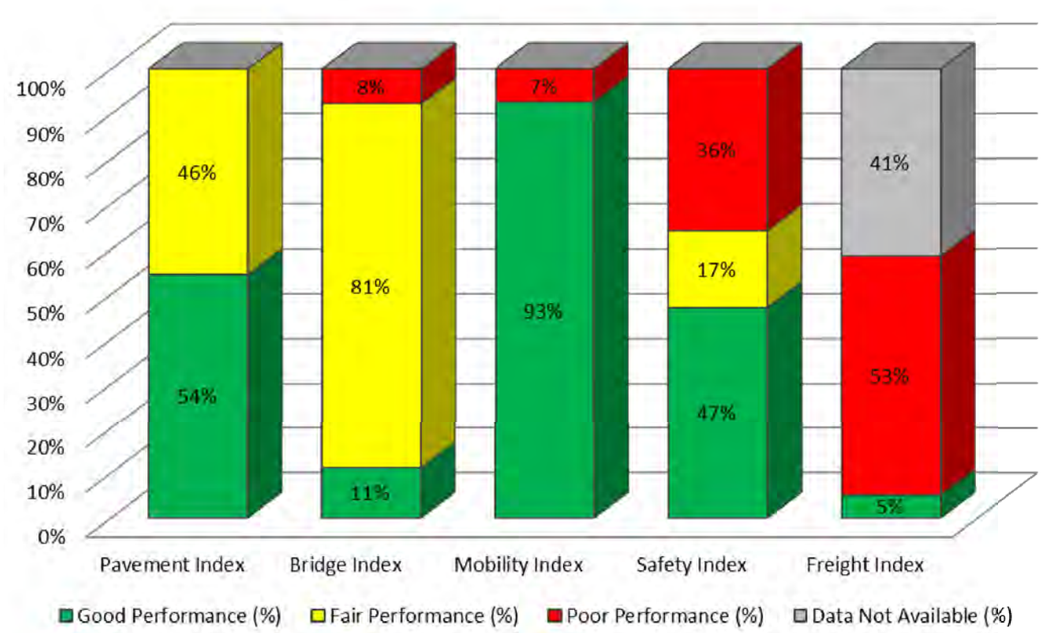


Figure 18: Corridor Performance Summary by Performance Measure

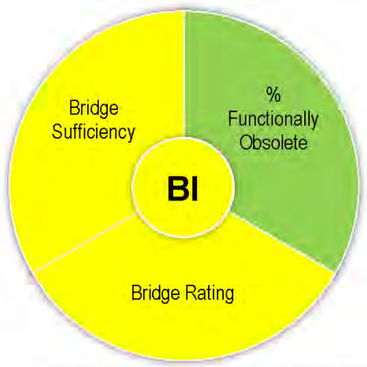
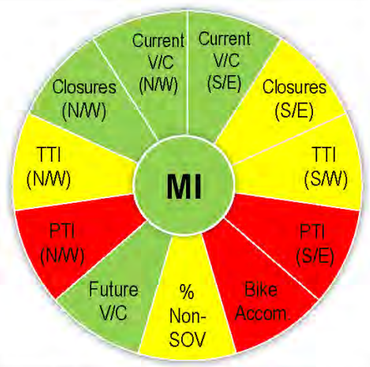
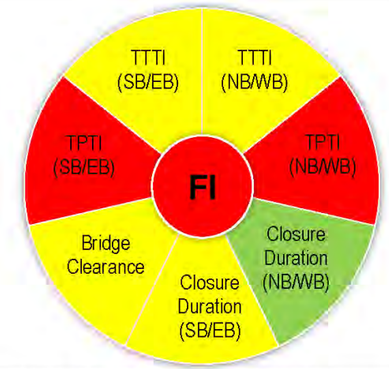
Pavement	Bridge	Mobility	Safety	Freight
				
Pavement Index (PI): based on two pavement condition ratings from the ADOT Pavement Database; the two ratings are the International Roughness Index (IRI) and the Cracking Rating.	**Bridge Index (BI):** based on four bridge condition ratings from the ADOT Bridge Database. The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating.	**Mobility Index (MI):** an average of the existing daily volume-to-capacity (V/C) ratio and the projected 2035 daily V/C ratio	**Safety Index (SI):** combines the bi-directional frequency and rate of fatal and incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona	**Freight Index (FI):** a reliability performance measure based on the bi-directional planning time index for truck travel.
➢ **Directional Pavement Serviceability Rating (PSR)** – the weighted average (based on number of lanes) of the PSR for the pavement in each direction of travel ➢ **% Area Failure** – the percentage of pavement area rated above failure thresholds for IRI or Cracking	➢ **Sufficiency Rating**– multipart rating includes structural adequacy and safety factors as well as functional aspects such as traffic volume and length of detour ➢ **% of Deck Area on Functionally Obsolete Bridges**– the percentage of deck area in a segment that is on functionally obsolete bridges; identifies bridges that no longer meet standards for current traffic volumes, lane width, shoulder width, or bridge rails; a bridge that is functionally obsolete may still be structurally sound ➢ **Lowest Bridge Rating** –the lowest rating of the four bridge condition ratings on each segment	➢ **Future Daily V/C** – the future 2035 V/C ratio provides a measure of future congestion if no capacity improvements are made to the corridor ➢ **Existing Peak Hour V/C** – the existing peak hour V/C ratio for each direction of travel provides a measure of existing peak hour congestion during typical weekdays ➢ **Closure Extent** – the average number of instances a particular milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel ➢ **Directional Travel Time Index (TTI)** – the ratio of the average peak period travel time to the free-flow travel time; the TTI represents recurring delay along the corridor ➢ **Directional Planning Time Index (PTI)** – the ratio of the 95th percentile travel time to the free-flow travel time; the PTI represents non-recurring delay along the corridor ➢ **% Bicycle Accommodation** – the percentage of a segment that accommodates bicycle travel ➢ **% Non-single Occupancy Vehicle (Non-SOV) Trips** – the percentage of trips that are taken by vehicles carrying more than one occupant	➢ **Directional Safety Index** – the combination of the directional frequency and rate of fatal and incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona ➢ **% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors** – the percentage of fatal and incapacitating crashes that involve at least one of the five Strategic Highway Safety Plan (SHSP) emphasis areas on a given segment compared to the statewide average percentage on roads with similar operating environments ➢ **% of Fatal + Incapacitating Crashes Involving SHSP Crash Unit Types** – the percentage of total fatal and incapacitating injury crashes that involves a given crash unit type (motorcycle, truck, non-motorized traveler) compared to the statewide average percentage on roads with similar operating environments.	➢ **Directional Truck Travel Time Index (TTTI)** – the ratio of the average peak period truck travel time to the free-flow truck travel time; the TTTI represents recurring delay along the corridor ➢ **Directional Truck Planning Time Index (TPTI)** – the ratio the 95th percentile truck travel time to the free-flow truck travel time; the TPTI represents non-recurring delay along the corridor ➢ **Closure Duration** – the average time a particular milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel ➢ **Bridge Vertical Clearance** – the minimum vertical clearance over the travel lanes for underpass structures on each segment

Table 10: Corridor Performance Summary by Segment and Performance Measure

Segment #	Segment Length (miles)	Pavement Performance Area				Bridge Performance Area				Mobility Performance Area											
		Pavement Index	Directional PSR		% Area Failure	Bridge Index	Sufficiency Rating	% of Deck Area on Functionally Obsolete Bridges	Lowest Bridge Rating	Mobility Index	Future Daily V/C	Existing Hour V/C		Closure Extent (instances/milepost/ year/mile)		Directional TTI (all vehicles)		Directional PTI (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
			NB/ WB	SB/ EB								NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB		
191-1[2*]	24	3.64	3.37	3.37	0%	6.00	89.00	0%	6	0.15	0.17	0.12	0.12	0.03	0.01	1.51	1.30	4.79	7.47	66%	12.5%
191-2[2*]	43	3.06	3.31	3.31	30%	5.37	76.93	0%	5	0.09	0.10	0.07	0.07	0.02	0.00	1.16	1.16	9.83	6.09	100%	16.0%
191-3[2^]	17	3.93	3.94	4.02	3%	6.02	93.91	0%	5	0.04	0.04	0.03	0.03	0.01	0.00	1.39	1.20	9.51	11.62	49%	9.8%
191-4[2^]	12	3.28	3.28	3.28	17%	6.00	69.50	0%	6	0.18	0.20	0.14	0.14	0.03	0.03	No Data				96%	9.3%
191-5[1*]	5	3.28	3.28	3.28	20%	No Bridges				0.33	0.39	0.27	0.28	0.12	0.08	No Data				27%	22.5%
70-6[1*]	9	3.70	3.44	3.44	10%	6.00	69.10	0%	6	0.53	0.69	0.32	0.32	0.02	0.06	No Data				46%	19.0%
70-7[2^]	19	3.43	3.35	3.35	5%	5.77	71.59	0%	5	0.18	0.21	0.13	0.13	0.02	0.00	No Data				73%	16.8%
70-8[2^]	2	3.87	3.78	3.78	0%	6.00	74.00	0%	6	0.12	0.15	0.08	0.08	0.00	0.10	No Data				0%	13.8%
70-9[2^]	5	3.81	3.80	3.80	0%	No Bridges				0.25	0.29	0.16	0.17	0.00	0.04	No Data				26%	12.2%
70-10[2^]	19	3.87	3.55	3.55	5%	7.00	80.00	0%	7	0.17	0.19	0.11	0.11	0.09	0.04	No Data				4%	8.9%
70-11[2^]	4	3.88	3.55	3.55	0%	7.54	82.03	0%	5	0.21	0.26	0.12	0.12	0.10	0.00	No Data				4%	13.7%
70-12[2^]	15	3.97	3.83	3.83	0%	6.00	63.20	0%	6	0.19	0.23	0.13	0.13	0.04	0.31	No Data	1.10	No Data	1.40	23%	12.1%
70|60-13[1*]	12	3.65	3.43	3.34	19%	5.17	78.89	49%	4	0.40	0.46	0.29	0.30	0.00	0.12	1.15	1.31	2.72	3.36	54%	17.0%
60-14[2^]	16	3.43	3.24	3.24	31%	4.56	18.49	0%	4	1.73	2.11	1.22	1.09	0.33	1.57	1.07	1.19	1.47	2.06	49%	15.0%
60-15[2^]	2	3.21	2.92	2.92	50%	6.00	83.70	57%	6	2.76	3.83	1.28	1.30	0.36	1.17	1.08	1.17	1.67	2.30	95%	13.0%
60-16[2^]	2	3.32	3.38	3.38	0%	5.00	86.66	0%	5	0.54	0.71	0.28	0.28	0.50	0.00	1.09	1.00	1.91	1.04	87%	9.0%
60-17[2^]	11	4.30	4.14	4.02	0%	6.42	91.11	0%	5	0.20	0.26	0.11	0.10	0.09	0.05	1.01	1.01	1.16	1.24	96%	10.0%
Weighted Corridor Average		3.57	3.49	3.49	13%	5.56	72.20	3%	5	0.32	0.39	0.22	0.21	0.06	0.17					61%	14%

SCALE												
Performance Level	Non-Interstate		All				Urban [1] Rural [2]	All	Uninterrupted ^ Interrupted *			All
Good / Above Average	> 3.50	< 5%	> 6.5	> 80	< 12%	> 6	≤ 0.71 (Urban) ≤ 0.56 (Rural)	< 0.22	≤ 1.15 ≤ 1.3	≤ 1.3 ≤ 3.0	> 90%	> 17%
Fair / Average	2.9 - 3.5	5%- 20%	5.0 - 6.5	50 - 80	12% - 40%	5 - 6	0.71 - 0.89 (Urban) 0.56 - 0.76 (Rural)	0.22 - 0.62	1.15 - 1.33 ≤ 1.3	1.3 - 1.5 3.0 - 6.0	90% - 60%	17% - 11%
Poor / Average	< 2.90	> 20%	< 5.0	< 50	> 40%	< 5	> 0.89 (Urban) > 0.76 (Rural)	≥ 0.62	≥ 1.33 ≥ 2.0	≥ 1.5 ≥ 6.0	< 60%	< 11%

[1] Urban or Fringe Urban Operating Environment
[2] Rural Operating Environment
^ Uninterrupted
* Interrupted

Table 10: Corridor Performance Summary by Segment and Performance Measure (continued)

Segment #	Segment Length (miles)	Safety Performance Area							Freight Performance Area							
		Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Segment Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Freight Index	Directional TTTI (trucks only)		Directional TPTI (trucks only)		Closure Duration (mins/milepost/closed/year/mile)		Bridge Vertical Clearance (feet)
			NB/WB	SB/EB						NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	
191-1[a*]	24	0.44	0.10	0.78	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.10	1.94	1.60	9.11	11.62	6.78	0.61	No UP
191-2[a*]	43	0.28	0.53	0.03	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.09	1.00	1.54	2.68	19.67	2.41	0.70	22.04
191-3[b^]	17	1.00	0.00	2.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.08	1.34	1.82	8.92	17.43	2.94	0.00	No UP
191-4[a^]	12	0.03	0.07	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					3.37	4.02	No UP
191-5[c*]	5	1.30	1.34	1.25	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					26.32	40.04	No UP
70-6[c*]	9	0.93	1.68	0.18	73%	Insufficient Data	Insufficient Data	Insufficient Data	No Data					3.96	16.64	No UP
70-7[a^]	19	0.10	0.20	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					2.42	0.00	17.03
70-8[a^]	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					0.00	22.10	No UP
70-9[a^]	5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					0.00	15.52	No UP
70-10[a^]	19	1.88	1.50	2.25	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					21.73	25.56	No UP
70-11[a^]	4	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data					27.45	0.00	No UP
70-12[a^]	15	1.67	1.67	1.67	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	No Data		1.14	No Data	2.01	7.71	127.15	No UP
70|60-13[c*]	12	2.09	1.64	2.55	57%	Insufficient Data	Insufficient Data	Insufficient Data	0.19	1.24	1.46	4.29	6.19	0.00	19.07	15.84
60-14[a^]	16	3.23	2.23	4.23	55%	Insufficient Data	Insufficient Data	Insufficient Data	0.43	1.18	1.60	2.34	2.36	68.54	378.72	13.03
60-15[a^]	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.33	1.13	1.25	1.87	4.23	107.46	249.09	16.79
60-16[a^]	2	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.49	1.14	1.00	2.98	1.12	108.80	0.00	No UP
60-17[b^]	11	0.81	1.28	0.33	42%	Insufficient Data	Insufficient Data	Insufficient Data	0.72	1.07	1.14	1.23	1.54	13.65	19.62	No UP
Weighted Corridor Averages		1.01	0.87	1.15					0.52					13.31	45.89	

SCALE										
Performance Level		2 or 3 Lane Undivided Highway 2, 3 or 4 Lane Divided Highway 4 or 5 Lane Undivided Highway					Uninterrupted Interrupted			All	
Good/Above Average	a b c	≤ 0.94 ≤ 0.77 ≤ 0.80	< 51.2% < 44.4% < 42.4%	< 5.2% < 3.5% < 6.1%	< 18.5% < 16.3% < 6.4%	< 2.2% < 2.4% < 4.7%	> 0.77 > 0.33	<1.15 < 1.30	< 1.3 ≤ 3.0	< 44.18	> 16.5
Fair/Average	a b c	0.94-1.06 0.77-1.23 0.80-1.20	51.2% - 57.5% 44.4% - 54.4% 42.4% - 51.1%	5.2% - 7.1% 3.5% - 7.3% 6.1% - 9.6%	18.5% - 26.5% 16.3% - 26.3% 6.4% - 9.4%	2.2%-4.2% 2.4%-4.5% 4.7%-7.9%	0.67-0.77 0.17-0.33	1.15-1.33 1.30-2.0	1.3-1.5 3.0-6.0	44.18-124.86	16.0-16.5
Poor/Below Average	a b c	≥ 1.06 ≥ 1.23 ≥ 1.20	> 57.5% > 54.4% > 51.1%	> 7.1% >7.3% > 9.6%	> 26.5% > 26.3% > 9.4%	> 4.2% > 4.5% > 7.9%	< 0.67 <0.17	>1.33 > 2.0	> 1.5 > 6.0	> 124.86	<16.0

[a] 2 or 3 Lane Undivided
[b] 2,3 or 4 Lane Divided
[c] 4 or 5 Lane Undivided
^ Uninterrupted
* Interrupted

Note: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings
"No UP" indicates no underpasses are present in the segment

3.0 NEEDS ASSESSMENT

3.1 Corridor Objectives

Statewide goals and performance measures were established by the ADOT Long-Range Transportation Plan (LRTP), 2010-2035. Statewide performance goals that are relevant to US 60|US 70|US 191 performance areas were identified and corridor goals were then formulated for each of the five performance areas that aligned with the overall statewide goals established by the LRTP. Based on stakeholder input, corridor goals, corridor objectives, and performance results, three “emphasis areas” were identified for the US 60|US 70|US 191 corridor: Mobility, Safety, and Freight.

Taking into account the corridor goals and identified emphasis areas, performance objectives were developed for each quantifiable performance measure that identify the desired level of performance based on the performance scale levels for the overall corridor and for each segment of the corridor. For the performance emphasis areas, the corridor-wide weighted average performance objectives are identified with a higher standard than for the other performance areas. **Table 11** shows the US 60|US 70|US 191 corridor goals, corridor objectives, and performance objectives, and how they align with the statewide goals.

It is not reasonable within a financially constrained environment to expect that every performance measure will always be at the highest levels on every corridor segment. Therefore, individual corridor segment objectives have been set as fair or better and should not fall below that standard.

Achieving corridor and segment performance objectives will help ensure that investments are targeted toward improvements that support the safe and efficient movement of travelers on the corridor. Addressing current and future congestion, thereby improving mobility on congested segments, will also help the corridor fulfill its potential as a significant contributor to the region’s economy.

Corridor performance is measured against corridor and segment objectives to determine needs – the gap between observed performance and performance objectives.

Goal achievement will improve or reduce current and future congestion, increase travel time reliability, and reduce fatalities and incapacitating injuries resulting from vehicle crashes. Where performance is currently rated “good”, the goal is always to maintain that standard, regardless of whether or not the performance is in an emphasis area.

Table 11: Corridor Performance Goals and Objectives

ADOT Statewide LRTP Goals	US 60|US 70|US 191 Corridor Goals	US 60|US 70|US 191 Corridor Objectives	Performance Area	Primary Index / Secondary Measure Indicators	Performance Objective: Corridor Average	Performance Objective: Segment
Improve Mobility and Accessibility **Support Economic Growth**	Provide a safe, reliable, and efficient connection for the communities along the corridor Provide a safe and reliable route for recreational and tourist travel Consider future land use when recommending infrastructure improvements since agricultural activities are transitioning to development activities	Reduce current and future congestion in the urbanized areas Reduce delays from non-recurring events and incidents to improve reliability Improve bicycle accommodation	Mobility (Emphasis Area)	**Mobility Index** Future Daily V/C Existing Peak Hour V/C Closure Extent Directional Travel Time Index Directional Planning Time Index % Bicycle Accommodation % Non-SOV Trips	Good	Fair or Better
	Provide a safe, reliable and efficient freight route between Arizona and Mexico	Reduce delays and restrictions to freight movement to improve reliability Improve travel time reliability (including impacts to motorists due to freight traffic)	Freight (Emphasis Area)	**Freight Index** Directional Truck Travel Time Index Directional Truck Planning Time Index Closure Duration Bridge Vertical Clearance	Good	Fair or Better
Preserve and Maintain the State Transportation System	Preserve and modernize highway infrastructure Provide an all-weather transportation facility	Maintain structural integrity of bridges	Bridge	**Bridge Index** Sufficiency Rating % of Deck Area on Functionally Obsolete Bridges Lowest Bridge Rating	Fair or Better	Fair or Better
		Improve pavement ride quality	Pavement	**Pavement Index** Directional Pavement Serviceability Rating % Area Failure	Fair or Better	Fair or Better
Enhance Safety and Security	Promote safety by implementing appropriate countermeasures, particularly in mountainous and rolling terrain	Reduce fatal and serious injury crashes	Safety (Emphasis Area)	**Safety Index** Directional Safety Index % of Crashes Involving SHSP Top 5 Emphasis Areas Behaviors % of Crashes Involving Crash Unit Types	Above Average	Average or Better

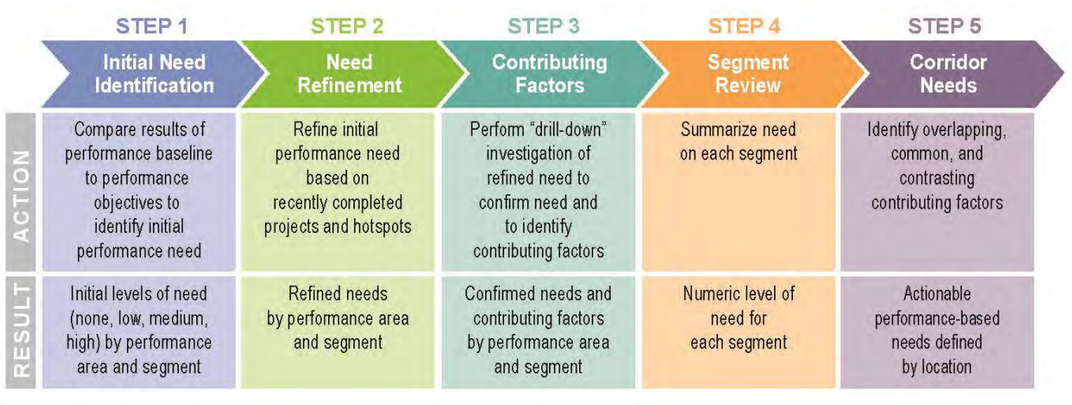
3.2 Needs Assessment Process

The following guiding principles were used as an initial step in developing a framework for the performance-based needs assessment process:

- Corridor needs are defined as the difference between the corridor performance and the performance objectives
- The needs assessment process should be systematic, progressive, and repeatable, but also allow for engineering judgment where needed
- The process should consider all primary and secondary performance measures developed for the study
- The process should develop multiple need levels including programmatic needs for the entire length of the corridor, performance area-specific needs, segment-specific needs, and location-specific needs (defined by MP limits)
- The process should produce actionable needs that can be addressed through strategic investments in corridor preservation, modernization, and expansion

The performance-based needs assessment process is illustrated in **Figure 19** and described in the following sections.

Figure 19: Needs Assessment Process



Step 1: Initial Needs Identification

The first step in the needs assessment process links baseline (existing) corridor performance with performance objectives. In this step, the baseline corridor performance is compared to the performance objectives to provide a starting point for the identification of performance needs. This mathematical comparison results in an initial need rating of None, Low, Medium, or High for each primary and secondary performance measure. An illustrative example of this process is shown below in **Figure 20**.

Figure 20: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)

Performance Thresholds	Performance Level	Initial Level of Need*	Description
6.5	Good	None	All levels of Good and top 1/3 of Fair (>6.0)
	Good		
	Good		
	Fair		
	Fair	Low	Middle 1/3 of Fair (5.5-6.0)
5.0	Fair	Medium	Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5)
	Poor		
	Poor	High	Lower 2/3 of Poor (<4.5)
	Poor		

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

The initial level of need for each segment is refined to account for hot spots and recently completed or under construction projects, resulting in a final level of need for each segment. The final levels of need for each primary and secondary performance measure are combined to produce a weighted final need rating for each segment. Values of 0, 1, 2, and 3 are assigned to the initial need levels of None, Low, Medium, and High, respectively. A weight of 1.0 is applied to the Performance Index need and equal weights of 0.20 are applied to each need for each secondary performance measure. For directional secondary performance measures, each direction of travel receives a weight of 0.10.

Step 2: Need Refinement

In Step 2, the initial level of need for each segment is refined using the following information and engineering judgment:

- For segments with an initial need of None that contain hot spots, the level of need should be increased from None to Low
- For segments with an initial level of need where recently completed projects or projects under construction are anticipated to partially or fully address the identified need, the level of need should be reduced or eliminated as appropriate
- Programmed projects that are expected to partially or fully address an identified need are not justification to lower the initial need because the programmed projects may not be implemented as planned; in addition, further investigations may suggest that changes in the scope of a programmed project may be warranted

The resulting final needs are carried forward for further evaluation in Step 3.

Step 3: Contributing Factors

In Step 3, a more detailed review of the condition and performance data available from ADOT is conducted to identify contributing factors to the need. Typically, the same databases used to develop the baseline performance serve as the principal sources for the more detailed analysis. However, other supplemental databases may also be useful sources of information. The databases used for diagnostic analysis are listed below:

Pavement Performance Area

- Pavement Rating Database

Bridge Performance Area

- ABISS

Mobility Performance Area

- Highway Performance Monitoring System (HPMS) Database
- AZTDM
- Real-time traffic conditions data produced by American Digital Cartography Inc. (HERE) Database
- Highway Conditions Reporting System (HCRS) Database

Safety Performance Area

- Crash Database

Freight Performance Area

- HERE Database
- HCRS Database

In addition, other sources considered helpful in identifying contributing factors are:

- Maintenance history (from ADOT PeCoS database for pavement), the level of past investments, or trends in historical data that provide context for pavement and bridge history
- Field observations from ADOT district personnel can be used to provide additional information regarding a need that has been identified
- Previous studies can provide additional information regarding a need that has been identified

Step 3 results in the identification of performance-based needs and contributing factors by segment (and MP locations, if appropriate) that can be addressed through investments in preservation, modernization, and expansion projects to improve corridor performance. See **Appendix D** for more information.

Step 4: Segment Review

In this step, the needs identified in Step 2 and refined in Step 3 are quantified for each segment to numerically estimate the level of need for each segment. Values of 0 to 3 are assigned to the final need levels (from Step 3) of None, Low, Medium, and High, respectively. A weighting factor is applied to the performance areas identified as emphasis areas and a weighted average need is calculated for each segment. The resulting average need score can be used to compare levels of need between segments within a corridor and between segments in different corridors.

Step 5: Corridor Needs

In this step, the needs and contributing factors for each performance area are reviewed on a segment-by-segment basis to identify actionable needs and to facilitate the formation of solution sets that address multiple performance areas and contributing factors. The intent of this process is to identify overlapping, common, and contrasting needs to help develop strategic solutions. This step results in the identification of corridor needs by specific location.

3.3 Corridor Needs Assessment

This section documents the results of the needs assessment process described in the prior section. The needs in each performance area were classified as either None, Low, Medium, or High based on how well each segment performed in the existing performance analysis. The needs for each segment were numerically combined to estimate the average level of need for each segment of the corridor

The final needs assessments for each performance measure, along with the scales used in analysis, are shown in **Table 12** through **Table 16**.

Pavement Needs Refinement and Contributing Factors

Of the 214 corridor miles, approximately 119 miles (55%) exhibit a "Low" level of pavement need and 17 miles (17%) exhibit "Medium" level of pavement need. Pavement hot spot failure needs were identified for 17 miles on US 191, 3 miles on US 70, and 3 miles on US 60.

Key contributing factors are summarized below:

- A high level of historical investment has occurred on Segments 70-9 and 70-10 through the San Carlos Indian Reservation and a medium level of historical investment has occurred through the remaining corridor segments, excluding Segment 191-1.
- See other contributing factors in **Appendix D**.

Table 12: Final Pavement Needs

Segment #	Performance Score and Level of Need				Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Pavement Index	Directional PSR		% Pavement Area Failure				
		NB/WB	SB/EB					
191-1	3.64	3.37	3.37	0.00%	None	None	None	None
191-2	3.06	3.31	3.31	30.23%	2.6	NB MP 24-27, NB MP 38-41, NB MP 45-46, NB MP 48-51, NB MP 62-64, NB MP 66-67	MP 25.54-37.97 (H8652): Double chip seal coat and replace pavement markings MP 37.97-45.80 (H8124): Mill existing pavement and replace with AC and new AR-ACFC MP 61.50-66.60 (H7883): Pavement rehabilitation including milling, replacement and AC overlay, applications of chip seal and paving turnouts	Low
191-3	3.93	3.94	4.02	2.94%	None	SB MP 87-88	MP 100.59-104.00 (H8185): Overlay the existing pavement with AC and AR-ACFC	Low
191-4	3.28	3.28	3.28	16.67%	1.6	NB MP 105-107	MP 104.00-104.52 (H8185): Overlay the existing pavement with AC and AR-ACFC	Medium
191-5	3.28	3.28	3.28	20.00%	1.6	NB MP 120-121	None	Medium
70-6	3.70	3.44	3.44	10.00%	None	WB MP 336-337	None	Low
70-7	3.43	3.35	3.35	5.26%	None	WB MP 300-301	None	Low
70-8	3.87	3.78	3.78	0.00%	None	None	None	None
70-9	3.81	3.80	3.80	0.00%	None	None	None	None

Table 12: Final Pavement Needs (continued)

Segment #	Performance Score and Level of Need				Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Pavement Index	Directional PSR		% Pavement Area Failure				
		EB	WB					
70-10	3.87	3.55	3.55	5.26%	None	WB MP 283-284	MP 275.0-279.5 (H8185): Milling and replace with AC and new AR-ACFC plus Fog Coat of shoulders MP 291.81- 293.74 (H6910): Remove the existing 23-span steel girder bridge and replace it with a 15-span precast prestressed concrete AASHTO Type VI girder bridge. The project includes roadway approach widening.	Low
70-11	3.88	3.55	3.55	0.00%	None	None	None	None
70-12	3.97	3.83	3.83	0.00%	None	None	None	None
70|60-13	3.65	3.43	3.34	18.52%	0.4	EB MP 247-248, EB MP 249-251	None	Low
60-14	3.43	3.24	3.24	31.25%	0.8	None	MP 229.48-241.93 (H5818): Construct climbing and passing lanes	None
60-15	3.21	2.92	2.92	50.00%	2.0	WB MP 226-227	MP 225-226.87 (H7900): Reconstruct existing 2-lane undivided roadway into a 4-lane divided highway and reconstruct the existing 3-lane roadway into a 4-lane roadway with a raised median	None
60-16	3.32	3.38	3.38	0.00%	None	None	MP 223-225 (H7900): Reconstruct existing 2-lane undivided roadway into a 4-lane divided highway and reconstruct the existing 3-lane roadway into a 4-lane roadway with a raised median	None
60-17	4.30	4.14	4.02	0.00%	None	None	MP 221.72-223 (H7900): Reconstruct existing 2-lane undivided roadway into a 4-lane divided highway and reconstruct the existing 3-lane roadway into a 4-lane roadway with a raised median	None

Level of Need* (Score)	Performance Score Need Scale		Segment Level Need Scale
None* (0)	> 3.57	< 10%	0
Low (1)	3.38 – 3.57	10% - 15%	< 1.5
Medium (2)	3.02 – 3.38	15% - 25%	1.5 – 2.5
High (3)	< 3.02	> 25%	> 2.5

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Bridge Needs Refinement and Contributing Factors

Bridge needs were identified on three segments of the corridor, 43 miles (20%) with a "Medium" level of bridge need and 28 miles (13%) with a "High" level of bridge need. These included all bridges that were documented having a bridge rating of 5 or less in deck, substructure, superstructure, or overall structural evaluation. One project is currently programmed related to bridge structural improvement on the US 60|US 70|US 191 corridor (Queen Creek Bridge (No. 406)).

Key contributing factors are summarized as follows:

- None of the initial needs required adjustment since no recent bridge work has occurred within the corridor that would change the bridge conditions.
- Nine bridges were defined as hot spots since they had multiple bridge ratings of 5 or less. Three bridges have bridge ratings of 4: Pinal Creek Bridge (No. 266), Waterfall Canyon Bridge (No. 328), and Queen Creek Bridge (No. 406).
- Of the nine hot spot bridges, five also showed repetitive investment issues. These included the Pinal Creek Bridge (No. 36), Pinal Creek Bridge (No. 266), Pinto Creek Bridge (No. 351), Waterfall Canyon Bridge (No. 328), and Queen Creek Bridge (No. 406).
- See other contributing factors in **Appendix D**.

Table 13: Final Bridge Needs

Segment #	Performance Score and Level of Need				Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Bridge Index	Sufficiency Rating	Functionally Obsolete Bridges	Bridge Rating				
191-1	6.00	89.0	0.0%	6	None	None	None	None
191-2	5.37	76.9	0.0%	5	2.2	None	MP 37.97-45.80 (H8124): Bridge deck repairs MP 61.50-66.60 (H7883): Bridge railing replacement	Medium
191-3	6.02	93.9	0.0%	5	0.2	None	None	Low
191-4	6.00	69.5	0.0%	6	0.2	None	None	Low
191-5	No Bridges within Segment				None	None	None	None
70-6	6.00	69.1	0.0%	6	0.2	None	None	Low
70-7	5.77	71.6	0.0%	5	1.2	Holyoak Wash Bridge MP 302.53 (#514)	MP 326.25 (H8547): Matthewsville Wash Bridge #394 scour repair project MP 304.85 (H8547): Fine Wash Bridge #515 scour repair project MP 302.53 (H8547): Holyoak Wash Bridge #514 scour repair project	Low
70-8	6.00	74.0	0.0%	6	None	None	MP 299.51 (H8547): Bridge #513 scour repair project	None
70-9	No Bridges within Segment				None	None	None	None
70-10	7.00	80.0	0.0%	7	None	None	None	None
70-11	7.54	82.0	0.0%	5	0.2	None	None	Low
70-12	6.00	63.2	0.0%	6	0.2	None	MP 259 (H8359): Constructing concrete floors underneath the Gilson Wash Bridge (#464)	Low
70|60-13	5.17	78.9	49.4%	4	2.7	Pinal Creek Bridge MP 250.37 (#549),Pinal Creek Bridge MP 249.80 (#36),Pinal Creek Bridge MP 249.64 (#266),Bloody Tanks Bridge MP 243.71 (#173)	None	High

Table 13: Final Bridge Needs (continued)

Segment #	Performance Score and Level of Need				Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Bridge Index	Sufficiency Rating	Functionally Obsolete Bridges	Bridge Rating				
60-14	4.56	36.0	0.0%	4	3.0	Pinto Creek Bridge MP 238.25 (#351), Waterfall Canyon Bridge MP 229.50 (#328), Queen Creek Bridge MP 227.71 (#406) Queen Creek Tunnel MP 228.47 (#407)	MP 229.48-241.93(H5818): Bridge repair (scour protection and column repair for Waterfall Canyon Bridge #328)	High
60-15	6.00	83.7	57.5%	6	0.3	None	MP 225.00-226.87 (H7900): New 4-lane rural divided and new 4-lane urban divided; Structure rehabilitation/ replacement	Low
60-16	5.00	86.7	0.0%	5	2.2	None	MP 223-225 (H7900): New 4-lane rural divided and new 4-lane urban divided; Structure rehabilitation/ replacement	None
60-17	6.42	91.1	0.0%	5	0.2	None	MP 221.72-223 (H7900): Structure rehabilitation/ replacement MP 222.25 (H8566): Bridge replacement project Queen Creek Bridge #296	Low

Level of Need* (Score)	Performance Score Need Scale				Segment Level Need Scale
None (0)	> 6.0	> 70	< 21.0%	> 5	0
Low (1)	5.5 – 6.0	60 – 70	21.0% - 31.0%	5	< 1.5
Medium (2)	4.5 – 5.5	40 – 60	31.0% - 49.0%	4	1.5 – 2.5
High (3)	< 4.5	< 40	> 49.0%	< 4	> 2.5

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Mobility Needs Refinement and Contributing Factors

Mobility was identified as a focus area for the US 60| US 70| US 191 corridor. A Low level of mobility need was identified on 168 miles (79%) of the corridor and a medium level of mobility need was identified on 33 miles (15%) of the corridor.

Key contributing factors are summarized below:

- Closures of the roadway due to flooding (US 191 at MP 53 and MP 66),
- A concentration of short term closures due to incidents/accidents throughout corridor,
- A significant number of extended duration closures on US 60 from MP 225 – 228,
- Mountainous grades with a lack of passing and climbing lanes on US 60 from MP 227 – 243,
- Limited passing, acceleration and deceleration on rolling terrain on US 70 from MP 255 – 330,
- Rockfall on US 60 caused repeated incidents of delay and closures between MP 228 – 248,
- Weather related delay and closures on US 60 between MP 224-243 due to snow, ice and impassable conditions,
- Limited bicycle accommodation on much of the corridor, on US 191 from MP 24 – 104 and MP 116 – 121, and US 60/70 from MP 298 – 243.

See other contributing factors in **Appendix D**.

Table 14: Final Mobility Needs

Segment #	Performance Score and Level of Need											Initial Segment Need*	Recently Completed Projects	Final Segment Need*
	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent		Directional TTI		Directional PTI		% Bicycle Accommodation			
			NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB				
191-1	0.15	0.17	0.12	0.12	0.03	0.01	1.51	1.30	4.79	7.47	66%	0.8	None	Low
191-2	0.09	0.10	0.07	0.07	0.02	0.00	1.16	1.16	9.83	6.09	100%	0.5	MP 37.97-45.80: Roadway excavation and borrow for widening of shoulders	Low
191-3	0.04	0.04	0.03	0.03	0.01	0.00	1.39	1.20	9.51	11.62	49%	1.5	None	Medium
191-4	0.18	0.20	0.14	0.14	0.03	0.03	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	96%	None	None	None
191-5	0.33	0.39	0.27	0.28	0.12	0.08	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	27%	0.6	None	Low
70-6	0.53	0.69	0.32	0.32	0.02	0.06	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	46%	0.6	None	Low
70-7	0.18	0.21	0.13	0.13	0.02	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	73%	0.2	None	Low
70-8	0.12	0.15	0.08	0.08	0.00	0.10	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0%	0.6	None	Low
70-9	0.25	0.29	0.16	0.17	0.00	0.04	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	26%	0.6	None	Low
70-10	0.17	0.19	0.11	0.11	0.09	0.04	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	4%	0.6	None	Low

Table 14: Final Mobility Needs (continued)

Segment	Performance Score and Level of Need										Initial Segment Need*	Recently Completed Projects	Final Segment Need*
	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent		Directional TTI		Directional PTI		% Bicycle Accommodation			
			NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB				
70-11	0.21	0.26	0.12	0.12	0.10	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	4%	0.6	MP 270-271.27: Construct a 6 foot wide asphalt pathway, concrete sidewalk and pedestrian lighting	Low
70-12	0.19	0.23	0.13	0.13	0.04	0.31	Insufficient Data	1.10	Insufficient Data	1.40	23%	0.7	MP 255.30-270: Construct 6 foot wide asphalt pathway, concrete sidewalk and pedestrian lighting	Low
70|60-13	0.40	0.46	0.29	0.30	0.00	0.12	1.15	1.31	2.72	3.36	54%	0.4	None	Low
60-14	1.73	2.11	1.22	1.09	0.33	1.57	1.07	1.19	1.47	2.06	49%	5.6	MP 229.48-241.93 (H5818): Construct climbing / passing lanes	Medium
60-15	2.76	3.83	1.28	1.30	0.36	1.17	1.08	1.17	1.67	2.30	95%	5.2	MP 225-226.87 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None
60-16	0.54	0.71	0.28	0.28	0.50	0.00	1.09	1.00	1.91	1.04	87%	0.9	MP 223-225 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None
60-17	0.20	0.26	0.11	0.10	0.09	0.05	1.01	1.01	1.16	1.24	96%	None	MP 221.72-223 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway andreconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None

Level of Need* (Score)	Performance Score Need Scale					Segment Level Need Scale
None (0)	≤ 0.77 (Urban) ≤ 0.63 (Rural)	< 0.35	< 1.21	< 1.37	> 80%	0
Low (1)	0.77 - 0.83 (Urban) 0.63 - 0.69 (Rural)	0.35 – 0.49	1.21 – 1.27	1.37 – 1.43	70% - 80%	< 1.5
Medium (2)	0.83 - 0.95 (Urban) 0.69 - 0.83 (Rural)	0.49 – 0.75	1.27 – 1.39	1.43 – 1.57	50% - 70%	1.5 - 2.5
High (3)	≥ 0.95 (Urban) ≥ 0.83 (Rural)	> 0.75	> 1.39	> 1.57	< 50%	> 2.5

[1] Urban or Fringe Urban Operating Environment
[2] Rural Operating Environment

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Safety Needs Refinements and Contributing Factors

Safety was identified as a focus area for the US 60|US 70|US 191 corridor. A High level of safety need was identified for 67 miles (31%) of the corridor and Low level of safety need identified for 37 miles (17%) of the corridor.

Key contributing factors to the safety needs are summarized below:

- Fatalities on SB US 191 in the vicinity of MP 91 – 93, which were single vehicle roll over crashes involving high speed.
- On both US 191 and US 70 in the Safford area, factors included lack of pedestrian lighting and pedestrian facilities, traffic control device reflectivity, intersection geometry, and high traffic volumes
- US 70 from Bylas to Peridot, MP 293 – 274, long stretch of rolling terrain with limited passing lanes and rest areas, with safety factors including shoulder conditions and width, traffic control device reflectivity, clear zone slope and obstructions, and intersection geometry
- US 60/US 70 from Peridot to Superior, lack of passing and climbing lanes, deceleration lanes, pedestrian facilities, intersection geometry, high traffic volumes in urbanized areas with high volume of trucks and motorcycles from MP 227 - 243
- US 60/70 from Globe to Superior, MP 227 – 255, high crash rate due to shoulder conditions, shoulder width, high speeds, clear zone slope and obstructions, high traffic volumes
- US 60 WB from Superior to Florence Junction, MP 223 -212, with safety factors including reduced shoulder conditions and width and potential clear zone slope and obstructions
- See other Contributing Factors in **Appendix D**.

Table 15: Final Safety Needs

Segment #	Performance Score and Level of Need							Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Safety Index	Directional Safety Index		Fatal + Incapacitating SHSP Top 5 %	SHSP Crash Unit Type %						
		NB/WB	EB/WB		Trucks	Motorcycle	Non-Motorized				
191-1	0.44	0.10	0.78	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	None	None	None	None
191-2	0.28	0.53	0.03	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	None	None	None	None
191-3	1.00	0.00	2.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	1.3	None	None	Low
191-4	0.03	0.07	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	None	None	None	None
191-5	1.30	1.34	1.25	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	2.5	None	None	High
70-6	0.93	1.68	0.18	73%	Insufficient Data	Insufficient Data	Insufficient Data	0.9	None	None	Low
70-7	0.10	0.20	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	None	None	None	None
70-8	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	None	None	N/A
70-9	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	None	None	N/A
70-10	1.88	1.50	2.25	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	3.6	None	None	High
70-11	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	None	None	N/A
70-12	1.67	1.67	1.67	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	3.6	None	None	High
70|60-13	2.09	1.64	2.55	56%	Insufficient Data	Insufficient Data	Insufficient Data	4.2	NB/WB: MP 246-249, SB/EB: MP 246-249	None	High
60-14	3.23	2.23	4.23	55%	Insufficient Data	Insufficient Data	Insufficient Data	4.0	NB/WB: MP 227-229, SB/EB: MP 232-234	MP 228.10-228.85 (H5818): Construct concrete barrier, installing guardrail and fence and related items	Medium

[a] 2 or 3 Lane Undivided
[b] 2,3 or 4 Lane Divided
[c] 4 or 5 Lane Undivided

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Segment #	Performance Score and Level of Need							Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Safety Index	Directional Safety Index		Fatal + Incapacitating SHSP Top 5 %	SHSP Crash Unit Type %						
		NB/WB	EB/WB		Trucks	Motorcycle	Non-Motorized				
60-15	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	None	MP 225-226.87 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	N/A
60-16	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	N/A	None	MP 223-225 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	N/A
60-17	0.81	1.28	0.33	42%	Insufficient Data	Insufficient Data	Insufficient Data	0.2	None	MP 221.72-223 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None

Level of Need* (Score)		Performance Score Needs Scale					Segment Level Need Scale
None (0)	1 2	≤ 0.93 ≤ 0.94	≤ 47% ≤ 42%	≤ 4% ≤ 8%	≤ 15% ≤ 9%	≤ 7% ≤ 2%	0
Low (1)	1 2	0.93 - 1.06 0.94 - 1.06	47% - 51% 42% - 50%	4% - 5% 8% - 10%	15% - 17% 9% - 11%	7% - 9% 2.0% - 2.2%	≤ 1.5
Medium (2)	1 2	1.06 - 1.33 1.06 - 1.30	51% - 59% 50% - 65%	5% - 7% 10% - 13%	17% - 22% 11% - 15%	9% -12% 2.2% - 2.8%	1.5 - 2.5
High (3)	1 2	≥ 1.33 ≥ 1.30	≥ 59% ≥ 65%	≥ 7% ≥ 13%	≥ 22% ≥ 15%	≥ 12% ≥ 2.8%	≥ 2.5

[1] Urban 4 Lane Freeway / Urban or Fringe Urban Operating Environment
[2] Rural 4 Lane Freeway < 25,000 vpd / Rural Operating Environment

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Freight Needs Refinements and Contributing Factors

Freight was identified as a focus area on the US 60|US 70|US 191 corridor. A Low level of freight needs was identified on 15 miles (7%) of the US 60| US 70| US 191 corridor and a High level of freight need was identified on 116 miles (54%) of the corridor. High level of delay related to the Planning Time Index (PTI) contributed to elevated freight needs for NB/SB US 191 MP 0 – 104, EB/WB US 60 MP 225 – 255, and EB US 70 MP 270 – 255.

Key contributing factors are summarized below:

- The number of closures on US 60| US 70| US 191 due to incidents/accidents or obstructions/ hazards are above statewide average in several areas
- Clearance restrictions exist at Pinal SPRR UP MP 253.63 (No. 562, height of 15.84 feet) and Queen Creek Tunnel MP 228.47 (height of 13.03 feet)
- See other Contributing Factors in **Appendix D**.

Table 16: Final Freight Needs

Segment #	Performance Score and Level of Need								Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Freight Index	Directional TTTI		Directional TPTI		Closure Duration		Bridge Vertical Clearance				
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB					
191-1	0.10	1.94	1.60	9.11	11.62	6.78	0.61	No UP	3.9	None	None	High
191-2	0.09	1.00	1.54	2.68	19.67	2.41	0.70	22.04	3.4	None	Paving project completed, Cochise TI currently in design.	High
191-3	0.08	1.34	1.82	8.92	17.43	2.94	0.00	No UP	4.1	None	None	High
191-4	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	3.37	4.02	No UP	N/A	None	None	N/A
191-5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	26.32	40.04	No Bridges	N/A	None	None	N/A
70-6	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	3.96	16.64	No UP	N/A	None	None	N/A
70-7	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	2.42	0.00	17.03	N/A	None	None	N/A
70-8	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.00	22.10	No UP	N/A	None	None	N/A
70-9	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.00	15.52	No Bridges	N/A	None	None	N/A
70-10	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	21.73	25.56	No UP	N/A	None	None	N/A
70-11	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	27.45	0.00	No UP	N/A	None	None	N/A
70-12	Insufficient Data	Insufficient Data	1.14	Insufficient Data	2.01	7.71	127.15	No UP	0.5	None	None	Low
70|60-13	0.19	1.24	1.48	4.29	6.19	0.00	19.07	15.84	2.7	1 (Pinal SPRR UP - MP 253.63, #0562)	None	High
60-14	0.43	1.18	1.60	2.34	2.36	68.54	378.72	No Bridges	4.2	1 (Queen Creek Tunnel)	MP 229.48-241.93 (H5818): Construct climbing and passing lanes	Medium
60-15	0.33	1.13	1.25	1.87	4.23	107.46	249.09	16.79	4.2	None	MP 225-226.87 (H7900): Reconstructing existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	Low

Table 16: Final Freight Needs (continued)

Segment	Performance Score and Level of Need							Initial Segment Need*	Hot Spots	Recently Completed Projects	Final Segment Need*
	Freight Index	Directional TTTI		Directional TPTI		Closure Duration		Bridge Vertical Clearance			
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB				
60-16	0.49	1.14	1.00	2.98	1.12	108.80	0.00	No UP	3.5	None	MP 223-225 (H7900): Reconstructing existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	Low
60-17	0.72	1.07	1.14	1.23	1.54	13.65	19.62	No UP	None	None	MP 221.72-223 (H7900): Reconstructing existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None

Level of Need* (Score)	Performance Score Need Scale					Segment Level Need Scale
None (0)	≥ 0.74	≤ 1.21	≤ 1.37	≤ 71.07	≥ 16.33	0
Low (1)	0.70 - 0.74	1.21 - 1.27	1.37 - 1.43	71.07 - 97.97	16.17 - 16.33	≤ 1.5
Medium (2)	0.64 - 0.70	1.27 - 1.39	1.43 - 1.57	97.97 - 151.75	15.83 - 16.17	1.5 - 2.5
High (3)	≤ 0.64	≥ 1.39	≥ 1.57	≥ 151.75	≤ 15.83	≥ 2.5

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Segment Review

The needs for each segment were combined to numerically estimate the average level of need for each segment of the corridor. **Table 17** provides a summary of needs for each segment across all performance areas, with the overall average need for each segment presented in the last row. All of the segments showed a Low level of average need.

Table 17: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)																
	191-1	191-2	191-3	191-4	191-5	70-6	70-7	70-8	70-9	70-10	70-11	70-12	70|60-13	60-14	60-15	60-16	60-17
	MP 0-24	MP 24-67	MP 87-104	MP 104-116	MP 116-121	MP 339-330	MP 330-300	MP 300-298	MP 298-293	MP 293-274	MP 274-270	MP 270-255	MP 255-243	MP 243-227	MP 227-225	MP 225-223	MP 223-212
Pavement	None*	Low	Low	Medium	Medium	Low	Low	None*	None*	Low	None*	None*	Low	None	None*	None*	None*
Bridge	None*	Medium	Low	Low	None*	Low	Low	None*	None*	None*	Low	Low	High	High	Low	None*	Low
Mobility+	Low	Low	Medium	None*	Low	Low	Low	Low	Low	Low	Low	Low	Low	Medium	None*	None*	None*
Safety+	None*	None*	Low	None*	High	Low	None*	N/A#	N/A#	High	N/A#	High	High	Medium	N/A#	N/A#	None*
Freight+	High	High	High	N/A#	N/A#	N/A#	N/A#	N/A#	N/A#	N/A#	N/A#	Low	High	Medium	Low	Low	None*
Average Need	0.92	1.38	1.69	0.60	2.00	1.00	0.70	0.43	0.60	1.40	0.83	1.31	2.23	1.85	0.50	0.30	0.15

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as this study.*

+ Identified as an emphasis area for the US 60|US 70|US 191 corridor

 # N/A indicates insufficient or no data available to determine level of need

Average Need Scale	
None*	< 0
Low	0.1-1.0
Medium	1.0-2.0
High	> 2.0

Summary of Corridor

The needs in each performance area are shown in **Figure 21** and summarized below:

Pavement Needs

- Of the 214 corridor miles, approximately 119 miles (55%) exhibit a "Low" level of pavement need and 17 miles (17%) exhibit "Medium" level of pavement need.
- Pavement hot spot failure needs were identified for 17 miles on US 191, 3 miles on US 70, and 3 miles on US 60.
- A high level of historical investment has occurred on Segments 70-9 and 70-10 through the San Carlos Indian Reservation and a medium level of historical investment has occurred through the remaining corridor segments, excluding Segment 191-1.

Bridge Needs

- Bridge needs were identified on three segments of the corridor, 43 miles (20%) with a "Medium" level of bridge need and 28 miles (13%) with a "High" level of bridge need.
- Eight bridges showed potential repetitive investment issues and may be candidates for life-cycle cost analysis to evaluate alternative solutions.
- Three bridges have bridge ratings of 4: Pinal Creek Bridge (No. 266), Waterfall Canyon Bridge (No. 328), and Queen Creek Bridge (No. 406).
- One bridge had a bridge rating of 5: Pinal Creek Bridge (No. 36).
- Nine bridges were defined as hot spots since they had multiple bridge ratings of 5 or less.
- Of the nine hot spot bridges, five also showed repetitive investment issues. These included the Pinal Creek Bridge (No. 36), Pinal Creek Bridge (No. 266), Pinto Creek Bridge (No. 351), Waterfall Canyon Bridge (No. 328), and Queen Creek Bridge (No. 406).

Mobility Needs

- Mobility Performance is an Emphasis Area for the US 60| US 70| US 191 corridor, giving it a heavier weight in the analysis.
- A low level of mobility need was identified on 168 miles (79%) of the US 60| US 70| US 191 corridor and a medium level of mobility need was identified on 33 miles (15%) of the corridor.
- Contributing factors include to reduced mobility performance includes:
  - Closures of the roadway due to flooding (US 191 at MP 53 and MP 66),
  - A concentration of short term closures due to incidents/accidents throughout corridor,
  - A significant number of extended duration closures on US 60 from MP 225 – 228,
  - Mountainous grades with a lack of passing and climbing lanes on US 60 from MP 227 – 243,
  - Limited passing, acceleration and deceleration on rolling terrain on US 70 from MP 255 – 330,
  - Rockfall on US 60 caused repeated incidents of delay and closures between MP 228 – 248,
  - Weather related delay and closures on US 60 between MP 224-243 due to snow, ice and impassable conditions,
  - Limited bicycle accommodation on much of the corridor, on US 191 from MP 24 – 104 and MP 116 – 121, and US 60/70 from MP 298 – 243.

Safety Needs

- Safety Performance is an Emphasis Area for the US 60| US 70| US 191 corridor, giving it a heavier weight in the analysis.
- A High level of safety need was identified for 67 miles (31%) of the corridor and Low level of safety need identified for 37 miles (17%) of the corridor.
- Contributing factors to the safety need include:
  - Fatalities on SB US 191 in the vicinity of MP 91 – 93, which were single vehicle roll over crashes involving high speed.
  - On both US 191 and US 70 in the Safford area, factors included lack of pedestrian lighting and pedestrian facilities, traffic control device reflectivity, intersection geometry, and high traffic volumes
  - US 70 from Bylas to Peridot, MP 293 – 274, long stretch of rolling terrain with limited passing lanes and rest areas, with safety factors including shoulder conditions and width, traffic control device reflectivity, clear zone slope and obstructions, and intersection geometry
  - US 60/US 70 from Peridot to Superior, lack of passing and climbing lanes, deceleration lanes, pedestrian facilities, intersection geometry, high traffic volumes in urbanized areas with high volume of trucks and motorcycles from MP 227 - 243
  - US 60/70 from Globe to Superior, MP 227 – 255, high crash rate due to shoulder conditions, shoulder width, high speeds, clear zone slope and obstructions, high traffic volumes
  - US 60 WB from Superior to Florence Junction, MP 223 -212, with safety factors including reduced shoulder conditions and width and potential clear zone slope and obstructions.

Freight Needs

- Freight Performance is an Emphasis Area for the US 60| US 70| US 191 corridor, giving it a heavier weight in the analysis.
- A Low level of freight needs was identified on 15 miles (7%) of the US 60|US 70|US 191 corridor and a High level of freight need was identified on 116 miles (54%) of the corridor.
- High level of delay related to the Planning Time Index (PTI) contributed to elevated freight needs for NB/SB US 191 MP 0 – 104, EB/WB US 60 MP 225 – 255, and EB US 70 MP 270 – 255.
- The number of closures on US 60| US 70| US 191 due to incidents/accidents or obstructions/ hazards are above statewide average in the following areas:
  - US 191 MP 0 – 67 including flooding at MP 53 and MP 66

- US 191 MP 43 (Border Patrol Check Point)
- Concentration of short term closures due to incidents/accidents at the following locations:

  Incidents/accidents US 191 MP 115 – 120
  US 60 from MP 233 – 242,
  US 60 from MP 228 – 231.7 (with a high concentration of incidents at MP 230), and
  US 60 from MP 224 – 227
- Significant number of extended duration closures on US 60 from MP 225 – 228
- Mountainous grades with a lack of passing and climbing lanes on US 60 from MP 227 - 243
- Limited passing, acceleration and deceleration on rolling terrain on US 70 MP 255 - 330
- Rockfall on US 60 caused repeated incidents of delay and closures between MP 228 – 248
- Weather related delay and closures on US 60 between MP 224-243 due to snow, ice and impassable conditions

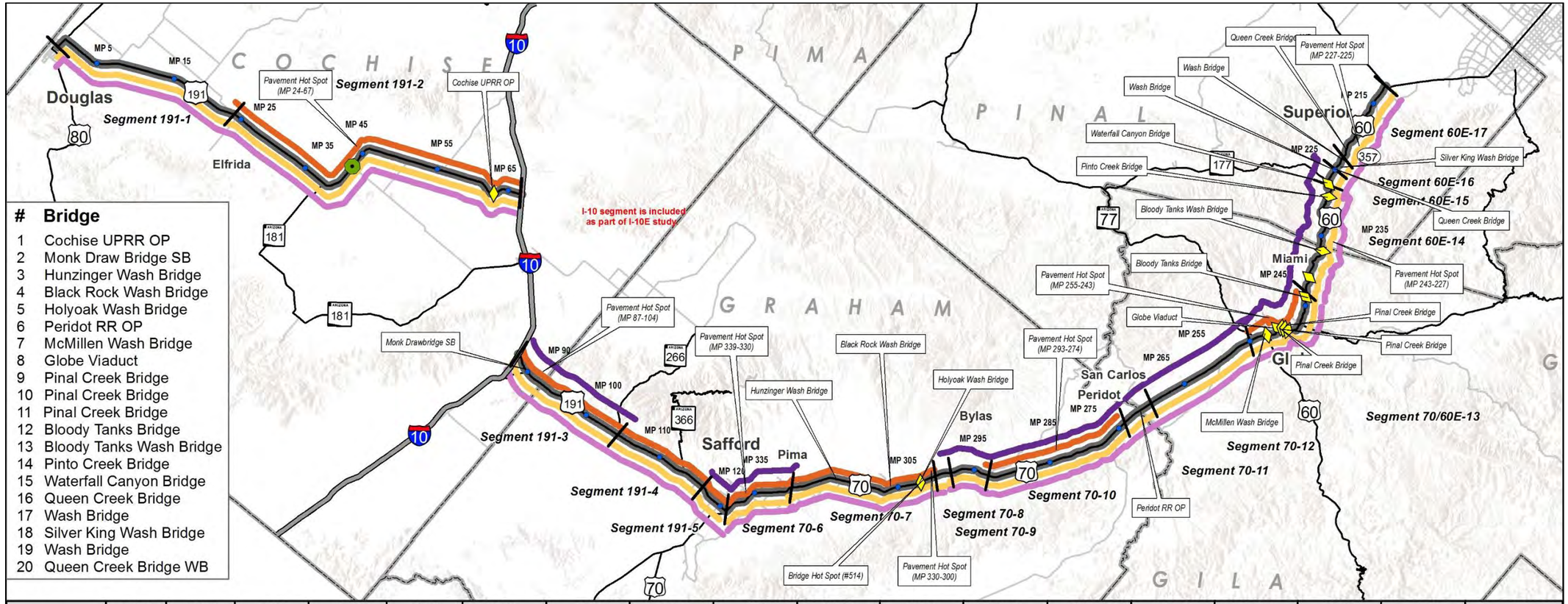
- Clearance restrictions exist at Pinal SPRR UP MP 253.63 (No. 562, height of 15.84') and Queen Creek Tunnel MP 228.47 (height of 13.03').

Overlapping Needs

This section identifies overlapping performance needs on the US 60|US 70|US 191 corridor, which provides guidance to develop strategic solutions that address more than one performance area with elevated levels of need. Completing projects that address multiple needs presents the opportunity to more effectively improve overall performance. A summary of the overlapping needs that relate to locations with elevated levels of need is provided below:

- Most segments on the corridor have overlapping needs, approximately 205 miles of the 214 miles or 96% of the corridor. The exceptions include Segments 70-8, 70-9 and 60-16. Traffic counters do not exist in Segments 191-4 through 70-11, approximately 75 miles or 35% of the corridor, resulting in insufficient data to calculate needs in the freight performance area for those locations.
- US 191 MP 87 to MP 104 (Segment 191-3) and US 60|70 MP 243 to MP 255 (Segment 70|60-13) have overlapping needs in all five performance areas. These segments comprised 29 of the 214 corridor miles.
- Segment 191-3 has an overall Medium need, with some level of need in all performance areas. The greater needs relate to mobility and freight due to high TTI and PTI related to accidents and incidents. A few closures have long durations that impacted the segment need level. Also noteworthy is that this segment is immediately north of I-10 and utilized when traffic is detoured through Safford during I-10 closures.
- Segment 70|60-13 has an overall High need and the highest need score in the corridor. Some needs are site specific while others are characteristics of the segment. High bridge needs are related to the Pinal Creek Bridge (No. 36) and Pinal Creek Bridge (No. 266), which are hot spots due to poor structural ratings and exhibit high repetitive investment. High safety needs are due to the more urbanized area with increased volumes and speeds too fast for conditions. High freight needs are due to TTI and PTI times, as well as the Pinal SPRR at MP 253.63 have low vertical clearance (15.84').
- Segment 60-14 also registers an overall High need score on the corridor. This segment has significant grades and subsequently suffers from freight and mobility needs related to delay and incidents/accidents associated with the grade. The segment includes 3 hot spot bridges, all of which have repetitive investment histories. The Queen Creek Tunnel, also located in the segment, affects bridge and freight needs with poor deck ratings and low vertical clearance.

Figure 21: Corridor Needs Summary



#	Bridge
1	Cochise UPRR OP
2	Monk Draw Bridge SB
3	Hunzinger Wash Bridge
4	Black Rock Wash Bridge
5	Holyoak Wash Bridge
6	Peridot RR OP
7	McMillen Wash Bridge
8	Globe Viaduct
9	Pinal Creek Bridge
10	Pinal Creek Bridge
11	Pinal Creek Bridge
12	Bloody Tanks Bridge
13	Bloody Tanks Wash Bridge
14	Pinto Creek Bridge
15	Waterfall Canyon Bridge
16	Queen Creek Bridge
17	Wash Bridge
18	Silver King Wash Bridge
19	Wash Bridge
20	Queen Creek Bridge WB

Performance Area	191-1	191-2	191-3	191-4	191-5	70-6	70-7	70-8	70-9	70-10	70-11	70-12	70|60-13	60-14	60-15	60-16	60-17	Performance Area
	MP 0-24	MP 24-67	MP 87-104	MP 104-116	MP 116-121	MP 339-330	MP 330-300	MP 300-298	MP 298-293	MP 293-274	MP 274-270	MP 270-255	MP 255-243	MP 243-227	MP 227-225	MP 225-223	MP 223-212	
Pavement	None*	Low	Low	Medium	Medium	Low	Low	None*	None*	Low	None*	None*	Low	None*	None*	None*	None*	Pavement
Bridge	None*	Medium	Low	Low	None*	Low	Low	None*	None*	None*	Low	Low	High	High	Low	None*	Low	Bridge
Mobility+	Low	Low	Medium	None*	Low	Low	Low	Low	Low	Low	Low	Low	Low	Medium	None*	None*	None*	Mobility+
Safety+	None*	None*	Low	None*	High	Low	None*	N/A#	N/A#	High	N/A#	High	High	Medium	N/A#	N/A#	None*	Safety+
Freight+	High	High	High	N/A#	N/A#	N/A#	N/A#	N/A#	N/A#	N/A#	N/A#	Low	High	Medium	Low	Low	None*	Freight+
Average Need	**0.92**	**1.38**	**1.69**	**0.60**	**2.00**	**1.00**	**0.70**	**0.43**	**0.60**	**1.40**	**0.83**	**1.31**	**2.23**	**1.85**	**0.50**	**0.30**	**0.15**	**Average Need**

+ Identified as emphasis area for US 60 | 70 | 191 Corridor
N/A# indicates insufficient data available to determine level of need
A segment need rating of **'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Corridor Needs Summary

4.0 STRATEGIC SOLUTIONS

The principal objective of the CPS is to identify strategic solutions (investments) that are performance-based to ensure that available funding resources are used to maximize the performance of the State's key transportation corridors. One of the first steps in the development of strategic solutions is to identify areas of elevated levels of need (i.e., Medium or High). Addressing areas of Medium or High need will have the greatest effect on corridor performance and are the focus of the strategic solutions. Segments with Medium or High needs and specific locations of hot spots are considered strategic investment areas for which strategic solutions should be developed. Segments with lower levels of need or without identified hot spots are not considered candidates for strategic investment and are expected to be addressed through other ADOT programming processes. The US 60|US 70|US 191 strategic investment areas (resulting from the elevated needs) are shown in **Figure 22**.

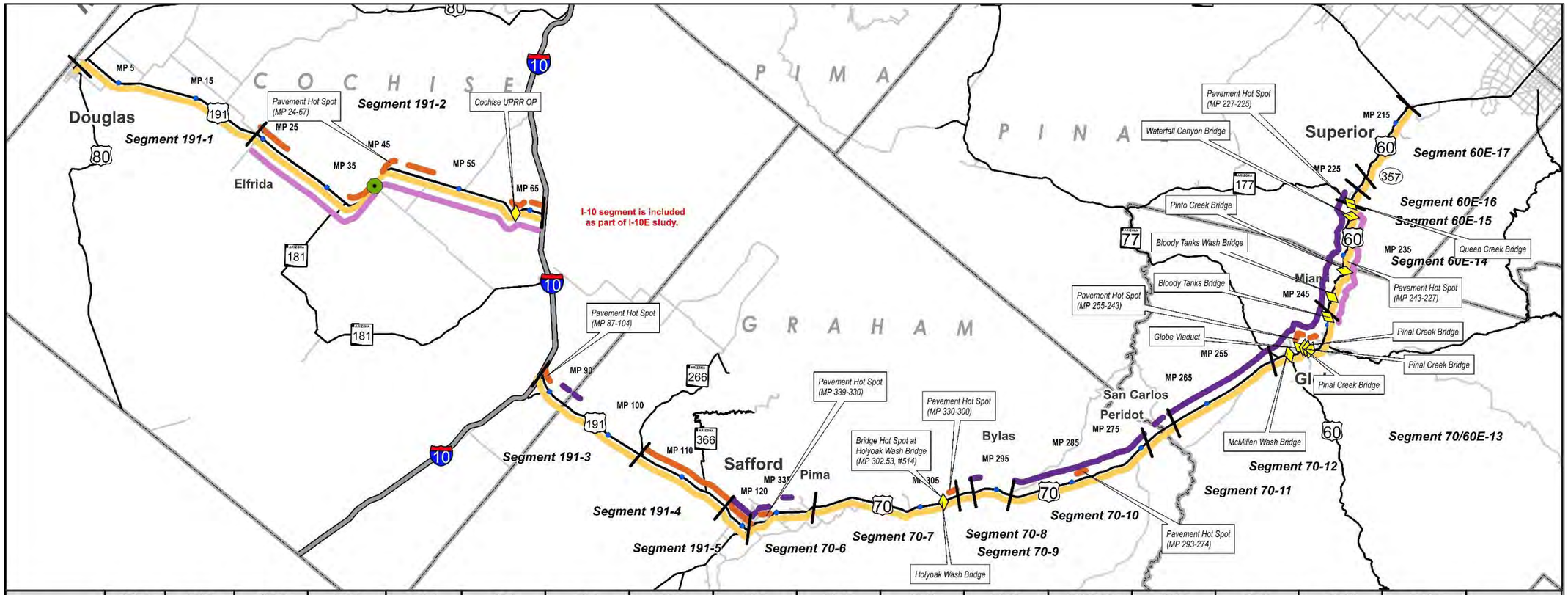
4.1 Screening Process

This section examines qualifying strategic needs and determines if the needs in those locations require action. In some cases, needs that are identified do not advance to solutions development and are screened out from further consideration because they have been or will be addressed through other measures including:

- A project is programmed to address this need
- The need is a result of a Pavement or Bridge hot spot that does not show historical investment or rating issues; these hot spots will likely be addressed through other ADOT programming means.
- A bridge is not a hot spot but is located within a segment with a Medium or High level of need; this bridge will likely be addressed through current ADOT bridge maintenance and preservation programming processes.
- The need is determined to be non-actionable (i.e., cannot be addressed through an ADOT project)
- The conditions/characteristics of the location have changed since the performance data was collected that was used to identify the need

Table 18 notes if each potential strategic need advanced to solution development, and if not, the reason for screening the potential strategic need out of the process. Locations advancing to solutions development are marked with Yes (Y); locations not advancing are marked with No (N) and highlighted. This screening table provides specific information about the needs in each segment that will be considered for strategic investment. The table identifies the level of need – either Medium or High segment needs, or segments without Medium or High level of need that have a hot spot. Each area of need is assigned a location number in the screening table to help document and track locations considered for strategic investment.

Figure 22: Strategic Investment Areas



Performance Area	191-1	191-2	191-3	191-4	191-5	70-6	70-7	70-8	70-9	70-10	70-11	70-12	70|60-13	60-14	60-15	60-16	60-17	Performance Area
	MP 0-24	MP 24-67	MP 87-104	MP 104-116	MP 116-121	MP 339-330	MP 330-300	MP 300-298	MP 298-293	MP 293-274	MP 274-270	MP 270-255	MP 255-243	MP 243-227	MP 227-225	MP 225-223	MP 223-212	
Pavement	-	Hot Spot	Hot Spot	Medium	Medium	Hot Spot	Hot Spot	-	-	Hot Spot	-	-	Hot Spot	Hot Spot	Hot Spot	-	-	Pavement
Bridge	-	Medium	-	-	-	-	Hot Spot	-	-	-	-	-	High	High	-	-	-	Bridge
Mobility+	-	-	Medium	-	-	-	-	-	-	-	-	-	-	Medium	-	-	-	Mobilitv+
Safety+	-	-	-	-	High	-	-	-	-	High	-	High	High	Medium	-	-	-	Safety+
Freight+	High	High	High	-	-	-	-	-	-	-	-	-	High	Medium	-	-	-	Freight+

+ Identified as Emphasis Area for US 60 | US 70 | US 191 Corridor

Note: Figure shows strategic investment areas, which are segments with Medium and High levels of need and locations of hotspots. A"-" symbol indicates a segment level of need of Low or None, which is not considered strategic.

US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction

Strategic Investment Areas

0 5 10 15 20 Miles

Corridor Segment
US Hwy/State Route
County Boundary
City Boundary
Border Patrol Check Point

Performance Area Needs
Pavement
Mobility
Safety
Freight
Bridge

Level of Need
Low
Medium
High

Table 18: Strategic Investment Area Screening

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
191-1 (MP 0 – 24)	-	-	-	-	High	L1	Freight	Congestion/delay related to trucks due to high PTI in both directions. Friction with large trucks, oversized vehicles and Douglas Port of Entry.	N	No programmed project to address freight need because freight need was due to weigh station.
191-2 (MP 24-67)	Hot Spot	Medium	-	-	High	L2	Pavement	Hot Spot in NB lanes MP 48-51 (Excessive Cracking)	N	A medium level of historical investment has occurred on Segment 191-2 according to PeCOS data and recent pavement preservation projects. No pavement preservation projects are currently programmed for this portion of the segment. Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.
						L3	Bridge	Medium level of need related to deck rating =5. The bridge was not identified as a Hot Spot. Cochise UPRR OP (MP 62.88, #157)	N	Structure does not have a historical rating issue according to the historical review, therefore it is not considered for strategic investment. Issues related to this bridge such as narrow width, use by oversized vehicles, and other safety concerns have been observed. These items will potentially be addressed in the solutions identified for need location L4.
						L4	Freight	Congestion/delay related to trucks due to high PTI in the southbound direction.	Y	
191-3 (MP 87-104)	Hot Spot	-	Medium	-	High	L5	Pavement	Hot Spot in SB lanes MP 87-88 (Excessive Cracking)	N	A medium level of historical investment has occurred on Segment 191-3. One future pavement preservation project was identified between MP 86.89 - 90.11, ADOT Five Year Program (H7866-FY18). Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.
						L6	Mobility	NB direction, high delay due to a few very long duration closures.	N	No programmed project to address mobility need. This segment was improved to a four-lane divided facility in 2009, its ultimate cross section. Current and future traffic volumes can be accommodated by the four-lane roadway. High closure durations are likely due to the location of the traffic counter providing data (within an intersection).
						L7	Freight	Congestion/delay related to trucks, with high TTI and PTI in both directions, primarily due to a few very long duration closures.	N	No programmed project to address freight need. This segment was improved to a four-lane divided facility in 2009, its ultimate cross section. Current and future traffic volumes can be accommodated by the four-lane roadway. High closure durations are likely due to the location of the traffic counter providing data (within an intersection).
191-4 (MP 104-116)	Medium	-	-	-	-	L8	Pavement	Hot Spot in NB lanes MP 105-107 (High IRI)	N	A medium level of historical investment has occurred on Segment 191-4. No pavement preservation projects are currently programmed for this portion of the segment. Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.

Legend: Strategic investment area screened out from further consideration.

Table 18: Strategic Investment Area Screening (continued)

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
191-5 (MP 116-121)	Medium	-	-	High	-	L9	Pavement	Hot Spot in NB lanes MP 120-121 (High IRI)	N	The segment had an initial need of medium and one hot spot was identified. One programmed projects exists in this segment, MP 116-118, ADOT Five Year Program FY16 (H8700). Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.
						L10	Safety	Lack of pedestrian lighting and pedestrian facilities, traffic control device reflectivity, intersection geometry, and high traffic volumes. 40% involved pedestrians, 20% involved pedestrians not using the crosswalk, 40% involved left turns, 40% involved failure to yield right-of-way, 40% occurred in dark unlighted condition, and 40% occurred in dark lighted conditions, and 60% involved drugs or alcohol. The higher concentration of incidents can be associated with the urbanized area of Safford in addition to the limited controlled intersection. Project H8324 is programmed and will support and increase of safety and mobility through the US 191/US 70 intersection.	Y	
70-6 (MP 339-330)	Hot Spot	-	-	-	-	L11	Pavement	Hot Spot in WB lanes MP 336-337 (High IRI)	N	A low level of historical investment has occurred on Segment 70-6. No pavement preservation projects are currently programmed for this portion of the segment. Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.
70-7 (MP 330-300)	Hot Spot	Hot Spot	-	-	-	L12	Pavement	Hot Spot in WB lanes MP 300-301 (Excessive Cracking)	N	A low level of historical investment has occurred on Segment 70-6. A pavement preservation chipseal is programmed.
						L13	Bridge	Hot Spot at Holyoak Wash Bridge (MP 302.53, #514)	N	Structures do not have a historical rating issue according to the review, therefore they are not considered for strategic investment. Anticipated to be addressed through current ADOT bridge maintenance and preservation programming processes.
70-8 (MP 300 - 298)	-	-	-	-	-	No Strategic Needs Identified				

Legend: Strategic investment area screened out from further consideration.

Table 18: Strategic Investment Area Screening (continued)

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
7-9 (MP 298 – 293)	-	-	-	-	-	No Strategic Needs Identified				
70-10 (MP 293-274	Hot Spot	-	-	High	-	L14	Pavement	Hot Spot in WB lanes MP 283-284 (Hot Spot failure, High IRI). District is currently seeking funding for pavement preservation.	Y	
						L15	Safety	The high level of initial and final need is associated with the high ratio of fatal crashes compared to those resulting in incapacitating injuries. This segment has rolling hills and valleys with few safe passing opportunities. 40% involved collision with motor vehicle, 40% involved overturning, 60% were single vehicle crashes, 20% was head on, 20% drove in the opposing lane, 20% driver inattention/distraction, 40% dark unlighted conditions.	Y	
70 – 11 (MP 274 – 270)	-	-	-	-	-	No Strategic Needs Identified				
70-12 (MP270-255)	-	-	-	High	-	L16	Safety	The high level of initial and final need is associated with the high ratio of fatal crashes compared to those resulting in incapacitating injuries. 50% involved a pedestrian, 50% were head on collisions, 25% drove in opposing lane, 25% involved unsafe passing, 50% involved crossing centerline, 25% involved drugs/alcohol.	Y	

Legend: Strategic investment area screened out from further consideration.

Table 18: Strategic Investment Area Screening (continued)

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
70|60-13 (MP255-243)	Hot Spot	High	-	High	High	L17	Pavement	Hot Spot in EB lanes MP 247-248 (Hot Spot Failure) and Hot Spot in EB lanes MP 249-251 (Hot Spot Failure and Excessive Cracking)	N	A medium level of historical investment has occurred on Segment 191-2. No pavement preservation projects are currently programmed for this portion of the segment. Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.
						L18	Bridge	Pinal Creek Bridge MP 250.37 (#549)	N	No historical rating issues.
						L19	Bridge	Pinal Creek Bridge MP 249.80 (#36)	Y	
						L20	Bridge	Pinal Creek Bridge MP 249.64 (#266)	Y	
						L21	Bridge	Bloody Tanks Bridge MP 243.71 (#173)	N	No historical rating issues.
						L22	Safety	Hot Spots at EB/WB MP 246-249; The higher concentration of incidents can be associated with the urbanized areas of Globe and Miami. 11% collisions with fixed object, 9% with pedestrian, 29% involved rear end collision, 26% involved failure to yield right of way, 20% driver inattention/distraction, 17% speed too fast for conditions, 23% in dark lighted conditions, 6% in dusk conditions, 9% ran off the road to the right.	Y	
						L23	Freight	High EB PTI (delay), can be contributed to signals located on steep grades in the EB direction with significant delay if trucks stop at signal.	Y	
						L24	Freight	Bridge clearance at Pinal SPRR UP (MP 253.63, #0562) (15.84')	Y	

Legend: Strategic investment area screened out from further consideration.

Table 18: Strategic Investment Area Screening (continued)

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
60-14 (MP243-227)	Hot Spot	High	Medium	Medium	Medium	L25	Pavement	Hot Spot in WB lanes MP 229-233 (High IRI) and WB MP 235-236 (High IRI)	N	A medium level of historical investment has occurred on Segment 191-2. No pavement preservation projects are currently programmed for this portion of the segment. Anticipated to be addressed through current ADOT pavement maintenance and preservation programming processes.
						L26	Bridge	Pinto Creek Bridge MP 238.25 (#351)	N	Programmed FY18
						L27	Bridge	Queen Creek Bridge MP 227.71 (#406). Project Assessment is currently underway for scoping improvements.	Y	
						L28	Bridge	Waterfall Canyon Bridge MP 229.50 (#328)	Y	
						L29	Bridge	Queen Creek Tunnel MP 228.47 (#407)	N	Non-actionable per discussion with District
						L30	Mobility	PTI/delay, mountainous terrain, high number of closures/duration	Y	
						L31	Safety	Hot Spots at WB: MP 227-229 and EB: MP 232-234; The high initial and final need can be associated with the mountainous terrain along this section of the corridor. 38% collision with fixed object, 14% head on, 38% speed too fast for conditions, 24% dark unlighted conditions, 3% dark lighted, 14% wet/slush conditions, 45% ran off road to the right, 28% crossed centerline, 24% under the influence of drugs/alcohol	Y	
						L32	Freight	High EB TTI, High EB/WB PTI, and High Closure Duration EB due to mountainous grades	Y	

Legend: Strategic investment area screened out from further consideration.

Table 18: Strategic Investment Area Screening (continued)

Segment	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
60-15 (MP227-225)	Hot Spot	-	-	-	-	L33	Pavement	WB MP 226-227	N	A medium level of historical investment has occurred on Segment 191-2. This pavement will be replaced under the Silver King to Superior Streets (H7900) project.
60-16 (MP225-223)	-	-	-	-	-	No Strategic Needs Identified				
60-17 (MP223-212)	-	-	-	-	-	No Strategic Needs Identified				

Legend: Strategic investment area screened out from further consideration.

4.2 Candidate Solutions

For each elevated need within a strategic investment area that is not screened out, a candidate solution is developed to address the identified need. Each candidate solution is assigned to one of the following three P2P investment categories based on the scope of the solution:

- Preservation
- Modernization
- Expansion

Documented performance needs serve as the foundation for developing candidate solutions for corridor preservation, modernization, and expansion. Candidate solutions are not intended to be a substitute or replacement for traditional ADOT project development processes where various ADOT technical groups and districts develop candidate projects for consideration in the performance-based programming in the P2P process. Rather, these candidate solutions are intended to complement ADOT's traditional project development processes through a performance-based process to address needs in one or more of the five performance areas of Pavement, Bridge, Mobility, Safety, and Freight. Candidate solutions developed for the US 60|US 70|US 191 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

Characteristics of Strategic Solutions

Candidate solutions should include some or all of the following characteristics:

- Do not recreate or replace results from normal programming processes
- May include programs or initiatives, areas for further study, and infrastructure projects
- Address elevated levels of need (High or Medium) and hot spots
- Focus on investments in modernization projects (to optimize current infrastructure)
- Address overlapping needs
- Reduce costly repetitive maintenance
- Extend operational life of system and delay expansion
- Leverage programmed projects that can be expanded to address other strategic elements
- Provide measurable benefit

Candidate Solutions

A set of 14 candidate solutions are proposed to address the identified needs on the US 60|US 70|US 191 corridor.

Table 19 identifies each strategic location that has been assigned a candidate solution with a number (e.g., CS8.1, CS8.2, etc.). Each candidate solution is comprised of one or more components to address the identified needs. The assigned candidate solution numbers are linked to the location number and provide tracking capability through the rest of the process. The locations of proposed solutions are shown on the map in **Figure 23**.

Candidate solutions developed to address an elevated need in the Pavement or Bridge performance area will include two options; rehabilitation or full replacement. These solutions are initially evaluated through a Life-Cycle Cost Analysis (LCCA) to provide insights into the cost-effectiveness of these options so a recommended approach can be identified. Candidate solutions developed to address an elevated need in the Mobility, Safety, or Freight performance areas are advanced directly to the Performance Effectiveness Evaluation. In some cases, there may be multiple solutions identified to address the same area of need.

Candidate solutions that are recommended to expand or modify the scope of an already programmed project are noted and are not advanced to solution evaluation and prioritization. These solutions are directly recommended for programming.

Table 19: Candidate Solutions

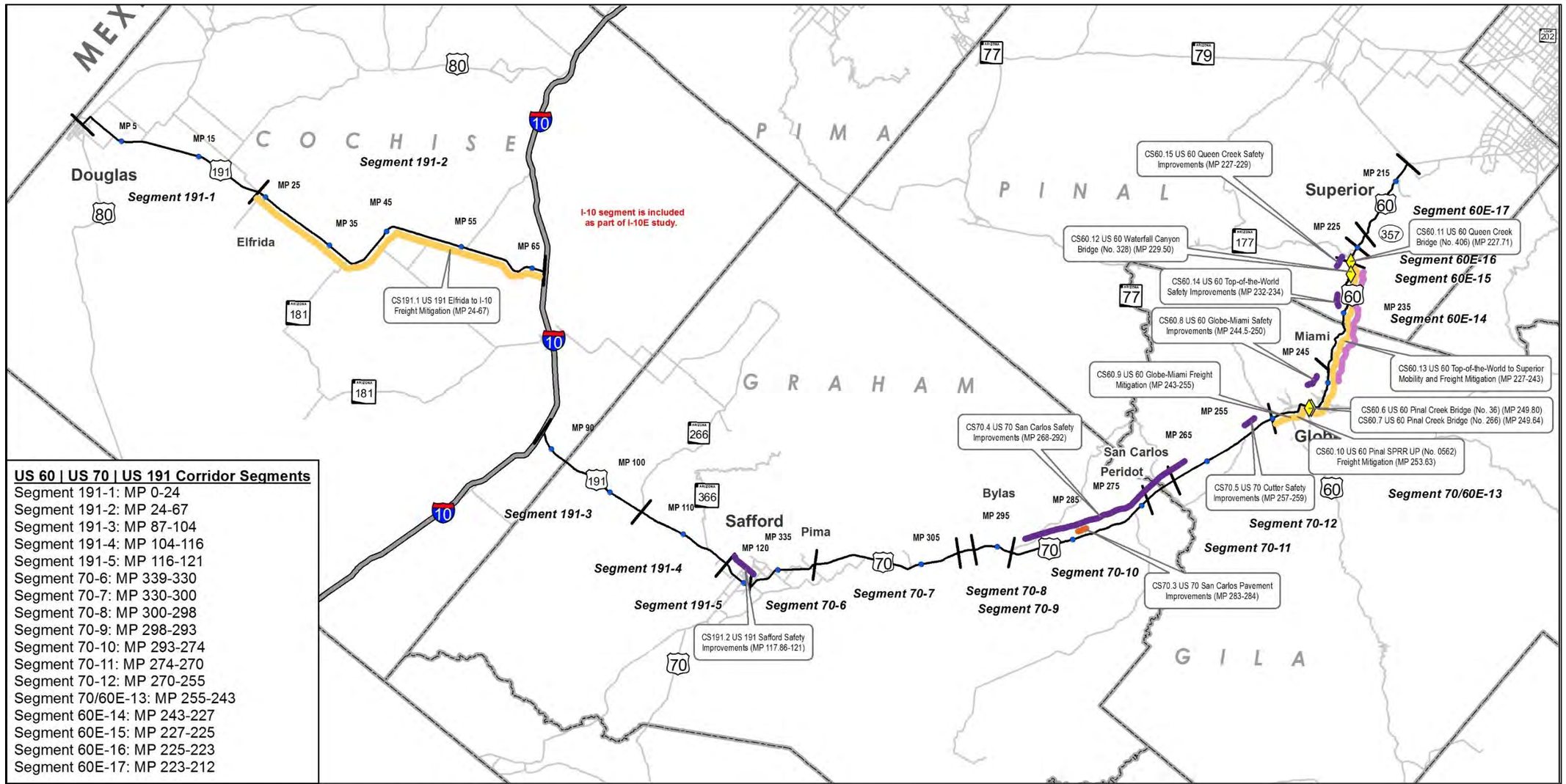
Candidate Solution #	Segment #	Location #	Beginning MP	Ending MP	Candidate Solution Name	Option*	Scope	Investment Category Preservation (P) Modernization (M) Expansion (E)
CS191.1	191-2	L4	59.9	64	US 191 Elfrida to I-10 Freight Mitigation	A B	Realign roadway from MP 59.9 to MP 64.2, replace Cochise RR bridge Realign roadway from MP 59.9 to MP 64.2, construct passing lane, replace Cochise RR bridge	M
CS191.2	191-5	L10	117	121	US 191 Safford Safety Improvements	-	Intersection improvements: • Armory Road Intersection (MP 118): Improve signal visibility, install warning signs with beacons in advance of intersection • Discovery Park Intersection (MP 119): Improve signal visibility, dynamic speed warning signs • Lone Star Intersection (MP 119.5): Install signal with crosswalk and lighting, install warning signs with beacons in advance of intersection • 16th Street (MP 120.5): Install warning signs with beacons in advance of intersection	M
CS70.3	70-10	L14	283	284	US 70 San Carlos Pavement Improvement	A B	Replace Pavement Rehabilitate Pavement	P P
CS70.4	70-10	L15	268	292	US 70 San Carlos Safety Improvements	-	Install high-visibility signage Install warning signs with beacons at curves and speed feedback signs (MP 292, MP 280, MP 278.5) Install warning signs and speed feedback signs entering high pedestrian area (WB MP 273, EB MP 269) Install centerline rumble strip Widen shoulder, install rumble strip and install safety edge Construct passing lanes (EB MP 262 - 264 and WB MP 282 - 288) Formalize pullouts (signage, ROW for pullouts) (WB MP 274.5, EB MP 279, EB MP 289, WB 292)	M
CS70.5	70-12	L16	258	260	US 70 Cutter Safety Improvements	-	Install warning signage in advance of intersection (EB MP 259 and WB MP 260) Construct center lane (MP 258.4 – 259.5) Install lighting (MP 258.2 – 259.5)	M
CS60.6	70|60-13	L19	249.80	249.80	US 60 Pinal Creek Bridge (No. 36)	A B	Replace bridge Rehabilitate bridge	M M
CS60.7	70|60-13	L20	249.64	249.64	US 60 Pinal Creek Bridge (No. 266)	A B	Replace bridge Rehabilitate bridge	M M

Table 19: Candidate Solutions (continued)

Candidate Solution #	Segment #	Location #	Beginning MP	Ending MP	Candidate Solution Name	Option*	Scope	Investment Category Preservation (P) Modernization (M) Expansion (E)
CS60.8	70|60-13	L22	244.5	250	US 60 Globe-Miami Safety Improvements	-	Install lighting (MP 244.5 to 250) Install speed feedback signs (2 EB and 2 WB between MP 246 - 250) Install warning signs with beacons in advance of SR 188 intersection	M
CS60.9	70|60-13	L24	253.63	253.63	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	-	Reprofile mainline	M
CS60.10	60-14	L27	227.71	227.71	US 60 Queen Creek Bridge (No. 406)	A B	Replace bridge Rehabilitate bridge	M
CS60.11	60-14	L28	229.50	229.50	US 60 Waterfall Canyon Bridge (No. 328)	A B	Replace bridge Rehabilitate bridge	M
CS60.12	60-14	L30/L32	227	243	US 60 Superior to Miami Mobility and Freight Mitigation	A B C	Widen shoulder (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5), install rock-fall mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75), install dynamic weather warning beacons, and install RWIS EB climbing/passing lane (MP 227-227.9, MP 230.4 – 232.6), WB climbing/passing lane (MP 236.4 – 236.6, MP 238.1 – 239.5), Five-lane widening (MP 234.2 – 236.4), install rock-fall mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75), and dynamic weather warning beacons, and install RWIS Construct four-lane divided (using 2 existing-lanes for one direction)	M E E
CS60.13	60-14	L31	232	234	US 60 Top-of-the-World Safety Improvements	-	Install warning signage and speed feedback signs Improve sign visibility Install centerline rumble strip	M
CS60.14	60-14	L31	227	229	US 60 Queen Creek Safety Improvements	-	Widen shoulder, install rumble strip and install safety edge Install guardrail Install warning signage and speed feedback signs Improve sign visibility Install centerline rumble strip *Note: Queen Creek Tunnel limits omitted from solution (MP 228.3 – 228.5)*	M

* '-' indicates only one solution is being proposed and no option

Figure 23: Candidate Solutions



5.0 SOLUTION EVALUATION AND PRIORITIZATION

Candidate solutions are evaluated using the following steps: LCCA (where applicable), Performance Effectiveness Evaluation, Solution Risk Analysis, and Candidate Solution Prioritization. The methodology and approach to this evaluation are shown in **Figure 24** and described more fully below.

Life-Cycle Cost Analysis

All Pavement and Bridge candidate solutions have two options: rehabilitation/repair or reconstruction. These options are evaluated through an LCCA to determine the best approach for each location where a Pavement or Bridge solution is recommended. The LCCA can eliminate options from further consideration and identify which options should be carried forward for further evaluation.

When multiple independent candidate solutions are developed for Mobility, Safety, or Freight strategic investment areas, these candidate solution options advance directly to the Performance Effectiveness Evaluation without an LCCA.

Performance Effectiveness Evaluation

After completing the LCCA process, all remaining candidate solutions are evaluated based on their performance effectiveness. This process includes determining a Performance Effectiveness Score (PES) based on how much each solution impacts the existing performance and needs scores for each segment. This evaluation also includes a Performance Area Risk Analysis to help differentiate between similar solutions based on factors that are not directly addressed in the performance system.

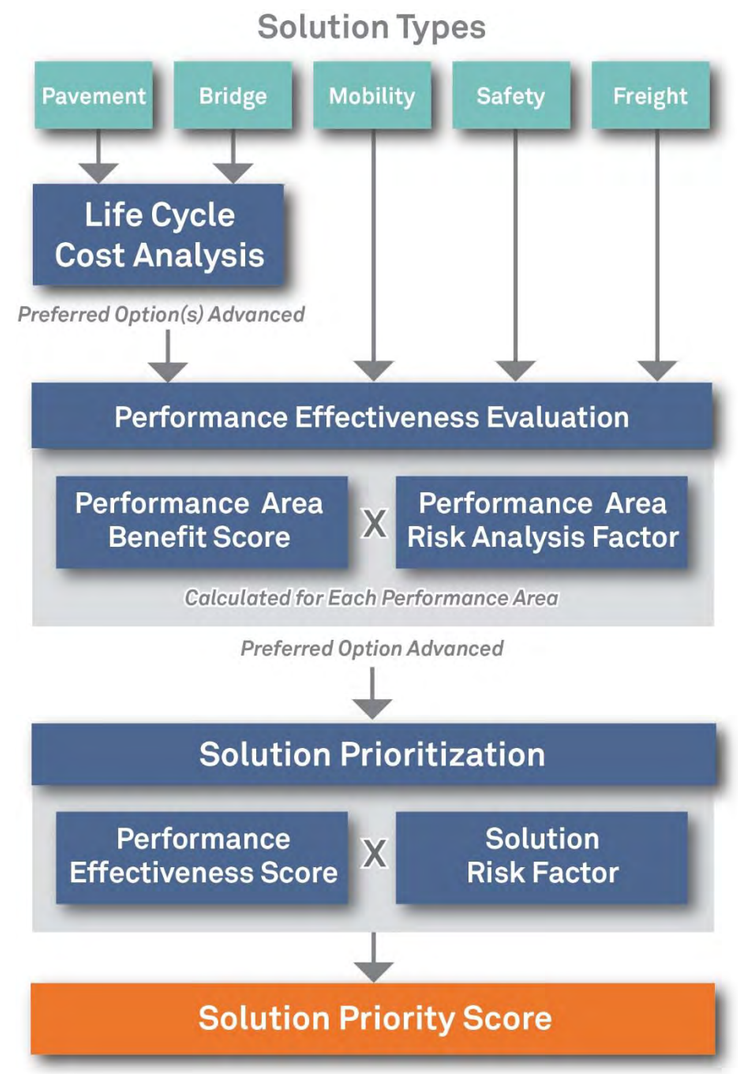
Solution Risk Analysis

All candidate solutions advanced through the Performance Effectiveness Evaluation are also evaluated through a Solution Risk Analysis process. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of performance failure.

Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score. The candidate solutions are ranked by prioritization score from highest to lowest. The highest prioritization score indicates the candidate solution that is recommended as the highest priority. Solutions that address multiple performance areas tend to score higher in this process.

Figure 24: Candidate Solution Evaluation Process



5.1 Life-Cycle Cost Analysis

LCCA is conducted for any candidate solution that is developed as a result of a need in the Pavement or Bridge Performance Area. The intent of the LCCA is to determine which options warrant further investigation and eliminate options that would not be considered strategic.

LCCA is an economic analysis that compares cost streams over time and presents the results in a common measure, the present value of all future costs. The cost stream occurs over an analysis period that is long enough to provide a reasonably fair comparison among alternatives that may differ significantly in scale of improvement actions over shorter time periods. For both bridge and pavement LCCA, the costs are focused on agency (ADOT) costs for corrective actions to meet the objective of keeping the bridge or pavement serviceable over a long period of time.

LCCA is performed to provide a more complete holistic perspective on asset performance and agency costs over the life of an investment stream. This approach helps ADOT look beyond initial and short-term costs, which often dominate the considerations in transportation investment decision making and programming.

Bridge LCCA

For the bridge LCCA, three basic strategies are analyzed that differ in timing and scale of improvement actions to maintain the selected bridges, as described below:

- Bridge replacement (large upfront cost but small ongoing costs afterwards)
- Bridge rehabilitation until replacement (moderate upfront costs then small to moderate ongoing costs until replacement)
- On-going repairs until replacement (low upfront and ongoing costs until replacement)

The bridge LCCA model developed for the CPS reviews the characteristics of the candidate bridges including bridge ratings and deterioration rates to develop the three improvement strategies (full replacement, rehabilitation until replacement, and repair until replacement). Each strategy consists of a set of corrective actions that contribute to keeping the bridge serviceable over the analysis period. Cost and effect of these improvement actions on the bridge condition are essential parts of the model. Other considerations in the model include bridge age, elevation, pier height, length to span ratio, skew angle, and substandard characteristics such as shoulders and vehicle clearance. The following assumptions are included in the bridge LCCA model:

- The bridge LCCA only addresses the structural condition of the bridge and does not address other issues or costs
- The bridge will require replacement at the end of its 75-year service life regardless of current condition
- The bridge elevation, pier height, skew angle, and length to span ratio can affect the replacement and rehabilitation costs
- The current and historical ratings are used to estimate a rate of deterioration for each candidate bridge
- Following bridge replacement, repairs will be needed every 20 years
- Different bridge repair and rehabilitation strategies have different costs, expected service life, and benefit to the bridge rating
- The Net Present Value (NPV) of future costs are discounted at 3% and all dollar amounts are in 2015 dollars
- If the LCCA evaluation recommends rehabilitation or repair, the solution is not be considered strategic and the rehabilitation or repair will be addressed by normal programming processes
- Since this LCCA is conducted at a planning level, and due to the variabilities in costs and improvement strategies, the LCCA NPV results that are within 15% should be considered equally; in such a case, the solution should be carried forward as a strategic replacement project – more detailed scoping will confirm if replacement or rehabilitation is needed

Based on the candidate solutions presented in **Table 19**, LCCA was not conducted for any bridges on the US 60|US 70|US 191 corridor. A summary of this analysis is shown in **Table 20**. Additional information regarding the LCCA is included in **Appendix E**.

Pavement LCCA

The LCCA approach to pavement is very similar to the process used for bridges. For the pavement LCCA, three basic strategies are analyzed that differ in timing and scale of improvement actions to maintain the selected pavement, as described below:

- Pavement replacement (large upfront cost but small ongoing costs afterwards – could be replacement with asphalt or concrete pavement)
- Pavement major rehabilitation until replacement (moderate upfront costs then small to moderate ongoing costs until replacement)
- Pavement minor rehabilitation until replacement (low upfront and ongoing costs until replacement)

The pavement LCCA model developed for the CPS reviews the characteristics of the candidate paving locations including the historical rehabilitation frequency to develop potential improvement strategies (full replacement, major rehabilitation until replacement, and minor rehabilitation until replacement, for either concrete or asphalt, as applicable). Each strategy consists of a set of corrective actions that contribute to keeping the pavement serviceable over the analysis period. The following assumptions are included in the pavement LCCA model:

- The pavement LCCA only addresses the condition of the pavement and does not address other issues or costs
- The historical pavement rehabilitation frequencies at each location are used to estimate future rehabilitation frequencies
- Different pavement replacement and rehabilitation strategies have different costs and expected service life

- The NPV of future costs are discounted at 3% and all dollar amounts are in 2015 dollars
- If the LCCA evaluation recommends rehabilitation or repair, the solution will not be considered strategic and the rehabilitation will be addressed by normal programming processes
- Because this LCCA is conducted at a planning level, and due to the variabilities in costs and improvement strategies, the LCCA NPV results that are within 15% should be considered equally; in such a case, the solution should be carried forward as a strategic replacement project – more detailed scoping will confirm if replacement or rehabilitation is needed

Based on the candidate solutions presented in **Table 19**, LCCA was conducted for one pavement project on the US 60|US 70|US 191corridor. A summary of this analysis is shown in **Table 21**. Additional information regarding the LCCA is contained in **Appendix E**.

As shown in **Table 20** and **Table 21**, the following conclusions were determined based on the LCCA

As shown in Tables 20 and 21, the following conclusions were determined based on the LCCA:

- Replacement is the only viable option for the following bridges due since their service life has expired (75-years) or will expire prior to the next possible programming year.
    - US 60 Pinal Creek Bridge (No. 36) – Built in 1920
    - US 60 Pinal Creek Bridge (No. 266) – Built in 1942
    - US 60 Queen Creek Bridge (No. 406) – Built in 1949
    - US 60 Waterfall Canyon Bridge (No. 328) – Built in 1929

- Pavement rehabilitation was the most cost effective option for improving the pavement quality between MP 283 and MP 284 on US 70.

Table 20: Bridge Life Cycle Cost Analysis Results

Candidate Solution	Present Value at 3% Discount Rate ($)			Ratio of Present Value Compared to Lowest Present Value			Other Needs	Results
	Replace	Rehab	Repair	Replace	Rehab	Repair		
US 60 Pinal Creek Bridge (No. 36)	$2,501,301	-	-	1.00	-	-	-	Considered a strategic solution to replace the bridge
US 60 Pinal Creek Bridge (No. 266)	$3,297,230	-	-	1.00	-	-	-	Considered a strategic solution to replace the bridge
US 60 Queen Creek Bridge (No. 406)	$9,322,474	-	-	1.00	-	-	-	Considered a strategic solution to replace the bridge
US 60 Waterfall Canyon Bridge (No. 328)	$1,600,870	-	-	1.00	-	-	-	Considered a strategic solution to replace the bridge

Table 21: Pavement Life Cycle Cost Analysis Results

Candidate Solution	Present Value at 3% Discount Rate ($)				Ratio of Present Value Compared to Lowest Present Value				Other Needs	Results
	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehabilitation	Asphalt Light Rehabilitation	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehabilitation	Asphalt Light Rehabilitation		
US 60 San Carlos Pavement Improvement (CS70.3, MP 283 to 284)	$4,761,541	$4,988,867	**$3,996,045**	$4,607,111	1.19	1.25	1.00	1.15	No	Reconstruction is not within 15% of lowest cost - Rehabilitation is recommended

5.2 Performance Effectiveness Evaluation

The results of the Performance Effectiveness Evaluation are combined with the results of a Performance Area Risk Analysis to determine the PES. The objectives of the Performance Effectiveness Evaluation include:

- Measure the benefit to the performance system versus the cost of the solution
- Include risk factors to help differentiate between similar solutions
- Apply to each performance area that is affected by the candidate solution
- Account for emphasis areas identified for the corridor

The Performance Effectiveness Evaluation includes the following steps:

- Estimate the post-solution performance for each of the five performance areas (Pavement, Bridge, Mobility, Safety, and Freight)
- Use the post-solution performance scores to calculate a post-solution level of need for each of the five performance areas
- Compare the pre-solution level of need to the post-solution level of need to determine the reduction in level of need (potential solution benefit) for each of the five performance areas
- Calculate performance area risk weighting factors for each of the five performance areas
- Use the reduction in level of need (benefit) and risk weighting factors to calculate the PES

Post-Solution Performance Estimation

For each performance area, a slightly different approach is used to estimate the post-solution performance. This process is based on the following assumptions:

- Pavement:
  - The IRI rating would decrease (to 30 for replacement or 45 for rehabilitation)
  - The Cracking rating would decrease (to 0 for replacement or rehabilitation)
- Bridge:
  - The structural ratings would increase (+1 for repair, +2 for rehabilitation, or increase to 8 for replacement)
  - The Sufficiency Rating would increase (+10 for repair, +20 for rehabilitation, or increase to 98 for replacement)
- Mobility:
  - Additional lanes would increase the capacity and therefore affect the Mobility Index and associated secondary measures
  - Other improvements (ramp metering, parallel ramps, variable speed limits) would also increase the capacity (to a lesser extent than additional lanes) and therefore would affect the Mobility Index and associated secondary measures
  - Changes in the Mobility Index (due to increased capacity) would have a direct effect on the TTI secondary measure
  - Changes in the Mobility Index (due to increased capacity) and Safety Index (due to crash reductions) would have a direct effect on the PTI secondary measure
  - Changes in the Safety Index (due to crash reductions) would have a direct effect on the Closure Extent secondary measure
- Safety:
  - Crash modification factors were developed that would be applied to estimate the reduction in crashes (for additional information see **Appendix F**)
- Freight:
  - Changes in the Mobility Index (due to increased capacity) and Safety Index (due to crash reductions) would have a direct effect on the Freight Index and the TPTI secondary measure
  - Changes in the Mobility Index (due to increased capacity) would have a direct effect on the TTTI secondary measure
  - Changes in the Safety Index (due to crash reductions) would have a direct effect on the Closure Duration secondary measure

Performance Area Risk Analysis

The Performance Area Risk Analysis is intended to develop a numeric risk weighting factor for each of the five performance areas (Pavement, Bridge, Mobility, Safety, and Freight). This risk analysis addresses other considerations for each performance area that are not directly included in the performance system. A risk weighting factor is calculated for each candidate solution based on the specific characteristics at the solution location. For example, the Pavement Risk Factor is based on factors such as the elevation, daily traffic volumes, and amount of truck traffic. Additional information regarding the Performance Area Risk Factors is included in **Appendix G**.

Following the calculation of the reduction in level of need (benefit) and the Performance Area Risk Factors, these values are used to calculate the PES. In addition, the reduction in level of Need in each emphasis area is also included in the PES.

Net Present Value Factor

The benefit (reduction in need) is measured as a one-time benefit. However, different types of solutions will have varying service lives during which the benefits will be obtained. For example, a preservation solution would likely have a shorter stream of benefits over time when compared to a modernization or expansion solution. To address the varying lengths of benefit streams, each solution is classified as a 10-year, 20-year, 30-year, or 75-year benefit stream, or the NPV factor (F_{NPV}). A 3% discount rate is used to calculate F_{NPV} for each classification of solution. The service lives and respective factors are described below:

- A 10-year service life is generally reflective of a preservation solution; this would include pavement and bridge preservation solutions which would likely have a 10-year stream of benefits; for these solutions, a F_{NPV} of 8.8 is used in the PES calculation

- A 20-year service life is reflective of modernization solutions that generally do not include new infrastructure; these solutions would likely have a 20-year stream of benefits; for these solutions, a F_{NPV} of 15.3 is used in the PES calculation
- A 30-year service life is generally reflective of an expansion solution or a modernization solution that includes new infrastructure; these solutions would likely have a 30-year stream of benefits; for these solutions, a F_{NPV} of 20.2 is used in the PES calculation
- A 75-year service life is used for bridge replacement solutions; for these solutions, a F_{NPV} of 30.6 is used in the PES calculation

Vehicle-Miles Travelled Factor

Another factor in assessing benefits is the number of travelers who would benefit from the implementation of the candidate solution. This factor varies between candidate solutions depending on the length of the solution and the magnitude of daily traffic volumes. Multiplying the solution length by the daily traffic volume results in vehicle-miles travelled (VMT), which provides a measure of the amount of traffic exposure that would receive the benefit of the proposed solution. The VMT is converted to a VMT factor (known as F_{VMT}), which is on a scale between 0 and 5, using the equation below:

$$F_{VMT} = 5 - (5 \times e^{VMT \times -0.0000139})$$

Performance Effectiveness Score

The PES is calculated using the following equation:

PES = (Sum of all Risk Factored Benefit Scores + Sum of all Risk Factored Emphasis Area Scores) / Cost) x F_{VMT} x F_{NPV}

Where:

Risk Factored Benefit Score = Reduction in Segment-Level Need (benefit) x Performance Area Risk Weighting Factor (calculated for each performance area)

Risk Factored Emphasis Area Score = Reduction in Corridor-Level Need x Performance Area Risk Factors x Emphasis Area Factor (calculated for each emphasis area)

*Cost = estimate cost of candidate solution in millions of dollars (see **Appendix H**)*

F_{VMT} = Factor between 0 and 5 to account for VMT at location of candidate solution based on existing (2014) daily volume and length of solution

F_{NPV} = Factor (ranging from 8.8 to 30.6 as previously described) to address anticipated longevity of service life (and duration of benefits) for each candidate solution

The resulting PES values are shown in **Table 22**. Additional information regarding the calculation of the PES is contained in **Appendix I**.

For candidate solutions with multiple options to address Mobility, Safety, or Freight needs, the PES should be compared to help identify the best performing option. If one option clearly performs better than the other options (e.g., more than twice the PES value and a difference in magnitude of at least 20 points), the other options should be eliminated from further consideration. If multiple options have similar PES values, those options should all be advanced to the prioritization process. On the US 60|US 70|US 191 corridor, the following candidate solutions have options:

- CS191.1 (A, B) – US 191 Elfrida to I-10 Freight Mitigation
- CS60.12 (A, B, C) - US 60 Superior to Miami Mobility and Freight Mitigation MP 227-243

Table 22: Performance Effectiveness Scores

Candidate Solution #	Segment #	Option	Candidate Solution Name	Milepost Location	Estimated Cost* ($ million)	Risk Factored Benefit Score					Risk Factored Emphasis Area Scores			Total Factored Benefit Score	F_{VMT}	F_{NPV}	Performance Effectiveness Score
						Pavement	Bridge	Safety	Mobility	Freight	Safety	Mobility	Freight				
191.1	191-2	A	US 191 Elfrida to I-10 Freight Mitigation Realign Roadway	MP 59.9-64	$46.7	0.82	6.02	0.00	0.81	0.87	0.00	0.23	0.03	8.79	0.40	20.2	1.5
		B	US 191 Elfrida to I-10 Freight Mitigation Realign Roadway and Construct Passing Lanes	MP 59.9-64	$62.7	0.82	6.02	0.00	1.05	0.87	0.00	0.31	0.03	9.11	0.40	20.2	1.2
191.2	191-5	-	US191 Safford Safety Improvements	MP 117-121	$0.6	0.00	0.00	2.97	0.00	0.00	0.01	0.00	0.00	2.98	1.03	8.8	42.4
70.4	70-10	-	US 70 San Carlos Safety Improvements	MP 268-292	$57.7	0.00	0.00	17.83	9.41	0.00	0.24	0.08	0.00	27.55	3.42	15.3	25.0
70.5	70-12	-	US 70 Cutter Safety Improvements	MP 257-260	$3.0	0.00	0.00	4.03	0.29	0.00	0.05	0.18	0.00	4.55	0.55	8.8	7.4
60.6	70|60-13	-	US 60 Pinal Creek Bridge (#36)	MP 249.8	$2.4	0.00	3.03	0.00	0.40	0.00	0.00	0.11	0.00	3.54	0.71	30.6	32.7
60.7	70|60-13	-	US 60 Pinal Creek Bridge (#226)	MP 249.64	$3.1	0.00	3.54	0.00	0.40	0.00	0.00	0.11	0.00	4.04	0.71	30.6	28.4
60.8	70|60-13	-	US 60 Globe-Miami Safety Improvements	MP 244.5-251	$7.7	0.00	0.00	12.81	0.00	0.00	0.13	0.00	0.02	12.96	2.84	8.8	42.1
60.9	70|60-13	-	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	MP 253.4-253.8	$0.6	0.00	0.00	0.00	0.00	3.51	0.00	0.00	0.02	3.53	0.19	20.2	22.1
60.10	60-14	-	US 60 Queen Creek Bridge (#406)	MP 227.71	$8.8	0.00	6.18	0.04	1.21	0.00	0.00	0.24	0.00	7.66	0.73	30.6	19.5
60.11	60-14	-	US 60 Waterfall Canyon Bridge (#328)	MP 229.5	$1.7	0.00	3.77	0.00	0.82	0.00	0.00	0.16	0.00	4.74	0.59	30.6	51.7
60.12	60-14	A	US 60 Superior to Miami Widen Shoulders	MP 227-243	$8.4	0.00	0.00	5.71	4.78	0.82	0.08	0.25	0.06	11.70	1.57	15.3	33.6
		B	US 60 Superior to Miami Climbing/ Passing Lanes	MP 227-243	$66.5	0.00	6.83	7.45	1.83	0.80	0.10	0.29	0.04	17.33	4.33	20.2	22.8
		C	US 60 Superior to Miami Construct New 4-Lane Divided	MP 227-243	$497.8	0.85	6.10	10.92	130.72	6.41	0.22	1.70	0.13	157.04	4.33	20.2	27.6
60.13	60-14	-	US 60 Top-of-the-World Safety Improvements	MP 232-234	$0.2	0.00	0.00	1.99	0.01	0.00	0.05	0.00	0.02	2.06	0.31	8.8	27.2
60.14	60-14	-	US 60 Queen Creek Safety Improvements	MP 227-229	$3.2	0.00	0.00	5.43	7.22	0.80	0.07	0.24	0.02	13.79	0.91	8.8	34.5

5.3 Solution Risk Analysis

Following the calculation of the PES, an additional step is taken to develop the prioritized list of solutions. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of performance failure. **Figure 25** shows the risk matrix used to develop the risk weighting factors.

Figure 25: Risk Matrix

		Severity/Consequence				
		Insignificant	**Minor**	**Significant**	**Major**	**Catastrophic**
Frequency/ Likelihood	**Very Rare**	Low	Low	Low	Moderate	Major
	Rare	Low	Low	Moderate	Major	Major
	Seldom	Low	Moderate	Moderate	Major	Severe
	Common	Moderate	Moderate	Major	Severe	Severe
	Frequent	Moderate	Major	Severe	Severe	Severe

Using the risk matrix in **Figure 25**, numeric values were assigned to each category of frequency and severity. The higher the risk, the higher the numeric factor that was assigned. The risk weight for each area of the matrix was calculated by multiplying the severity factor times the frequency factor. These numeric factors are shown in **Figure 26**.

Figure 26: Numeric Risk Matrix

			Severity/Consequence				
			Insignificant	**Minor**	**Significant**	**Major**	**Catastrophic**
		Weight	1.00	1.10	1.20	1.30	1.40
Frequency/ Likelihood	**Very Rare**	1.00	1.00	1.10	1.20	1.30	1.40
	Rare	1.10	1.10	1.21	1.32	1.43	1.54
	Seldom	1.20	1.20	1.32	1.44	1.56	1.68
	Common	1.30	1.30	1.43	1.56	1.69	1.82
	Frequent	1.40	1.40	1.54	1.68	1.82	1.96

Using the values in **Figure 26**, risk weighting factors were calculated for each of the four risk categories (low, moderate, major, and severe). These values are simply the average of the values in **Figure 26** that fall within each category. The resulting average risk weighting factors are:

Low	Moderate	Major	Severe
1.14	1.36	1.51	1.78

The risk weighting factors listed above are assigned to the five performance areas as follows:

- Safety = 1.78
  - The Safety performance area quantifies the likelihood of fatal or incapacitating injury crashes; therefore, it is assigned the Severe (1.78) risk weighting factor
- Bridge = 1.51
  - The Bridge performance area focuses on the structural adequacy of bridges; a bridge failure may result in crashes or traffic being detoured for long periods of time resulting in significant travel time increases; therefore, it is assigned the Major (1.51) risk weighting factor
- Mobility and Freight = 1.36
  - The Mobility and Freight performance areas focus on capacity and congestion; failure in either of these performance areas would result in increased travel times but would not have significant effect on safety (crashes) that would not already be addressed in the Safety performance area; therefore, they are assigned the Moderate (1.36) risk weighing factor
- Pavement = 1.14
  - The Pavement performance area focuses on the ride quality of the pavement; failure in this performance area would likely be a spot location that would not dramatically affect drivers beyond what is already captured in the Safety performance area; therefore, it is assigned the Low (1.14) risk weighting factor

The benefit in each performance area is calculated for each candidate solution as part of the Performance Effectiveness Evaluation. Using this information on benefits and the risk factors listed above, a weighted (based on benefit) solution-level numeric risk factor is calculated for each candidate solution. For example, a solution that has 50% of its benefit in Safety and 50% of its benefit in Mobility has a weighted risk factor of 1.57 (0.50 x 1.36 + 0.50 x 1.78 = 1.57).

5.4 Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score as follows:

Prioritization Score = PES x Weighted Risk Factor x Segment Average Need Score

Where:

*PES = Performance Effectiveness Score as shown in **Table 22***

Weighted Risk Factor = Weighted factor to address risk of not implementing a solution based on the likelihood and severity of the performance failure

*Segment Average Need Score = Segment average need score as shown in **Table 17***

Table 23 shows the prioritization scores for the candidate solutions subjected to the solution evaluation and prioritization process. Solutions that address multiple performance areas tend to score higher in this process. A prioritized list of candidate solutions is provided in the subsequent section. See **Appendix J** for additional information on the prioritization process.

Table 23: Prioritization Scores

Candidate Solution #	Segment	Option	Candidate Solution Name	Milepost Location	Estimated Cost* ($ million)	Performance Effectiveness Score	Weighted Risk Factor	Segment Need	Prioritization Score	Percentage by which Solution Reduces Performance Area Segment Needs				
										Pavement	Bridge	Mobility	Safety	Freight
191.1	191-2	A	US 191 Elfrida to I-10 Freight Mitigation Realign Roadway	59.9-64	$46.7	1.5	1.45	1.38	3	100%	100%	14%		3%
		B	US 191 Elfrida to I-10 Freight Mitigation Realign Roadway and Construct Passing Lanes	59.9-64	$62.7	1.2	1.44	1.38	2	100%	100%	18%		3%
191.2	191-5	-	US191 Safford Safety Improvements	117-121	$0.6	42.4	1.78	2.00	151				23%	
70.4	70-10	-	US 70 San Carlos Safety Improvements	268-292	$57.7	25.0	1.64	1.39	57			38%	36%	
70.5	70-12	-	US 70 Cutter Safety Improvements	257-260	$3.0	7.4	1.75	1.31	17			11%	59%	
60.6	70|60-13	-	US 60 Pinal Creek Bridge (#36)	249.8	$2.4	32.7	1.49	2.23	109		30%	11%		
60.7	70|60-13	-	US 60 Pinal Creek Bridge (#226)	249.64	$3.1	28.4	1.50	2.23	95		35%	11%		
60.8	70|60-13	-	US 60 Globe-Miami Safety Improvements	244.5-251	$7.7	42.1	1.79	2.23	167			4%	30%	2%
60.9	70|60-13	-	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	253.4-253.8	$0.6	22.1	1.36	2.23	67					26%
60.10	60-14	-	US 60 Queen Creek Bridge (#406)	227.71	$8.8	19.5	1.49	2.00	58		49%	1%		
60.11	60-14	-	US 60 Waterfall Canyon Bridge (#328)	229.5	$1.7	51.7	1.48	2.00	153		30%	1%		
60.12	60-14	A	US 60 Superior to Miami Widen Shoulders	227-243	$8.4	33.6	1.57	2.00	106			1%	14%	5%
		B	US 60 Superior to Miami Climbing/ Passing Lanes	227-243	$66.5	22.8	1.61	2.00	73		55%	7%	17%	11%
		C	US 60 Superior to Miami Construct New 4-Lane Divided	227-243	$497.8	27.6	1.40	2.00	77	57%	49%	92%	25%	13%
60.13	60-14	-	US 60 Top-of-the-World Safety Improvements	232-234	$0.2	27.2	1.78	2.00	97				5%	
60.14	60-14	-	US 60 Queen Creek Safety Improvements	227-229	$3.2	34.5	1.53	2.00	106			6%	12%	2%

6.0 SUMMARY OF CORRIDOR RECOMMENDATIONS

6.1 Prioritized Candidate Solution Recommendations

Table 24 and **Figure 27** show the prioritized candidate solutions recommended for the US 60|US 70|US 191 corridor. Implementation of these solutions is anticipated to improve performance of the corridor. The following observations were noted about the prioritized solutions:

- Most of the anticipated improvements in performance are in the Mobility, Safety, and Freight performance areas
- The highest ranking solutions tended to have overlapping benefits in the Mobility, Safety, and Freight performance areas
- The highest priority solutions address needs in the US 60 Superior to Miami area (MP 227 to MP 243)

6.2 Other Corridor Recommendations

As part of the investigation of strategic investment areas and candidate solutions, other corridor recommendations can also be identified. These recommendations could include modifications to the existing Statewide Construction Program, areas for further study, or other corridor-specific recommendations that are not related to construction or policy. The list below identifies other corridor recommendations for the US 60|US 70|US 191 corridor:

- A Sign Visibility Study in the Safford area along US 191 is recommended to identify locations with potential to improve retroreflectivity. Poor visibility of crossroads in the Safford area is causing a higher level of crashes.
- Road Safety Assessments are recommended in Peridot, Cutter and Globe to identify safety improvements, specifically pedestrian circulation and access needs in Peridot.
- Access Control Studies in Peridot (MP 270 – 274) and Globe-Miami (MP 243 – 255) are recommended to identify potential for access consolidation, signage, etc to reduce friction and improve safety.
- Recommend Superior to Globe DCR/Feasibility Study
- Recommend San Carlos Area (MP 268 – 292) Superelevation Study

6.3 Policy and Initiative Recommendations

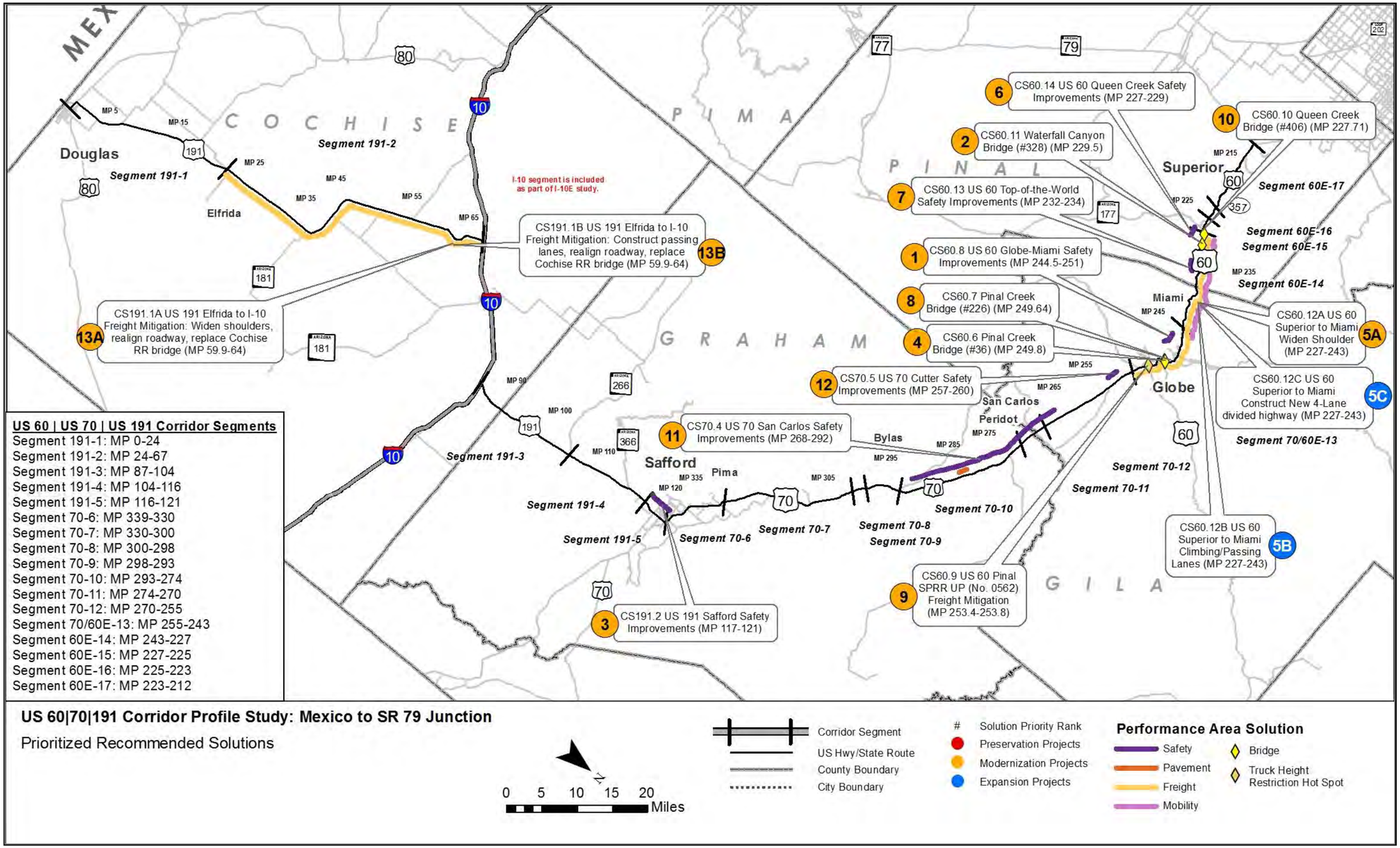
In addition to location-specific needs, general corridor and system-wide needs have also been identified through the CPS process. While these needs are more overarching and cannot be individually evaluated through this process, it is important to document them. A list of recommended policies and initiatives was developed for consideration when programming future projects not only on US 60|US 70|US 191, but across the entire state highway system where the conditions are applicable. The following list, which is in no particular order of priority, was derived from the Round 1, Round 2, and Round 3 CPS:

- Install Intelligent Transportation System (ITS) conduit with all new infrastructure projects
- Prepare strategic plans for Closed Circuit Television (CCTV) camera and Road Weather Information System (RWIS) locations statewide
- Leverage power and communication at existing weigh-in-motion (WIM), dynamic message signs (DMS), and call box locations to expand ITS applications across the state
- Consider solar power for lighting and ITS where applicable
- Investigate ice formation prediction technology where applicable
- Conduct highway safety manual evaluation for all future programmed projects
- Develop infrastructure maintenance and preservation plans (including schedule and funding) for all pavement and bridge infrastructure replacement or expansion projects
- Develop standardized bridge maintenance procedures so districts can do routine maintenance work
- Review historical ratings and level of previous investment during scoping of pavement and bridge projects. In pavement locations that warrant further investigation, conduct subsurface investigations during project scoping to determine if full replacement is warranted
- For pavement rehabilitation projects, enhance the amount/level of geotechnical investigations to address issues specific to the varying conditions along the project
- Expand programmed and future pavement projects as necessary to include shoulders
- Expand median cable barrier guidelines to account for safety performance
- Install CCTV cameras with all DMS
- In locations with limited communications, use CCTV cameras to provide still images rather than streaming video
- Develop statewide program for pavement replacement
- Install additional continuous permanent count stations along strategic corridors to enhance traffic count data
- When reconstruction or rehabilitation activities will affect existing bridge vertical clearance, the dimension of the new bridge vertical clearance should be a minimum of 16.25 feet where feasible
- All new or reconstructed roadway/shoulder edges adjacent to an unpaved surface should be constructed with a Safety Edge
- Collision data on tribal lands may be incomplete or inconsistent; additional coordination for data on tribal lands is required to ensure adequate reflection of safety issues
- Expand data collection devices statewide to measure freight delay
- Evaluate and accommodate potential changes in freight and goods movement trends that may result from improvements and expansions to the state roadway network

Table 24: Prioritized Recommended Solutions

Rank	Candidate Solution #	Option	Solution Name and Location	Description / Scope	Estimated Cost (in millions)	Investment Category Preservation [P] Modernization [M] Expansion [E]	Prioritization Score
1	60.8	-	US 60 Globe-Miami Safety Improvements	Install lighting Install speed feedback signs (MP 246 - 250) Install warning signs with beacons in advance of SR 188 intersection	$7.7	M	167
2	60.11	-	US 60 Waterfall Canyon Bridge (#328)	Replace Bridge	$1.7	M	153
3	191.2	-	US191 Safford Safety Improvements	US 191/Armory Road Intersection: Install Warning Signs with Beacons, Improve Signal Visibility US 191/Discovery Park Intersection: Improve Signal Visibility, Install Dynamic Speed Feedback Signs US 191/Lone Star Intersection: Install Traffic Signal, Install Warning Signs with Beacons US 191/16th Street Intersection: Install Warning Signs with Beacons	$0.6	M	151
4	60.6	-	US 60 Pinal Creek Bridge (#36)	Replace Bridge	$2.4	M	109
5	60.12	A	US 60 Top-of-the-World to Superior Widen shoulder	Widen Shoulders (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5), Install Rock-Fall Mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75), dynamic weather warning beacons and RWIS. *Note: Queen Creek Tunnel limits omitted from solution (MP 228.3 – 228.5)	$8.4	M	106
		C	*US 60 Top-of-the-World to Superior Construct New 4-lane divided*	*Construct four-lane divided (using 2 existing-lanes for one direction)* *(Cost based upon US 60 Superior to Globe Feasibility Study 2014)*	*$497.8*	*E*	*77*
		B	*US 60 Top-of-the-World to Superior Climbing/ Passing Lanes*	*Widen Shoulders (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5), Install Rock-Fall Mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75); Install Dynamic Weather Warning Beacons and RWIS*	*$66.5*	*E*	*73*
6	60.14	-	US 60 Queen Creek Safety Improvements	Widen Shoulders; Install Warning Signs, Dynamic Speed Feedback Signs, Centerline Rumble Strip, Guardrail (EB and WB)	$3.2	M	106
7	60.13	-	US 60 Top-of-the-World Safety Improvements	Install Warning Signs, Dynamic Speed Feedback Signs, High Visibility Edge Line Striping, Centerline Rumble Strip	$0.2	M	97
8	60.7	-	US 60 Pinal Creek Bridge (#226)	Replace Bridge	$3.1	M	95
9	60.9	-	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	Re-profile roadway to achieve 16.5 feet vertical clearance	$0.6	M	67
10	60.10	-	US 60 Queen Creek Bridge (#406)	Replace Bridge	$8.8	M	58
11	70.4	-	US 70 San Carlos Safety Improvements	Install Centerline Rumble Strip (MP 268-292), Warning Signs with Beacons (MP 278.5, 280, 292), Warning Signs (MP 269, 273), Dynamic Speed Feedback Signs (MP 268, 273, 278.5, 280, 292); Widen Shoulders (MP 270-292); Formalize Pullouts (WB MP 274.5, EB MP 279, EB MP 289, WB 292); Construct Passing Lane (WB MP 282-288 and EB 262-264)	$57.7	M	57
12	70.5	-	US 70 Cutter Safety Improvements	Install Lighting and Center Turn Lane	$3.1	M	16
13	191.1A	A	US 191 Elfrida to I-10 Freight Mitigation: Widen shoulders, realign roadway, replace Cochise RR bridge	Realign Roadway, Replace Cochise RR Bridge	$46.7	M	3
		B	*US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge*	*Realign Roadway, Construct Passing Lanes (NB and SB), Replace Cochise RR Bridge*	*$62.7*	*M*	*2*

Figure 27: Prioritized Recommended Solutions



6.4 Next Steps

The candidate solutions recommended in this study are not intended to be a substitute or replacement for traditional ADOT project development processes where various ADOT technical groups and districts develop candidate projects for consideration in the performance-based programming in the P2P process. Rather, these candidate solutions are intended to complement ADOT's traditional project development processes through a performance-based process to address needs in one or more of the five performance areas of Pavement, Bridge, Mobility, Safety, and Freight. Candidate solutions developed for the US 60|US 70|US 191 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

It is important to note that the candidate solutions are intended to represent strategic solutions to address existing performance needs related to the Pavement, Bridge, Mobility, Safety, and Freight performance areas. Therefore, the strategic solutions are not intended to preclude recommendations related to the ultimate vision for the corridor that may have been defined in the context of prior planning studies and/or design concept reports. Recommendations from such studies are still relevant to addressing the ultimate corridor objectives.

Upon completion of all three CPS rounds, the results will be incorporated into a summary document comparing all corridors that is expected to provide a performance-based review of statewide needs and candidate solutions.

Appendix A: Corridor Performance Maps

This appendix contains maps of each primary and secondary measure associated with the five performance areas for the US 60 | US 70 | US 191 corridor. The following are the areas and maps included:

Pavement Performance Area:

- Pavement Index and Hot Spots
- Pavement Serviceability (Directional)
- Percentage of Pavement Area Failure

Bridge Performance Area:

- Bridge Index and Hot Spots
- Bridge Sufficiency
- Percent of Deck Area on Functionally Obsolete Bridges
- Lowest Bridge Rating

Mobility Performance Area:

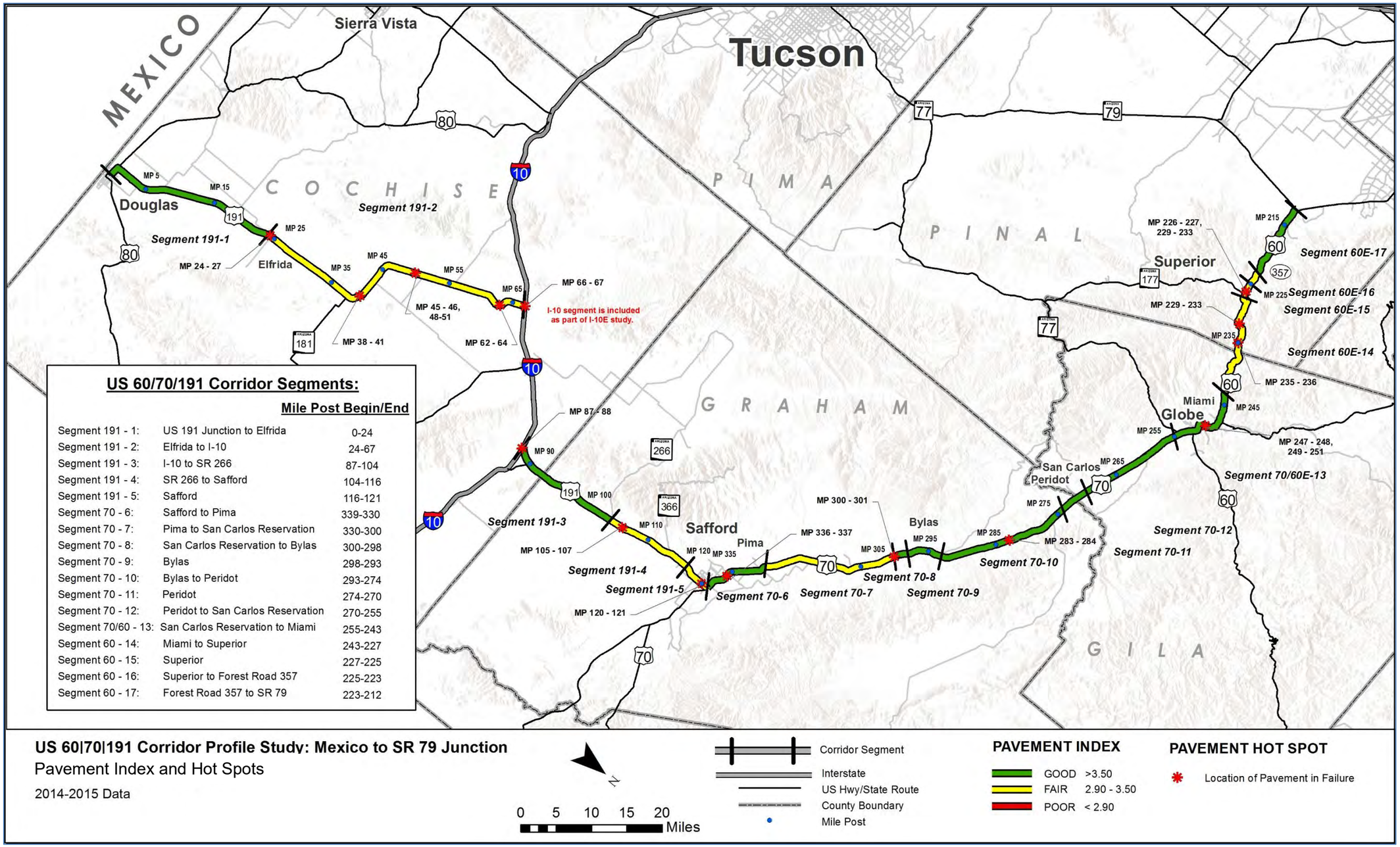
- Mobility Index
- Future Daily V/C
- Existing Peak V/C (Directional)
- Average Instances per Year a Given Milepost Is Closed per Segment Mile
- All Vehicles Travel Time Index
- All Vehicles Planning Time Index
- Multimodal Opportunities
- Percentage of Bicycle Accommodation

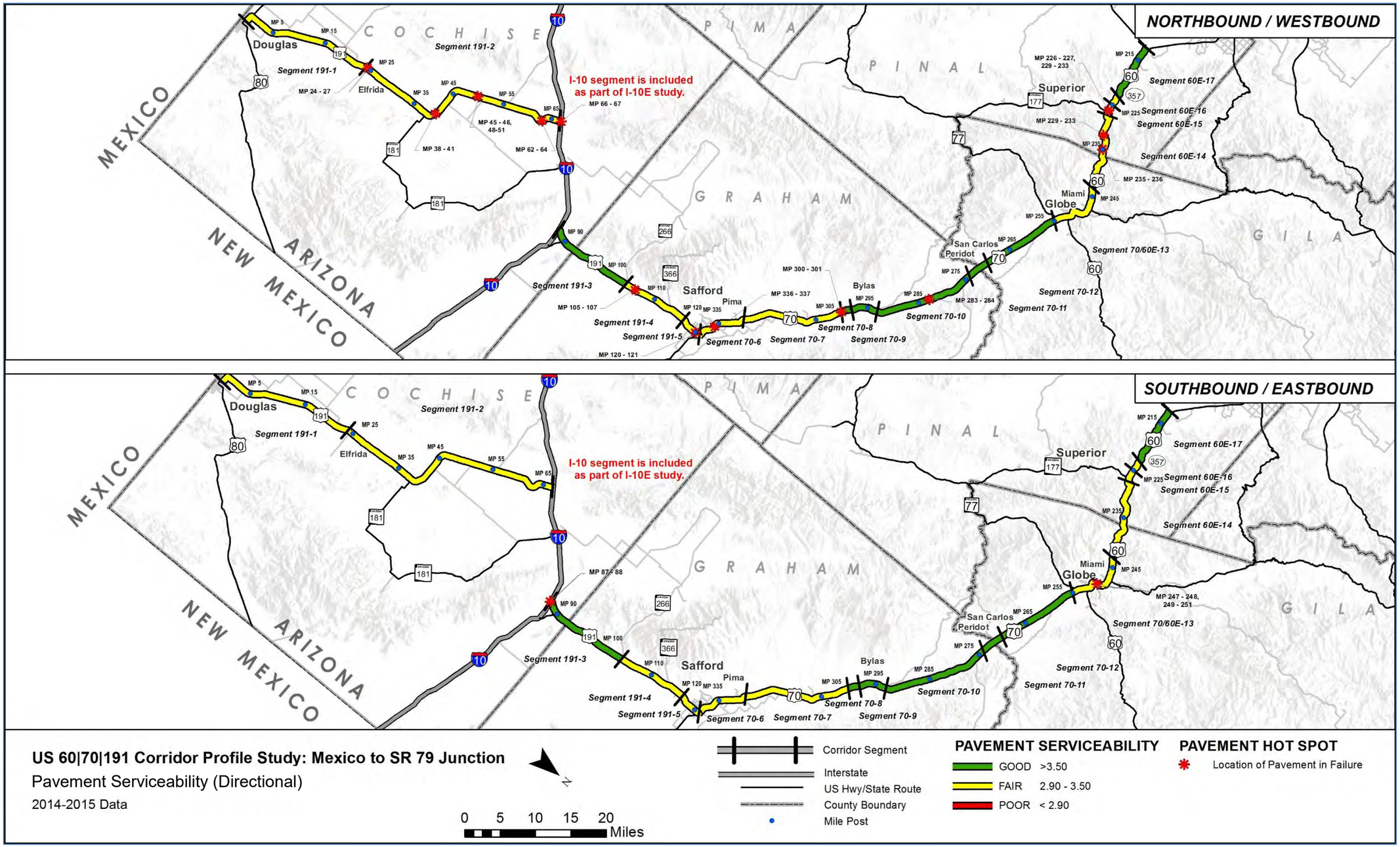
Safety Performance Area:

- Safety Index and Hot Spots
- Safety Index and Hot Spots (Directional)
- Relative Frequency of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors Compared to the Statewide Average for Similar Segments

Freight Performance Area:

- Freight Index and Hot Spots
- Truck Travel Time Index (Directional)
- Truck Planning Time Index (Directional)
- Average Minutes per Year Given Milepost Is Closed per Segment Mile (Directional)
- Freight Truck Height Restrictions

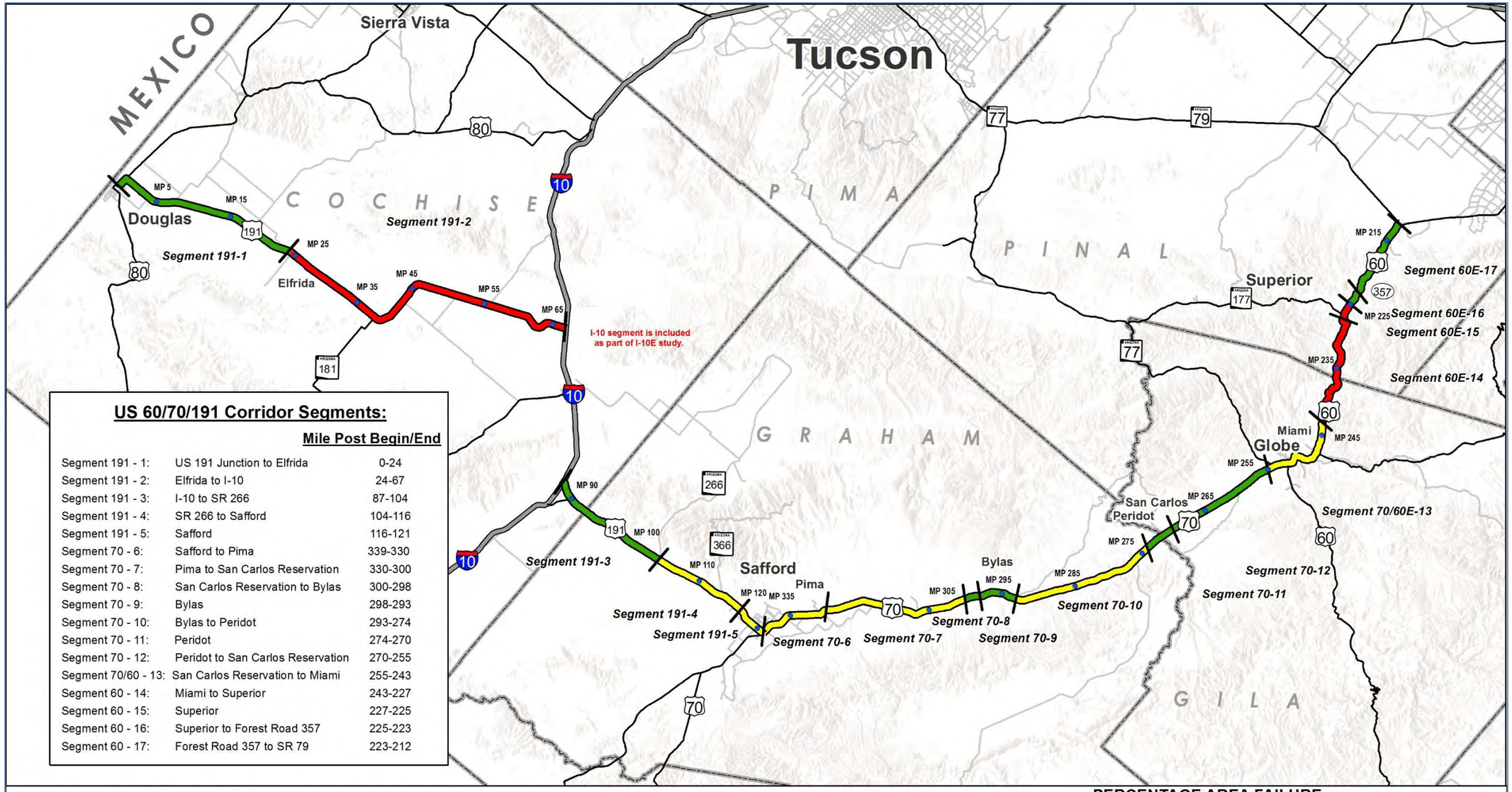

MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos Peridot
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
MP 5
MP 15
MP 24 - 27
MP 25
MP 35
MP 38 - 41
MP 45
MP 45 - 46, 48-51
MP 55
MP 62 - 64
MP 65
MP 66 - 67
MP 87 - 88
MP 90
MP 100
MP 105 - 107
MP 110
MP 120
MP 120 - 121
MP 335
MP 336 - 337
MP 300 - 301
MP 305
MP 295
MP 285
MP 283 - 284
MP 275
MP 265
MP 255
MP 247 - 248, 249 - 251
MP 245
MP 235
MP 235 - 236
MP 229 - 233
MP 226 - 227, 229 - 233
MP 225
MP 215
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
Segment 191 - 2: Elfrida to I-10 24-67
Segment 191 - 3: I-10 to SR 266 87-104
Segment 191 - 4: SR 266 to Safford 104-116
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Pavement Index and Hot Spots
2014-2015 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
PAVEMENT INDEX
GOOD >3.50
FAIR 2.90 - 3.50
POOR < 2.90
PAVEMENT HOT SPOT
Location of Pavement in Failure

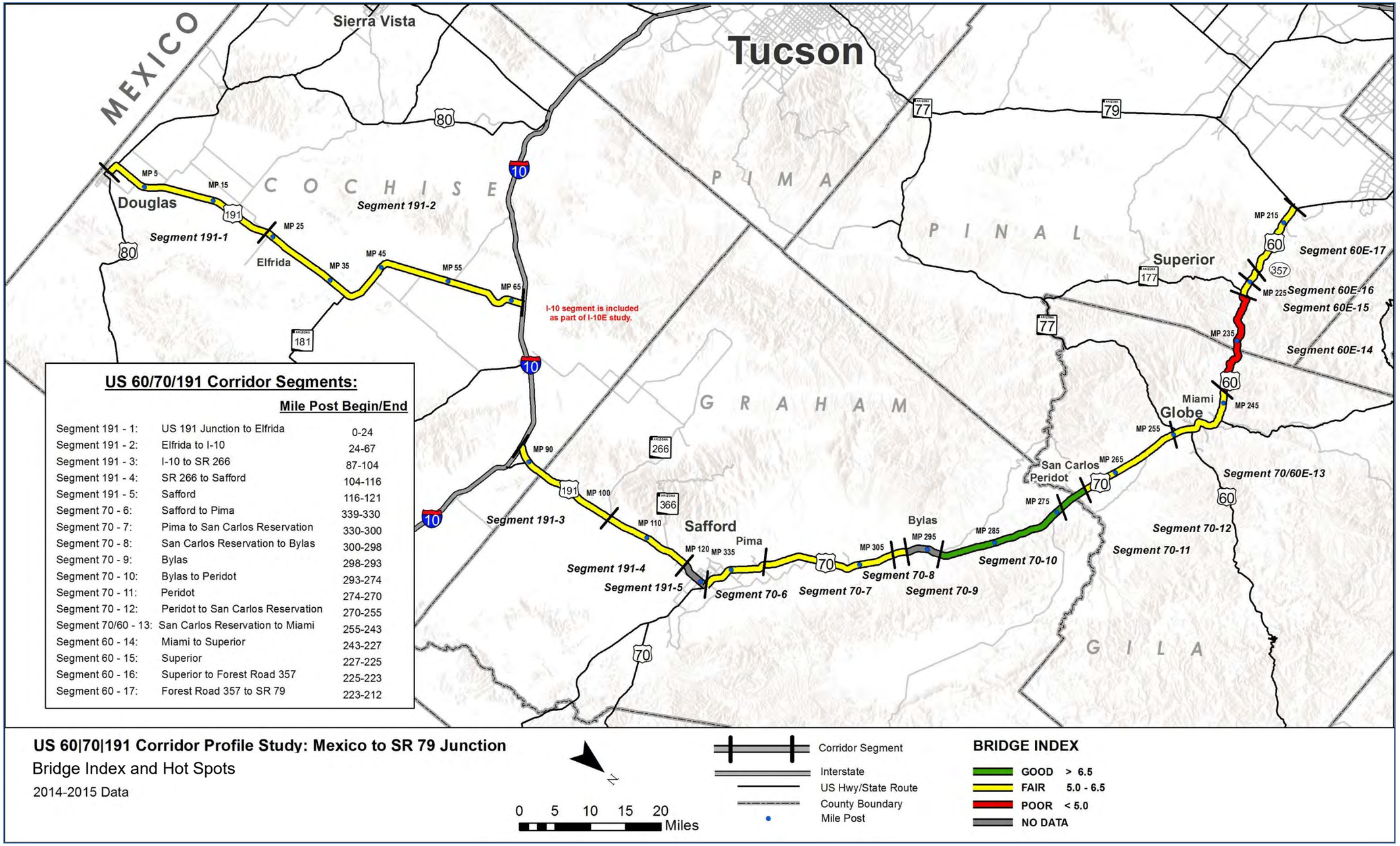


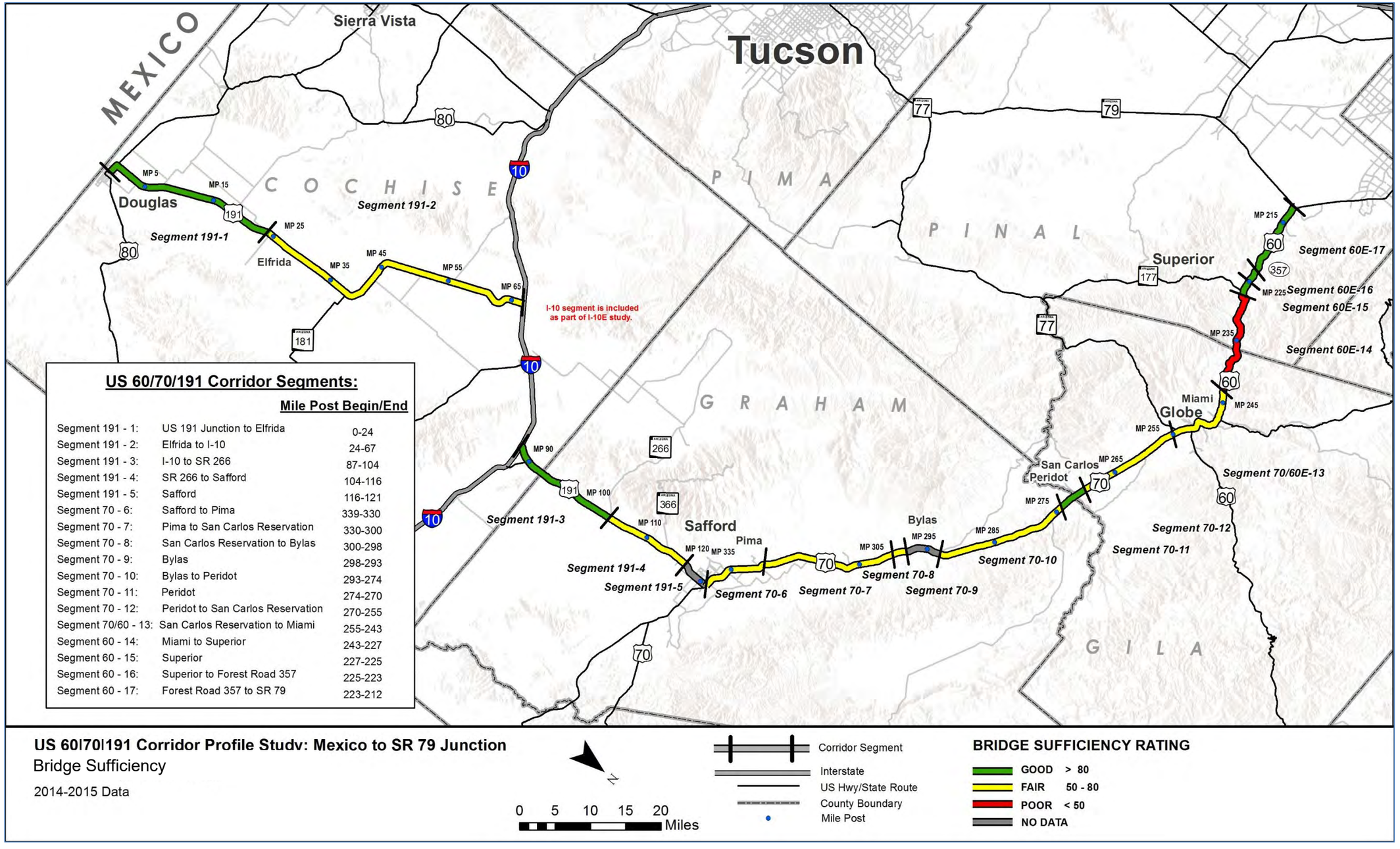
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction

Pavement Serviceability (Directional)

2014-2015 Data


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
Segment 191 - 2: Elfrida to I-10 24-67
Segment 191 - 3: I-10 to SR 266 87-104
Segment 191 - 4: SR 266 to Safford 104-116
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Percentage of Pavement Area Failure
2014-2015 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
PERCENTAGE AREA FAILURE
Percentage of Pavement in Failure
ABOVE AVERAGE PERFORMACE <5%
AVERAGE PERFORMANCE 5% - 20%
BELOW AVERAGE PERFORMANCE >20%


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
Segment 191 - 2: Elfrida to I-10 24-67
Segment 191 - 3: I-10 to SR 266 87-104
Segment 191 - 4: SR 266 to Safford 104-116
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Bridge Index and Hot Spots
2014-2015 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
BRIDGE INDEX
GOOD > 6.5
FAIR 5.0 - 6.5
POOR < 5.0
NO DATA


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
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MP 215
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Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
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Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
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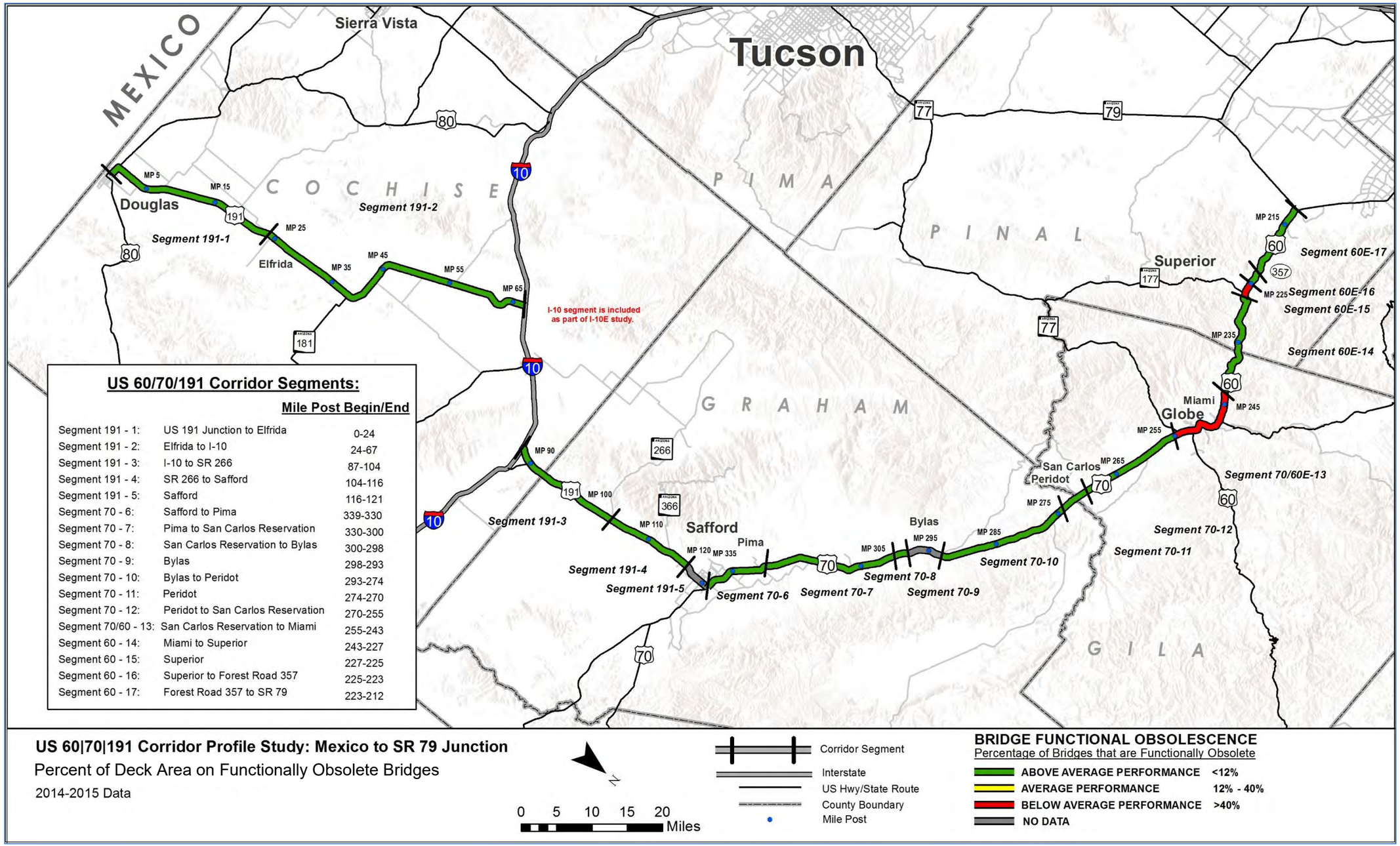
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Studv: Mexico to SR 79 Junction
Bridge Sufficiency
2014-2015 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
BRIDGE SUFFICIENCY RATING
GOOD > 80
FAIR 50 - 80
POOR < 50
NO DATA


MEXICO
Sierra Vista
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COCHISE
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PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
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MP 45
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MP 100
MP 110
MP 120
MP 335
MP 305
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MP 275
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Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
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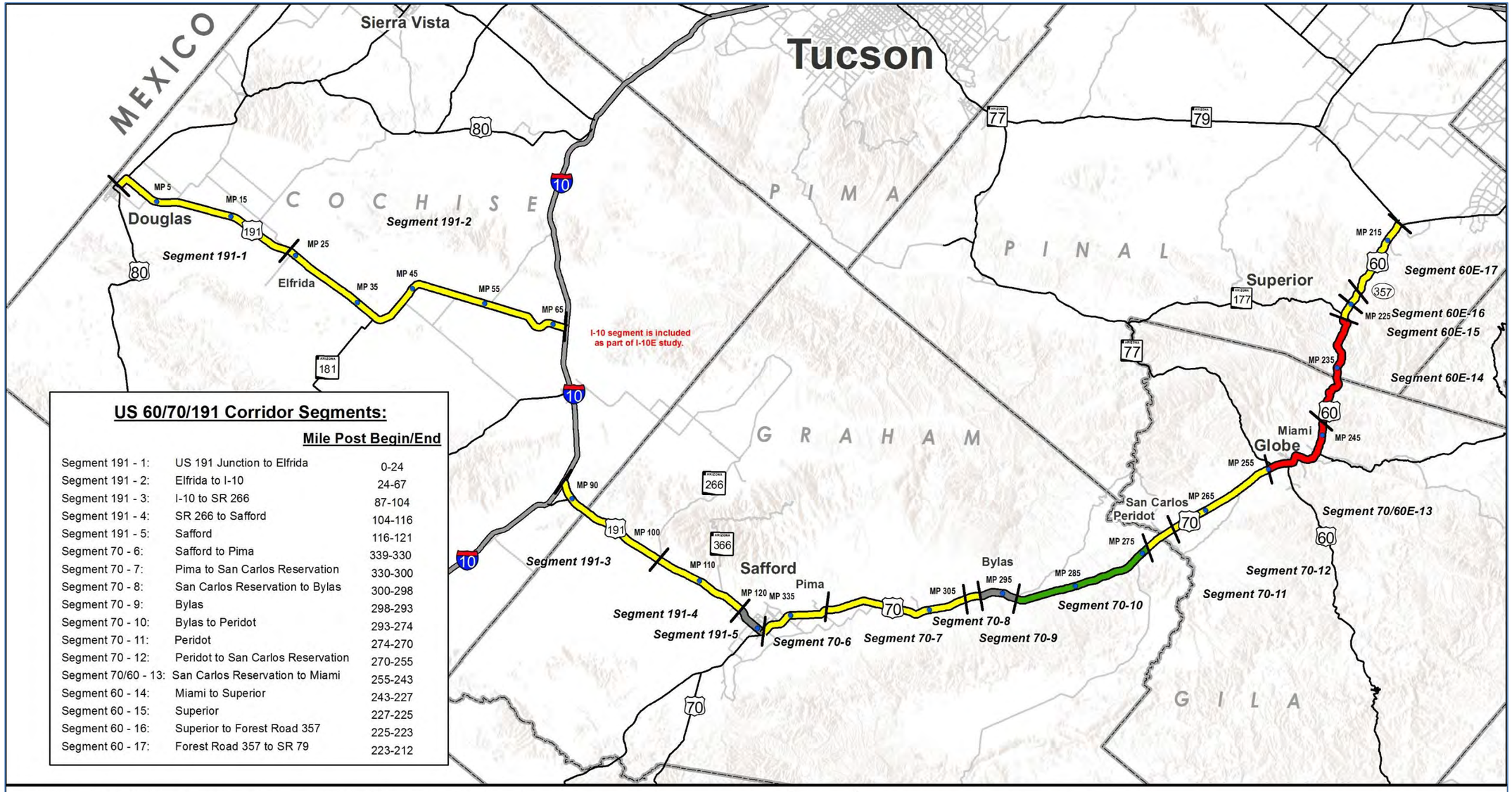
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Percent of Deck Area on Functionally Obsolete Bridges
2014-2015 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
BRIDGE FUNCTIONAL OBSOLESCENCE
Percentage of Bridges that are Functionally Obsolete
ABOVE AVERAGE PERFORMANCE <12%
AVERAGE PERFORMANCE 12% - 40%
BELOW AVERAGE PERFORMANCE >40%
NO DATA



US 60/70/191 Corridor Segments:

		Mile Post Begin/End
Segment 191 - 1:	US 191 Junction to Elfrida	0-24
Segment 191 - 2:	Elfrida to I-10	24-67
Segment 191 - 3:	I-10 to SR 266	87-104
Segment 191 - 4:	SR 266 to Safford	104-116
Segment 191 - 5:	Safford	116-121
Segment 70 - 6:	Safford to Pima	339-330
Segment 70 - 7:	Pima to San Carlos Reservation	330-300
Segment 70 - 8:	San Carlos Reservation to Bylas	300-298
Segment 70 - 9:	Bylas	298-293
Segment 70 - 10:	Bylas to Peridot	293-274
Segment 70 - 11:	Peridot	274-270
Segment 70 - 12:	Peridot to San Carlos Reservation	270-255
Segment 70/60 - 13:	San Carlos Reservation to Miami	255-243
Segment 60 - 14:	Miami to Superior	243-227
Segment 60 - 15:	Superior	227-225
Segment 60 - 16:	Superior to Forest Road 357	225-223
Segment 60 - 17:	Forest Road 357 to SR 79	223-212

US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction

Lowest Bridge Rating

2014-2015 Data

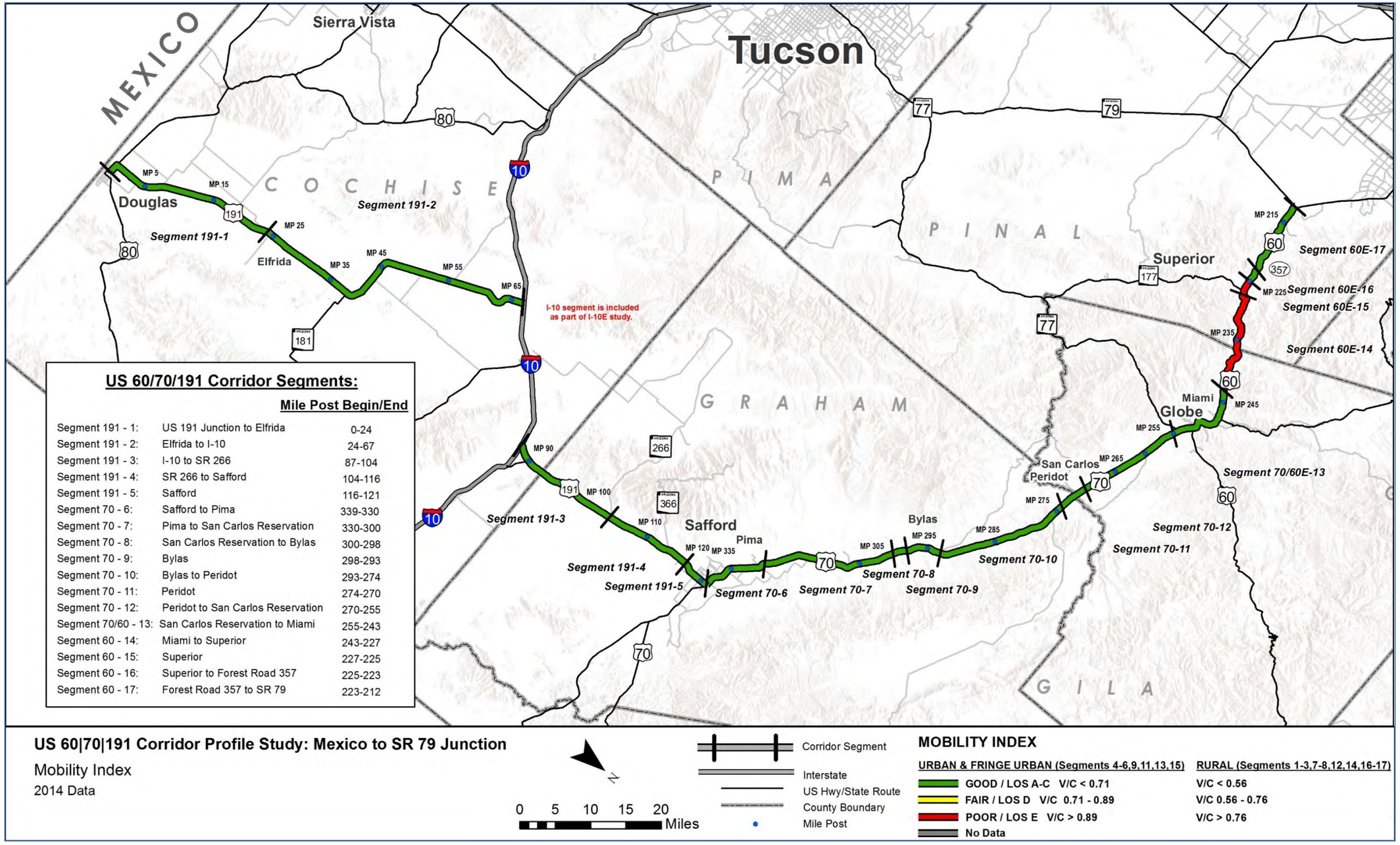
N

0 5 10 15 20 Miles

Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post

BRIDGE RATING

- GOOD > 6.0
- FAIR 5.0 - 6.0
- POOR < 5.0
- NO DATA


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
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Segment 191-5
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Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
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US 60/70/191 Corridor Segments:
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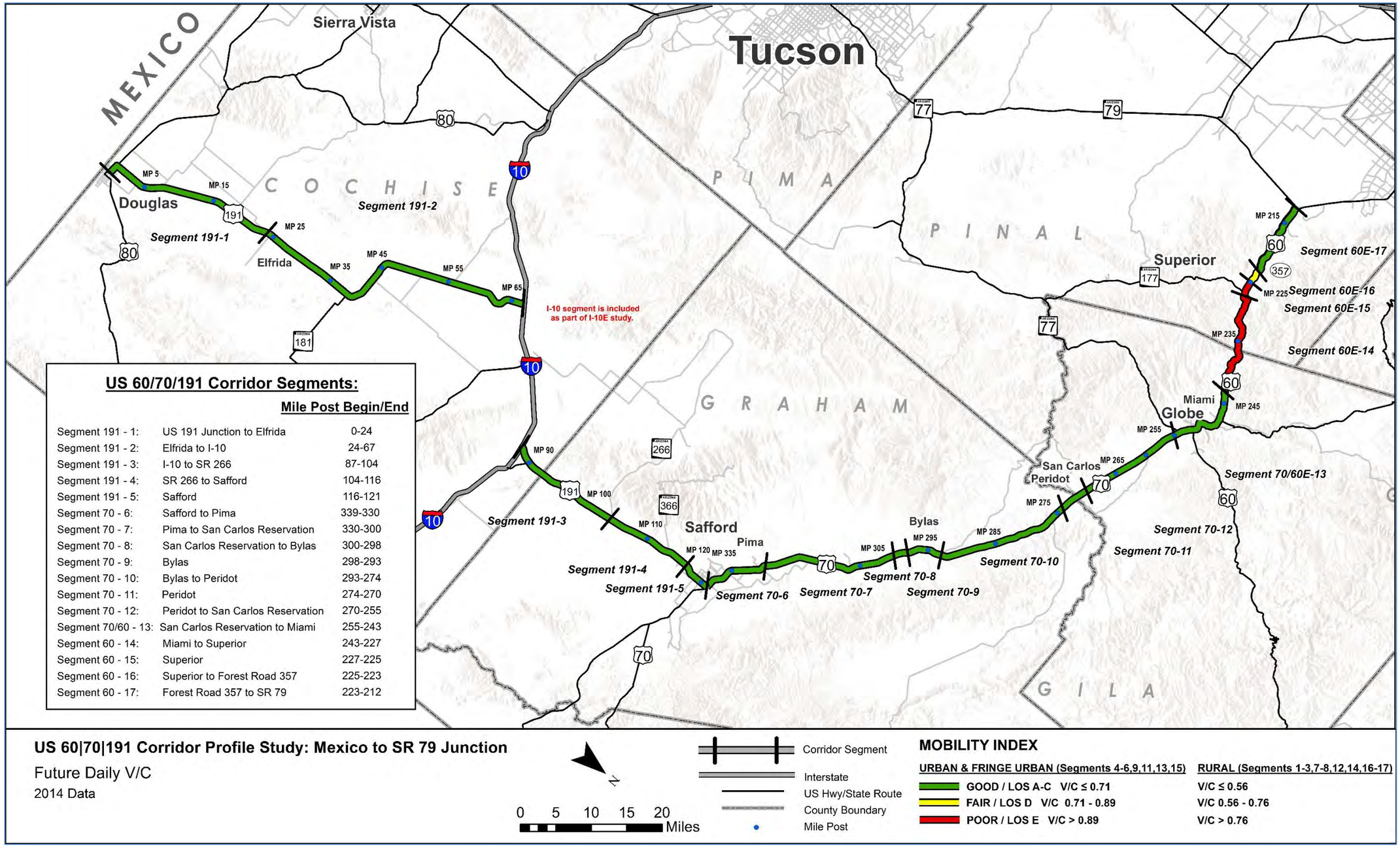
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Mobility Index
2014 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
MOBILITY INDEX
URBAN & FRINGE URBAN (Segments 4-6,9,11,13,15)
GOOD / LOS A-C V/C < 0.71
FAIR / LOS D V/C 0.71 - 0.89
POOR / LOS E V/C > 0.89
No Data
RURAL (Segments 1-3,7-8,12,14,16-17)
V/C < 0.56
V/C 0.56 - 0.76
V/C > 0.76


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
MP 45
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MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
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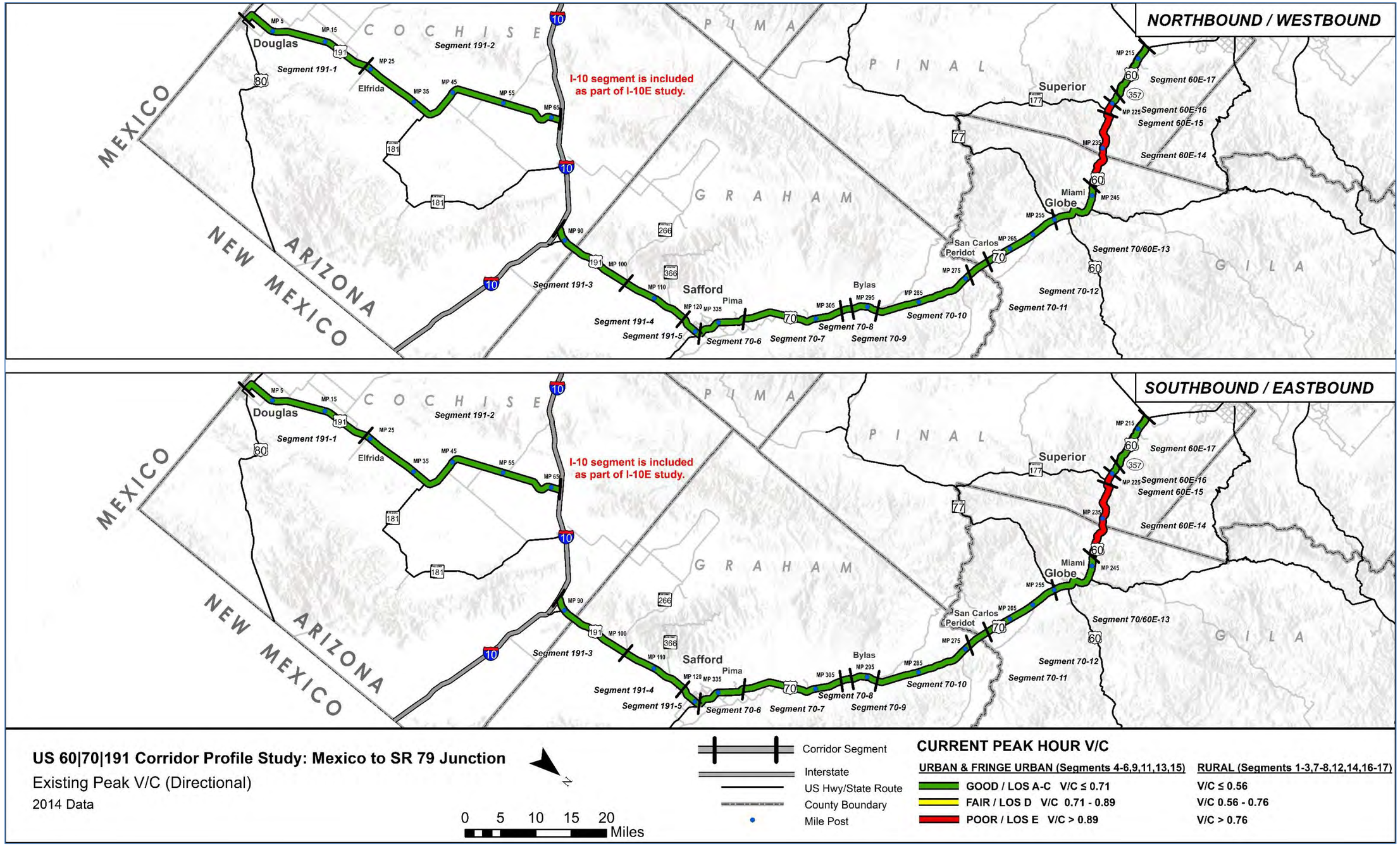
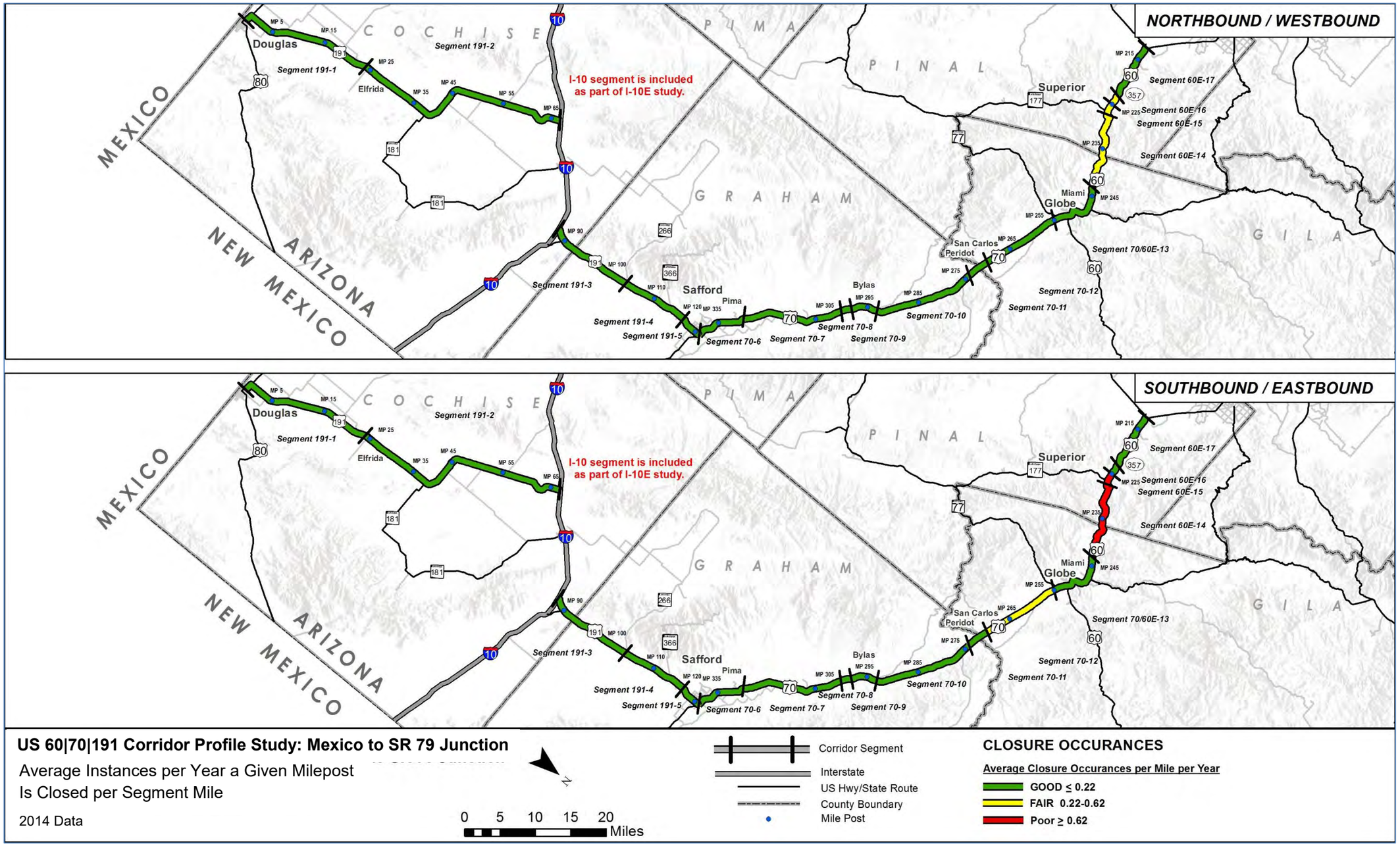
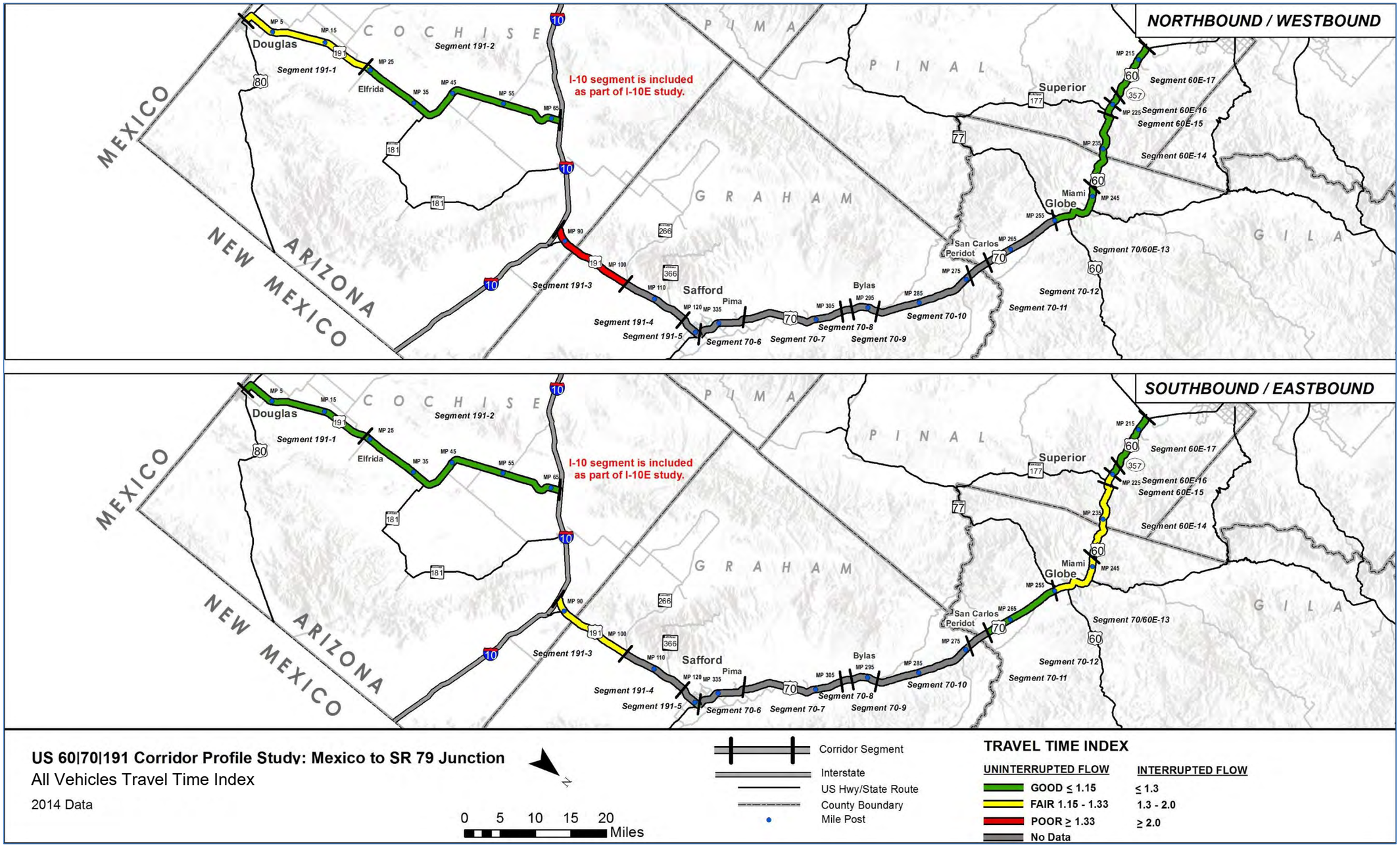
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Future Daily V/C
2014 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
MOBILITY INDEX
URBAN & FRINGE URBAN (Segments 4-6,9,11,13,15)
GOOD / LOS A-C V/C ≤ 0.71
FAIR / LOS D V/C 0.71 - 0.89
POOR / LOS E V/C > 0.89
RURAL (Segments 1-3,7-8,12,14,16-17)
V/C ≤ 0.56
V/C 0.56 - 0.76
V/C > 0.76


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 285
MP 295
MP 305
MP 265
MP 275
MP 255
MP 245
MP 235
MP 225
MP 215
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Existing Peak V/C (Directional)
2014 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
CURRENT PEAK HOUR V/C
URBAN & FRINGE URBAN (Segments 4-6,9,11,13,15)
GOOD / LOS A-C V/C ≤ 0.71
FAIR / LOS D V/C 0.71 - 0.89
POOR / LOS E V/C > 0.89
RURAL (Segments 1-3,7-8,12,14,16-17)
V/C ≤ 0.56
V/C 0.56 - 0.76
V/C > 0.76


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
GRAHAM
PINAL
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
I-10 segment is included as part of I-10E study.
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 285
MP 295
MP 305
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Average Instances per Year a Given Milepost
Is Closed per Segment Mile
2014 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
CLOSURE OCCURANCES
Average Closure Occurances per Mile per Year
GOOD ≤ 0.22
FAIR 0.22-0.62
Poor ≥ 0.62


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
GRAHAM
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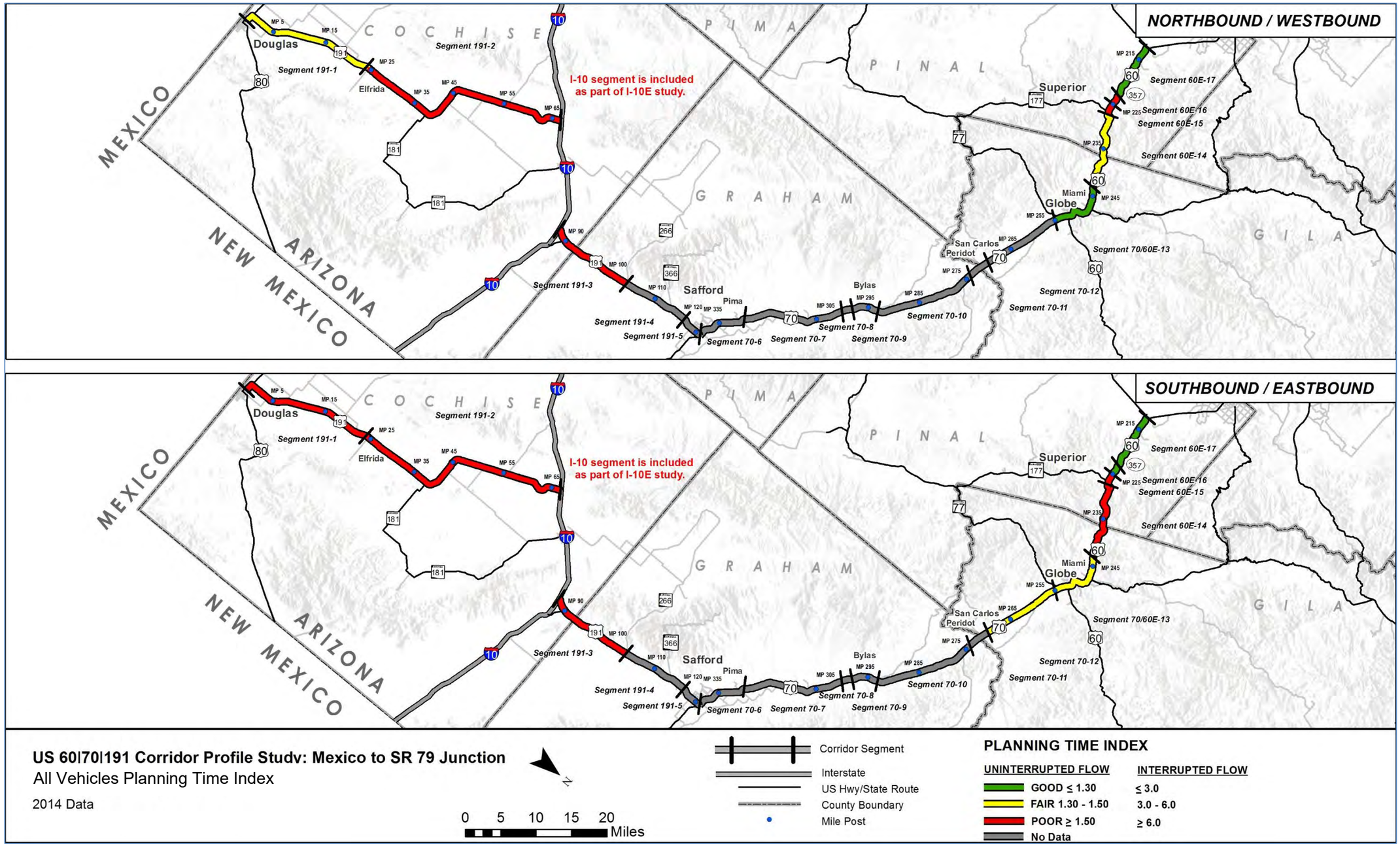
Globe
I-10 segment is included as part of I-10E study.
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
All Vehicles Travel Time Index
2014 Data
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
TRAVEL TIME INDEX
UNINTERRUPTED FLOW
INTERRUPTED FLOW
GOOD ≤ 1.15
≤ 1.3
FAIR 1.15 - 1.33
1.3 - 2.0
POOR ≥ 1.33
≥ 2.0
No Data


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
GRAHAM
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Segment 70/60E-13
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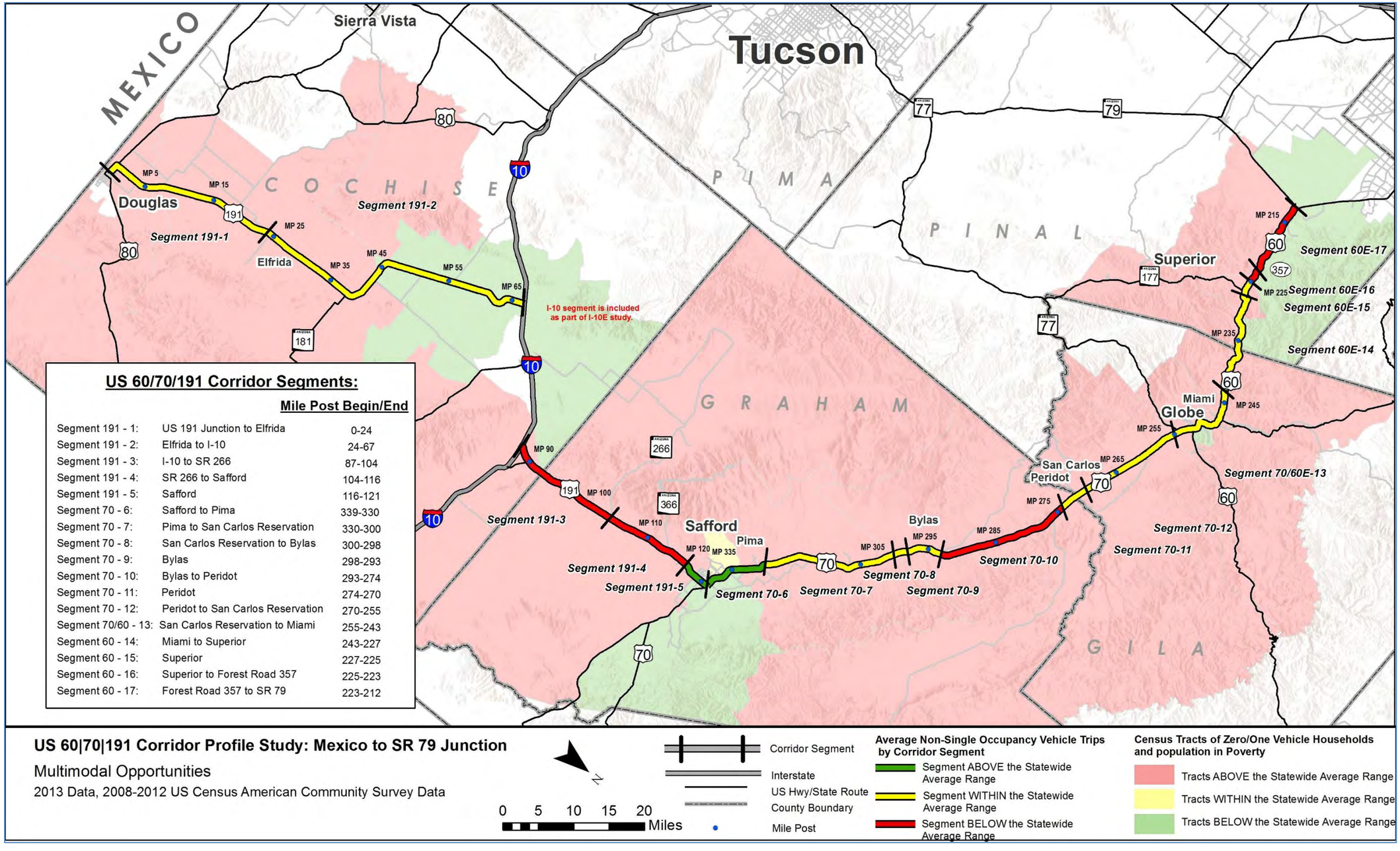
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60|70|191 Corridor Profile Studv: Mexico to SR 79 Junction
All Vehicles Planning Time Index
2014 Data
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
PLANNING TIME INDEX
UNINTERRUPTED FLOW
INTERRUPTED FLOW
GOOD ≤ 1.30
≤ 3.0
FAIR 1.30 - 1.50
3.0 - 6.0
POOR ≥ 1.50
≥ 6.0
No Data


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
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Elfrida
Safford
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Bylas
Superior
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Segment 60E-14
Segment 60E-15
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Segment 60E-17
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US 60/70/191 Corridor Segments:
Mile Post Begin/End
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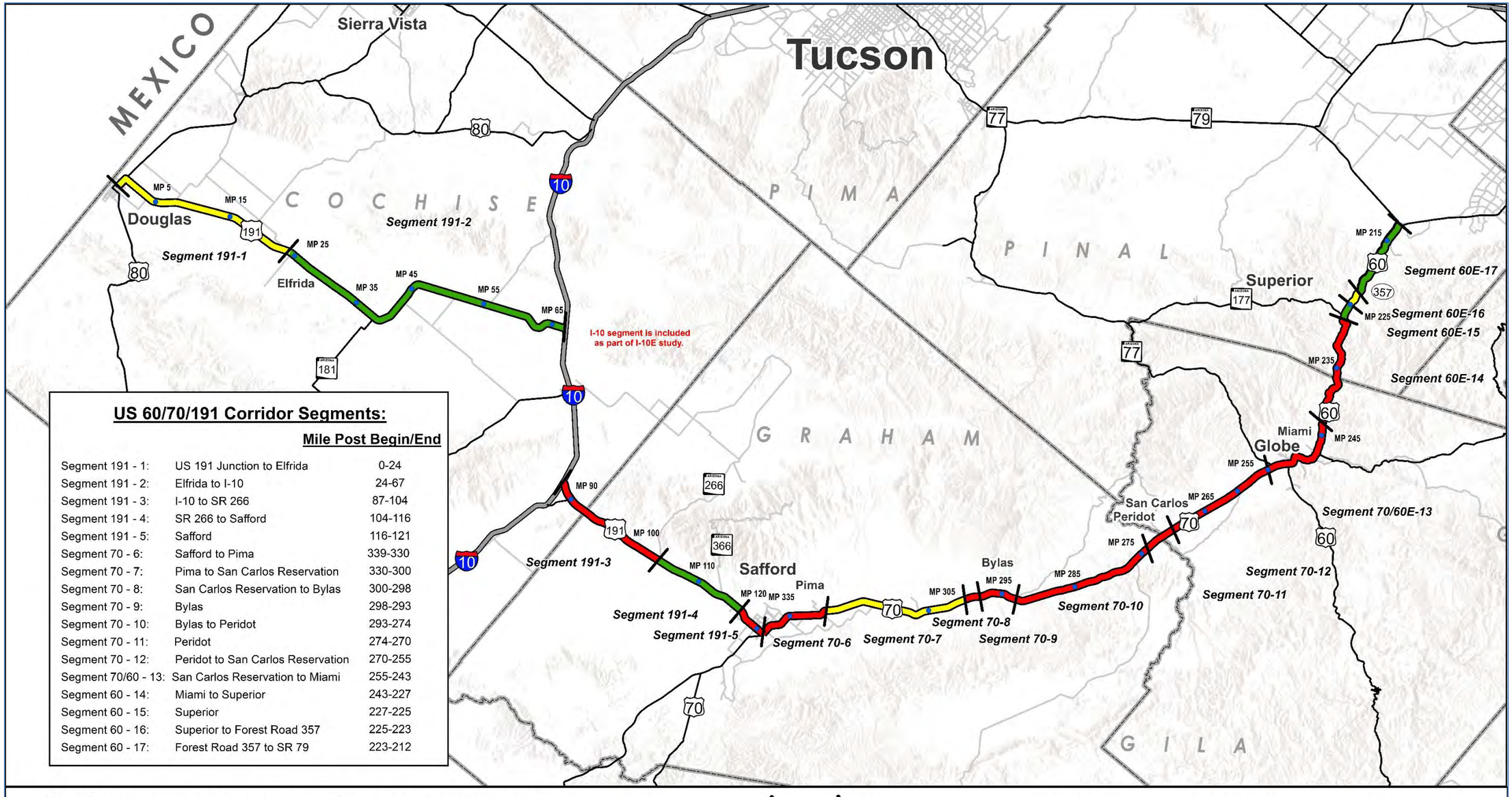
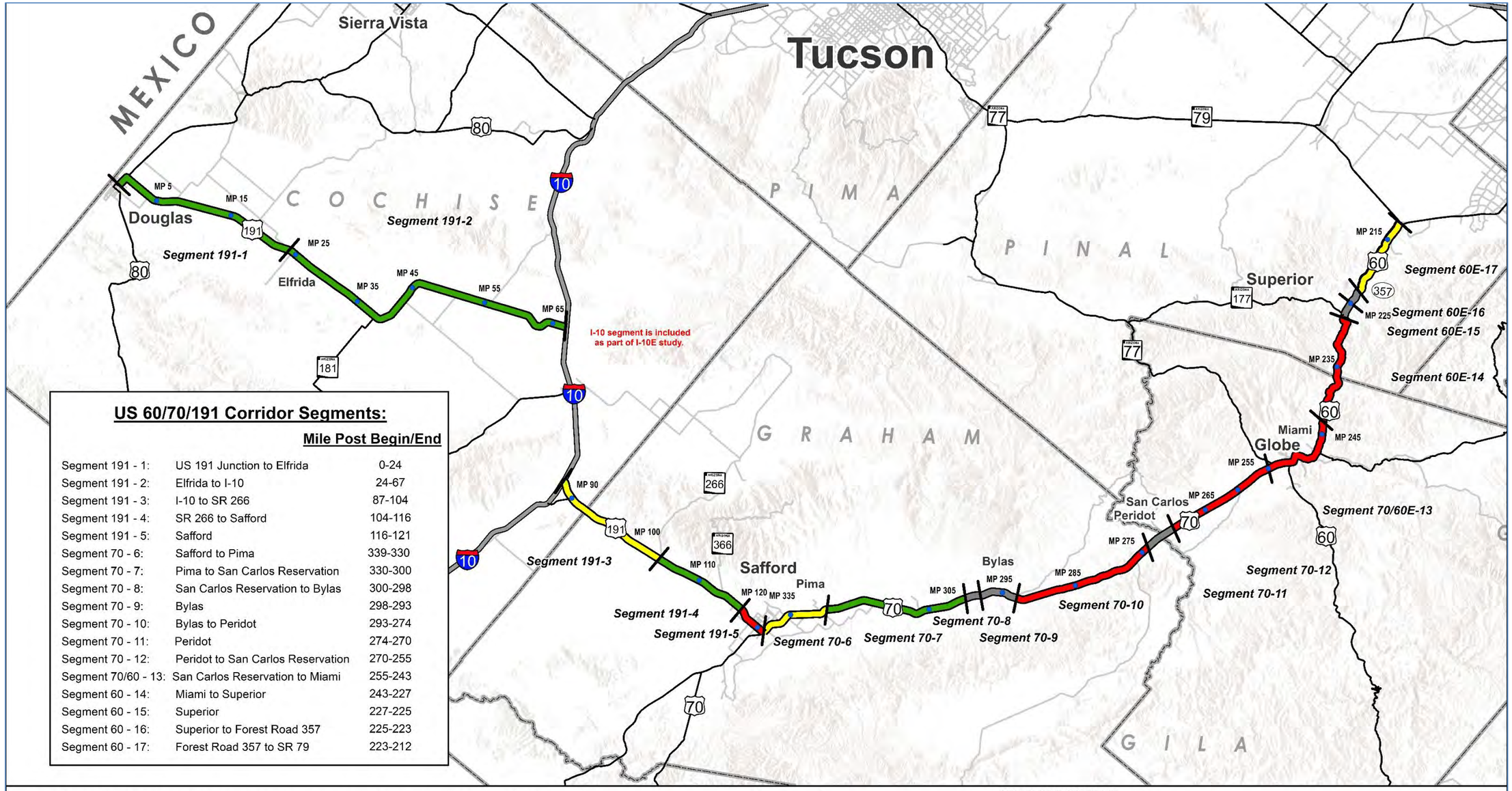
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Multimodal Opportunities
2013 Data, 2008-2012 US Census American Community Survey Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
Average Non-Single Occupancy Vehicle Trips by Corridor Segment
Segment ABOVE the Statewide Average Range
Segment WITHIN the Statewide Average Range
Segment BELOW the Statewide Average Range
Census Tracts of Zero/One Vehicle Households and population in Poverty
Tracts ABOVE the Statewide Average Range
Tracts WITHIN the Statewide Average Range
Tracts BELOW the Statewide Average Range


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
Segment 191 - 2: Elfrida to I-10 24-67
Segment 191 - 3: I-10 to SR 266 87-104
Segment 191 - 4: SR 266 to Safford 104-116
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Percentage of Bicycle Accommodation
2014 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
% BICYCLE ACCOMMODATION
GOOD > 90%
FAIR > 60% & < 90%
POOR < 60%



US 60/70/191 Corridor Segments:

		Mile Post Begin/End
Segment 191 - 1:	US 191 Junction to Elfrida	0-24
Segment 191 - 2:	Elfrida to I-10	24-67
Segment 191 - 3:	I-10 to SR 266	87-104
Segment 191 - 4:	SR 266 to Safford	104-116
Segment 191 - 5:	Safford	116-121
Segment 70 - 6:	Safford to Pima	339-330
Segment 70 - 7:	Pima to San Carlos Reservation	330-300
Segment 70 - 8:	San Carlos Reservation to Bylas	300-298
Segment 70 - 9:	Bylas	298-293
Segment 70 - 10:	Bylas to Peridot	293-274
Segment 70 - 11:	Peridot	274-270
Segment 70 - 12:	Peridot to San Carlos Reservation	270-255
Segment 70/60 - 13:	San Carlos Reservation to Miami	255-243
Segment 60 - 14:	Miami to Superior	243-227
Segment 60 - 15:	Superior	227-225
Segment 60 - 16:	Superior to Forest Road 357	225-223
Segment 60 - 17:	Forest Road 357 to SR 79	223-212

US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction

Safety Index and Hot Spots

2010-2014 Data

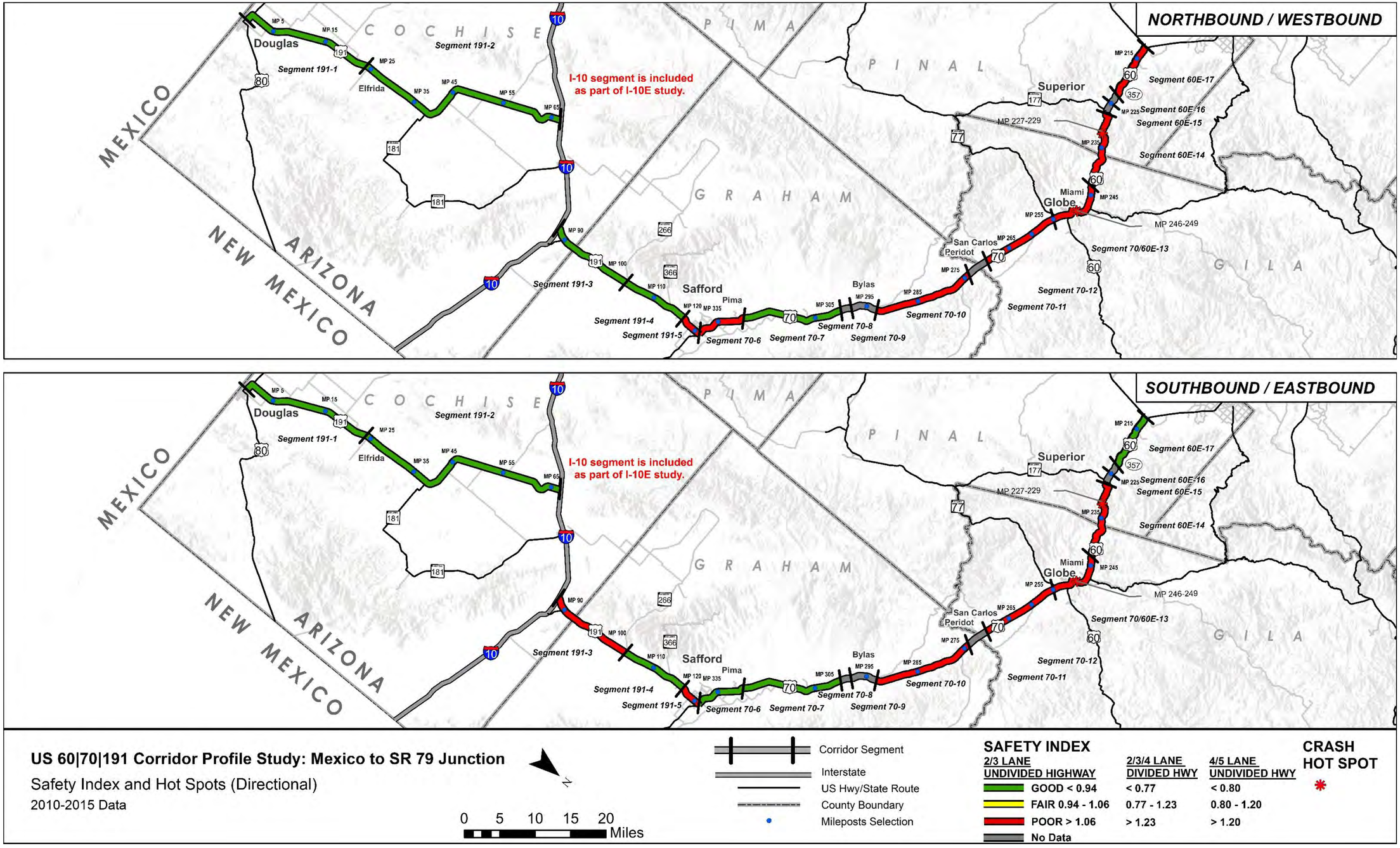
N

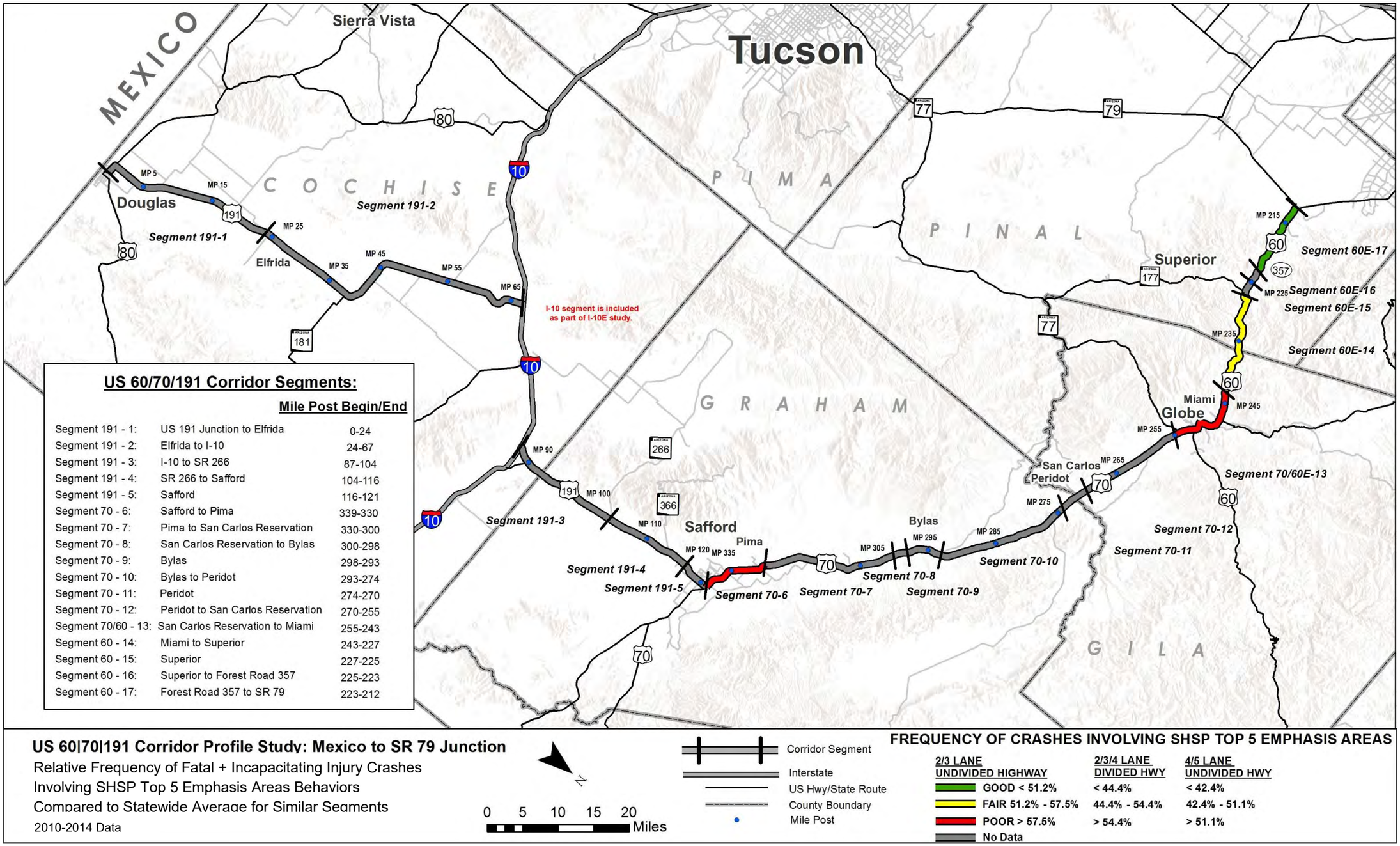
0 5 10 15 20 Miles

Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mileposts Selection

SAFETY INDEX

	2/3 LANE UNDIVIDED HIGHWAY (Segments 1-2,4,7-12,14-16)	2/3/4 LANE DIVIDED HWY (Segments 3,17)	4/5 LANE UNDIVIDED HWY (Segments 5-6,13)
GOOD	< 0.94	< 0.77	< 0.80
FAIR	0.94 - 1.06	0.77 - 1.23	0.80 - 1.20
POOR	> 1.06	> 1.23	> 1.20
No Data			


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
I-10 segment is included as part of I-10E study.
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 227-229
MP 246-249
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Safety Index and Hot Spots (Directional)
2010-2015 Data
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mileposts Selection
SAFETY INDEX
2/3 LANE UNDIVIDED HIGHWAY
2/3/4 LANE DIVIDED HWY
4/5 LANE UNDIVIDED HWY
GOOD < 0.94 | < 0.77 | < 0.80
FAIR 0.94 - 1.06 | 0.77 - 1.23 | 0.80 - 1.20
POOR > 1.06 | > 1.23 | > 1.20
No Data
CRASH HOT SPOT


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
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MP 45
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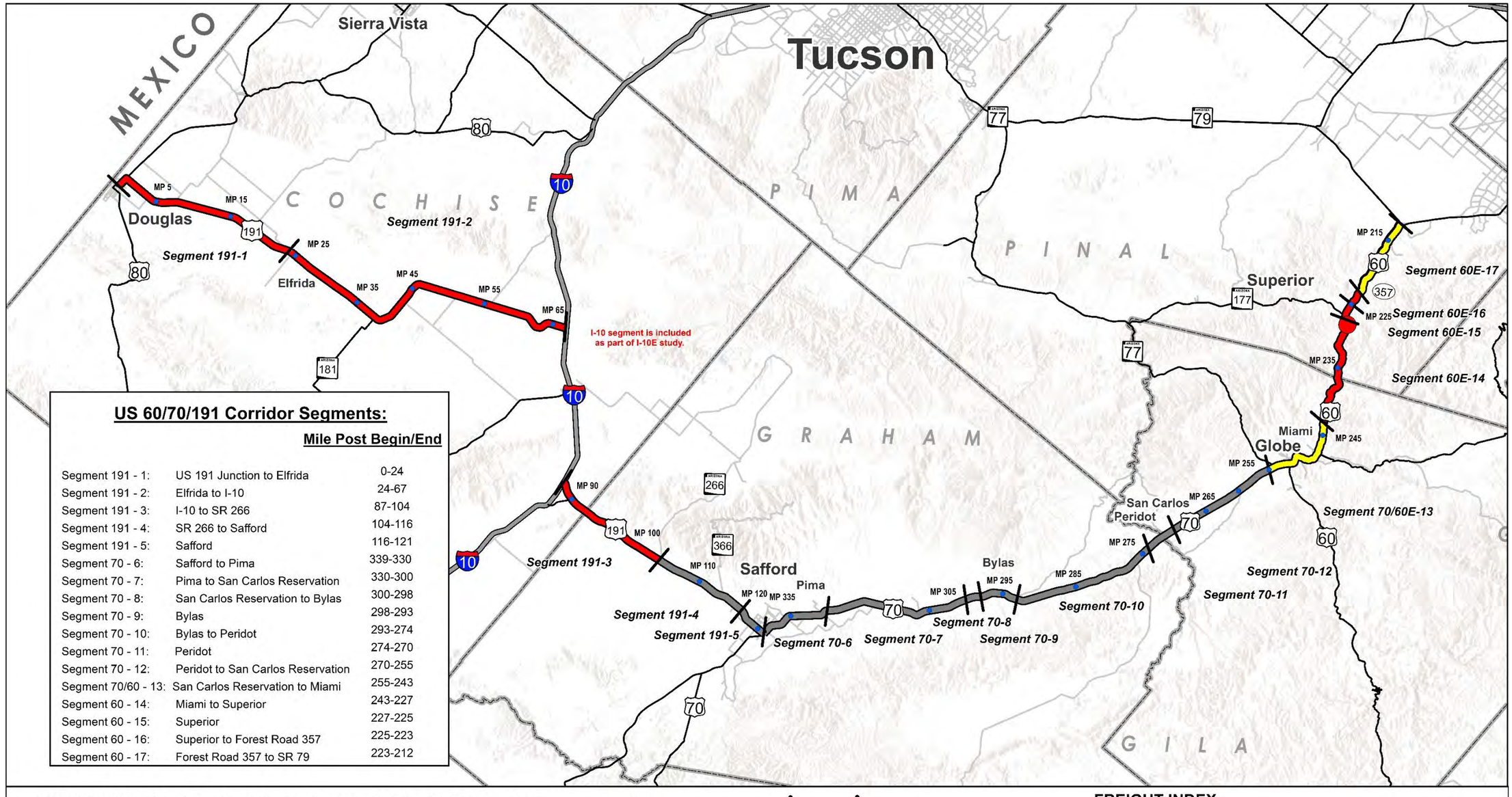
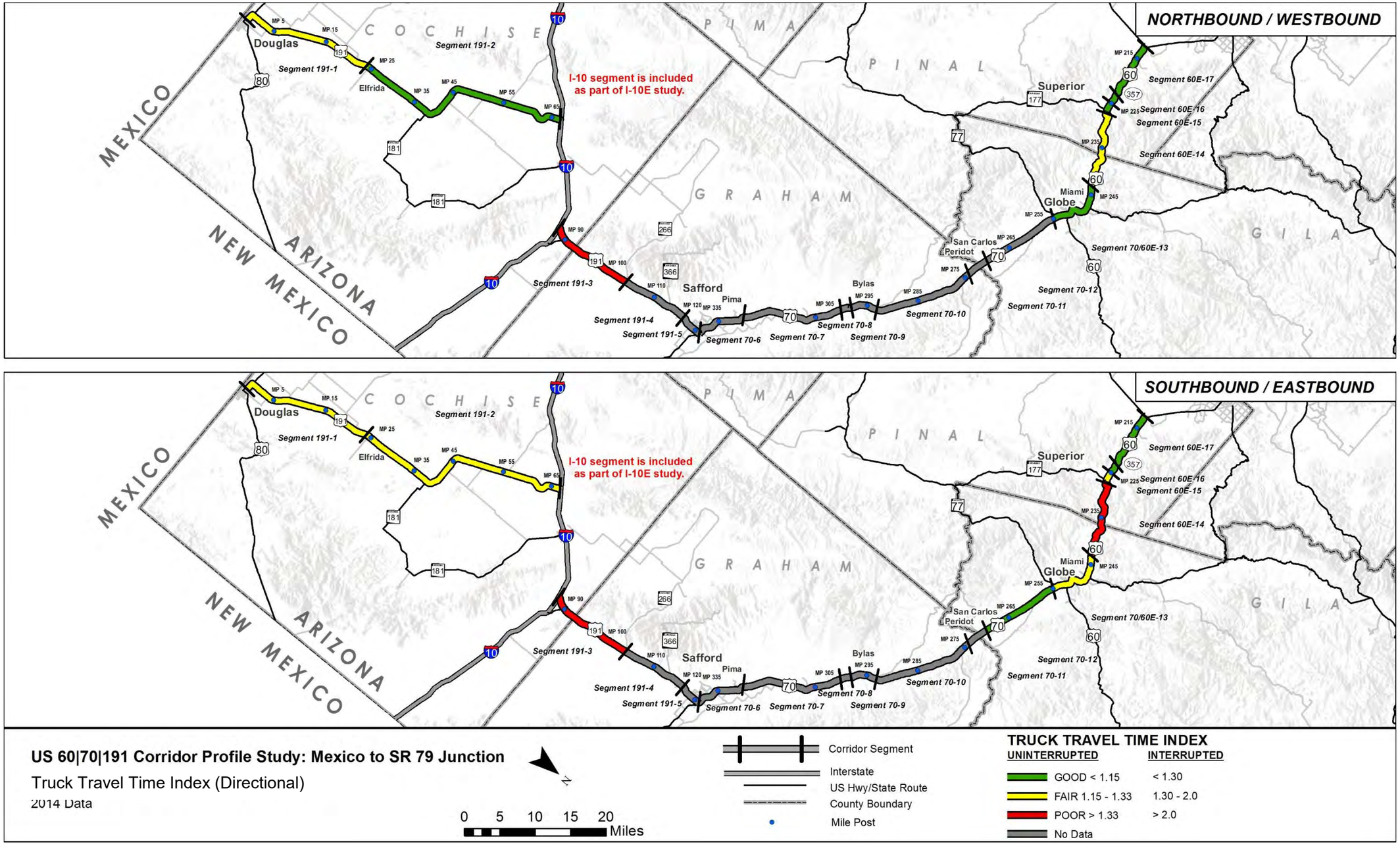
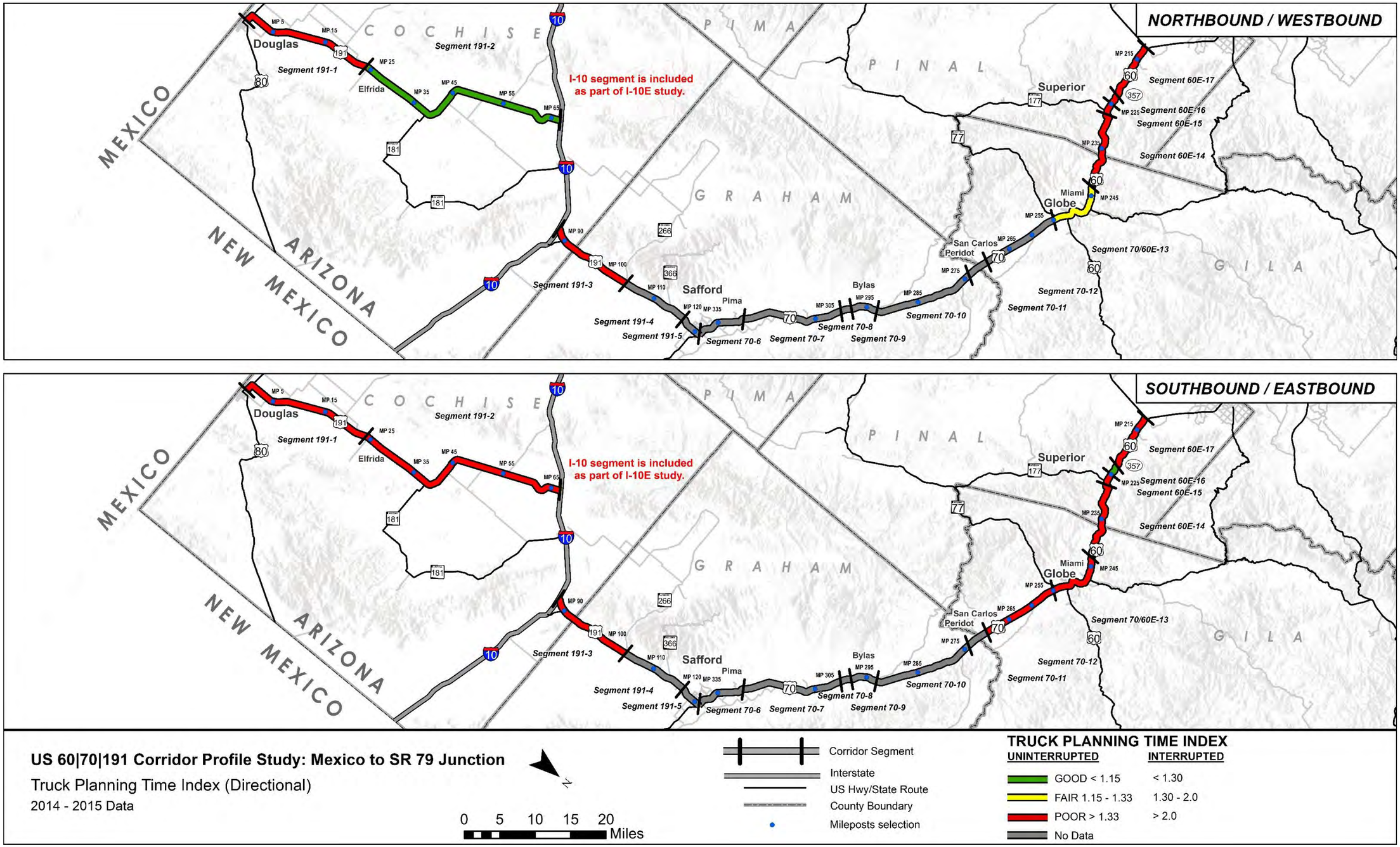
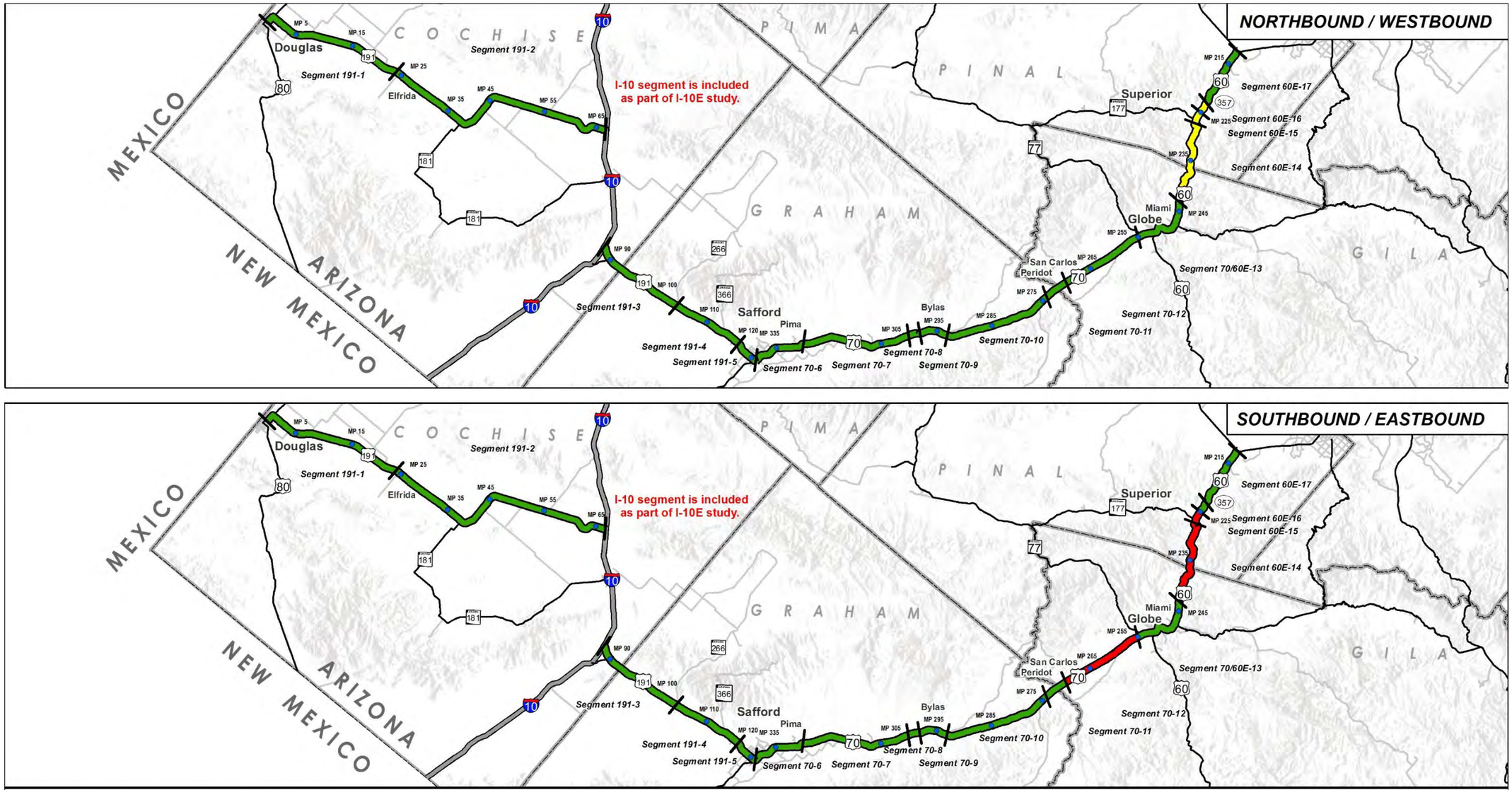
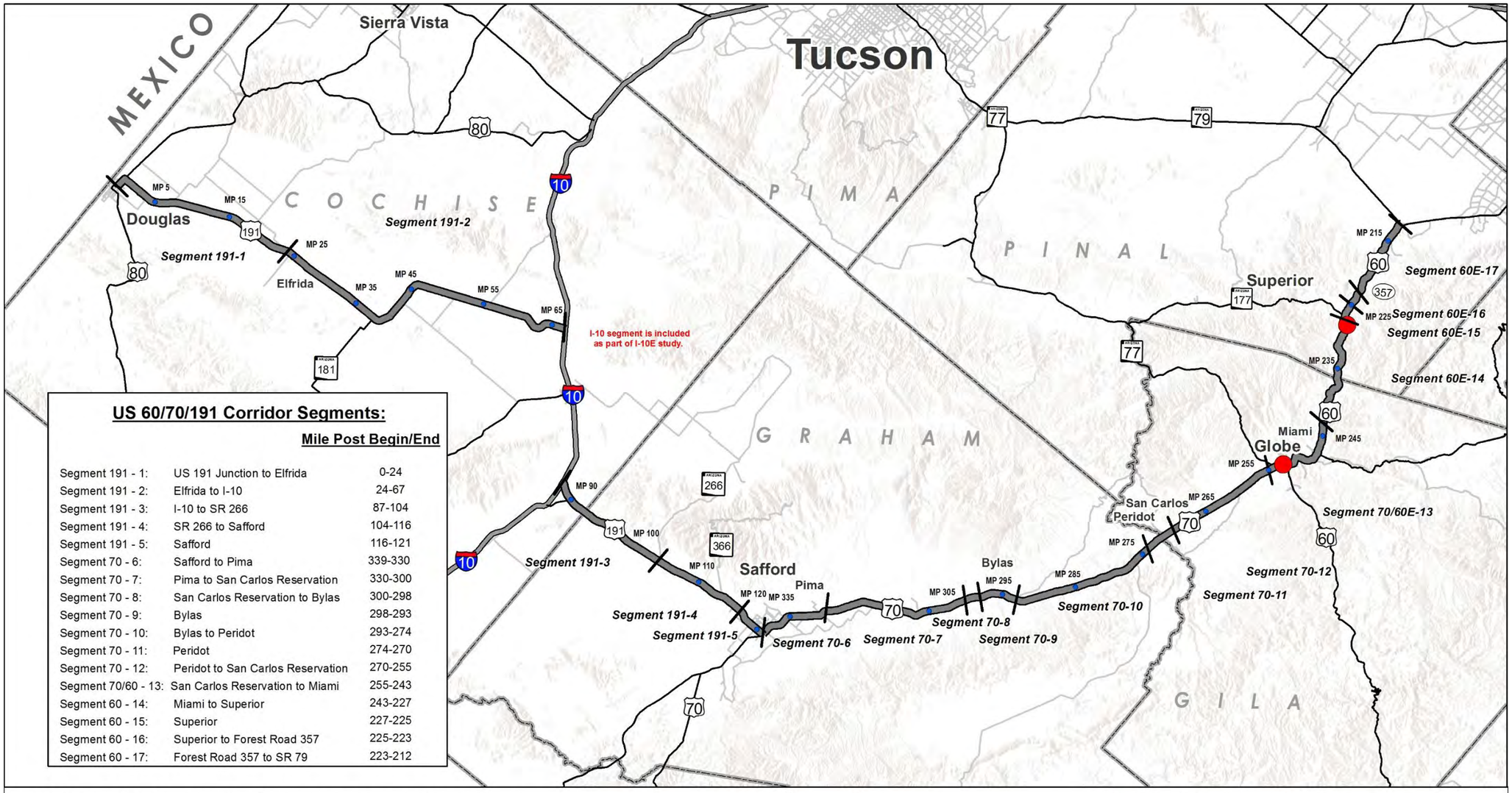
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
Segment 191 - 2: Elfrida to I-10 24-67
Segment 191 - 3: I-10 to SR 266 87-104
Segment 191 - 4: SR 266 to Safford 104-116
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Relative Frequency of Fatal + Incapacitating Injury Crashes
Involving SHSP Top 5 Emphasis Areas Behaviors
Compared to Statewide Average for Similar Segments
2010-2014 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
FREQUENCY OF CRASHES INVOLVING SHSP TOP 5 EMPHASIS AREAS
2/3 LANE UNDIVIDED HIGHWAY
2/3/4 LANE DIVIDED HWY
4/5 LANE UNDIVIDED HWY
GOOD < 51.2% < 44.4% < 42.4%
FAIR 51.2% - 57.5% 44.4% - 54.4% 42.4% - 51.1%
POOR > 57.5% > 54.4% > 51.1%
No Data


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
MP 45
MP 55
MP 65
MP 90
MP 100
MP 110
MP 120
MP 335
MP 305
MP 295
MP 285
MP 275
MP 265
MP 255
MP 245
MP 235
MP 225
MP 215
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
Segment 191 - 1: US 191 Junction to Elfrida 0-24
Segment 191 - 2: Elfrida to I-10 24-67
Segment 191 - 3: I-10 to SR 266 87-104
Segment 191 - 4: SR 266 to Safford 104-116
Segment 191 - 5: Safford 116-121
Segment 70 - 6: Safford to Pima 339-330
Segment 70 - 7: Pima to San Carlos Reservation 330-300
Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
Segment 70 - 10: Bylas to Peridot 293-274
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Freight Index and Hot Spots
2014-2015 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
FREIGHT INDEX
UNINTERRUPTED FLOW
INTERRUPTED FLOW
GOOD > 0.77 > 0.33
FAIR 0.67 - 0.77 0.17 - 0.33
POOR < 0.67 < 0.17
No Data


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
San Carlos Peridot
Superior
Miami
Globe
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Truck Travel Time Index (Directional)
2014 Data
N
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
TRUCK TRAVEL TIME INDEX
UNINTERRUPTED
INTERRUPTED
GOOD < 1.15
< 1.30
FAIR 1.15 - 1.33
1.30 - 2.0
POOR > 1.33
> 2.0
No Data


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
GRAHAM
PINAL
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Truck Planning Time Index (Directional)
2014 - 2015 Data
N
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mileposts selection
TRUCK PLANNING TIME INDEX
UNINTERRUPTED
INTERRUPTED
GOOD < 1.15
< 1.30
FAIR 1.15 - 1.33
1.30 - 2.0
POOR > 1.33
> 2.0
No Data


NORTHBOUND / WESTBOUND
SOUTHBOUND / EASTBOUND
MEXICO
NEW MEXICO
ARIZONA
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Average Minutes per Year Given Milepost
Is Closed per Segment Mile (Directional)
2014-2015 Data
0 5 10 15 20 Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
CLOSURE DURATION
AVERAGE CLOSURE DURATION: Minutes per Mile per Year
GOOD < 44.18
FAIR 44.18 - 124.86
POOR > 124.86
No Data


MEXICO
Sierra Vista
Tucson
COCHISE
PIMA
PINAL
GRAHAM
GILA
Douglas
Segment 191-1
Segment 191-2
Segment 191-3
Segment 191-4
Segment 191-5
Elfrida
Safford
Pima
Bylas
Superior
Miami
Globe
San Carlos
Peridot
MP 5
MP 15
MP 25
MP 35
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MP 55
MP 65
MP 90
MP 100
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MP 235
MP 225
MP 215
Segment 70-6
Segment 70-7
Segment 70-8
Segment 70-9
Segment 70-10
Segment 70-11
Segment 70-12
Segment 70/60E-13
Segment 60E-14
Segment 60E-15
Segment 60E-16
Segment 60E-17
I-10 segment is included as part of I-10E study.
US 60/70/191 Corridor Segments:
Mile Post Begin/End
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Segment 70 - 8: San Carlos Reservation to Bylas 300-298
Segment 70 - 9: Bylas 298-293
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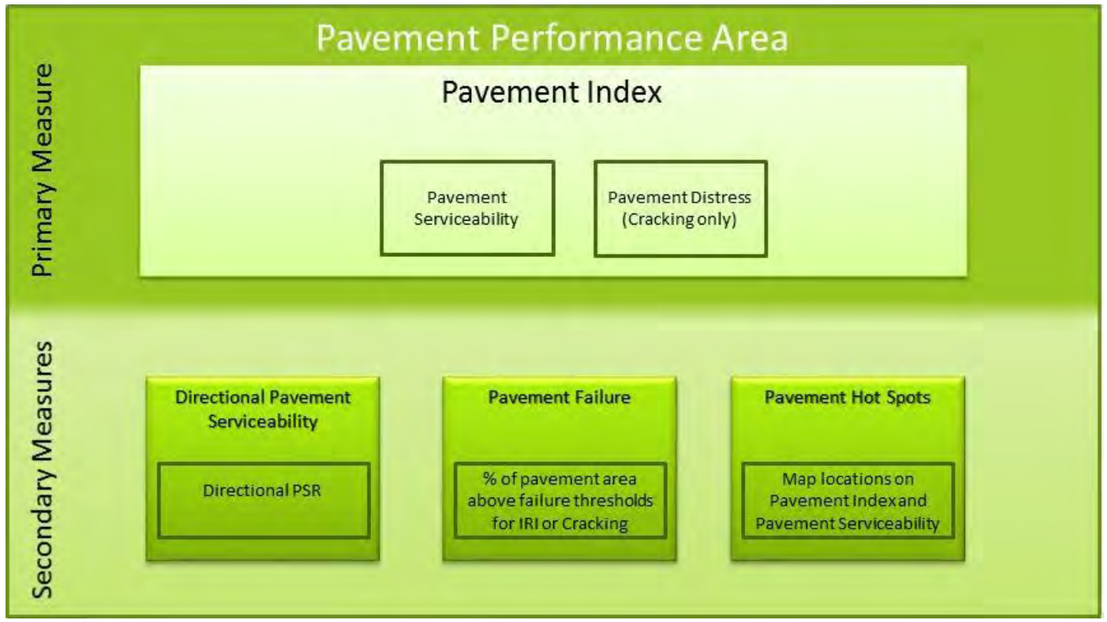
Segment 70 - 11: Peridot 274-270
Segment 70 - 12: Peridot to San Carlos Reservation 270-255
Segment 70/60 - 13: San Carlos Reservation to Miami 255-243
Segment 60 - 14: Miami to Superior 243-227
Segment 60 - 15: Superior 227-225
Segment 60 - 16: Superior to Forest Road 357 225-223
Segment 60 - 17: Forest Road 357 to SR 79 223-212
US 60|70|191 Corridor Profile Study: Mexico to SR 79 Junction
Freight Truck Height Restrictions
2014-2015 Data
0 5 10 15 20
Miles
Corridor Segment
Interstate
US Hwy/State Route
County Boundary
Mile Post
TRUCK HEIGHT RESTRICTIONS
CANNOT RAMP AROUND

Appendix B: Performance Area Detailed Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Pavement performance area as shown in the following graphic:



This performance area is used to evaluate mainline pavement condition. Pavement condition data for ramps, frontage roads, crossroads, etc. was not included in the evaluation.

Primary Pavement Index

The Pavement Index is calculated based on the use of two pavement condition ratings from the ADOT Pavement Database. The two ratings are the International Roughness Index (IRI) and the Cracking rating. The calculation of the Pavement Index uses a combination of these two ratings.

The IRI is a measurement of the pavement roughness based on field-measured longitudinal roadway profiles. To facilitate the calculation of the index, the IRI rating was converted to a Pavement Serviceability Rating (PSR) using the following equation:

$$PSR = 5 * e^{-0.0038*IRI}$$

The Cracking Rating is a measurement of the amount of surface cracking based on a field-measured area of 1,000 square feet that serves as a sample for each mile. To facilitate the calculation of the index, the Cracking Rating was converted to a Pavement Distress Index (PDI) using the following equation:

$$PDI = 5 - (0.345 * C^{0.66})$$

Both the PSR and PDI use a 0 to 5 scale with 0 representing the lowest performance and 5 representing the highest performance. The performance thresholds for interstates and non-interstates shown in the tables below were used for the PSR and PDI.

Performance Level for Interstates	IRI (PSR)	Cracking (PDI)
Good	<75 (>3.75)	<7 (>3.75)
Fair	75 - 117 (3.20 - 3.75)	7 - 12 (3.22 - 3.75)
Poor	>117 (<3.20)	>12 (<3.22)

Performance Level for Non-Interstates	IRI (PSR)	Cracking (PDI)
Good	<94 (>3.5)	<9 (>3.5)
Fair	94 - 142 (2.9 - 3.5)	9 - 15 (2.9 - 3.5)
Poor	>142 (<2.9)	>15 (<2.9)

The PSR and PDI are calculated for each 1-mile section of roadway. If PSR or PDI falls into a poor rating (<3.2 for interstates, for example) for a 1-mile section, then the score for that 1-mile section is entirely (100%) based on the lower score (either PSR or PDI). If neither PSR or PDI fall into a poor rating for a 1-mile section, then the score for that 1-mile section is based on a combination of the lower rating (70% weight) and the higher rating (30% weight). The result is a score between 0 and 5 for each direction of travel of each mile of roadway based on a combination of both the PSR and the PDI.

The project corridor has been divided into segments. The Pavement Index for each segment is a weighted average of the directional ratings based on the number of travel lanes. Therefore, the condition of a section with more travel lanes will have a greater influence on the resulting segment Pavement Index than a section with fewer travel lanes.

Secondary Pavement Measures

Three secondary measures are evaluated:

- Directional Pavement Serviceability
- Pavement Failure
- Pavement Hot Spots

Directional Pavement Serviceability: Similar to the Pavement Index, the Directional Pavement Serviceability is calculated as a weighted average (based on number of lanes) for each segment. However, this rating only utilizes the PSR and is calculated separately for each direction of travel. The PSR uses a 0 to 5 scale with 0 representing the lowest performance and 5 representing the highest performance.

Pavement Failure: The percentage of pavement area rated above the failure thresholds for IRI or Cracking is calculated for each segment. In addition, the Standard score (z-score) is calculated for each segment.

The Standard score (z-score) is the number of standard deviations above or below the mean. Therefore, a Standard score between -0.5 and +0.5 is “average”, less than -0.5 is lower (better) than average, and higher than +0.5 is above (worse) than average.

Pavement Hot Spots: The Pavement Index map identifies locations that have an IRI rating or Cracking rating that fall above the failure threshold as identified by ADOT Pavement Group. For interstates, an IRI rating above 105 or a Cracking rating above 15 will be used as the thresholds which are slightly different than the ratings shown previously. For non-interstates, an IRI rating above 142 or a Cracking rating above 15 will be used as the thresholds.

Scoring

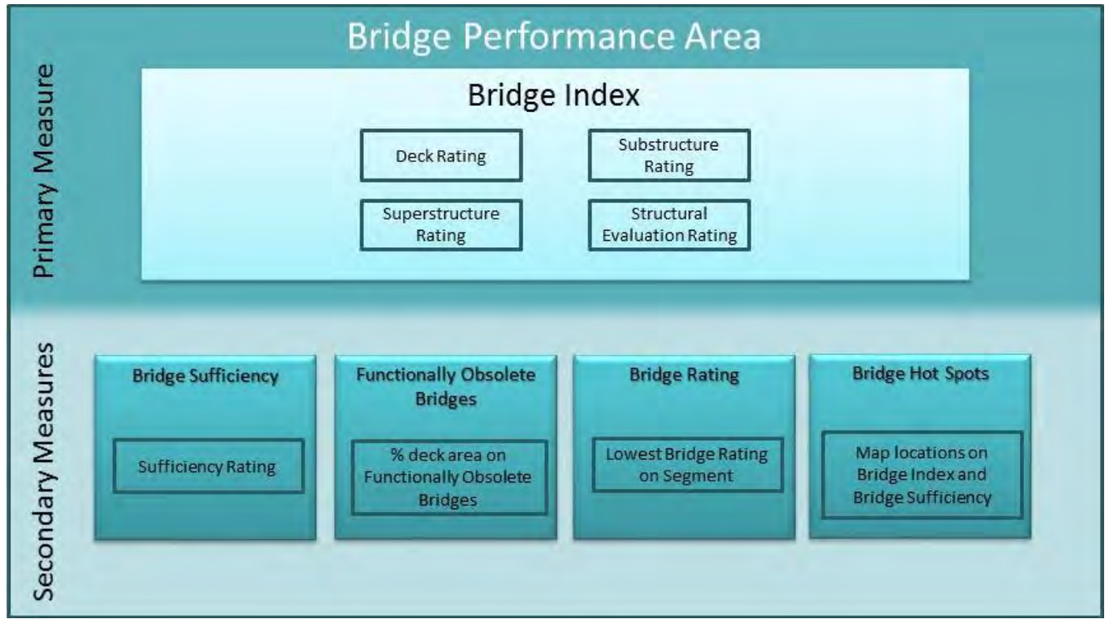
Performance Level	Pavement Index	
	Interstates	Non-Interstates
Good	>3.75	>3.5
Fair	3.2 - 3.75	2.9 - 3.5
Poor	<3.2	<2.9

Performance Level	Directional Pavement Serviceability	
	Interstates	Non-Interstates
Good	>3.75	>3.5
Fair	3.2 - 3.75	2.9 - 3.5
Poor	<3.2	<2.9

Performance Level	% Pavement Failure
Good	< 5%
Fair	5% – 20%
Poor	>20%

Bridge Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Bridge performance area as shown in the following graphic:



This performance area is used to evaluate mainline bridges. Bridges on ramps (that do not cross the mainline), frontage roads, etc. should not be included in the evaluation. Basically, any bridge that carries mainline traffic or carries traffic over the mainline should be included and bridges that do not carry mainline traffic, run parallel to the mainline (frontage roads), or do not cross the mainline should not be included.

Primary Bridge Index

The Bridge Index is calculated based on the use of four bridge condition ratings from the ADOT Bridge Database, also known as the Arizona Bridge Information and Storage System (ABISS). The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating. The calculation of the Bridge Index uses the lowest of these four ratings.

Each of the four condition ratings use a 0 to 9 scale with 0 representing the lowest performance and 9 representing the highest performance.

The project corridor has been divided into segments and the bridges are grouped together according to the segment definitions. In order to report the Bridge Index for each corridor segment, the Bridge Index for each segment is a weighted average based on the deck area for each bridge. Therefore, the condition of a larger bridge will have a greater influence on the resulting segment Bridge Index than a smaller bridge.

Secondary Bridge Measures

Four secondary measures will be evaluated:

- Bridge Sufficiency
- Functionally Obsolete Bridges
- Bridge Rating
- Bridge Hot Spots

Bridge Sufficiency: Similar to the Bridge Index, the Bridge Sufficiency rating is calculated as a weighted average (based on deck area) for each segment. The Bridge Sufficiency rating is a scale of 0 to 100 with 0 representing the lowest performance and 100 representing the highest performance. A rating of 80 or above represents “good” performance, a rating between 50 and 80 represents “fair” performance, and a rating below 50 represents “poor” performance.

Functionally Obsolete Bridges: The percentage of total deck area in a segment that is on functionally obsolete bridges is calculated for each segment. The deck area for each bridge within each segment that has been identified as functionally obsolete is totaled and divided by the total deck area for the segment to calculate the percentage of deck area on functionally obsolete bridges for each segment.

The thresholds for this performance measure are determined based on the Standard score (z-score). The Standard score (z-score) is the number of standard deviations above or below the mean. Therefore, a Standard score between -0.5 and +0.5 is “average”, less than -0.5 is lower (better) than average, and higher than +0.5 is above (worse) average.

Bridge Rating: The Bridge Rating simply identifies the lowest bridge rating on each segment. This performance measure is not an average and therefore is not weighted based on the deck area. The Bridge Index identifies the lowest rating for each bridge, as described above. Each of the four condition ratings use a 0 to 9 scale with 0 representing the lowest performance and 9 representing the highest performance.

Bridge Hot Spots: The Bridge Index map identifies individual bridge locations that are identified as hot spots. Hot spots are bridges that have a single rating of 4 in any of the four ratings, or multiple ratings of 5 in the deck, substructure or superstructure ratings.

Scoring:

Performance Level	Bridge Index
Good	>6.5
Fair	5.0-6.5
Poor	<5.0

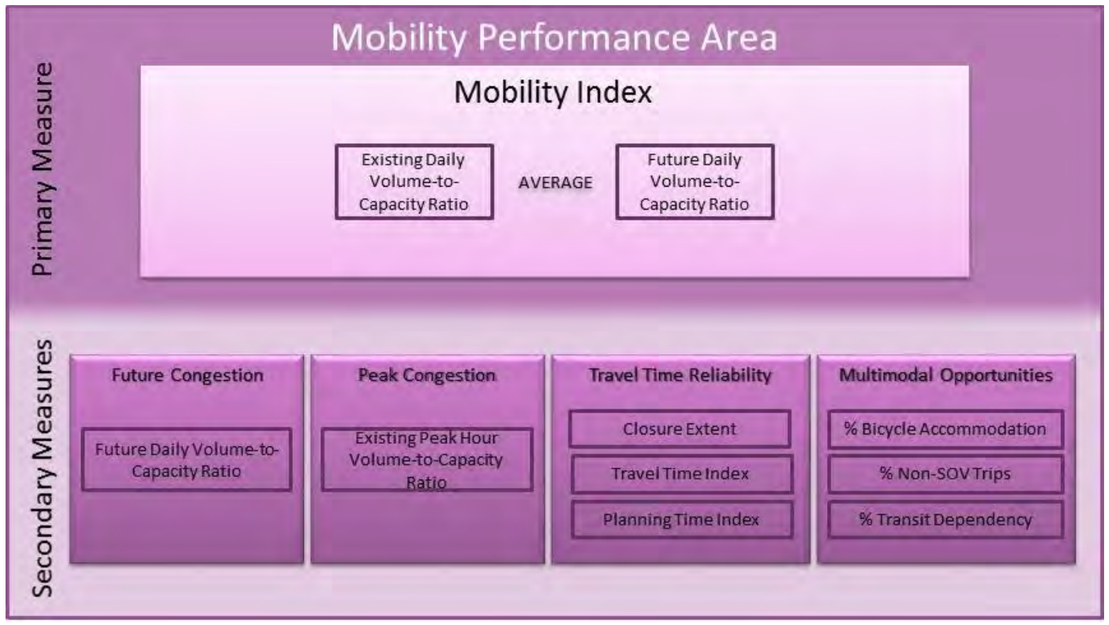
Performance Level	Sufficiency Rating
Good	>80
Fair	50-80
Poor	<50

Performance Level	Bridge Rating
Good	>6
Fair	5-6
Poor	<5

Performance Level	% Functionally Obsolete
Good	< 12%
Fair	12%-40%
Poor	>40%

Mobility Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Mobility performance area as shown in the following graphic:



Primary Mobility Index

The primary Mobility Index is an average of the existing daily volume-to-capacity (V/C) ratio and the future daily V/C ratio for each segment of the corridor.

Existing Daily V/C: The existing daily V/C ratio for each segment is calculated by dividing the 2014 Annual Average Daily Traffic (AADT) volume for each segment by the total Level of Service (LOS) E capacity volume for that segment

The capacity is calculated using the HERS Procedures for Estimating Highway Capacity[1]. The HERS procedure incorporates HCM 2010 methodologies. The methodology includes capacity estimation procedures for multiple facility types including freeways, rural two-lane highways, multilane highways, and signalized and non-signalized urban sections.

The segment capacity is defined as a function of the number of mainline lanes, shoulder width, interrupted or uninterrupted flow facilities, terrain type, percent of truck traffic, and the designated urban or rural environment.

The AADT for each segment is calculated by applying a weighted average across the length of the segment based on the individual 24-hour volumes and distances associated with each HPMS count station within each segment.

The following example equation is used to determine the weighted average of a segment with two HPMS count locations within the corridor

((HPMS 1 Distance x HPMS 1 Volume) + (HPMS 2 Distance x HPMS 2 Volume))/Total Segment Length

For specific details regarding the HERS methodology used, refer to the *Procedures for Estimating Highway Capacity, draft Technical Memorandum.*

Future Daily V/C: The future daily V/C ratio for each segment is calculated by dividing the 2035 AADT volume for each segment by the 2014 LOS E capacity. The capacity volume used in this calculation is the same as is utilized in the existing daily V/C equation.

The future AADT daily volumes are generated by applying an average annual compound growth rate (ACGR) to each 2014 AADT segment volume. The following equation is used to apply the average annual compound growth rate:

2035 AADT = 2014 AADT x ((1+ACGR)^(2035-2014))

The ACGR for each segment is defined by comparing the total volumes in the 2010 Arizona Travel Demand Model (AZTDM2) to the 2035 AZTDM2 traffic volumes at each existing HPMS count station location throughout the corridor. Each 2010 and 2035 segment volume is defined using the same weighted average equation described in the *Existing Daily V/C* section above and then summing the directional volumes for each location. The following equation is used to determine the ACGR for each segment:

ACGR = ((2035 Volume/2010 Volume)^(1/(2035-2010))))-1

Secondary Mobility Measures

Four secondary measures are evaluated:

- Future Congestion
- Peak Congestion
- Travel Time Reliability

[1] HERS Support – 2011, Task 6: Procedures for Estimating Highway Capacity, draft Technical Memorandum. Cambridge Systematics. Prepared for the Federal Highway Administration. March 2013.

  - Closure Extent
  - Directional Travel Time Index
  - Directional Planning Time Index
- Multimodal Opportunities
  - % Bicycle Accommodation
  - % Non-Single Occupancy Vehicle (SOV) Trips
  - % Transit Dependency

Future Congestion: The future daily V/C ratios for each segment in the corridor that are calculated and used in the Mobility Index as part of the overall average between Existing Daily V/C and Future Daily V/C are applied independently as a secondary measure. The methods to calculate the Future Daily V/C can be referenced in the Mobility Index section.

Peak Congestion: Peak Congestion has been defined as the peak hour V/C ratio in both directions of the corridor. The peak hour V/C ratio is calculated using the HERS method as described previously. The peak hour volume utilizes the directional AADT for each segment, which is calculated by applying a weighted average across the length of the segment based on the individual directional 24-hour volumes and distances associated with each HPMS count station within each segment. The segment capacity is defined based on the characteristics of each segment including number of lanes, terrain type, and environment, similar to the 24-hour volumes using the HERS method.

Travel Time Reliability: Travel time reliability is a secondary measure that includes three indicators. The three indicators are the number of times a piece of a corridor is closed for any specific reason, the directional Travel Time Index (TTI), and the directional Planning Time Index (PTI).

Closure Extent: The number of times a roadway is closed is documented through the HCRS dataset. Closure Extent is defined as the average number of times a particular milepost of the corridor is closed per year per mile in a specific direction of travel. The weighted average of each occurrence takes into account the distance over which a specific occurrence spans.

Thresholds that determine levels of good, fair, and poor are based on the average number of closures per mile per year within each of the identified statewide significant corridors by ADOT. The thresholds shown at the end of this section represent statewide averages across those corridors.

Directional Travel Time and Planning Time Index: In terms of overall mobility, the TTI is the relationship of the mean peak period travel time in a specific section of the corridor to the free-flow travel time in the same location. The PTI is the relationship of the 95th percentile highest travel time to the free-flow travel time (based on the posted speed limit) in a specific section of the corridor. The TTI and PTI can be converted into speed-based indices by recognizing that speed is equal to distance traveled divided by travel time. The inverse relationship between travel time and speed means that the 95th percentile highest travel time corresponds to the 5th percentile lowest speed.

Using HERE data provided by ADOT, four time periods for each data point were collected throughout the day (AM peak, mid-day, PM peak, and off-peak). Using the mean speeds and 5th percentile lowest mean speeds collected over 2014 for these time periods for each data location, four TTI and PTI calculations were made using the following formulas:

TTI = Posted Speed Limit/Mean Peak Hour Speed

PTI = Posted Speed Limit/5th Percentile Lowest Speed

The highest value of the four time periods calculation is defined as the TTI for that data point. The average TTI is calculated within each segment based on the number of data points collected. The value of the average TTI across each entry is used as the TTI for each respective segment within the corridor.

Multimodal Opportunities: Three multimodal opportunity indicators reflect the characteristics of the corridor that promote alternate modes to a single occupancy vehicle (SOV) for trips along the corridor. The three indicators include the percent bicycle accommodation, non-SOV trips, and transit dependency along the corridor.

Percent Bicycle Accommodation: For this secondary performance evaluation, outside shoulder widths are evaluated considering the roadway's context and conditions. This requires use of the roadway data that includes right shoulder widths, shoulder surface types, and speed limits, all of which are available in the following ADOT geographic information system (GIS) data sets:

- Right Shoulder Widths
- Left Shoulder Widths (for undivided roadways)
- Shoulder Surface Type (Both Left/Right)
- Speed Limit

Additionally, each segment's average AADT, estimated earlier in the Mobility performance area methodology, is used for the criteria to determine if the existing shoulder width meets the effective width.

The criteria for screening if a shoulder segment meets the recommended width criteria are as followed:

(1) If AADT <= 1500 OR Speed Limit <= 25 miles per hour (mph):
The segment's general purpose lane can be shared with bicyclists (no effective shoulder width required)

(2) If AADT > 1500 AND Speed Limit between (25 - 50 mph) AND Pavement Surface is Paved:
Effective shoulder width required is 4 feet or greater

(3) If AADT > 1500 AND Speed Limit >= 50 mph and Pavement Surface is Paved:
Effective shoulder width required is 6 feet or greater

The summation of the length of the shoulder sections that meet the defined effective width criteria, based on criteria above, is divided by the segment's total length to estimate the percent of the segment that accommodates bicycles as illustrated at the end of this section. If shoulder data is not available or appears erroneous, field measurements can substitute for the shoulder data.

Percent Non-SOV Trips: The percentage of non-SOV trips over distances less than 50 miles gives an indication of travel patterns along a section of the corridor that could benefit from additional multimodal options in the future.

Thresholds that determine levels of good, fair, and poor are based on the percent non-SOV trips within each of the identified statewide significant corridors by ADOT. The thresholds shown at the end of this section represent statewide averages across those corridors.

Percent Transit Dependency: 2008-2012 U.S. Census American Community Survey tract and state level geographic data and attributes from the tables B08201 (Number of Vehicles Available by Household Size) and B17001 (Population in Poverty within the Last 12 Months) were downloaded with margins of error included from the Census data retrieval application Data Ferret. Population ranges for each tract were determined by adding and subtracting the margin of error to each estimate in excel. The tract level attribute data was then joined to geographic tract data in GIS. Only tracts within a one mile buffer of each corridor are considered for this evaluation.

Tracts that have a statistically significantly larger number of either people in poverty or households with only one or no vehicles available than the state average are considered potentially transit dependent.

Example: The state average for zero or one vehicles households (HHs) is between 44.1% and 45.0%. Tracts which have the lower bound of their range above the upper bound of the state range have a greater percentage of zero/one vehicle HHs than the state average. Tracts that have their upper bound beneath the lower bound of the state range have a lesser percentage of zero/one vehicles HHs than the state average. All other tracts that have one of their bounds overlapping with the state average cannot be considered statistically significantly different because there is a chance the value is actually the same.

In addition to transit dependency, the following attributes are added to the Multimodal Opportunities map based on available data.

- Shoulder width throughout the corridor based on 'Shoulder Width' GIS dataset provided by ADOT
- Intercity bus routes
- Multiuse paths within the corridor right-of-way, if applicable

Scoring:

Volume-to-Capacity Ratios		
Urban and Fringe Urban		
Good - LOS A-C	V/C ≤ 0.71	*Note - ADOT Roadway Design Standards indicate Urban and Fringe Urban roadways should be designed to level of service C or better
Fair - LOS D	V/C > 0.71 & ≤ 0.89	
Poor - LOS E or less	V/C > 0.89	
Rural		
Good - LOS A-B	V/C ≤ 0.56	*Note - ADOT Roadway Design Standards indicate Rural roadways should be designed to level of service B or better
Fair - LOS C	V/C > 0.56 & ≤ 0.76	
Poor - LOS D or less	V/C > 0.76	

Performance Level	Closure Extent
Good	≤ 0.22
Fair	> 0.22 & ≤ 0.62
Poor	V/C > 0.62

Performance Level	TTI on Uninterrupted Flow Facilities
Good	< 1.15
Fair	≥ 1.15 & < 1.33
Poor	≥ 1.33

Performance Level	TTI on Interrupted Flow Facilities
Good	< 1.30
Fair	≥ 1.30 & < 1.2.00
Poor	≥ 2.00

Performance Level	PTI on Uninterrupted Flow Facilities
Good	< 1.30
Fair	≥ 1.30 & < 1.50
Poor	≥ 1.50

Performance Level	PTI Interrupted Flow Facilities
Good	< 3.00
Fair	≥ 3.00 & < 6.00
Poor	≥ 6.00

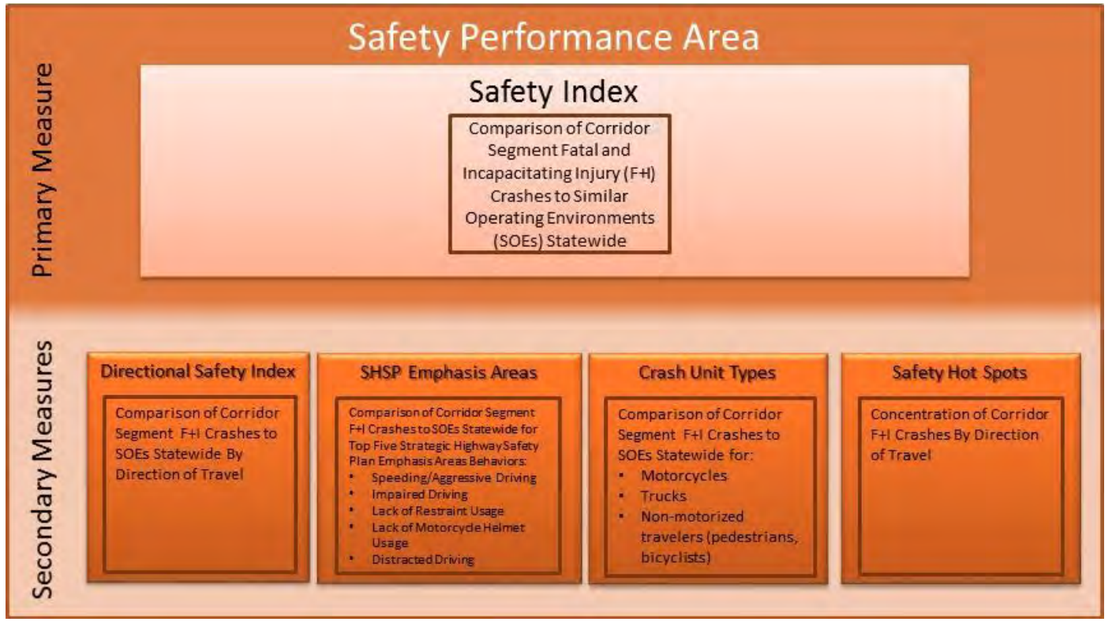
Performance Level	Percent Bicycle Accommodation
Good	≥ 90%
Fair	> 60% & ≤ 90%
Poor	< 60%

Performance Level	Percent Non-SOV Trips
Good	≥ 17%
Fair	> 11% & ≤ 17%
Poor	< 11%

Performance Level	Percent Transit Dependency
Good	Tracts with both zero and one vehicle household population in poverty percentages below the statewide average
Fair	Tracts with either zero and one vehicle household or population in poverty percentages below the statewide average
Poor	Tracts with both zero and one vehicle household and population in poverty percentages above the statewide average

Safety Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Safety performance area as shown in the following graphic:



Primary Safety Index

The Safety Index is a safety performance measure based on the bi-directional (i.e., both directions combined) frequency and rate of fatal and incapacitating injury crashes, the relative cost of those types of crashes, and crash occurrences on similar roadways in Arizona. According to ADOT's 2010 Highway Safety Improvement Program Manual, fatal crashes have an estimated cost that is 14.5 times the estimated cost of incapacitating injury crashes ($5.8 million compared to $400,000).

The Combined Safety Score (CSS) is an interim measure that combines fatal and incapacitating injury crashes into a single value. The CSS is calculated using the following generalized formula:

*CSS = 14.5 * (Normalized Fatal Crash Rate + Frequency) + (Normalized Incapacitating Injury Crash Rate + Frequency)*

Because crashes vary depending on the operating environment of a particular roadway, statewide CSS values were developed for similar operating environments defined by functional classification, urban vs. rural setting, number of travel lanes, and traffic volumes. To determine the Safety Index of a particular segment, the segment CSS is compared to the average statewide CSS for the similar statewide operating environment.

The Safety Index is calculated using the following formula:

Safety Index = Segment CSS / Statewide Similar Operating Environment CSS

The average annual Safety Index for a segment is compared to the statewide similar operating environment annual average, with one standard deviation from the statewide average forming the scale break points.

The more a particular segment's Safety Index value is below the statewide similar operating environment average, the better the safety performance is for that particular segment as a lower value represents fewer crashes.

Scoring:

The scale for rating the Safety Index depends on the operating environments selected, as shown in the table below.

Similar Operating Environment	Safety Index (Overall & Directional)	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	0.94	1.06
2 or 3 or 4 Lane Divided Highway	0.77	1.23
4 or 5 Lane Undivided Highway	0.80	1.20
6 Lane Highway	0.56	1.44
Rural 4 Lane Freeway with Daily Volume < 25,000	0.73	1.27
Rural 4 Lane Freeway with Daily Volume > 25,000	0.68	1.32
Urban 4 Lane Freeway	0.79	1.21
Urban or Rural 6 Lane Freeway	0.82	1.18
Urban > 6 Lane Freeway	0.80	1.20

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

Some corridor segments may have a very low number of total fatal and incapacitating injury crashes. Low crash frequencies (i.e., a small sample size) can translate into performance ratings that can be unstable. In some cases, a change in crash frequency of one crash (one additional crash or one less crash) could result in a change in segment performance of two levels. To avoid reliance on performance ratings where small changes in crash frequency result in large changes in performance, the following two criteria were developed to identify segments with "insufficient data" for assessing performance for the Safety Index. Both of these criteria must be met for a segment to have "insufficient data" to reliably rate the Safety Index performance:

- If the crash sample size (total fatal plus incapacitating injury crashes) for a given segment is less than five crashes over the five-year analysis period; AND

- If a change in one crash results in a change in segment performance by two levels (i.e., a change from below average to above average performance or a change from above average to below average frequency), the segment has "insufficient data" and Safety Index performance ratings are unreliable.

Secondary Safety Measures

The Safety performance area has four secondary measures related to fatal and incapacitating injury crashes:

- Directional Safety Index
- Strategic Highway Safety Plan (SHSP) Behavior Emphasis Areas
- Crash Unit Types
- Safety Hot Spots

Directional Safety Index: The Direction Safety Index shares the same calculation procedure and thresholds as the Safety Index. However, the measure is based on the directional frequency and rate of fatal and incapacitating injury crashes.

Similar to the Safety Index, the segment CSS is compared to the average statewide CSS for the similar statewide operating environment. The Directional Safety Index follows the lead of the Safety Index in terms of "insufficient data" status. If the Safety Index meets both criteria for "insufficient data", the Directional Safety Index should also be changed to "insufficient data". If the Safety Index does not meet both criteria for "insufficient data", the Directional Safety Index would also not change to say "insufficient data"

SHSP Behavior Emphasis Areas: ADOT's 2014 SHSP identifies several emphasis areas for reducing fatal and incapacitating injury crashes. The top five SHSP emphasis areas relate to the following driver behaviors:

- Speeding and aggressive driving
- Impaired driving
- Lack of restraint usage
- Lack of motorcycle helmet usage
- Distracted driving

To develop a performance measure that reflects these five emphasis areas, the percentage of total fatal and incapacitating injury crashes that involves at least one of the emphasis area driver behaviors on a particular segment is compared to the statewide average percentage of crashes involving at least one of the emphasis area driver behaviors on roads with similar operating environments in a process similar to how the Safety Index is developed.

To increase the crash sample size for this performance measure, the five behavior emphasis areas are combined to identify fatal and incapacitating injury crashes that exhibit one or more of the behavior emphasis areas.

The SHSP behavior emphasis areas performance is calculated using the following formula:

% Crashes Involving SHSP Behavior Emphasis Areas = Segment Crashes Involving SHSP Behavior Emphasis Areas / Total Segment Crashes

The percentage of total crashes involving SHSP behavior emphasis areas for a segment is compared to the statewide percentages on roads with similar operating environments. One standard deviation from the statewide average percentage forms the scale break points.

When assessing the performance of the SHSP behavior emphasis areas, the more the frequency of crashes involving SHSP behavior emphasis areas is below the statewide average implies better levels of segment performance. Thus, lower values are better, similar to the Safety Index.

Scoring:

The scale for rating the SHSP behavior emphasis areas performance depends on the crash history on similar statewide operating environments, as shown in the table below:

Similar Operating Environment	Crashes in SHSP Top 5 Emphasis Areas	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	51.2%	57.5%
2 or 3 or 4 Lane Divided Highway	44.4%	54.4%
4 or 5 Lane Undivided Highway	42.4%	51.1%
6 Lane Highway	35.3%	46.5%
Rural 4 Lane Freeway with Daily Volume < 25,000	42.8%	52.9%
Rural 4 Lane Freeway with Daily Volume > 25,000	40.8%	57.1%
Urban 4 Lane Freeway	49.1%	59.4%
Urban or Rural 6 Lane Freeway	33.5%	57.2%
Urban > 6 Lane Freeway	42.6%	54.8%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

The SHSP behavior emphasis areas secondary safety performance measure for the Safety performance area includes proportions of specific types of crashes within the total fatal and incapacitating injury crash frequencies. This more detailed categorization of fatal and incapacitating injury crashes can result in low crash frequencies (i.e., a small sample size) that translate into performance ratings that can be unstable. In some cases, a change in crash frequency of one crash (one additional crash or one less crash) could result in a change in segment performance of two levels. To avoid reliance on performance ratings where small changes in crash frequency result in large changes in performance, the following criteria were developed to identify segments with "insufficient data" for assessing performance for the SHSP behavior emphasis areas secondary

safety performance measure. If any of these criteria are met for a segment, that segment has "insufficient data" to reliably rate the SHSP behavior emphasis areas performance:

- If the crash sample size (total fatal plus incapacitating injury crashes) for a given segment is less than five crashes over the five-year analysis period, the segment has "insufficient data" and performance ratings are unreliable. OR
- If a change in one crash results in a change in segment performance by two levels (i.e., a change from below average to above average performance or a change from above average to below average frequency), the segment has "insufficient data" and performance ratings are unreliable. OR
- If the corridor average segment crash frequency for the SHSP behavior emphasis areas performance measure is less than two crashes over the five-year analysis period, the entire SHSP behavior emphasis areas performance measure has "insufficient data" and performance ratings are unreliable.

Crash Unit Type Emphasis Areas: ADOT's SHSP also identifies emphasis areas that relate to the following "unit-involved" crashes:

- Heavy vehicle (trucks)-involved crashes
- Motorcycle-involved crashes
- Non-motorized traveler (pedestrians and bicyclists)-involved crashes

To develop a performance measure that reflects the aforementioned crash unit type emphasis areas, the percentage of total fatal and incapacitating injury crashes that involves a given crash unit type emphasis area on a particular segment is compared to the statewide average percentage of crashes involving that same crash unit type emphasis area on roads with similar operating environments in a process similar to how the Safety Index is developed.

The SHSP crash unit type emphasis areas performance is calculated using the following formula:

% Crashes Involving Crash Unit Type = Segment Crashes Involving Crash Unit Type / Total Segment Crashes

The percentage of total crashes involving crash unit types for a segment is compared to the statewide percentages on roads with similar operating environments. One standard deviation from the statewide average percentage forms the scale break points.

When assessing the performance of the crash unit types, the more the frequency of crashes involving crash unit types is below the statewide average implies better levels of segment performance. Thus, lower values are better, similar to the Safety Index. The scale for rating the unit-involved crash performance depends on the crash history on similar statewide operating environments, as shown in the following tables.

Scoring:

Similar Operating Environment	Crashes Involving Trucks	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	5.2%	7.1%
2 or 3 or 4 Lane Divided Highway	3.5%	7.3%
4 or 5 Lane Undivided Highway	6.1%	9.6%
6 Lane Highway	0.3%	8.7%
Rural 4 Lane Freeway with Daily Volume < 25,000	13.2%	17.0%
Rural 4 Lane Freeway with Daily Volume > 25,000	7.2%	12.9%
Urban 4 Lane Freeway	6.8%	10.9%
Urban or Rural 6 Lane Freeway	6.2%	11.0%
Urban > 6 Lane Freeway	2.5%	6.0%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

Similar Operating Environment	Crashes Involving Motorcycles	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	18.5%	26.5%
2 or 3 or 4 Lane Divided Highway	16.3%	26.3%
4 or 5 Lane Undivided Highway	6.4%	9.4%
6 Lane Highway	0.0%	20.0%
Rural 4 Lane Freeway with Daily Volume < 25,000	5.0%	8.5%
Rural 4 Lane Freeway with Daily Volume > 25,000	7.7%	17.1%
Urban 4 Lane Freeway	9.3%	11.5%
Urban or Rural 6 Lane Freeway	6.7%	12.9%
Urban > 6 Lane Freeway	12.6%	20.5%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

Similar Operating Environment	Crashes Involving Non-Motorized Travelers	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	2.2%	4.2%
2 or 3 or 4 Lane Divided Highway	2.4%	4.5%
4 or 5 Lane Undivided Highway	4.7%	7.9%
6 Lane Highway	8.4%	17.4%
Rural 4 Lane Freeway with Daily Volume < 25,000	1.7%	2.5%
Rural 4 Lane Freeway with Daily Volume > 25,000	0.0%	0.0%
Urban 4 Lane Freeway	4.8%	10.3%
Urban or Rural 6 Lane Freeway	0.9%	6.7%
Urban > 6 Lane Freeway	0.5%	1.5%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

The crash unit types have the same “insufficient data” criteria as the SHSP behavior emphasis areas.

Safety Hot Spots: A hot spot analysis was conducted that identified abnormally high concentrations of fatal and incapacitating injury crashes along the study corridor by direction of travel. The identification of crash concentrations involves a GIS-based function known as “kernel density analysis”. This measure is mapped for graphical display purposes with the Directional Safety Index but is not included in the Safety performance area rating calculations.

Freight Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Freight performance area as shown in the following graphic:

Primary Freight Index

The Freight Index is a reliability performance measure based on the planning time index for truck travel. The industry standard definition for the Truck Planning Time Index (TPTI) is the ratio of total travel time needed for 95% on-time arrival to free-flow travel time. The TPTI reflects the extra buffer time needed for on-time delivery while accounting for non-recurring delay. Non-recurring delay refers to unexpected or abnormal delay due to closures or restrictions resulting from circumstances such as crashes, inclement weather, and construction activities.

The TPTI can be converted into a speed-based index by recognizing that speed is equal to distance traveled divided by travel time. The inverse relationship between travel time and speed means that the 95th percentile highest travel time corresponds to the 5th percentile lowest speed. The speed-based TPTI is calculated using the following formula:

TPTI = Free-Flow Truck Speed / Observed 5th Percentile Lowest Truck Speed

Observed 5th percentile lowest truck speeds are available in the 2014 American Digital Cartography, Inc. HERE (formerly NAVTEQ) database to which ADOT has access. The free-flow truck speed is assumed to be 65 miles per hour or the posted speed, whichever is less. This upper limit of 65 mph accounts for governors that trucks often have that restrict truck speeds to no more than 65 mph, even when the speed limit may be higher.

For each corridor segment, the TPTI is calculated for each direction of travel and then averaged to create a bi-directional TPTI. When assessing performance using TPTI, the higher the TPTI value is above 1.0, the more buffer time is needed to ensure on-time delivery.

The Freight Index is calculated using the following formula to invert the overall TPTI:

Freight Index = 1 / Bi-directional TPTI

Inversion of the TPTI allows the Freight Index to have a scale where the higher the value, the better the performance, which is similar to the directionality of the scales of most of the other primary measures. This Freight Index scale is based on inverted versions of TPTI scales created previously by ADOT. The scale for rating the Freight Index differs between uninterrupted and interrupted flow facilities.

Secondary Freight Measures

The Freight performance area includes five secondary measures that provide an in-depth evaluation of the different characteristics of freight performance:

- Recurring Delay (Directional TTTI)
- Non-Recurring Delay (Directional TPTI)
- Closure Duration
- Bridge Vertical Clearance
- Bridge Vertical Clearance Hot Spots

Recurring Delay (Directional TTTI): The performance measure for recurring delay is the Directional Truck Travel Time Index (TTTI). The industry standard definition for TTTI is the ratio of average peak period travel time to free-flow travel time. The TTTI reflects the extra time spent in traffic during peak times due to recurring delay. Recurring delay refers to expected or normal delay due to roadway capacity constraints or traffic control devices.

Similar to the TPTI, the TTTI can be converted into a speed-based index by recognizing that speed is equal to distance traveled divided by travel time. The speed-based TTTI can be calculated using the following formula:

TTTI = Free-Flow Truck Speed / Observed Average Peak Period Truck Speed

Observed average peak period truck speeds are available in the 2014 American Digital Cartography, Inc. HERE (formerly NAVTEQ) database to which ADOT has access. The free-flow truck speed is assumed to be 65 mph or the posted speed, whichever is less.

For each corridor segment, the TTTI is calculated for each direction of travel. With the TTTI, the higher the TTTI value is above 1.0, the more time is spent in traffic during peak times. TTTI values are generally lower than TPTI values. The Directional TTTI scale is based on TTTI scales created previously by ADOT.

Non-Recurring Delay (Directional TPTI): The performance measure for non-recurring delay is the Directional TPTI. Directional TPTI is calculated as described previously as an interim step in the development of the Freight Index.

For each corridor segment, the TPTI is calculated for each direction of travel. With the TPTI, the higher the TPTI value is above 1.0, the more buffer time is needed to ensure on-time delivery.

Closure Duration: This performance measure related to road closures is average roadway closure (i.e., full lane closure) duration time in minutes. There are three main components to full closures that affect reliability – frequency, duration, and extent. In the freight industry, closure duration is the most important component because trucks want to minimize travel time and delay.

Data on the frequency, duration, and extent of full roadway closures on the ADOT State Highway System is available for 2010-2014 in the HCRS database that is managed and updated by ADOT.

The average closure duration in a segment – in terms of the average time a milepost is closed per mile per year on a given segment – is calculated using the following formula:

*Closure Duration = Sum of Segment (Closure Clearance Time * Closure Extent) / Segment Length*

The segment closure duration time in minutes can then be compared to statewide averages for closure duration in minutes, with one-half standard deviation from the average forming the scale break points. The scale for rating closure duration in minutes is found at the end of this section.

Bridge Vertical Clearance: This performance measure uses the vertical clearance information from the ADOT Bridge Database to identify locations with low vertical clearance. The minimum vertical clearance for all underpass structures (i.e., structures under which mainline traffic passes) is determined for each segment.

Bridge Vertical Clearance Hot Spots: This performance measure related to truck restrictions is the locations, or hot spots, where bridge vertical clearance issues restrict truck travel. Sixteen feet three inches (16.25') is the minimum standard vertical clearance value for state highway bridges over travel lanes.

Locations with lower vertical clearance values than the minimum standard are categorized by the ADOT Intermodal Transportation Department Engineering Permits Section as either locations where ramps exist that allow the restriction to be avoided or locations where ramps do not exist and the restriction cannot be avoided. The locations with vertical clearances below the minimum standard that cannot be ramped around are considered hot spots. This measure is mapped for graphical display purposes with the bridge vertical clearance map but is not included in the Freight performance area rating calculations.

Scoring:

Performance Level	Freight Index	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	> 0.77	> 0.33
Fair	0.67 – 0.77	0.17 – 0.33
Poor	< 0.67	< 0.17

Performance Level	TTTI	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	< 1.15	< 1.30
Fair	1.15 – 1.33	1.30 – 2.00
Poor	> 1.33	> 2.00

Performance Level	TPTI	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	< 1.30	< 3.00
Fair	1.30 – 1.50	3.00 – 6.00
Poor	> 1.50	> 6.00

Performance Level	Closure Duration (minutes)
Good	< 44.18
Fair	44.18 – 124.86
Poor	> 124.86

Performance Level	Bridge Vertical Clearance
Good	> 16.5'
Fair	16.0' – 16.5'
Poor	< 16.0'

Appendix C: Performance Area Data

Pavement Performance Area Data

				Northbound/West			Southbound/Eastbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Segment 1		***Interstate?***		**No**														
Mile 1	0	to	1	2	136.77	8	0	-	-	2.97	3.6	#VALUE!	#VALUE!	3.17	#VALUE!		0	0
Mile 2	1	to	2	2	123.54	10	0	-	-	3.13	3.4	#VALUE!	#VALUE!	3.22	#VALUE!		0	0
Mile 3	2	to	3	2	115.85	7	0	-	-	3.22	3.8	#VALUE!	#VALUE!	3.38	#VALUE!		0	0
Mile 4	3	to	4	2	106.20	8	0	-	-	3.34	3.6	#VALUE!	#VALUE!	3.43	#VALUE!		0	0
Mile 5	4	to	5	2	95.52	10	0	-	-	3.48	3.4	#VALUE!	#VALUE!	3.44	#VALUE!		0	0
Mile 6	5	to	6	2	109.55	6	0	-	-	3.30	3.9	#VALUE!	#VALUE!	3.47	#VALUE!		0	0
Mile 7	6	to	7	2	116.84	4	0	-	-	3.21	4.1	#VALUE!	#VALUE!	3.49	#VALUE!		0	0
Mile 8	7	to	8	2	110.97	2	0	-	-	3.28	4.5	#VALUE!	#VALUE!	3.63	#VALUE!		0	0
Mile 9	8	to	9	2	95.67	3	0	-	-	3.48	4.3	#VALUE!	#VALUE!	3.72	#VALUE!		0	0
Mile 10	9	to	10	2	83.17	2	0	-	-	3.65	4.5	#VALUE!	#VALUE!	3.89	#VALUE!		0	0
Mile 11	10	to	11	2	101.45	4	0	-	-	3.40	4.1	#VALUE!	#VALUE!	3.62	#VALUE!		0	0
Mile 12	11	to	12	2	114.90	3	0	-	-	3.23	4.3	#VALUE!	#VALUE!	3.55	#VALUE!		0	0
Mile 13	12	to	13	2	100.66	3	0	-	-	3.41	4.3	#VALUE!	#VALUE!	3.67	#VALUE!		0	0
Mile 14	13	to	14	2	97.04	3	0	-	-	3.46	4.3	#VALUE!	#VALUE!	3.71	#VALUE!		0	0
Mile 15	14	to	15	2	91.91	3	0	-	-	3.53	4.3	#VALUE!	#VALUE!	3.75	#VALUE!		0	0
Mile 16	15	to	16	2	112.16	3	0	-	-	3.26	4.3	#VALUE!	#VALUE!	3.57	#VALUE!		0	0
Mile 17	16	to	17	2	120.33	4	0	-	-	3.17	4.1	#VALUE!	#VALUE!	3.46	#VALUE!		0	0
Mile 18	17	to	18	2	95.98	3	0	-	-	3.47	4.3	#VALUE!	#VALUE!	3.72	#VALUE!		0	0
Mile 19	18	to	19	2	99.06	0	0	-	-	3.43	5.0	#VALUE!	#VALUE!	3.90	#VALUE!		0	0
Mile 20	19	to	20	2	79.31	2	0	-	-	3.70	4.5	#VALUE!	#VALUE!	3.93	#VALUE!		0	0
Mile 21	20	to	21	2	82.92	1	0	-	-	3.65	4.7	#VALUE!	#VALUE!	3.95	#VALUE!		0	0
Mile 22	21	to	22	2	93.11	0	0	-	-	3.51	5.0	#VALUE!	#VALUE!	3.96	#VALUE!		0	0
Mile 23	22	to	23	2	77.62	0	0	-	-	3.72	5.0	#VALUE!	#VALUE!	4.11	#VALUE!		0	0
Mile 24	23	to	24	2	139.07	0	0	-	-	2.95	5.0	#VALUE!	#VALUE!	3.56	#VALUE!		0	0
			Total	48			0											0
			Weighted Average							3.37	4.26	#VALUE!	#VALUE!	3.64	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.37**		**#VALUE!**						**0.0%**
			Pavement Index													**3.64**		

Segment 2			*Interstate?*	No														
Mile 1	24	to	25	2	182.77	1	0	-	-	2.50	4.7	#VALUE!	#VALUE!	2.50	#VALUE!		2	0
Mile 2	25	to	26	2	166.65	3	0	-	-	2.65	4.3	#VALUE!	#VALUE!	2.65	#VALUE!		2	0
Mile 3	26	to	27	2	171.84	10	0	-	-	2.60	3.4	#VALUE!	#VALUE!	2.60	#VALUE!		2	0
Mile 4	27	to	28	2	92.36	15	0	-	-	3.52	2.9	#VALUE!	#VALUE!	3.11	#VALUE!		0	0
Mile 5	28	to	29	2	87.34	10	0	-	-	3.59	3.4	#VALUE!	#VALUE!	3.47	#VALUE!		0	0
Mile 6	29	to	30	2	137.11	10	0	-	-	2.97	3.4	#VALUE!	#VALUE!	3.11	#VALUE!		0	0
Mile 7	30	to	31	2	95.85	15	0	-	-	3.47	2.9	#VALUE!	#VALUE!	3.10	#VALUE!		0	0
Mile 8	31	to	32	2	83.47	12	0	-	-	3.64	3.2	#VALUE!	#VALUE!	3.35	#VALUE!		0	0
Mile 9	32	to	33	2	95.87	15	0	-	-	3.47	2.9	#VALUE!	#VALUE!	3.10	#VALUE!		0	0
Mile 10	33	to	34	2	90.48	15	0	-	-	3.55	2.9	#VALUE!	#VALUE!	3.12	#VALUE!		0	0
Mile 11	34	to	35	2	107.74	15	0	-	-	3.32	2.9	#VALUE!	#VALUE!	3.05	#VALUE!		0	0
Mile 12	35	to	36	2	94.86	12	0	-	-	3.49	3.2	#VALUE!	#VALUE!	3.30	#VALUE!		0	0
Mile 13	36	to	37	2	100.23	12	0	-	-	3.42	3.2	#VALUE!	#VALUE!	3.28	#VALUE!		0	0
Mile 14	37	to	38	2	122.21	10	0	-	-	3.14	3.4	#VALUE!	#VALUE!	3.23	#VALUE!		0	0
Mile 15	38	to	39	2	176.30	7	0	-	-	2.56	3.8	#VALUE!	#VALUE!	2.56	#VALUE!		2	0
Mile 16	39	to	40	2	137.04	20	0	-	-	2.97	2.5	#VALUE!	#VALUE!	2.51	#VALUE!		2	0
Mile 17	40	to	41	2	143.98	8	0	-	-	2.89	3.6	#VALUE!	#VALUE!	2.89	#VALUE!		2	0
Mile 18	41	to	42	2	113.96	12	0	-	-	3.24	3.2	#VALUE!	#VALUE!	3.23	#VALUE!		0	0
Mile 19	42	to	43	2	61.76	10	0	-	-	3.95	3.4	#VALUE!	#VALUE!	3.58	#VALUE!		0	0
Mile 20	43	to	44	2	76.96	6	0	-	-	3.73	3.9	#VALUE!	#VALUE!	3.77	#VALUE!		0	0
Mile 21	44	to	45	2	68.78	5	0	-	-	3.85	4.0	#VALUE!	#VALUE!	3.90	#VALUE!		0	0
Mile 22	45	to	46	2	96.56	35	0	-	-	3.46	1.4	#VALUE!	#VALUE!	1.40	#VALUE!		2	0
Mile 23	46	to	47	2	85.75	10	0	-	-	3.61	3.4	#VALUE!	#VALUE!	3.48	#VALUE!		0	0
Mile 24	47	to	48	2	100.51	12	0	-	-	3.41	3.2	#VALUE!	#VALUE!	3.28	#VALUE!		0	0
Mile 25	48	to	49	2	109.99	20	0	-	-	3.29	2.5	#VALUE!	#VALUE!	2.51	#VALUE!		2	0
Mile 26	49	to	50	2	88.04	25	0	-	-	3.58	2.1	#VALUE!	#VALUE!	2.11	#VALUE!		2	0
Mile 27	50	to	51	2	89.02	20	0	-	-	3.56	2.5	#VALUE!	#VALUE!	2.51	#VALUE!		2	0
Mile 28	51	to	52	2	77.85	8	0	-	-	3.72	3.6	#VALUE!	#VALUE!	3.66	#VALUE!		0	0
Mile 29	52	to	53	2	72.19	10	0	-	-	3.80	3.4	#VALUE!	#VALUE!	3.54	#VALUE!		0	0
Mile 30	53	to	54	2	102.63	15	0	-	-	3.39	2.9	#VALUE!	#VALUE!	3.07	#VALUE!		0	0
Mile 31	54	to	55	2	122.01	10	0	-	-	3.14	3.4	#VALUE!	#VALUE!	3.23	#VALUE!		0	0
Mile 32	55	to	56	2	85.61	12	0	-	-	3.61	3.2	#VALUE!	#VALUE!	3.34	#VALUE!		0	0
Mile 33	56	to	57	2	90.86	15	0	-	-	3.54	2.9	#VALUE!	#VALUE!	3.12	#VALUE!		0	0
Mile 34	57	to	58	2	77.00	12	0	-	-	3.73	3.2	#VALUE!	#VALUE!	3.37	#VALUE!		0	0
Mile 35	58	to	59	2	84.47	7	0	-	-	3.63	3.8	#VALUE!	#VALUE!	3.67	#VALUE!		0	0
Mile 36	59	to	60	2	85.02	15	0	-	-	3.62	2.9	#VALUE!	#VALUE!	3.14	#VALUE!		0	0
Mile 37	60	to	61	2	69.94	10	0	-	-	3.83	3.4	#VALUE!	#VALUE!	3.55	#VALUE!		0	0
Mile 38	61	to	62	2	101.97	9	0	-	-	3.39	3.5	#VALUE!	#VALUE!	3.43	#VALUE!		0	0
Mile 39	62	to	63	2	214.31	8	0	-	-	2.21	3.6	#VALUE!	#VALUE!	2.21	#VALUE!		2	0
Mile 40	63	to	64	2	149.58	6	0	-	-	2.83	3.9	#VALUE!	#VALUE!	2.83	#VALUE!		2	0
Mile 41	64	to	65	2	115.70	5	0	-	-	3.22	4.0	#VALUE!	#VALUE!	3.46	#VALUE!		0	0
Mile 42	65	to	66	2	135.68	15	0	-	-	2.99	2.9	#VALUE!	#VALUE!	2.95	#VALUE!		0	0
Mile 43	66	to	67	2	213.43	10	0	-	-	2.22	3.4	#VALUE!	#VALUE!	2.22	#VALUE!		2	0
			Total	86			0											26
			Weighted Average							3.31	3.28	#VALUE!	#VALUE!	3.06	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.31**		**#VALUE!**						**30.2%**
			Pavement Index													**3.06**		

Segment 3			*Interstate?*	No														
Mile 1	87	to	88	2	98.65	10	2	83.85	75	3.44	3.4	3.64	-1.0	3.43	-0.96		0	2
Mile 2	88	to	89	2	80.47	2	2	61.68	7	3.68	4.5	3.96	3.8	3.91	3.81		0	0
Mile 3	89	to	90	2	82.37	1	2	71.13	3	3.66	4.7	3.82	4.3	3.96	3.96		0	0
Mile 4	90	to	91	2	74.72	2	2	50.63	0	3.76	4.5	4.12	5.0	3.97	4.39		0	0
Mile 5	91	to	92	2	67.98	3	2	42.91	1	3.86	4.3	4.25	4.7	3.99	4.37		0	0
Mile 6	92	to	93	2	41.54	0	2	38.37	4	4.27	5.0	4.32	4.1	4.49	4.19		0	0
Mile 7	93	to	94	2	46.23	0	2	48.59	0	4.19	5.0	4.16	5.0	4.44	4.41		0	0
Mile 8	94	to	95	2	48.27	0	2	47.13	0	4.16	5.0	4.18	5.0	4.41	4.43		0	0
Mile 9	95	to	96	2	49.03	2	2	62.05	2	4.15	4.5	3.95	4.5	4.24	4.10		0	0
Mile 10	96	to	97	2	57.89	2	2	71.23	4	4.01	4.5	3.81	4.1	4.15	3.91		0	0
Mile 11	97	to	98	2	56.19	1	2	83.84	15	4.04	4.7	3.64	2.9	4.22	3.15		0	0
Mile 12	98	to	99	2	78.17	4	2	55.36	9	3.72	4.1	4.05	3.5	3.84	3.69		0	0
Mile 13	99	to	100	2	64.52	7	2	50.96	9	3.91	3.8	4.12	3.5	3.80	3.71		0	0
Mile 14	100	to	101	2	64.80	9	2	65.75	7	3.91	3.5	3.89	3.8	3.64	3.80		0	0
Mile 15	101	to	102	2	51.59	0	2	48.47	0	4.11	5.0	4.16	5.0	4.38	4.41		0	0
Mile 16	102	to	103	2	51.89	0	2	44.43	0	4.11	5.0	4.22	5.0	4.37	4.46		0	0
Mile 17	103	to	104	2	59.65	0	2	52.35	0	3.99	5.0	4.10	5.0	4.29	4.37		0	0
			Total	34			34											2
			Weighted Average							3.94	4.49	4.02	4.01	4.09	3.78			
			Factor							1.00		1.00						
			Indicator Score							**3.94**		**4.02**						**2.9%**
			Pavement Index													**3.93**		
Segment 4			***Interstate?***	**No**														
Mile 1	104	to	105	2	105.77	0	0	-	-	3.35	5.0	#VALUE!	#VALUE!	3.84	#VALUE!		0	0
Mile 2	105	to	106	2	168.40	8	0	-	-	2.64	3.6	#VALUE!	#VALUE!	2.64	#VALUE!		2	0
Mile 3	106	to	107	2	160.12	7	0	-	-	2.72	3.8	#VALUE!	#VALUE!	2.72	#VALUE!		2	0
Mile 4	107	to	108	2	124.55	9	0	-	-	3.11	3.5	#VALUE!	#VALUE!	3.24	#VALUE!		0	0
Mile 5	108	to	109	2	109.40	9	0	-	-	3.30	3.5	#VALUE!	#VALUE!	3.37	#VALUE!		0	0
Mile 6	109	to	110	2	99.95	7	0	-	-	3.42	3.8	#VALUE!	#VALUE!	3.52	#VALUE!		0	0
Mile 7	110	to	111	2	128.86	8	0	-	-	3.06	3.6	#VALUE!	#VALUE!	3.24	#VALUE!		0	0
Mile 8	111	to	112	2	109.11	10	0	-	-	3.30	3.4	#VALUE!	#VALUE!	3.34	#VALUE!		0	0
Mile 9	112	to	113	2	92.22	15	0	-	-	3.52	2.9	#VALUE!	#VALUE!	3.11	#VALUE!		0	0
Mile 10	113	to	114	2	98.68	15	0	-	-	3.44	2.9	#VALUE!	#VALUE!	3.09	#VALUE!		0	0
Mile 11	114	to	115	2	68.04	8	0	-	-	3.86	3.6	#VALUE!	#VALUE!	3.71	#VALUE!		0	0
Mile 12	115	to	116	2	79.57	10	0	-	-	3.70	3.4	#VALUE!	#VALUE!	3.50	#VALUE!		0	0
			Total	24			0											4
			Weighted Average							3.28	3.60	#VALUE!	#VALUE!	3.28	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.28**		**#VALUE!**						**16.7%**
			Pavement Index													**3.28**		
Segment 5			***Interstate?***	**No**														
Mile 1	116	to	117	4	74.05	12	0	-	-	3.77	3.2	#VALUE!	#VALUE!	3.39	#VALUE!		0	0
Mile 2	117	to	118	4	125.40	7	0	-	-	3.10	3.8	#VALUE!	#VALUE!	3.30	#VALUE!		0	0
Mile 3	118	to	119	4	91.82	6	0	-	-	3.53	3.9	#VALUE!	#VALUE!	3.63	#VALUE!		0	0
Mile 4	119	to	120	4	73.63	5	0	-	-	3.78	4.0	#VALUE!	#VALUE!	3.85	#VALUE!		0	0
Mile 5	120	to	121	4	213.57	2	0	-	-	2.22	4.5	#VALUE!	#VALUE!	2.22	#VALUE!		4	0
			Total	20			0											4
			Weighted Average							3.28	3.86	#VALUE!	#VALUE!	3.28	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.28**		**#VALUE!**						**20.0%**
			Pavement Index													**3.28**		

Segment 6			*Interstate?*	No														
Mile 1	330	to	331	4	85.87	4	0	-	-	3.61	4.1	#VALUE!	#VALUE!	3.77	#VALUE!		0	0
Mile 2	331	to	332	4	98.69	2	0	-	-	3.44	4.5	#VALUE!	#VALUE!	3.74	#VALUE!		0	0
Mile 3	332	to	333	4	77.42	4	0	-	-	3.73	4.1	#VALUE!	#VALUE!	3.85	#VALUE!		0	0
Mile 4	333	to	334	4	81.66	3	0	-	-	3.67	4.3	#VALUE!	#VALUE!	3.85	#VALUE!		0	0
Mile 5	334	to	335	4	76.50	5	0	-	-	3.74	4.0	#VALUE!	#VALUE!	3.82	#VALUE!		0	0
Mile 6	335	to	336	4	78.75	1	0	-	-	3.71	4.7	#VALUE!	#VALUE!	3.99	#VALUE!		0	0
Mile 7	336	to	337	4	152.91	2	0	-	-	2.80	4.5	#VALUE!	#VALUE!	2.80	#VALUE!		4	0
Mile 8	337	to	338	4	116.09	0	0	-	-	3.22	5.0	#VALUE!	#VALUE!	3.75	#VALUE!		0	0
Mile 9	338	to	339	4	109.18	0	0	-	-	3.30	5.0	#VALUE!	#VALUE!	3.81	#VALUE!		0	0
Mile 10	339	to	340	4	113.51	2	0	-	-	3.25	4.5	#VALUE!	#VALUE!	3.61	#VALUE!		0	0
			Total	40			0											4
			Weighted Average							3.44	4.46	#VALUE!	#VALUE!	3.70	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.44**		**#VALUE!**						**10.0%**
			Pavement Index													**3.70**		
Segment 7			***Interstate?***	**No**														
Mile 1	300	to	301	2	100.70	32	0	-	-	3.41	1.6	#VALUE!	#VALUE!	1.60	#VALUE!		2	0
Mile 2	301	to	302	2	119.33	7	0	-	-	3.18	3.8	#VALUE!	#VALUE!	3.35	#VALUE!		0	0
Mile 3	302	to	303	2	112.83	11	0	-	-	3.26	3.3	#VALUE!	#VALUE!	3.28	#VALUE!		0	0
Mile 4	303	to	304	2	115.53	8	0	-	-	3.22	3.6	#VALUE!	#VALUE!	3.35	#VALUE!		0	0
Mile 5	304	to	305	2	126.18	7	0	-	-	3.10	3.8	#VALUE!	#VALUE!	3.29	#VALUE!		0	0
Mile 6	305	to	306	2	99.78	7	0	-	-	3.42	3.8	#VALUE!	#VALUE!	3.52	#VALUE!		0	0
Mile 7	306	to	307	2	131.47	7	0	-	-	3.03	3.8	#VALUE!	#VALUE!	3.25	#VALUE!		0	0
Mile 8	307	to	308	2	122.80	9	0	-	-	3.14	3.5	#VALUE!	#VALUE!	3.25	#VALUE!		0	0
Mile 9	308	to	309	2	131.79	7	0	-	-	3.03	3.8	#VALUE!	#VALUE!	3.25	#VALUE!		0	0
Mile 10	309	to	310	2	93.59	4	0	-	-	3.50	4.1	#VALUE!	#VALUE!	3.69	#VALUE!		0	0
Mile 11	310	to	311	2	108.09	5	0	-	-	3.32	4.0	#VALUE!	#VALUE!	3.52	#VALUE!		0	0
Mile 12	311	to	312	2	103.28	5	0	-	-	3.38	4.0	#VALUE!	#VALUE!	3.56	#VALUE!		0	0
Mile 13	312	to	313	2	101.23	6	0	-	-	3.40	3.9	#VALUE!	#VALUE!	3.54	#VALUE!		0	0
Mile 14	313	to	314	2	124.46	7	0	-	-	3.12	3.8	#VALUE!	#VALUE!	3.31	#VALUE!		0	0
Mile 15	314	to	315	2	114.23	1	0	-	-	3.24	4.7	#VALUE!	#VALUE!	3.66	#VALUE!		0	0
Mile 27	326	to	327	2	88.23	0	0	-	-	3.58	5.0	#VALUE!	#VALUE!	4.00	#VALUE!		0	0
Mile 28	327	to	328	2	73.26	0	0	-	-	3.78	5.0	#VALUE!	#VALUE!	4.15	#VALUE!		0	0
Mile 29	328	to	329	2	79.61	2	0	-	-	3.69	4.5	#VALUE!	#VALUE!	3.92	#VALUE!		0	0
Mile 30	329	to	330	2	71.04	8	0	-	-	3.82	3.6	#VALUE!	#VALUE!	3.69	#VALUE!		0	0
			Total	38			0											2
			Weighted Average							3.35	3.86	#VALUE!	#VALUE!	3.43	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.35**		**#VALUE!**						**5.3%**
			Pavement Index													**3.43**		

Segment 8		***Interstate?***		**No**														
Mile 1	298	to	299	2	63.41	5	0	-	-	3.93	4.0	#VALUE!	#VALUE!	3.95	#VALUE!		0	0
Mile 2	299	to	300	2	83.53	4	0	-	-	3.64	4.1	#VALUE!	#VALUE!	3.79	#VALUE!		0	0
			Total	4			0											0
			Weighted Average							3.78	4.07	#VALUE!	#VALUE!	3.87	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.78**		**#VALUE!**						**0.0%**
			Pavement Index													**3.87**		
Segment 9		***Interstate?***		**No**														
Mile 1	293	to	294	2	90.52	0	0	-	-	3.54	5.0	#VALUE!	#VALUE!	3.98	#VALUE!		0	0
Mile 2	294	to	295	2	70.45	5	0	-	-	3.83	4.0	#VALUE!	#VALUE!	3.88	#VALUE!		0	0
Mile 3	295	to	296	2	68.27	5	0	-	-	3.86	4.0	#VALUE!	#VALUE!	3.90	#VALUE!		0	0
Mile 4	296	to	297	2	63.67	8	0	-	-	3.93	3.6	#VALUE!	#VALUE!	3.72	#VALUE!		0	0
Mile 5	297	to	298	2	69.64	10	0	-	-	3.84	3.4	#VALUE!	#VALUE!	3.55	#VALUE!		0	0
			Total	10			0											0
			Weighted Average							3.80	4.01	#VALUE!	#VALUE!	3.81	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.80**		**#VALUE!**						**0.0%**
			Pavement Index													**3.81**		

Segment 10			Interstate?	No														
Mile 1	274	to	275	2	66.05	1	0	-	-	3.89	4.7	#VALUE!	#VALUE!	4.12	#VALUE!		0	0
Mile 2	275	to	276	2	67.59	0	0	-	-	3.87	5.0	#VALUE!	#VALUE!	4.21	#VALUE!		0	0
Mile 3	276	to	277	2	63.15	0	0	-	-	3.93	5.0	#VALUE!	#VALUE!	4.25	#VALUE!		0	0
Mile 4	277	to	278	2	62.48	0	0	-	-	3.94	5.0	#VALUE!	#VALUE!	4.26	#VALUE!		0	0
Mile 5	278	to	279	2	63.43	0	0	-	-	3.93	5.0	#VALUE!	#VALUE!	4.25	#VALUE!		0	0
Mile 6	279	to	280	2	128.19	0	0	-	-	3.07	5.0	#VALUE!	#VALUE!	3.65	#VALUE!		0	0
Mile 7	280	to	281	2	131.59	0	0	-	-	3.03	5.0	#VALUE!	#VALUE!	3.62	#VALUE!		0	0
Mile 8	281	to	282	2	112.99	0	0	-	-	3.25	5.0	#VALUE!	#VALUE!	3.78	#VALUE!		0	0
Mile 9	282	to	283	2	133.13	0	0	-	-	3.01	5.0	#VALUE!	#VALUE!	3.61	#VALUE!		0	0
Mile 10	283	to	284	2	144.23	3	0	-	-	2.89	4.3	#VALUE!	#VALUE!	2.89	#VALUE!		2	0
Mile 11	284	to	285	2	109.78	10	0	-	-	3.29	3.4	#VALUE!	#VALUE!	3.33	#VALUE!		0	0
Mile 12	285	to	286	2	119.41	5	0	-	-	3.18	4.0	#VALUE!	#VALUE!	3.42	#VALUE!		0	0
Mile 13	286	to	287	2	94.39	6	0	-	-	3.49	3.9	#VALUE!	#VALUE!	3.61	#VALUE!		0	0
Mile 14	287	to	288	2	74.75	4	0	-	-	3.76	4.1	#VALUE!	#VALUE!	3.88	#VALUE!		0	0
Mile 15	288	to	289	2	63.10	0	0	-	-	3.93	5.0	#VALUE!	#VALUE!	4.25	#VALUE!		0	0
Mile 16	289	to	290	2	55.61	0	0	-	-	4.05	5.0	#VALUE!	#VALUE!	4.33	#VALUE!		0	0
Mile 17	290	to	291	2	66.35	0	0	-	-	3.89	5.0	#VALUE!	#VALUE!	4.22	#VALUE!		0	0
Mile 18	291	to	292	2	85.76	0	0	-	-	3.61	5.0	#VALUE!	#VALUE!	4.03	#VALUE!		0	0
Mile 19	292	to	293	2	99.85	0	0	-	-	3.42	5.0	#VALUE!	#VALUE!	3.89	#VALUE!		0	0
			Total	38			0											2
			Weighted Average							3.55	4.70	#VALUE!	#VALUE!	3.87	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.55**		**#VALUE!**						**5.3%**
			Pavement Index													**3.87**		
Segment 11			***Interstate?***	**No**														
Mile 1	270	to	271	2	98.14	2	0	-	-	3.44	4.5	#VALUE!	#VALUE!	3.75	#VALUE!		0	0
Mile 2	271	to	272	2	103.66	0	0	-	-	3.37	5.0	#VALUE!	#VALUE!	3.86	#VALUE!		0	0
Mile 3	272	to	273	2	88.09	0	0	-	-	3.58	5.0	#VALUE!	#VALUE!	4.00	#VALUE!		0	0
Mile 4	273	to	274	2	72.99	4	0	-	-	3.79	4.1	#VALUE!	#VALUE!	3.89	#VALUE!		0	0
			Total	8			0											0
			Weighted Average							3.55	4.65	#VALUE!	#VALUE!	3.88	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.55**		**#VALUE!**						**0.0%**
			Pavement Index													**3.88**		

Segment 12				Interstate?	No														
Mile 1	255	to	256	2	66.86	4	0	-	-	3.88	4.1	#VALUE!	#VALUE!	3.96	#VALUE!		0	0
Mile 2	256	to	257	2	82.91	1	0	-	-	3.65	4.7	#VALUE!	#VALUE!	3.95	#VALUE!		0	0
Mile 3	257	to	258	2	76.80	3	0	-	-	3.73	4.3	#VALUE!	#VALUE!	3.90	#VALUE!		0	0
Mile 4	258	to	259	2	112.03	3	0	-	-	3.27	4.3	#VALUE!	#VALUE!	3.57	#VALUE!		0	0
Mile 5	259	to	260	2	83.96	5	0	-	-	3.63	4.0	#VALUE!	#VALUE!	3.74	#VALUE!		0	0
Mile 6	260	to	261	2	63.48	2	0	-	-	3.93	4.5	#VALUE!	#VALUE!	4.09	#VALUE!		0	0
Mile 7	261	to	262	2	78.37	3	0	-	-	3.71	4.3	#VALUE!	#VALUE!	3.88	#VALUE!		0	0
Mile 8	262	to	263	2	63.90	2	0	-	-	3.92	4.5	#VALUE!	#VALUE!	4.08	#VALUE!		0	0
Mile 9	263	to	264	2	56.30	3	0	-	-	4.04	4.3	#VALUE!	#VALUE!	4.11	#VALUE!		0	0
Mile 10	264	to	265	2	52.09	5	0	-	-	4.10	4.0	#VALUE!	#VALUE!	4.03	#VALUE!		0	0
Mile 11	265	to	266	2	52.28	2	0	-	-	4.10	4.5	#VALUE!	#VALUE!	4.21	#VALUE!		0	0
Mile 12	266	to	267	2	59.47	3	0	-	-	3.99	4.3	#VALUE!	#VALUE!	4.08	#VALUE!		0	0
Mile 13	267	to	268	2	73.85	4	0	-	-	3.78	4.1	#VALUE!	#VALUE!	3.89	#VALUE!		0	0
Mile 14	268	to	269	2	70.11	2	0	-	-	3.83	4.5	#VALUE!	#VALUE!	4.02	#VALUE!		0	0
Mile 15	269	to	270	2	64.93	4	0	-	-	3.91	4.1	#VALUE!	#VALUE!	3.98	#VALUE!		0	0
			Total	30			0											0
			Weighted Average							3.83	4.29	#VALUE!	#VALUE!	3.97	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.83**		**#VALUE!**						**0.0%**
			Pavement Index													**3.97**		

Segment 13				Interstate?	No														
Mile 1 (60)	243	to	244	0	-	-	2	91.28	1	#VALUE!	#VALUE!	3.53	4.7	#VALUE!	3.87		0	0
Mile 2 (60)	244	to	245	2	94.46	0	2	122.67	4	3.49	5.0	3.14	4.1	3.94	3.44		0	0
Mile 3 (60)	245	to	246	2	81.59	0	2	116.54	1	3.67	5.0	3.21	4.7	4.07	3.64		0	0
Mile 4 (60)	246	to	247	2	97.79	0	2	138.25	0	3.45	5.0	2.96	5.0	3.91	3.57		0	0
Mile 5 (60)	247	to	248	2	123.48	0	2	142.22	1	3.13	5.0	2.91	4.7	3.69	3.44		0	2
Mile 6 (60)	248	to	249	0	-	-	4	91.39	1	#VALUE!	#VALUE!	3.53	4.7	#VALUE!	3.87		0	0
Mile 7 (60)	249	to	250	0	-	-	4	164.99	1	#VALUE!	#VALUE!	2.67	4.7	#VALUE!	2.67		0	4
Mile 8 (60)	250	to	251	0	-	-	4	186.31	1	#VALUE!	#VALUE!	2.46	4.7	#VALUE!	2.46		0	4
Mile 9 (60)	251	to	252	0	-	-	4	109.75	0	#VALUE!	#VALUE!	3.29	5.0	#VALUE!	3.81		0	0
Mile 10 (60)	252	to	253	0	-	-	4	110.75	4	#VALUE!	#VALUE!	3.28	4.1	#VALUE!	3.54		0	0
Mile 11 (60)	253	to	254	0	-	-	4	88.09	0	#VALUE!	#VALUE!	3.58	5.0	#VALUE!	4.00		0	0
Mile 1 (70)	252	to	253	0	-	-	4	52.32	1	#VALUE!	#VALUE!	4.10	4.7	#VALUE!	4.27		0	0
Mile 2 (70)	253	to	254	0	-	-	4	70.12	4	#VALUE!	#VALUE!	3.83	4.1	#VALUE!	3.92		0	0
Mile 3 (70)	254	to	255	0	-	-	4	72.78	3	#VALUE!	#VALUE!	3.79	4.3	#VALUE!	3.94		0	0
			Total	8			46											10
			Weighted Average							3.43	5.00	3.34	4.59	3.90	3.61			
			Factor							1.00		1.00						
			Indicator Score							**3.43**		**3.34**						**18.5%**
			Pavement Index													**3.65**		

Segment 14			*Interstate?*	No														
Mile 1	227	to	228	2	124.07	6	0	-	-	3.12	3.9	#VALUE!	#VALUE!	3.35	#VALUE!		0	0
Mile 2	228	to	229	2	125.39	10	0	-	-	3.10	3.4	#VALUE!	#VALUE!	3.20	#VALUE!		0	0
Mile 3	229	to	230	2	142.90	4	0	-	-	2.90	4.1	#VALUE!	#VALUE!	3.28	#VALUE!		2	0
Mile 4	230	to	231	2	189.67	8	0	-	-	2.43	3.6	#VALUE!	#VALUE!	2.43	#VALUE!		2	0
Mile 5	231	to	232	2	186.43	7	0	-	-	2.46	3.8	#VALUE!	#VALUE!	2.46	#VALUE!		2	0
Mile 6	232	to	233	2	144.60	4	0	-	-	2.89	4.1	#VALUE!	#VALUE!	2.89	#VALUE!		2	0
Mile 7	233	to	234	2	137.45	6	0	-	-	2.97	3.9	#VALUE!	#VALUE!	3.24	#VALUE!		0	0
Mile 8	234	to	235	2	135.35	6	0	-	-	2.99	3.9	#VALUE!	#VALUE!	3.25	#VALUE!		0	0
Mile 9	235	to	236	2	152.54	4	0	-	-	2.80	4.1	#VALUE!	#VALUE!	2.80	#VALUE!		2	0
Mile 10	236	to	237	2	78.36	6	0	-	-	3.71	3.9	#VALUE!	#VALUE!	3.76	#VALUE!		0	0
Mile 11	237	to	238	2	75.72	0	0	-	-	3.75	5.0	#VALUE!	#VALUE!	4.12	#VALUE!		0	0
Mile 12	238	to	239	2	84.57	0	0	-	-	3.63	5.0	#VALUE!	#VALUE!	4.04	#VALUE!		0	0
Mile 13	239	to	240	2	77.73	1	0	-	-	3.72	4.7	#VALUE!	#VALUE!	4.00	#VALUE!		0	0
Mile 14	240	to	241	2	80.48	0	0	-	-	3.68	5.0	#VALUE!	#VALUE!	4.08	#VALUE!		0	0
Mile 15	241	to	242	2	66.76	5	0	-	-	3.88	4.0	#VALUE!	#VALUE!	3.92	#VALUE!		0	0
Mile 16	242	to	243	2	67.31	3	0	-	-	3.87	4.3	#VALUE!	#VALUE!	4.00	#VALUE!		0	0
			Total	32			0											10
			Weighted Average							3.24	4.17	#VALUE!	#VALUE!	3.43	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.24**		**#VALUE!**						**31.3%**
			Pavement Index													**3.43**		

Segment 15			*Interstate?*	No														
Mile 1	225	to	226	2	139.40	8	0	-	-	2.94	3.6	#VALUE!	#VALUE!	3.15	#VALUE!		0	0
Mile 2	226	to	227	2	143.24	4	0	-	-	2.90	4.1	#VALUE!	#VALUE!	3.27	#VALUE!		2	0
			Total	4			0											2
			Weighted Average							2.92	3.89	#VALUE!	#VALUE!	3.21	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**2.92**		**#VALUE!**						**50.0%**
			Pavement Index													**3.21**		

Segment 16			*Interstate?*	No														
Mile 1	223	to	224	2	108.21	10	0	-	-	3.31	3.4	#VALUE!	#VALUE!	3.35	#VALUE!		0	0
Mile 2	224	to	225	2	98.63	12	0	-	-	3.44	3.2	#VALUE!	#VALUE!	3.29	#VALUE!		0	0
			Total	4			0											0
			Weighted Average							3.38	3.32	#VALUE!	#VALUE!	3.32	#VALUE!			
			Factor							1.00		1.00						
			Indicator Score							**3.38**		**#VALUE!**						**0.0%**
			Pavement Index													**3.32**		

Segment 17			*Interstate?*	No														
Mile 1	212	to	213	2	62.02	3	2	62.52	2	3.95	4.3	3.94	4.5	4.05	4.10		0	0
Mile 2	213	to	214	2	58.00	5	2	63.97	4	4.01	4.0	3.92	4.1	4.00	3.99		0	0
Mile 3	214	to	215	2	56.86	0	2	73.22	0	4.03	5.0	3.79	5.0	4.32	4.15		0	0
Mile 4	215	to	216	2	43.31	0	2	49.42	0	4.24	5.0	4.14	5.0	4.47	4.40		0	0
Mile 5	216	to	217	2	41.05	0	2	52.40	0	4.28	5.0	4.10	5.0	4.49	4.37		0	0
Mile 6	217	to	218	2	42.34	0	2	51.58	0	4.26	5.0	4.11	5.0	4.48	4.38		0	0
Mile 7	218	to	219	2	40.18	1	2	44.77	0	4.29	4.7	4.22	5.0	4.40	4.45		0	0
Mile 8	219	to	220	2	51.46	1	2	41.85	0	4.11	4.7	4.26	5.0	4.27	4.49		0	0
Mile 9	220	to	221	2	47.46	1	2	44.78	0	4.17	4.7	4.22	5.0	4.32	4.45		0	0
Mile 10	221	to	222	2	42.41	0	2	47.77	0	4.26	5.0	4.17	5.0	4.48	4.42		0	0
Mile 11	222	to	223	2	62.84	1	2	103.12	0	3.94	4.7	3.38	5.0	4.15	3.87		0	0
			Total	22			22											0
			Weighted Average							4.14	4.72	4.02	4.87	4.31	4.28			
			Factor							1.00		1.00						
			Indicator Score							**4.14**		**4.02**						**0.0%**
			Pavement Index													**4.30**		

Bridge Performance Area Data

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete	
Segment 1											
Moffet Wash Bridge	297	6.44	241	89.00	7	7	6	6	6.0	0	
Total			241								
Weighted Average				89.00					6.00	0.00%	
Factor				1.00					1.00	1.00	
Indicator Score				**89.00**						**0.00%**	**6**
Bridge Index									**6.00**		
Segment 2											
Bridge	291	45.46	178	81.40	6	6	6	6	6.0	0	
Cochise UPRR OP	157	62.88	302	74.30	5	6	6	6	5.0	0	
Total			480								
Weighted Average				76.93					5.37	0.00%	
Factor				1.00					1.00	1.00	
Indicator Score				**76.93**						**0.00%**	**5**
Bridge Index									**5.37**		
Segment 3											
Monk Draw Bridge SB	292	89.28	333	87.70	6	6	7	5	5.0	0	
Monk Draw Br NB	2572	89.29	345	99.90	7	7	7	7	7.0	0	
Total			678								
Weighted Average				93.91					6.02	0.00%	
Factor				1.00					1.00	1.00	
Indicator Score				**93.91**						**0.00%**	**5**
Bridge Index									**6.02**		
Segment 4											
Stockton Wash Bridge	201	111.11	605	69.50	6	6	7	6	6.0	0	
Total			605								
Weighted Average				69.50					6.00	0.00%	
Factor				1.00					1.00	1.00	
Indicator Score				**69.50**						**0.00%**	**6**
Bridge Index									**6.00**		
Segment 5											
-	-	-	-	-	-	-	-	-	0.0	0	
Total			0								
Weighted Average				-					-	-	
Factor				1.00					1.00	1.00	
Indicator Score				**-**						**0.00%**	**0**
Bridge Index									**-**		

Segment 6												
Cottonwood Wash Br		305	330.14	989	69.10	6	6	6	6	6.0	0	
	Total			989								
	Weighted Average				69.10					6.00	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**69.10**						**0.00%**	**6**
	Bridge Index									**6.00**		
Segment 7												
Goodwin Wash Bridge		2736	301.87	766	80.00	7	8	8	8	7.0	0	
Holyoak Wash Bridge		514	302.53	389	66.70	5	5	5	5	5.0	0	
Fine Wash Bridge		515	304.85	468	78.70	6	6	6	6	6.0	0	
Ft Thomas Ped UP		560	306.59	53	-2.00	7	6	7	N	6.0	0	
Black Rock Wash Br		545	306.76	888	67.00	6	6	5	5	5.0	0	
Hunzinger Wash Br		561	313.62	345	69.00	6	6	5	5	5.0	0	
Matthewsville Wash Br		394	326.25	720	66.80	6	6	6	6	6.0	0	
Patterson Wash Br		1421	327.72	104	77.00	6	6	7	6	6.0	0	
	Total			3,733								
	Weighted Average				71.59					5.77	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**71.59**						**0.00%**	**5**
	Bridge Index									**5.77**		
Segment 8												
Bridge		513	299.51	451	74.00	6	6	7	6	6.0	0	
	Total			451								
	Weighted Average				74.00					6.00	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**74.00**						**0.00%**	**6**
	Bridge Index									**6.00**		
Segment 9												
-		-	-	-	-	-	-	-	-	-	0	
	Total			0								
	Weighted Average				#VALUE!					#VALUE!	#DIV/0!	
	Factor				1.00					1.00	1.00	
	Indicator Score				**#VALUE!**						**#DIV/0!**	**0**
	Bridge Index									**#VALUE!**		
Segment 10												
Gila River Br Bylas		2945	292.55	9495	80.00	7	8	8	8	7.0	0	
	Total			9,495								
	Weighted Average				80.00					7.00	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**80.00**						**0.00%**	**7**
	Bridge Index									**7.00**		

Segment 11												
Peridot RR OP		477	271.27	857	93.30	5	6	7	6	5.0	0	
San Carlos River Bridge		2910	271.56	4747	80.00	8	8	8	8	8.0	0	
	Total			5,604								
	Weighted Average				82.03					7.54	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**82.03**						**0.00%**	**5**
	Bridge Index									**7.54**		
Segment 12												
Gilson Wash Br		464	259.55	706	63.20	6	6	7	6	6.0	0	
	Total			706								
	Weighted Average				63.20					6.00	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**63.20**						**0.00%**	**6**
	Bridge Index									**6.00**		
Segment 13												
Bloody Tanks Bridge		173	243.71	585	77.20	5	5	6	5	5.0	0	
Pinal Creek Bridge		266	249.64	926	45.20	4	4	5	4	4.0	0	
Pinal Creek Bridge		36	249.80	702	53.80	5	5	6	5	5.0	0	
Central Sch Ped OP		1788	250.34	314	-2.00	7	8	7	N	7.0	0	
Pinal Creek Bridge		549	250.37	1336	78.50	5	5	6	5	5.0	0	
Pinal Creek Bridge		1785	250.53	1621	94.60	6	6	7	6	6.0	0	
Maple Street OP		1786	250.75	654	94.60	6	7	7	7	6.0	0	
Globe Viaduct		1787	250.90	6607	85.10	5	6	7	6	5.0	6,607	
Globe School Ped OP		488	251.27	72	-2.00	7	7	7	N	7.0	0	
McMillen Wash Br		1028	251.75	448	81.40	6	6	5	5	5.0	0	
Pinal SPRR UP		562	253.63	103	-2.00	N	6	7	N	6.0	0	
	Total			13,367								
	Weighted Average				78.89					5.17	49.42%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**78.89**						**49.42%**	**4**
	Bridge Index									**5.17**		

Segment 14												
Queen Creek Bridge		406	227.71	1823	36.30	4	4	4	4	4.0	0	
Queen Creek Tunnel		407	228.47	4491	-2.00	N	5	N	N	5.0	0	
Waterfall Canyon Br		328	229.50	388	40.30	7	5	4	4	4.0	0	
Devils Canyon Bridge		261	232.49	189	81.60	7	7	6	6	6.0	0	
Pinto Creek Bridge		351	238.25	2071	26.80	4	4	4	4	4.0	0	
Bloody Tanks Wash Br		45	242.72	261	68.00	6	6	5	5	5.0	0	
	Total			9,223								
	Weighted Average				36.03					4.56	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**36.03**						**0.00%**	**4**
	Bridge Index									**4.56**		
Segment 15												
Queen Creek Bridge		436	226.14	642	77.00	6	6	7	6	6.0	0	
Stone Avenue OP		437	226.62	393	87.30	7	7	7	6	6.0	393	
Route 177 TI UP		438	226.85	474	89.80	6	6	8	6	6.0	474	
	Total			1,509								
	Weighted Average				83.70					6.00	57.45%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**83.70**						**57.45%**	**6**
	Bridge Index									**6.00**		
Segment 16												
Silver King Wash Br		318	223.70	319	86.60	6	7	7	5	5.0	0	
Wash Bridge		319	224.64	146	86.80	6	6	6	5	5.0	0	
	Total			465								
	Weighted Average				86.66					5.00	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**86.66**						**0.00%**	**5**
	Bridge Index									**5.00**		
Segment 17												
US 60 EB OP Bridge		2663	212.17	845	97.40	7	7	7	7	7.0	0	
US 60 WB OP Bridge		2664	212.17	845	97.00	6	7	7	7	6.0	0	
Reymert Wash Bridge EB		286	219.85	176	89.70	7	7	6	6	6.0	0	
Reymert Wash Bridge WB		2846	220.00	337	99.60	8	8	8	8	8.0	0	
Queen Creek Bridge EB		2847	222.25	1175	99.60	7	8	7	7	7.0	0	
Queen Creek Bridge WB		296	222.25	686	65.40	6	6	5	5	5.0	0	
Wash Bridge		288	222.87	216	66.80	6	6	6	5	5.0	0	
	Total			4,279								
	Weighted Average				91.11					6.42	0.00%	
	Factor				1.00					1.00	1.00	
	Indicator Score				**91.11**						**0.00%**	**5**
	Bridge Index									**6.42**		

Mobility Performance Area Data

Segment	Begin MP	End MP	Length (mi)	Facility Type	Flow Type	Terrain	No. of Lanes	Capacity Environment Type	Lane Width (feet)	Posted Speed Limit (mph)	Divided or Undivided	Access Points (per mile)	% No-Passing Zone	Street Parking
1	0	24	24	Rural	Interrupted	Level	2	Urban/Rural Single or Multilane Signalized	12.00	55	Undivided	7	12%	N/A
2	24	67	43	Rural	Interrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	8	26%	N/A
3	87	104	17	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	55	Divided	2	3%	N/A
4	104	116	12	Rural	Uninterrupted	Level	4	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	13	30%	N/A
5	116	121	5	Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	40	Undivided	N/A	13%	N/A
6	330	339	9	Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	40	Undivided	N/A	0%	N/A
7	300	330	19	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	9	13%	N/A
8	298	300	2	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	7	6%	N/A
9	293	298	5	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	50	Undivided	14	53%	N/A
10	274	293	19	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	2	37%	N/A
11	270	274	4	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	9	77%	N/A
12	255	270	15	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	60	Undivided	4	10%	N/A
13	243	255	12	Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	45	Undivided	N/A	0%	N/A
14	227	243	16	Rural	Uninterrupted	Mountainous	2	Rural Two-Lane, Non-Signalized	12.00	50	Undivided	4	68%	N/A
15	225	227	2	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	45	Undivided	23	98%	N/A
16	223	225	2	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	7	55%	N/A
17	212	223	11	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	2	11%	N/A

Car TTI and PTI/Truck TTTI and TPTI

Segment	TMC	timeperiod	week_type	ROAD_NUMBER	ROAD_NAME	road_direction	cars_mean	trucks_mean	cars_P95	trucks_P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars_TTI	Trucks_TTI	cars_PTI	Trucks_PTI	Cars_PeakTTI	Trucks_PeakTTI	Cars_PeakPTI	Trucks_PeakPTI
1	115N06006	1 AM Peak	Weekday	US-191		Southbound	54.8	43.5	67.7	5.6	65	65	65	1.19	1.49	3.73	11.62	1.30	1.60	7.47	11.62
1	115N06006	2 Mid Day	Weekday	US-191		Southbound	50.1	40.6	67.7	7.5	65	65	65	1.30	1.60	7.47	8.72				
1	115N06006	3 PM Peak	Weekday	US-191		Southbound	54.5	41.3	67.0	7.8	65	65	65	1.19	1.57	3.67	8.37				
1	115N06006	4 Evening	Weekday	US-191		Southbound	52.6	49.6	66.4	13.7	65	65	65	1.24	1.31	3.17	4.75				
2	115N06008	1 AM Peak	Weekday	US-191		Southbound	44.6	34.3	59.5	4.0	55	55	55	1.23	1.60	1.95	13.61	1.33	1.74	11.06	29.50
2	115N06008	2 Mid Day	Weekday	US-191		Southbound	43.1	35.0	60.5	5.0	55	55	55	1.28	1.57	3.28	11.06				
2	115N06008	3 PM Peak	Weekday	US-191		Southbound	44.7	32.2	70.6	2.5	55	55	55	1.23	1.71	11.06	22.13				
2	115N06008	4 Evening	Weekday	US-191		Southbound	41.5	31.6	54.4	1.9	55	55	55	1.33	1.74	2.21	29.50				
2	115N07041	1 AM Peak	Weekday	US-191		Southbound	60.8	41.2	69.0	5.6	55	55	55	1.00	1.33	1.09	9.83	1.00	1.33	1.13	9.83
2	115N07041	2 Mid Day	Weekday	US-191		Southbound	59.4	54.4	69.0	19.9	55	55	55	1.00	1.01	1.13	2.77				
2	115N07041	3 PM Peak	Weekday	US-191		Southbound	61.2	46.9	68.2	5.6	55	55	55	1.00	1.17	1.10	9.83				
2	115N07041	4 Evening	Weekday	US-191		Southbound	61.7	50.8	66.8	6.2	55	55	55	1.00	1.08	1.02	8.85				
3	115N06009	1 AM Peak	Weekday	US-191		Southbound	54.7	36.3	72.8	5.0	65	65	65	1.19	1.79	9.51	13.07	1.20	1.82	11.62	17.43
3	115N06009	2 Mid Day	Weekday	US-191		Southbound	56.2	39.5	74.1	5.6	65	65	65	1.16	1.65	4.18	11.62				
3	115N06009	3 PM Peak	Weekday	US-191		Southbound	57.3	42.8	75.4	6.8	65	65	65	1.13	1.52	4.55	9.51				
3	115N06009	4 Evening	Weekday	US-191		Southbound	54.3	35.7	75.9	3.7	65	65	65	1.20	1.82	11.62	17.43				
12	115N06420	1 AM Peak	Weekday	US-70		Southbound	60.8	58.8	69.7	40.4	65	65	65	1.07	1.10	1.36	1.61	1.10	1.14	1.40	2.01
12	115N06420	2 Mid Day	Weekday	US-70		Southbound	59.6	57.1	68.0	32.3	65	65	65	1.09	1.14	1.40	2.01				
12	115N06420	3 PM Peak	Weekday	US-70		Southbound	59.2	57.6	67.7	45.4	65	65	65	1.10	1.13	1.36	1.43				
12	115N06420	4 Evening	Weekday	US-70		Southbound	60.7	57.9	70.7	48.0	65	65	65	1.07	1.12	1.30	1.35				
13	115P05675	1 AM Peak	Weekday	US-60	Live Oak St	Eastbound	52.8	49.2	62.5	38.5	45	45	45	1.00	1.00	1.08	1.17	1.00	1.00	1.14	1.25
13	115P05675	2 Mid Day	Weekday	US-60	Live Oak St	Eastbound	51.3	48.3	61.0	37.3	45	45	45	1.00	1.00	1.14	1.21				
13	115P05675	3 PM Peak	Weekday	US-60	Live Oak St	Eastbound	51.1	48.0	60.3	36.7	45	45	45	1.00	1.00	1.13	1.23				
13	115P05675	4 Evening	Weekday	US-60	Live Oak St	Eastbound	52.3	48.1	64.1	36.1	45	45	45	1.00	1.00	1.14	1.25				
13	115P05940	1 AM Peak	Weekday	US-60		Eastbound	34.4	28.9	44.7	7.5	45	45	45	1.31	1.56	2.78	6.03	1.41	1.65	4.20	8.05
13	115P05940	2 Mid Day	Weekday	US-60		Eastbound	32.6	28.2	43.1	7.5	45	45	45	1.38	1.60	3.29	6.03				
13	115P05940	3 PM Peak	Weekday	US-60		Eastbound	32.0	27.3	42.9	5.6	45	45	45	1.41	1.65	4.20	8.05				
13	115P05940	4 Evening	Weekday	US-60		Eastbound	33.4	30.2	43.6	10.6	45	45	45	1.35	1.49	2.90	4.26				
13	115P05941	1 AM Peak	Weekday	US-60		Eastbound	35.0	29.8	46.0	9.9	45	45	45	1.28	1.51	2.26	4.53	1.38	1.59	3.62	4.53
13	115P05941	2 Mid Day	Weekday	US-60		Eastbound	33.3	29.1	44.6	10.6	45	45	45	1.35	1.55	2.54	4.26				
13	115P05941	3 PM Peak	Weekday	US-60		Eastbound	32.5	28.3	43.8	9.9	45	45	45	1.38	1.59	2.78	4.53				
13	115P05941	4 Evening	Weekday	US-60		Eastbound	32.8	30.2	44.7	9.9	45	45	45	1.37	1.49	3.62	4.53				
13	115N05840	1 AM Peak	Weekday	US-70		Southbound	30.4	25.3	48.4	12.1	45	45	45	1.48	1.78	4.34	3.72	1.72	2.01	5.89	8.06
13	115N05840	2 Mid Day	Weekday	US-70		Southbound	27.5	23.2	48.4	6.9	45	45	45	1.63	1.94	5.89	6.51				
13	115N05840	3 PM Peak	Weekday	US-70		Southbound	26.2	22.4	48.4	5.6	45	45	45	1.72	2.01	4.65	8.06				
13	115N05840	4 Evening	Weekday	US-70		Southbound	27.4	22.9	48.4	7.6	45	45	45	1.64	1.97	4.65	5.89				
13	115N05841	1 AM Peak	Weekday	US-70		Southbound	46.3	38.9	56.8	5.0	45	45	45	1.00	1.16	1.46	9.05	1.03	1.16	1.96	9.05
13	115N05841	2 Mid Day	Weekday	US-70		Southbound	44.1	40.6	54.6	14.9	45	45	45	1.02	1.11	1.81	3.02				
13	115N05841	3 PM Peak	Weekday	US-70		Southbound	43.7	40.3	54.6	17.1	45	45	45	1.03	1.12	1.96	2.63				
13	115N05841	4 Evening	Weekday	US-70		Southbound	45.2	40.7	55.9	18.6	45	45	45	1.00	1.11	1.38	2.42				
14	115P05669	1 AM Peak	Weekday	US-60		Eastbound	46.7	29.8	61.3	20.0	55	55	55	1.18	1.85	2.31	2.75	1.28	1.94	2.66	2.93
14	115P05669	2 Mid Day	Weekday	US-60		Eastbound	44.4	29.0	60.8	18.8	55	55	55	1.24	1.90	2.66	2.93				
14	115P05669	3 PM Peak	Weekday	US-60		Eastbound	42.9	28.8	60.2	18.8	55	55	55	1.28	1.91	2.44	2.93				
14	115P05669	4 Evening	Weekday	US-60		Eastbound	45.6	28.4	63.0	20.7	55	55	55	1.21	1.94	2.31	2.66				

Segment	TMC	timeperiod	week_type	ROAD_NUMBER	ROAD_NAME	road_direction	cars_mean	trucks_mean	cars_P95	trucks_P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars_TTI	Trucks_TTI	cars_PTI	Trucks_PTI	Cars_PeakTTI	Trucks_PeakTTI	Cars_PeakPTI	Trucks_PeakPTI
14	115P05671	1 AM Peak	Weekday	US-60		Eastbound	52.4	42.2	63.5	27.4	55	55	55	1.05	1.30	1.50	2.01	1.09	1.35	1.70	2.06
14	115P05671	2 Mid Day	Weekday	US-60		Eastbound	51.4	41.2	62.2	26.7	55	55	55	1.07	1.33	1.57	2.06				
14	115P05671	3 PM Peak	Weekday	US-60		Eastbound	50.6	40.9	62.7	26.7	55	55	55	1.09	1.34	1.61	2.06				
14	115P05671	4 Evening	Weekday	US-60		Eastbound	51.1	40.8	64.6	26.7	55	55	55	1.08	1.35	1.70	2.06				
14	115P05674	1 AM Peak	Weekday	US-60		Eastbound	54.5	51.0	63.3	40.1	55	55	55	1.01	1.08	1.24	1.37	1.03	1.12	1.32	1.47
14	115P05674	2 Mid Day	Weekday	US-60		Eastbound	53.3	49.7	61.5	38.7	55	55	55	1.03	1.11	1.28	1.42				
14	115P05674	3 PM Peak	Weekday	US-60		Eastbound	53.2	49.2	62.0	37.4	55	55	55	1.03	1.12	1.28	1.47				
14	115P05674	4 Evening	Weekday	US-60		Eastbound	54.1	49.5	65.7	38.5	55	55	55	1.02	1.11	1.32	1.43				
14	115P11100	1 AM Peak	Weekday	US-60		Eastbound	42.0	28.7	56.5	19.7	55	55	55	1.31	1.92	2.45	2.78	1.34	1.98	2.55	2.98
14	115P11100	2 Mid Day	Weekday	US-60		Eastbound	40.9	28.0	55.9	19.1	55	55	55	1.34	1.97	2.55	2.88				
14	115P11100	3 PM Peak	Weekday	US-60		Eastbound	41.0	27.8	56.5	18.5	55	55	55	1.34	1.98	2.41	2.98				
14	115P11100	4 Evening	Weekday	US-60		Eastbound	42.9	27.8	59.2	19.7	55	55	55	1.28	1.98	2.41	2.78				
15	115P05668	1 AM Peak	Weekday	US-60		Eastbound	44.1	40.0	58.9	11.8	50	50	50	1.13	1.25	1.87	4.23	1.17	1.25	2.30	4.23
15	115P05668	2 Mid Day	Weekday	US-60		Eastbound	42.8	41.1	57.9	17.4	50	50	50	1.17	1.22	2.30	2.87				
15	115P05668	3 PM Peak	Weekday	US-60		Eastbound	44.3	41.1	59.5	14.9	50	50	50	1.13	1.22	1.87	3.35				
15	115P05668	4 Evening	Weekday	US-60		Eastbound	43.5	41.2	59.5	13.7	50	50	50	1.15	1.21	2.20	3.66				
16	115P05667	1 AM Peak	Weekday	US-60		Eastbound	60.1	56.0	69.5	45.3	50	50	50	1.00	1.00	1.02	1.10	1.00	1.00	1.04	1.12
16	115P05667	2 Mid Day	Weekday	US-60		Eastbound	59.5	55.4	68.7	45.3	50	50	50	1.00	1.00	1.04	1.10				
16	115P05667	3 PM Peak	Weekday	US-60		Eastbound	60.0	54.7	69.5	44.7	50	50	50	1.00	1.00	1.04	1.12				
16	115P05667	4 Evening	Weekday	US-60		Eastbound	61.0	55.4	71.8	45.3	50	50	50	1.00	1.00	1.03	1.10				
17	115P05663	1 AM Peak	Weekday	US-60		Eastbound	65.8	61.7	73.6	54.4	65	65	65	1.00	1.05	1.14	1.19	1.00	1.07	1.16	1.22
17	115P05663	2 Mid Day	Weekday	US-60		Eastbound	65.6	61.3	74.7	54.4	65	65	65	1.00	1.06	1.16	1.19				
17	115P05663	3 PM Peak	Weekday	US-60		Eastbound	66.9	60.6	74.7	53.2	65	65	65	1.00	1.07	1.09	1.22				
17	115P05663	4 Evening	Weekday	US-60		Eastbound	66.5	61.4	75.8	53.8	65	65	65	1.00	1.06	1.13	1.21				
17	115P05664	1 AM Peak	Weekday	US-60		Eastbound	65.9	61.6	74.4	54.9	65	65	65	1.00	1.06	1.12	1.18	1.00	1.06	1.15	1.18
17	115P05664	2 Mid Day	Weekday	US-60		Eastbound	65.9	61.2	74.4	55.4	65	65	65	1.00	1.06	1.15	1.17				
17	115P05664	3 PM Peak	Weekday	US-60		Eastbound	67.2	61.3	76.2	55.4	65	65	65	1.00	1.06	1.07	1.17				
17	115P05664	4 Evening	Weekday	US-60		Eastbound	66.8	61.6	76.2	55.4	65	65	65	1.00	1.05	1.14	1.17				
17	115P05665	1 AM Peak	Weekday	US-60		Eastbound	63.5	51.8	72.8	27.3	65	65	65	1.02	1.26	1.33	2.38	1.03	1.30	1.49	2.43
17	115P05665	2 Mid Day	Weekday	US-60		Eastbound	63.5	52.0	73.8	27.3	65	65	65	1.02	1.25	1.40	2.38				
17	115P05665	3 PM Peak	Weekday	US-60		Eastbound	64.0	51.2	74.4	26.7	65	65	65	1.02	1.27	1.41	2.43				
17	115P05665	4 Evening	Weekday	US-60		Eastbound	63.1	50.0	75.2	27.3	65	65	65	1.03	1.30	1.49	2.38				
17	115P05666	1 AM Peak	Weekday	US-60		Eastbound	65.5	61.0	74.1	53.2	65	65	65	1.00	1.07	1.14	1.22	1.00	1.11	1.16	1.32
17	115P05666	2 Mid Day	Weekday	US-60		Eastbound	65.1	60.1	74.1	53.2	65	65	65	1.00	1.08	1.16	1.22				
17	115P05666	3 PM Peak	Weekday	US-60		Eastbound	65.1	58.7	74.1	49.4	65	65	65	1.00	1.11	1.14	1.32				
17	115P05666	4 Evening	Weekday	US-60		Eastbound	65.4	60.7	74.1	52.4	65	65	65	1.00	1.07	1.16	1.24				

Segment	TMC	timeperiod	week_type	ROAD_NUMBER	road_direction	cars_mean	trucks_mean	cars_P95	trucks_P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars_TTI	Trucks_TTI	cars_PTI	Trucks_PTI	Cars_PeakTTI	Trucks_PeakTTI	Cars_PeakPTI	Trucks_PeakPTI
4	115P05131	1 AM Peak	Weekday	I-8	Eastbound	70.6	63.3	79.6	59.0	75	75	65	1.00	1.03	1.23	1.10	1.00	1.03	1.23	1.11
4	115P05131	2 Mid Day	Weekday	I-8	Eastbound	71.4	63.2	81.1	58.7	75	75	65	1.00	1.03	1.21	1.11				
4	115P05131	3 PM Peak	Weekday	I-8	Eastbound	72.1	63.2	82.4	59.0	75	75	65	1.00	1.03	1.19	1.10				
4	115P05131	4 Evening	Weekday	I-8	Eastbound	70.0	63.0	79.9	58.5	75	75	65	1.00	1.03	1.19	1.11				
4	115P05132	1 AM Peak	Weekday	I-8	Eastbound	70.8	63.4	79.9	58.9	75	75	65	1.00	1.02	1.22	1.10	1.00	1.03	1.22	1.11
4	115P05132	2 Mid Day	Weekday	I-8	Eastbound	71.4	63.4	81.3	58.3	75	75	65	1.00	1.03	1.21	1.11				
4	115P05132	3 PM Peak	Weekday	I-8	Eastbound	72.1	63.3	82.8	59.1	75	75	65	1.00	1.03	1.19	1.10				
4	115P05132	4 Evening	Weekday	I-8	Eastbound	70.0	63.1	80.3	58.3	75	75	65	1.00	1.03	1.20	1.11				
4	115P05133	1 AM Peak	Weekday	I-8	Eastbound	70.5	62.6	79.0	58.3	75	75	65	1.00	1.04	1.22	1.12	1.00	1.04	1.22	1.13
4	115P05133	2 Mid Day	Weekday	I-8	Eastbound	71.6	62.6	82.6	57.3	75	75	65	1.00	1.04	1.22	1.13				
4	115P05133	3 PM Peak	Weekday	I-8	Eastbound	72.3	62.7	82.6	58.3	75	75	65	1.00	1.04	1.20	1.12				
4	115P05133	4 Evening	Weekday	I-8	Eastbound	70.0	62.5	80.8	57.3	75	75	65	1.00	1.04	1.20	1.13				
5	115P05134	1 AM Peak	Weekday	I-8	Eastbound	73.2	63.7	82.2	58.7	75	75	65	1.00	1.02	1.28	1.11	1.00	1.02	1.28	1.11
5	115P05134	2 Mid Day	Weekday	I-8	Eastbound	74.5	63.7	82.2	58.7	75	75	65	1.00	1.02	1.28	1.11				
5	115P05134	3 PM Peak	Weekday	I-8	Eastbound	75.6	63.6	82.2	58.7	75	75	65	1.00	1.02	1.28	1.11				
5	115P05134	4 Evening	Weekday	I-8	Eastbound	72.5	63.7	82.2	58.7	75	75	65	1.00	1.02	1.28	1.11				
5	115P05135	1 AM Peak	Weekday	I-8	Eastbound	69.9	63.0	79.6	58.3	75	75	65	1.00	1.03	1.24	1.11	1.00	1.04	1.24	1.14
5	115P05135	2 Mid Day	Weekday	I-8	Eastbound	71.0	62.9	81.3	57.7	75	75	65	1.00	1.03	1.22	1.13				
5	115P05135	3 PM Peak	Weekday	I-8	Eastbound	71.6	62.9	82.2	58.3	75	75	65	1.00	1.03	1.21	1.11				
5	115P05135	4 Evening	Weekday	I-8	Eastbound	69.4	62.7	79.6	57.3	75	75	65	1.00	1.04	1.23	1.14				
5	115P05136	1 AM Peak	Weekday	I-8	Eastbound	69.3	62.4	79.5	55.4	75	75	65	1.00	1.04	1.34	1.17	1.00	1.04	1.34	1.17
5	115P05136	2 Mid Day	Weekday	I-8	Eastbound	71.0	62.7	81.2	56.8	75	75	65	1.00	1.04	1.24	1.14				
5	115P05136	3 PM Peak	Weekday	I-8	Eastbound	71.4	62.7	82.4	57.4	75	75	65	1.00	1.04	1.25	1.13				
5	115P05136	4 Evening	Weekday	I-8	Eastbound	69.1	62.4	80.1	56.3	75	75	65	1.00	1.04	1.28	1.16				
5	115P05137	1 AM Peak	Weekday	I-8	Eastbound	70.7	63.2	79.5	58.7	75	75	65	1.00	1.03	1.22	1.11	1.00	1.03	1.22	1.11
5	115P05137	2 Mid Day	Weekday	I-8	Eastbound	71.4	63.1	80.8	59.3	75	75	65	1.00	1.03	1.19	1.10				
5	115P05137	3 PM Peak	Weekday	I-8	Eastbound	72.2	63.2	82.0	59.3	75	75	65	1.00	1.03	1.18	1.10				
5	115P05137	4 Evening	Weekday	I-8	Eastbound	70.0	63.0	79.5	58.4	75	75	65	1.00	1.03	1.19	1.11				
5	115P05138	1 AM Peak	Weekday	I-8	Eastbound	70.4	63.4	79.6	58.4	75	75	65	1.00	1.03	1.22	1.11	1.00	1.03	1.22	1.11
5	115P05138	2 Mid Day	Weekday	I-8	Eastbound	71.0	63.4	81.3	59.1	75	75	65	1.00	1.03	1.22	1.10				
5	115P05138	3 PM Peak	Weekday	I-8	Eastbound	72.0	63.3	82.6	59.1	75	75	65	1.00	1.03	1.19	1.10				
5	115P05138	4 Evening	Weekday	I-8	Eastbound	70.1	63.1	80.4	58.4	75	75	65	1.00	1.03	1.20	1.11				
6	115P05139	1 AM Peak	Weekday	I-8	Eastbound	70.4	63.5	80.2	58.8	75	75	65	1.00	1.02	1.22	1.11	1.00	1.03	1.22	1.11
6	115P05139	2 Mid Day	Weekday	I-8	Eastbound	71.2	63.5	81.2	59.4	75	75	65	1.00	1.02	1.22	1.09				
6	115P05139	3 PM Peak	Weekday	I-8	Eastbound	72.2	63.5	82.0	59.2	75	75	65	1.00	1.02	1.19	1.10				
6	115P05139	4 Evening	Weekday	I-8	Eastbound	70.1	63.2	80.5	58.4	75	75	65	1.00	1.03	1.20	1.11				
6	115P05140	1 AM Peak	Weekday	I-8	Eastbound	69.2	61.2	79.0	52.2	75	75	65	1.00	1.06	1.26	1.25	1.00	1.07	1.28	1.26
6	115P05140	2 Mid Day	Weekday	I-8	Eastbound	69.8	61.6	80.3	54.3	75	75	65	1.00	1.06	1.27	1.20				
6	115P05140	3 PM Peak	Weekday	I-8	Eastbound	70.9	61.7	81.6	53.9	75	75	65	1.00	1.05	1.22	1.21				
6	115P05140	4 Evening	Weekday	I-8	Eastbound	68.6	61.0	79.0	51.6	75	75	65	1.00	1.07	1.28	1.26				
6	115P05141	1 AM Peak	Weekday	I-8	Eastbound	65.0	59.4	77.1	45.4	75	75	65	1.00	1.10	1.73	1.43	1.00	1.10	1.73	1.43
6	115P05141	2 Mid Day	Weekday	I-8	Eastbound	68.8	61.1	81.0	47.2	75	75	65	1.00	1.06	1.51	1.38				
6	115P05141	3 PM Peak	Weekday	I-8	Eastbound	69.1	61.2	81.0	46.7	75	75	65	1.00	1.06	1.47	1.39				
6	115P05141	4 Evening	Weekday	I-8	Eastbound	68.0	61.2	79.2	49.8	75	75	65	1.00	1.06	1.38	1.31				
7	115P05142	1 AM Peak	Weekday	I-8	Eastbound	67.1	63.0	76.0	58.6	75	75	65	1.00	1.03	1.33	1.11	1.00	1.04	1.33	1.14
7	115P05142	2 Mid Day	Weekday	I-8	Eastbound	69.0	62.8	79.4	58.3	75	75	65	1.00	1.04	1.26	1.11				
7	115P05142	3 PM Peak	Weekday	I-8	Eastbound	70.2	63.0	80.3	58.7	75	75	65	1.00	1.03	1.23	1.11				
7	115P05142	4 Evening	Weekday	I-8	Eastbound	68.5	62.7	78.2	57.2	75	75	65	1.00	1.04	1.26	1.14				
7	115P05143	1 AM Peak	Weekday	I-8	Eastbound	69.8	63.8	78.7	59.1	75	75	65	1.00	1.02	1.22	1.10	1.00	1.03	1.22	1.12
7	115P05143	2 Mid Day	Weekday	I-8	Eastbound	70.4	63.4	80.2	58.3	75	75	65	1.00	1.03	1.22	1.11				
7	115P05143	3 PM Peak	Weekday	I-8	Eastbound	71.6	63.5	81.2	58.8	75	75	65	1.00	1.02	1.19	1.10				
7	115P05143	4 Evening	Weekday	I-8	Eastbound	70.3	63.4	80.7	58.0	75	75	65	1.00	1.03	1.19	1.12				
8	115P05144	1 AM Peak	Weekday	I-8	Eastbound	68.7	63.4	77.7	58.4	75	75	65	1.00	1.03	1.28	1.11	1.00	1.03	1.28	1.15
8	115P05144	2 Mid Day	Weekday	I-8	Eastbound	69.6	63.0	79.6	57.1	75	75	65	1.00	1.03	1.26	1.14				
8	115P05144	3 PM Peak	Weekday	I-8	Eastbound	70.7	63.3	80.1	57.9	75	75	65	1.00	1.03	1.23	1.12				
8	115P05144	4 Evening	Weekday	I-8	Eastbound	69.0	62.9	79.1	56.5	75	75	65	1.00	1.03	1.23	1.15				

Segment	TMC	timeperiod	week_type	ROAD_NUMBER	ROAD_NAME	road_direction	cars_mean	trucks_mean	cars_P95	trucks_P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars_TTI	Trucks_TTI	cars_PTI	Trucks_PTI	Cars_PeakTTI	Trucks_PeakTTI	Cars_PeakPTI	Trucks_PeakPTI
1	115P06006	1 AM Peak	Weekday	US-191		Northbound	39.5	30.6	56.3	8.7	65	65	65	1.65	2.12	3.66	7.47	1.80	2.33	5.23	9.50
1	115P06006	2 Mid Day	Weekday	US-191		Northbound	36.1	27.8	54.5	9.9	65	65	65	1.80	2.33	4.76	6.53				
1	115P06006	3 PM Peak	Weekday	US-191		Northbound	38.5	29.4	56.3	9.9	65	65	65	1.69	2.21	5.23	6.53				
1	115P06006	4 Evening	Weekday	US-191		Northbound	38.2	33.9	56.3	6.8	65	65	65	1.70	1.92	3.88	9.50				
1	115P07031	1 AM Peak	Weekday	US-191		Northbound	56.1	45.4	67.2	12.9	65	65	65	1.16	1.43	2.43	5.03	1.22	1.55	4.36	8.72
1	115P07031	2 Mid Day	Weekday	US-191		Northbound	53.2	42.7	67.5	9.9	65	65	65	1.22	1.52	3.37	6.54				
1	115P07031	3 PM Peak	Weekday	US-191		Northbound	54.0	49.4	67.2	14.9	65	65	65	1.20	1.32	4.36	4.36				
1	115P07031	4 Evening	Weekday	US-191		Northbound	56.0	41.9	66.5	7.5	65	65	65	1.16	1.55	1.94	8.72				
2	115P06008	1 AM Peak	Weekday	US-191		Northbound	47.3	58.0	67.7	23.0	55	55	55	1.16	1.00	9.83	2.39	1.16	1.00	9.83	2.68
2	115P06008	2 Mid Day	Weekday	US-191		Northbound	49.8	57.0	69.0	20.5	55	55	55	1.10	1.00	3.54	2.68				
2	115P06008	3 PM Peak	Weekday	US-191		Northbound	50.7	60.8	70.3	42.2	55	55	55	1.09	1.00	4.92	1.30				
2	115P06008	4 Evening	Weekday	US-191		Northbound	52.6	60.8	70.9	37.0	55	55	55	1.05	1.00	3.28	1.49				
3	115P06009	1 AM Peak	Weekday	US-191		Northbound	37.7	54.7	70.8	10.5	65	65	65	1.73	1.19	13.07	6.21	1.73	1.19	17.42	6.21
3	115P06009	2 Mid Day	Weekday	US-191		Northbound	40.1	58.1	74.2	16.8	65	65	65	1.62	1.12	11.62	3.87				
3	115P06009	3 PM Peak	Weekday	US-191		Northbound	43.5	59.4	74.2	20.6	65	65	65	1.49	1.09	9.50	3.16				
3	115P06009	4 Evening	Weekday	US-191		Northbound	47.0	58.2	74.2	13.6	65	65	65	1.38	1.12	17.42	4.76				
3	115P06010	1 AM Peak	Weekday	US-191		Northbound	61.8	47.7	71.5	8.7	65	65	65	1.05	1.36	1.52	7.47	1.06	1.49	1.59	11.62
3	115P06010	2 Mid Day	Weekday	US-191		Northbound	62.7	51.9	72.6	14.9	65	65	65	1.04	1.25	1.54	4.35				
3	115P06010	3 PM Peak	Weekday	US-191		Northbound	62.5	50.7	74.2	16.8	65	65	65	1.04	1.28	1.59	3.87				
3	115P06010	4 Evening	Weekday	US-191		Northbound	61.6	43.7	72.6	5.6	65	65	65	1.06	1.49	1.52	11.62				
13	115N05675	1 AM Peak	Weekday	US-60	Live Oak St	Westbound	34.9	28.2	44.8	7.5	45	45	45	1.29	1.60	2.68	6.04	1.33	1.60	3.81	6.04
13	115N05675	2 Mid Day	Weekday	US-60	Live Oak St	Westbound	33.9	29.6	43.5	10.6	45	45	45	1.33	1.52	2.68	4.26				
13	115N05675	3 PM Peak	Weekday	US-60	Live Oak St	Westbound	34.7	30.0	44.8	8.7	45	45	45	1.30	1.50	2.59	5.17				
13	115N05675	4 Evening	Weekday	US-60	Live Oak St	Westbound	33.8	29.6	44.2	8.7	45	45	45	1.33	1.52	3.81	5.17				
13	115N05940	1 AM Peak	Weekday	US-60		Westbound	35.5	32.4	46.6	12.2	45	45	45	1.27	1.39	2.41	3.68	1.32	1.46	2.59	6.03
13	115N05940	2 Mid Day	Weekday	US-60		Westbound	34.1	31.5	45.3	10.6	45	45	45	1.32	1.43	2.59	4.26				
13	115N05940	3 PM Peak	Weekday	US-60		Westbound	34.3	30.7	46.0	7.5	45	45	45	1.31	1.46	2.55	6.03				
13	115N05940	4 Evening	Weekday	US-60		Westbound	34.9	33.0	46.0	11.2	45	45	45	1.29	1.36	2.41	4.02				
13	115N05941	1 AM Peak	Weekday	US-60		Westbound	47.6	46.1	63.1	17.9	45	45	45	1.00	1.00	3.02	2.51	1.05	1.00	4.26	5.17
13	115N05941	2 Mid Day	Weekday	US-60		Westbound	48.2	46.2	63.4	8.7	45	45	45	1.00	1.00	2.90	5.17				
13	115N05941	3 PM Peak	Weekday	US-60		Westbound	48.3	47.2	62.8	20.5	45	45	45	1.00	1.00	2.63	2.20				
13	115N05941	4 Evening	Weekday	US-60		Westbound	42.9	45.4	62.8	12.4	45	45	45	1.05	1.00	4.26	3.62				
13	115P05840	1 AM Peak	Weekday	US-70		Northbound	44.6	40.1	52.9	21.8	45	45	45	1.01	1.12	1.48	2.07	1.07	1.12	1.75	2.19
13	115P05840	2 Mid Day	Weekday	US-70		Northbound	43.5	40.2	53.3	20.5	45	45	45	1.03	1.12	1.75	2.19				
13	115P05840	3 PM Peak	Weekday	US-70		Northbound	43.3	40.1	52.5	20.5	45	45	45	1.04	1.12	1.58	2.19				
13	115P05840	4 Evening	Weekday	US-70		Northbound	42.0	41.0	51.0	23.2	45	45	45	1.07	1.10	1.61	1.94				
13	115P05841	1 AM Peak	Weekday	US-70		Northbound	57.6	55.7	67.7	37.1	45	45	45	1.00	1.00	1.08	1.21	1.00	1.00	1.18	2.00
13	115P05841	2 Mid Day	Weekday	US-70		Northbound	56.2	54.1	65.9	22.5	45	45	45	1.00	1.00	1.18	2.00				
13	115P05841	3 PM Peak	Weekday	US-70		Northbound	55.6	54.1	65.7	23.9	45	45	45	1.00	1.00	1.12	1.88				
13	115P05841	4 Evening	Weekday	US-70		Northbound	55.6	55.8	66.1	40.4	45	45	45	1.00	1.00	1.15	1.11				
14	115N05669	1 AM Peak	Weekday	US-60		Westbound	55.1	52.2	63.5	38.6	55	55	55	1.00	1.05	1.19	1.43	1.03	1.07	1.30	1.43
14	115N05669	2 Mid Day	Weekday	US-60		Westbound	53.9	51.9	62.7	38.7	55	55	55	1.02	1.06	1.27	1.42				
14	115N05669	3 PM Peak	Weekday	US-60		Westbound	54.5	51.3	62.7	38.9	55	55	55	1.01	1.07	1.23	1.41				
14	115N05669	4 Evening	Weekday	US-60		Westbound	53.1	51.2	62.2	38.9	55	55	55	1.03	1.07	1.30	1.41				

Segment	TMC	timeperiod	week_type	ROAD_NUMBER	ROAD_NAME	road_direction	cars_mean	trucks_mean	cars_P95	trucks_P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars_TTI	Trucks_TTI	cars_PTI	Trucks_PTI	Cars_PeakTTI	Trucks_PeakTTI	Cars_PeakPTI	Trucks_PeakPTI
14	115N05671	1 AM Peak	Weekday	US-60		Westbound	54.7	49.2	63.3	26.7	55	55	55	1.01	1.12	1.24	2.06	1.04	1.12	1.31	2.06
14	115N05671	2 Mid Day	Weekday	US-60		Westbound	53.8	50.6	62.8	31.8	55	55	55	1.02	1.09	1.31	1.73				
14	115N05671	3 PM Peak	Weekday	US-60		Westbound	54.5	50.9	63.3	37.0	55	55	55	1.01	1.08	1.26	1.49				
14	115N05671	4 Evening	Weekday	US-60		Westbound	53.1	50.7	62.3	34.2	55	55	55	1.04	1.09	1.31	1.61				
14	115N05674	1 AM Peak	Weekday	US-60		Westbound	51.7	43.7	61.0	25.2	55	55	55	1.06	1.26	1.40	2.19	1.10	1.26	1.53	2.19
14	115N05674	2 Mid Day	Weekday	US-60		Westbound	50.1	46.0	60.3	26.7	55	55	55	1.10	1.19	1.53	2.06				
14	115N05674	3 PM Peak	Weekday	US-60		Westbound	50.5	46.2	61.2	29.8	55	55	55	1.09	1.19	1.50	1.84				
14	115N05674	4 Evening	Weekday	US-60		Westbound	49.9	46.7	60.0	27.3	55	55	55	1.10	1.18	1.50	2.01				
14	115N11100	1 AM Peak	Weekday	US-60		Westbound	51.3	43.3	61.6	14.9	55	55	55	1.07	1.27	1.50	3.69	1.11	1.27	1.76	3.69
14	115N11100	2 Mid Day	Weekday	US-60		Westbound	49.4	43.7	59.7	17.4	55	55	55	1.11	1.26	1.76	3.16				
14	115N11100	3 PM Peak	Weekday	US-60		Westbound	51.2	46.1	60.7	23.6	55	55	55	1.07	1.19	1.44	2.33				
14	115N11100	4 Evening	Weekday	US-60		Westbound	50.3	46.9	59.7	27.9	55	55	55	1.09	1.17	1.45	1.97				
15	115N05668	1 AM Peak	Weekday	US-60		Westbound	48.3	44.4	58.7	27.4	50	50	50	1.04	1.13	1.58	1.83	1.08	1.13	1.67	1.87
15	115N05668	2 Mid Day	Weekday	US-60		Westbound	46.5	44.1	56.6	26.7	50	50	50	1.08	1.13	1.67	1.87				
15	115N05668	3 PM Peak	Weekday	US-60		Westbound	48.2	45.7	58.7	27.4	50	50	50	1.04	1.09	1.49	1.83				
15	115N05668	4 Evening	Weekday	US-60		Westbound	48.7	46.9	57.6	34.9	50	50	50	1.03	1.07	1.30	1.43				
16	115N05667	1 AM Peak	Weekday	US-60		Westbound	47.1	43.8	62.6	16.8	50	50	50	1.06	1.14	1.84	2.98	1.09	1.14	1.91	2.98
16	115N05667	2 Mid Day	Weekday	US-60		Westbound	45.9	44.6	61.7	20.5	50	50	50	1.09	1.12	1.91	2.44				
16	115N05667	3 PM Peak	Weekday	US-60		Westbound	47.5	44.7	62.6	18.6	50	50	50	1.05	1.12	1.66	2.68				
16	115N05667	4 Evening	Weekday	US-60		Westbound	46.8	46.8	62.6	26.8	50	50	50	1.07	1.07	1.65	1.86				
17	115N05663	1 AM Peak	Weekday	US-60		Westbound	67.7	63.0	75.0	57.3	65	65	65	1.00	1.03	1.07	1.13	1.00	1.05	1.11	1.19
17	115N05663	2 Mid Day	Weekday	US-60		Westbound	67.4	62.6	75.9	57.3	65	65	65	1.00	1.04	1.09	1.13				
17	115N05663	3 PM Peak	Weekday	US-60		Westbound	68.5	62.3	76.9	56.7	65	65	65	1.00	1.04	1.06	1.15				
17	115N05663	4 Evening	Weekday	US-60		Westbound	66.4	62.0	75.0	54.7	65	65	65	1.00	1.05	1.11	1.19				
17	115N05664	1 AM Peak	Weekday	US-60		Westbound	66.5	61.9	75.3	51.6	65	65	65	1.00	1.05	1.16	1.26	1.00	1.05	1.16	1.26
17	115N05664	2 Mid Day	Weekday	US-60		Westbound	66.7	62.0	75.3	52.5	65	65	65	1.00	1.05	1.14	1.24				
17	115N05664	3 PM Peak	Weekday	US-60		Westbound	68.3	62.0	77.6	53.5	65	65	65	1.00	1.05	1.08	1.22				
17	115N05664	4 Evening	Weekday	US-60		Westbound	66.3	61.8	75.0	53.5	65	65	65	1.00	1.05	1.11	1.22				
17	115N05665	1 AM Peak	Weekday	US-60		Westbound	67.1	61.5	74.3	54.2	65	65	65	1.00	1.06	1.08	1.20	1.00	1.06	1.14	1.22
17	115N05665	2 Mid Day	Weekday	US-60		Westbound	66.0	61.4	74.3	55.1	65	65	65	1.00	1.06	1.12	1.18				
17	115N05665	3 PM Peak	Weekday	US-60		Westbound	67.4	61.4	75.9	55.1	65	65	65	1.00	1.06	1.10	1.18				
17	115N05665	4 Evening	Weekday	US-60		Westbound	65.8	61.1	74.3	53.4	65	65	65	1.00	1.06	1.14	1.22				
17	115N05666	1 AM Peak	Weekday	US-60		Westbound	63.9	61.6	71.1	52.4	65	65	65	1.02	1.06	1.16	1.24	1.05	1.10	1.24	1.26
17	115N05666	2 Mid Day	Weekday	US-60		Westbound	61.7	60.5	68.9	51.9	65	65	65	1.05	1.07	1.23	1.25				
17	115N05666	3 PM Peak	Weekday	US-60		Westbound	61.7	59.2	69.6	51.5	65	65	65	1.05	1.10	1.24	1.26				
17	115N05666	4 Evening	Weekday	US-60		Westbound	62.6	61.2	69.6	52.4	65	65	65	1.04	1.06	1.23	1.24				

Closure Data

Segment	Length (miles)	# of closures	Total miles of closures		Average Occurrences/Mile/Year	
			NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)
1	24	12	3.8	1.0	0.03	0.01
2	43	17	4.0	1.0	0.02	0.00
3	17	27	1.0	0.0	0.01	0.00
4	12	36	2.0	2.0	0.03	0.03
5	5	9	3.0	2.0	0.12	0.08
6	9	18	1.0	2.6	0.02	0.06
7	19	2	3.0	0.0	0.03	0.00
8	2	1	0.0	1.0	0.00	0.10
9	5	13	0.0	1.0	0.00	0.04
10	19	19	4.0	2.0	0.04	0.02
11	4	11	2.0	0.0	0.10	0.00
12	15	27	3.0	23.6	0.04	0.31
13	12	3	0.0	7.0	0.00	0.12
14	16	4	26.5	125.5	0.33	1.57
15	2	14	3.6	11.7	0.36	1.17
16	2	0	5.0	0.0	0.50	0.00
17	11	8	5.0	3.0	0.09	0.05

	ITIS Category Description										
	Closures		Incidents/Accidents	Incidents/Crashes		Obstruction Hazards		Winds		Winter Storm Codes	
Segment	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)
1	0	0	2	1	0	0	0	0	0	0	0
2	0	0	3	0	0	0	1	1	0	0	0
3	0	0	1	0	0	0	0	0	0	0	0
4	0	0	2	2	0	0	0	0	0	0	0
5	0	0	3	2	0	0	0	0	0	0	0
6	0	0	1	1	0	0	0	0	0	0	0
7	0	0	3	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	1	0	0	0
9	0	0	0	1	0	0	0	0	0	0	0
10	0	0	4	2	0	0	0	0	0	0	0
11	0	0	2	0	0	0	0	0	0	0	0
12	0	0	3	4	0	0	0	0	0	0	0
13	0	0	0	2	0	0	0	1	0	0	0
14	0	0	20	19	0	0	1	3	0	0	0
15	0	0	2	4	0	0	0	0	0	0	0
16	0	0	5	0	0	0	0	0	0	0	0
17	0	0	5	3	0	0	0	0	0	0	0

HPMS Data

SEGMENT	MP_FROM	MP_TO	WEIGHTED AVERAGE NB/WB AADT	WEIGHTED AVERAGE SB/EB AADT	WEIGHTED AVERAGE AADT	NB/WB AADT	SB/EB AADT	2014 AADT	K Factor	D-Factor	T-Factor
1	0	24	976	976	1952	10%	50%	17%	1	0	24
2	24	67	691	693	1384	10%	50%	17%	2	24	67
3	87	104	1196	1196	2392	9%	50%	17%	3	87	104
4	104	116	2292	2292	4584	9%	50%	17%	4	104	116
5	116	121	4061	4251	8312	11%	51%	17%	5	116	121
6	330	339	6299	6331	12630	9%	51%	5%	6	330	339
7	300	330	1753	1753	3506	9%	50%	5%	7	300	330
8	298	300	1644	1650	3295	8%	50%	5%	8	298	300
9	293	298	1644	1650	3295	8%	50%	5%	9	293	298
10	274	293	1644	1650	3295	8%	50%	5%	10	274	293
11	270	274	1644	1650	3295	8%	50%	5%	11	270	274
12	255	270	2115	2115	4230	9%	50%	11%	12	255	270
13	243	255	5455	5553	11008	9%	51%	12%	13	243	255
14	227	243	4781	4287	9069	9%	53%	14%	14	227	243
15	225	227	3864	3917	7781	8%	50%	14%	15	225	227
16	223	225	3864	3917	7781	8%	50%	14%	16	223	225
17	212	223	4782	4764	9547	8%	50%	13%	17	212	223

Bicycle Accommodation Data

Segment	BMP	EMP	Divided or Non	NB/WB Right Shoulder Width	SB/EB Right Shoulder Width	NB/WB Left Shoulder Width	SB/EB Left Shoulder Width	NB/WB Effective Length of Shoulder	SB/EB Effective Length of Shoulder	% Bicycle Accommodation
1	0	24	Undivided	6.8	6.8	N/A	N/A	15.7	15.8	66%
2	24	67	Undivided	2.3	2.4	N/A	N/A	43.0	43.0	100%
3	87	104	Divided	10.3		4.0		16.5	0.0	49%
4	104	116	Undivided	7.9	7.8	N/A	N/A	11.8	11.3	96%
5	116	121	Undivided	3.0	2.3	N/A	N/A	1.6	1.1	27%
6	330	339	Undivided	2.9	2.8	N/A	N/A	4.2	4.1	46%
7	300	330	Undivided	6.7	6.7	N/A	N/A	43.5	0.0	73%
8	298	300	Undivided	5.0	5.0	N/A	N/A	0.0	0.0	0%
9	293	298	Undivided	5.8	5.9	N/A	N/A	1.2	1.4	26%
10	274	293	Undivided	5.1	5.1	N/A	N/A	0.8	0.9	4%
11	270	274	Undivided	4.5	4.7	N/A	N/A	0.0	0.3	4%
12	255	270	Undivided	5.4	5.3	N/A	N/A	4.1	2.8	23%
13	243	255	Undivided	5.04	4.1	N/A	N/A	7.8	5.2	54%
14	227	243	Undivided	4.86	4.8	N/A	N/A	7.7	7.8	49%
15	225	227	Undivided	7.88	7.9	N/A	N/A	1.9	1.9	95%
16	223	225	Undivided	7.75	7.2	N/A	N/A	1.8	1.7	87%
17	212	223	Divided	10.12	10.0	4.8	6.0	11.0	10.2	96%

AZTDM Data

SEGMENT	Growth Rate	% Non-SOV
1	1.47%	12.5%
2	1.06%	16.0%
3	0.90%	9.8%
4	1.02%	9.3%
5	1.72%	22.5%
6	2.98%	19.0%
7	1.35%	16.8%
8	1.94%	13.8%
9	1.49%	12.2%
10	1.50%	8.9%
11	2.34%	13.7%
12	1.96%	12.1%
13	1.36%	17%
14	2.15%	15%
15	3.96%	13%
16	3.15%	9%
17	3.14%	10%

HERS Capacity Calculation Data

Segment	Capacity Environment Type	Facility Type	Terrain	Lane Width (Rounded, feet)	NB/WB Rt. Shoulder	SB/EB Rt. Shoulder	F_{lw} or f_w or f_{LS}	NB/WB F_{lc}	SB/EB F_{lc}	Total Ramp Density[1]	PHF	E_T	f_{HV}	f_M	f_A	g/C^2	f_G	f_{NP}	Nm	f_p	NB/WB FFS	SB/EB FFS	NB/WB Peak-Hour Capacity	SB/EB Peak-Hour Capacity	Major Direction Peak-Hour Capacity	Daily Capacity[3]
1	3	Rural	Level	12.00	6.78	6.81	1.0	N/A	N/A	N/A	0.9	2	0.857	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	805.64	15,346
2	4	Rural	Level	12.00	2.32	2.37	2.6	N/A	N/A	N/A	0.88	1.9	0.869	N/A	2	N/A	1	1.20	N/A	N/A	60.40	60.40	N/A	N/A	945.67	18,013
3	2	Rural	Level	12.00	10.29		0.0	0	0.4	N/A	0.88	1.5	0.923	0	0.5	N/A	N/A	N/A	N/A	N/A	54.50	54.10	3394	3381	N/A	64,651
4	4	Rural	Level	12.00	7.93	7.83	0.0	N/A	N/A	N/A	0.88	1.5	0.923	N/A	3.25	N/A	1	2.75	N/A	N/A	71.75	71.75	N/A	N/A	1517.19	28,899
5	3	Urban	Level	12.00	2.97	2.29	1.0	N/A	N/A	N/A	0.9	2	0.856	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1610.94	30,685
6	3	Urban	Level	12.00	2.89	2.82	1.0	N/A	N/A	N/A	0.9	2	0.949	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1784.16	33,984
7	4	Rural	Level	12.00	6.68	6.67	0.0	N/A	N/A	N/A	0.88	1.5	0.974	N/A	2.25	N/A	1	1.90	N/A	N/A	62.75	62.75	N/A	N/A	1151.05	21,925
8	4	Rural	Level	12.00	5.00	5.00	0.0	N/A	N/A	N/A	0.88	1.9	0.954	N/A	1.75	N/A	1	1.10	N/A	N/A	73.25	73.25	N/A	N/A	1738.25	33,110
9	4	Rural	Level	12.00	5.82	5.92	0.0	N/A	N/A	N/A	0.88	1.9	0.954	N/A	3.5	N/A	1	1.70	N/A	N/A	56.50	56.50	N/A	N/A	800.19	15,242
10	4	Rural	Level	12.00	5.07	5.08	0.0	N/A	N/A	N/A	0.88	1.9	0.954	N/A	0.5	N/A	1	1.70	N/A	N/A	64.50	64.50	N/A	N/A	1232.73	23,481
11	4	Rural	Level	12.00	4.54	4.70	0.0	N/A	N/A	N/A	0.88	1.9	0.954	N/A	2.25	N/A	1	2.80	N/A	N/A	62.75	62.75	N/A	N/A	1078.64	20,545
12	4	Rural	Level	12.00	5.43	5.33	0.0	N/A	N/A	N/A	0.88	1.5	0.949	N/A	1	N/A	1	2.20	N/A	N/A	69.00	69.00	N/A	N/A	1442.52	27,477
13	3	Urban	Level	12.00	5.04	4.15	1.0	N/A	N/A	N/A	0.9	2	0.895	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1684.40	32,084
14	4	Rural	Mountainous	12.00	4.86	4.78	0.0	N/A	N/A	N/A	0.88	7.2	0.533	N/A	1	N/A	0.71	2.55	N/A	N/A	59.00	59.00	N/A	N/A	352.92	6,722
15	4	Rural	Rolling	12.00	7.88	7.87	0.0	N/A	N/A	N/A	0.88	2.1	0.868	N/A	5.75	N/A	0.83	3.35	N/A	N/A	49.25	49.25	N/A	N/A	240.97	4,590
16	4	Rural	Level	12.00	7.75	7.25	0.0	N/A	N/A	N/A	0.88	1.4	0.948	N/A	1.75	N/A	1	2.78	N/A	N/A	63.25	63.25	N/A	N/A	1100.04	20,953
17	2	Rural	Level	12.00	10.12	10.00	0.0	0	0.4	N/A	0.88	1.5	0.940	0	0.5	N/A	N/A	N/A	N/A	N/A	64.50	64.10	3638	3638	N/A	69,299

Safety Performance Area Data

Segment	Operating Environment	Segment Length (miles)	NB/EB Fatal Crashes 2010-2014	SB/WB Fatal Crashes 2010-2014	NB/EB Incapacitating Injury Crashes	SB/WB Incapacitating Injury Crashes	Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors
1	2 or 3 Lane Undivided Highway	24.0	0	1	2	1	4
2	2 or 3 Lane Undivided Highway	43.0	1	0	1	1	3
3	2 or 3 or 4 Lane Divided Highway	17.0	0	2	0	0	2
4	2 or 3 Lane Undivided Highway	12.0	0	0	1	0	1
5	4 or 5 Lane Undivided Highway	5.0	1	1	2	1	3
6	4 or 5 Lane Undivided Highway	9.0	3	0	3	5	8
7	2 or 3 Lane Undivided Highway	19.0	0	0	4	0	3
8	2 or 3 Lane Undivided Highway	2.0	0	0	0	0	0
9	2 or 3 Lane Undivided Highway	5.0	1	0	0	0	0
10	2 or 3 Lane Undivided Highway	19.0	2	3	0	0	2
11	2 or 3 Lane Undivided Highway	4.0	1	3	0	0	0
12	2 or 3 Lane Undivided Highway	15.0	2	2	0	0	2
13	4 or 5 Lane Undivided Highway	12.0	3	5	13	15	20
14	2 or 3 Lane Undivided Highway	16.0	3	6	8	12	16
15	2 or 3 Lane Undivided Highway	2.0	1	0	1	2	3
16	2 or 3 Lane Undivided Highway	2.0	0	0	0	1	0
17	2 or 3 or 4 Lane Divided Highway	11.0	2	0	2	8	5

Segment	Operating Environment	Fatal + Incapacitating Injury Crashes Involving Trucks	Fatal + Incapacitating Injury Crashes Involving Motorcycles	Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Weighted 5-Year (2010-2014) Average NB/EB AADT	Weighted 5-Year (2010-2014) Average SB/WB AADT	Weighted 5-Year (2010-2014) Average Total AADT
1	2 or 3 Lane Undivided Highway	0	0	0	976	976	1952
2	2 or 3 Lane Undivided Highway	0	1	0	691	693	1384
3	2 or 3 or 4 Lane Divided Highway	0	0	0	1196	1196	2392
4	2 or 3 Lane Undivided Highway	0	1	0	2292	2292	4584
5	4 or 5 Lane Undivided Highway	0	1	0	4061	4251	8312
6	4 or 5 Lane Undivided Highway	0	0	0	6299	6331	12630
7	2 or 3 Lane Undivided Highway	1	0	0	1753	1753	3506
8	2 or 3 Lane Undivided Highway	0	0	0	1644	1650	3295
9	2 or 3 Lane Undivided Highway	0	0	0	1644	1650	3295
10	2 or 3 Lane Undivided Highway	0	0	0	1644	1650	3295
11	2 or 3 Lane Undivided Highway	0	0	1	1644	1650	3295
12	2 or 3 Lane Undivided Highway	1	0	1	2115	2115	4230
13	4 or 5 Lane Undivided Highway	0	3	0	5455	5553	11008
14	2 or 3 Lane Undivided Highway	1	9	0	4781	4287	9069
15	2 or 3 Lane Undivided Highway	1	0	0	3864	3917	7781
16	2 or 3 Lane Undivided Highway	0	0	0	3864	3917	7781
17	2 or 3 or 4 Lane Divided Highway	0	3	0	4782	4764	9547

HPMS Data

2010-2014 Weighted Average						2014			2013			2012			2011			2010		
SEGMENT	MP_FROM	MP_TO	WEIGHTED AVERAGE NB/EB AADT	WEIGHTED AVERAGE SB/WB AADT	WEIGHTED AVERAGE AADT	NB/EB AADT	SB/WB AADT	2014 AADT	NB/EB AADT	SB/WB AADT	2014 AADT	NB/EB AADT	SB/WB AADT	2014 AADT	NB/EB AADT	SB/WB AADT	2014 AADT	NB/EB AADT	SB/WB AADT	2014 AADT
191-1	0	24	1022	1022	2045	976	976	1952	968	968	1937	1032	1032	2064	1054	1054	2107	1082	1082	2163
191-2	24	67	727	724	1451	691	693	1384	683	685	1368	754	754	1508	801	795	1596	706	693	1399
191-3	87	104	1230	1230	2460	1196	1196	2392	1278	1278	2555	1229	1229	2458	1206	1206	2411	1242	1242	2485
191-4	104	116	2292	2292	4584	2292	2292	4584	2418	2418	4836	2341	2341	4683	2226	2226	4452	2183	2183	4366
191-5	116	121	4269	4312	8580	4061	4251	8312	4088	4088	8176	3987	4003	7990	4697	4707	9405	4510	4510	9020
70-6	339	330	6272	6220	12493	6331	6299	12630	6479	6440	12919	6382	6246	12628	6089	6035	12123	6081	6081	12163
70-7	330	300	1742	1739	3481	1753	1753	3506	1835	1835	3669	1775	1775	3550	1712	1700	3412	1635	1635	3269
70-8	300	298	1742	1739	3481	1753	1753	3506	1835	1835	3669	1775	1775	3550	1712	1700	3412	1635	1635	3269
70-9	298	293	1742	1739	3481	1753	1753	3506	1835	1835	3669	1775	1775	3550	1712	1700	3412	1635	1635	3269
70-10	29	274	1742	1739	3481	1753	1753	3506	1835	1835	3669	1775	1775	3550	1712	1700	3412	1635	1635	3269
70-11	274	270	1544	1541	3085	1650	1644	3295	1742	1742	3484	1681	1681	3363	1255	1249	2504	1389	1389	2779
70-12	270	255	2127	2127	4255	2115	2115	4230	2238	2238	4476	2149	2149	4297	2035	2035	4070	2100	2100	4200
70/60E-13	255	243	5551	5500	11051	5553	5455	11008	5754	5650	11404	5251	5250	10502	5405	5335	10740	5795	5808	11603
60E-14	243	227	4430	4723	9153	4287	4781	9069	4262	4733	8996	4530	4530	9060	4220	4721	8941	4850	4850	9700
60E-15	227	225	3739	3658	7397	3917	3864	7781	3842	3682	7525	3604	3604	7208	4001	3810	7811	3330	3330	6660
60E-16	225	223	3739	3658	7397	3917	3864	7781	3842	3682	7525	3604	3604	7208	4001	3810	7811	3330	3330	6660
60E-17	223	212	4820	4768	9588	4764	4782	9547	4793	4564	9357	4953	4948	9901	5021	4976	9997	4570	4570	9140

Freight Performance Area Data

Segment	Length (miles)	# of closures	Total minutes of closures		Avg Mins/Mile/Year	
			NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)
1	24	3	813.0	73.0	6.78	0.61
2	43	5	519.0	151.0	2.41	0.70
3	17	1	250.0	0.0	2.94	0.00
4	12	4	202.0	241.0	3.37	4.02
5	5	5	658.0	1001.0	26.32	40.04
6	9	2	178.0	748.8	3.96	16.64
7	19	3	363.0	0.0	3.82	0.00
8	2	1	0.0	221.0	0.00	22.10
9	5	1	0.0	388.0	0.00	15.52
10	19	6	978.0	1150.0	10.29	12.11
11	4	2	549.0	0.0	27.45	0.00
12	15	7	578.0	9536.1	7.71	127.15
13	12	3	0.0	1144.0	0.00	19.07
14	16	47	5483.5	30297.9	68.54	378.72
15	2	9	1074.6	2490.9	107.46	249.09
16	2	5	1088.0	0.0	108.80	0.00
17	11	8	751.0	1079.0	13.65	19.62

	ITIS Category Description											
	Closures		Incidents/Accidents		Incidents/Crashes		Obstruction Hazards		Winds		Winter Storm Codes	
Segment	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)
1	0	0	2	1	0	0	0	0	0	0	0	0
2	0	0	3	0	0	0	1	1	0	0	0	0
3	0	0	1	0	0	0	0	0	0	0	0	0
4	0	0	2	2	0	0	0	0	0	0	0	0
5	0	0	3	2	0	0	0	0	0	0	0	0
6	0	0	1	1	0	0	0	0	0	0	0	0
7	0	0	3	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	1	0	0	0	0
9	0	0	0	1	0	0	0	0	0	0	0	0
10	0	0	4	2	0	0	0	0	0	0	0	0
11	0	0	2	0	0	0	0	0	0	0	0	0
12	0	0	3	4	0	0	0	0	0	0	0	0
13	0	0	0	2	0	0	0	1	0	0	0	0
14	0	0	20	19	0	0	1	3	0	0	0	4
15	0	0	2	4	0	0	0	0	0	0	0	3
16	0	0	5	0	0	0	0	0	0	0	0	0

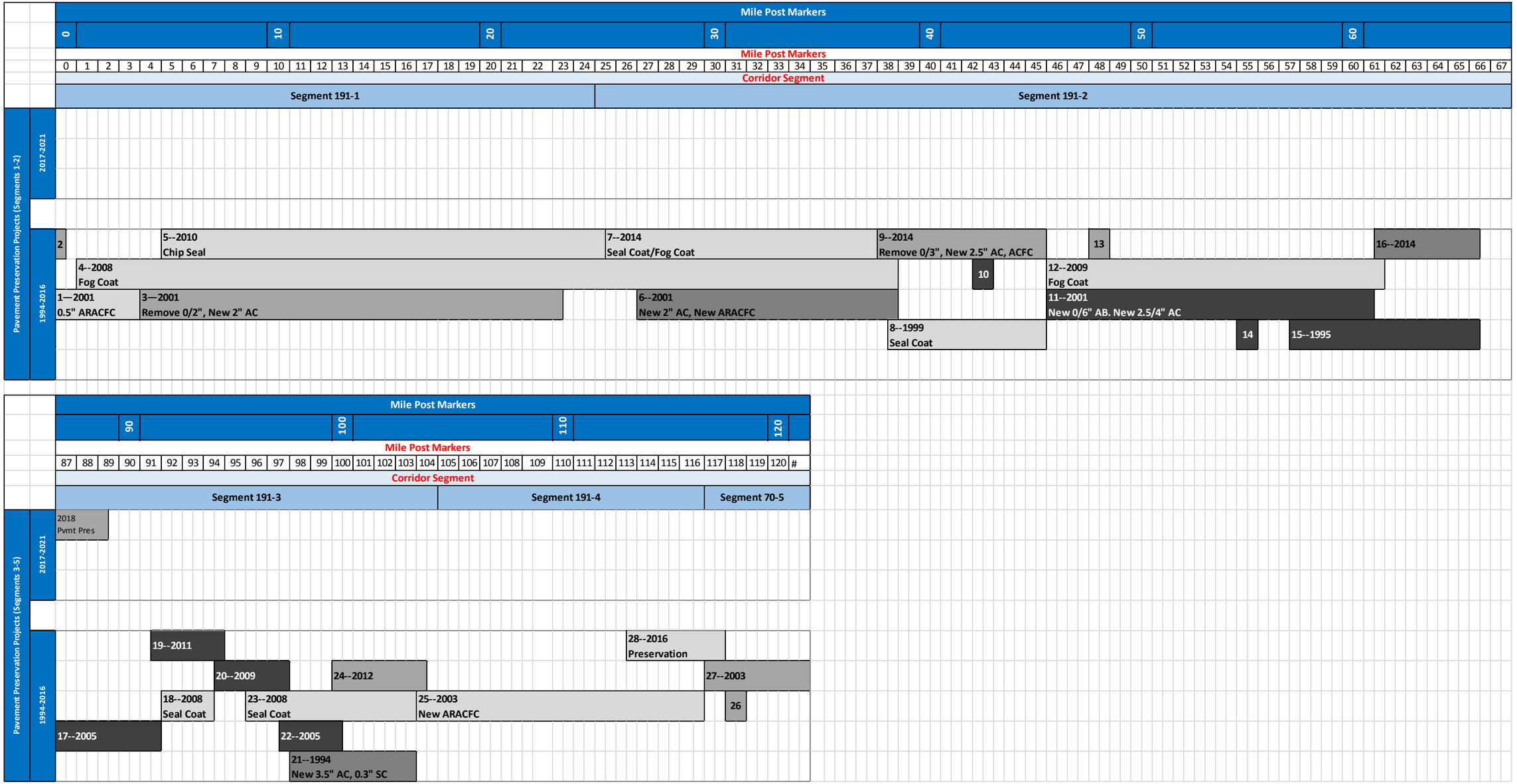
See the **Mobility Performance Area Data** section for other Freight Performance Area related data.

Appendix D: Needs Analysis Contributing Factors and Scores

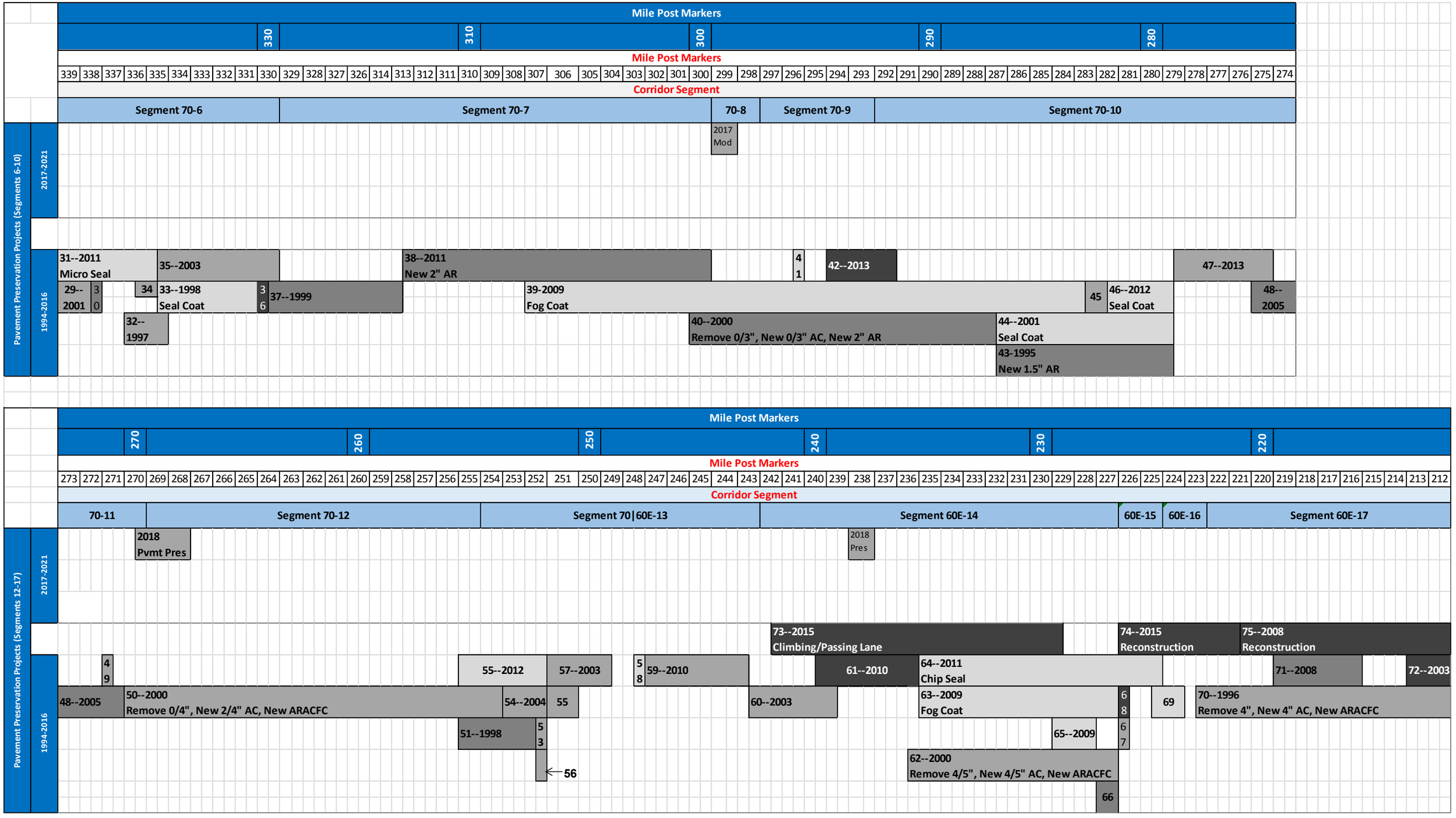
Pavement Performance Needs Analysis

Segment	Segment Length (miles)	Segment Mileposts (MP)	Final Need	Bid History Investment	PeCos History Investment	Resulting Historical Investment	Contributing Factors and Comments
191-1	24	0-24	None	Low	Low	Low	
191-2	43	24-67	Low	Medium	Medium	Medium	NB/WB MP 24-27, NB MP 48-51
191-3	17	87-104	Low	Medium	Low	Medium	SB/EB MP 87-88
191-4	12	104-116	Medium	Low	High	Medium	NB MP 105-107
191-5	5	116-121	Medium	Low	High	Medium	NB MP 120-121
70-6	9	339-330	Low	Medium	Low	Medium	WB MP 336-337
70-7	19	330-300	Low	Medium	Low	Medium	WB MP 300-301
70-8	2	300-298	None	Medium	Low	Medium	
70-9	5	298-293	None	High	Low	High	
70-10	19	293-274	Low	Medium	High	High	WB MP 283-284
70-11	4	274-270	None	Medium	Low	Medium	
70-12	15	270-255	None	Low	High	Medium	
70/60E-13	12	255-243	Low	Low	High	Medium	EB MP 247-248, EB MP 249-251
60E-14	16	243-227	None	Medium	Low	Medium	WB MP 229-233, WB MP 235-236
60E-15	2	227-225	None	Medium	Low	Medium	
60E-16	2	225-223	None	Medium	Low	Medium	
60E-17	11	223-212	None	Medium	Medium	Medium	

Pavement History



Pavement History – Part 2



Pavement Treatment Reference Numbers		
1. 2001 (NB/SB) Hxxxx: New 0.5" ARACFC	**26. 1999 (NB/SB)** Hxxxx: Remove 0.6", New ARACFC	**51. 1998 (EB/WB)** Hxxxx: New 2" AR, New ARACFC
2. 2007 (NB/SB) Hxxxx: Remove 0.5", New 0.5" ARACFC	**27. 2003 (NB/SB)** Hxxxx: Remove 2", New 2" AR, New ARACFC	**52. 1997 (EB)** Hxxxx: Remove 0.6", New ACFC
3. 2001 (NB/SB) Hxxxx: Remove 0/2", New 2" AC	**28. 2016 (NB/SB)** H8700: Pavement Preservation	**53. 2004 (EB/WB)** Hxxxx: Remove 3", New 3" AC, New ARACFC
4. 2008 (NB/SB) Hxxxx: Fog Coat	**29. 2001 (EB/WB)** Hxxxx: Remove 0.7", New 0.7" AC, New ARACFC	**54. 2004 (EB/WB)** Hxxxx: Remove 3", New 3" AC, New ARACFC
5. 2010 (NB/SB) Hxxxx: Chip Seal	**30. 2009 (EB/WB)** Hxxxx: New 0/1" AC, New ARACFC	**55. 2012 (EB/WB)** Hxxxx: Micro Seal
6. 2001 (NB/SB) Hxxxx: New 2" AC, New ARACFC	**31. 2011 (EB/WB)** Hxxxx: Micro Seal	**56. 1998 (EB/WB)** Hxxxx: Remove 0.63", New ARACFC
7. 2014 (NB/SB) Hxxxx: Seal Coat/Fog Coat	**32. 1997 (EB/WB)** Hxxxx: Remove 3", New 3" AC, 0.3" SC	**57. 2003 (EB/WB)** Hxxxx: Remove 2/3", New 2/3" AR
8. 1999 (NB/SB) Hxxxx: Seal Coat	**33. 1998 (EB/WB)** Hxxxx: Seal Coat	**58. 1999 (EB/WB)** Hxxxx: New ACFC
9. 2014 (NB/SB) Hxxxx: Remove 0/3", New 2.5" AC, New ACFC	**34. 2009 (EB)** Hxxxx: Remove 2/3", New 2/3" AC	**59. 2010 (EB/WB)** Hxxxx: Remove 3/6", New 3/6" AC
10. 2006 (NB/SB) Hxxxx: New 8" AB, New 4" AC, 0.3" SC	**35. 2003 (EB/WB)** Hxxxx: Remove 0/3", New 3" AC, New ARACFC	**60. 2003 (EB/WB)** Hxxxx: Remove 4", New 4" AC, New ARACFC
11. 2001 (NB/SB) Hxxxx: New 0/6" AB. New 2.5/4" AC	**36. 1998 (EB/WB)** Hxxxx: New 6" AB, New 4" AC	**61. 2010 (EB/WB)** Hxxxx: Remove 0/3.5", New 0/6" AB, New 3/6" AC, New ARACFC
12. 2012 (NB/SB) Hxxxx: Fog Coat	**37. 1999 (EB/WB)** Hxxxx: Remove 1", New 0/2" AC, New 0/2" AR	**62. 2000 (EB/WB)** Hxxxx: Remove 4/5", New 4/5" AC, New ARACFC
13. 2009 (NB/SB) Hxxxx: Remove 0.5", New ACFC	**38. 2001 (EB/WB)** Hxxxx: New 2" AR	**63. 2009 (EB/WB)** Hxxxx: Fog Coat
14. 2005 (NB/SB) Hxxxx: New 0/8" AB, New4.5/ AC, 0.3" SC	**39. 2009 (EB/WB)** Hxxxx: Fog Coat	**64. 2011 (EB/WB)** Hxxxx: Chip Seal
15. 1995 (NB/SB) Hxxxx: New 0/12" AB, New 2/4" AC, New 2" RO, 4" MC, 0.3" SC, New ARACFC	**40. 2000 (EB/WB)** Hxxxx: Remove 0/3", New 0/3" AC, New 2" AR	**65. 2009 (EB/WB)** Hxxxx: Grind
16. 2014 (NB/SB) Hxxxx: Remove 2.5/4", New 4.5/7.5" AC, 0.5 DC", New ACFC	**41. 2004 (EB/WB)** Hxxxx: Fogcoat	**66. 1996 (EB/WB)** Hxxxx: New 0/6" AB, Remove 0/2.5", New 0/4" AC, New ARACFC
17. 2005 (NB/SB) Hxxxx: New 8' AB, New 2.5/5" AC, New ACFC	**42. 2013 (EB/WB)** Hxxxx: New 5" AB, New 5" AC, New ACFC	**67. 2000 (EB/WB)** Hxxxx: Remove 2", New 2" AC, New ACFC
18. 2008 (NB/SB) Hxxxx: Seal Coat	**43. 1995 (EB/WB)** Hxxxx: New 1.5" AR	**68. 2003 (EB/WB)** Hxxxx: New 0/6" AB, New 0/6.5" AC, New 0/10" PC, New ARACFC
19. 2011 (NB/SB) Hxxxx: New 0/8" AB, Remove 0/0.5", New ARACFC	**44. 2001 (EB/WB)** Hxxxx: Seal Coat	**69. 2001 (EB/WB)** Hxxxx: Seal Coat
20. 2009 (NB/SB) Hxxxx: New 0/4" AB, Remove 0/1", New 3/5" AC, New ARACFC	**45. 2007 (EB/WB)** Hxxxx: Remove 2.5/31.5, New 0/5" AB, New 2.5/5" AC, New 0/18" BO, New ACFC	**70. 1996 (EB/WB)** Hxxxx: Remove 4", New 4" AC, New ARACFC
21. 1994 (NB/SB) Hxxxx: New 3.5" AC, 0.3" SC	**46. 2012 (EB/WB)** Hxxxx: Seal Coat	**71. 2008 (EB/WB)** Hxxxx: Remove 0/2", New 5/9" AC, New ARACFC
22. 2005 (NB/SB) Hxxxx: New 0/8" AB, New 0/5" AC, New ARACFC	**47. 2013 (EB/WB)** Hxxxx: Removed 3", New 3" AC, New ARACFC	**72. 2003 (EB/WB)** Hxxxx: New 6" AB, New 7" AC, New ARACFC
23. 2008 (NB/SB) Hxxxx: Seal Coat	**48. 2005 (EB/WB)** Hxxxx: Remove 0/1.5", New 0/2.5" AR, New ARACFC	**73. 2014 (EB/WB)** H5818: Climbing/Passing Lane
24. 2012 (NB/SB) Hxxxx: New 2.5" AC, New ARACFC	**49. 2013 (EB/WB)** Hxxxx: Removed 0.5", New 0.5" ACFC	**74. 2014 (EB/WB)** H7900: Reconstruction
25. 2003 (NB/SB) Hxxxx: New ARACFC	**50. 2000 (EB/WB)** Hxxxx: Remove 0/4", New 2/4" AC, New ARACFC	**75. 2008 (EB/WB)** H7900: Reconstruction

Legend

- New Paving or Reconstruction
- Mill and Overlay (Adding Structural Thickness)
- Mill and Replace (No Change Structural Thickness)
- Fog Coat or Thin Overlay Treatments
- PCCP Pavement Border
- AC Pavement Border

Value	Level	1		2		3		4		5		6		7		8		9	
		Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir
1		6%	100%		83%		23%		13%		40%		56%		20%	43%	35%		82%
1			25%		58%		36%		50%		47%		44%		27%				100%
1	L1		22%		100%		20%		63%		50%				16%				
1							20%				20%				2%				
1															52%				
3		9%	78%	75%		20%	23%		42%		3%		44%	11%	27%	65%	38%		18%
3			47%	25%		20%	24%		42%		20%		56%	2%	52%				
3	L2		3%	17%					25%		33%		56%		4%				
3			6%						38%		17%								
3																			
4			16%		42%		53%		21%		27%				48%		48%		82%
4																			18%
4	L3																		
4																			
4																			
6			6%																
6																			
6	L4																		
6																			
6																			
Sub-Total		0.34	6.50	3.50	4.08	1.20	4.51	0.00	6.46	0.00	4.83	0.00	5.67	0.38	5.55	2.38	3.38	0.00	6.36
Total		**6.67**		**5.83**		**5.11**		**6.46**		**4.83**		**5.67**		**5.74**		**4.56**		**6.36**	

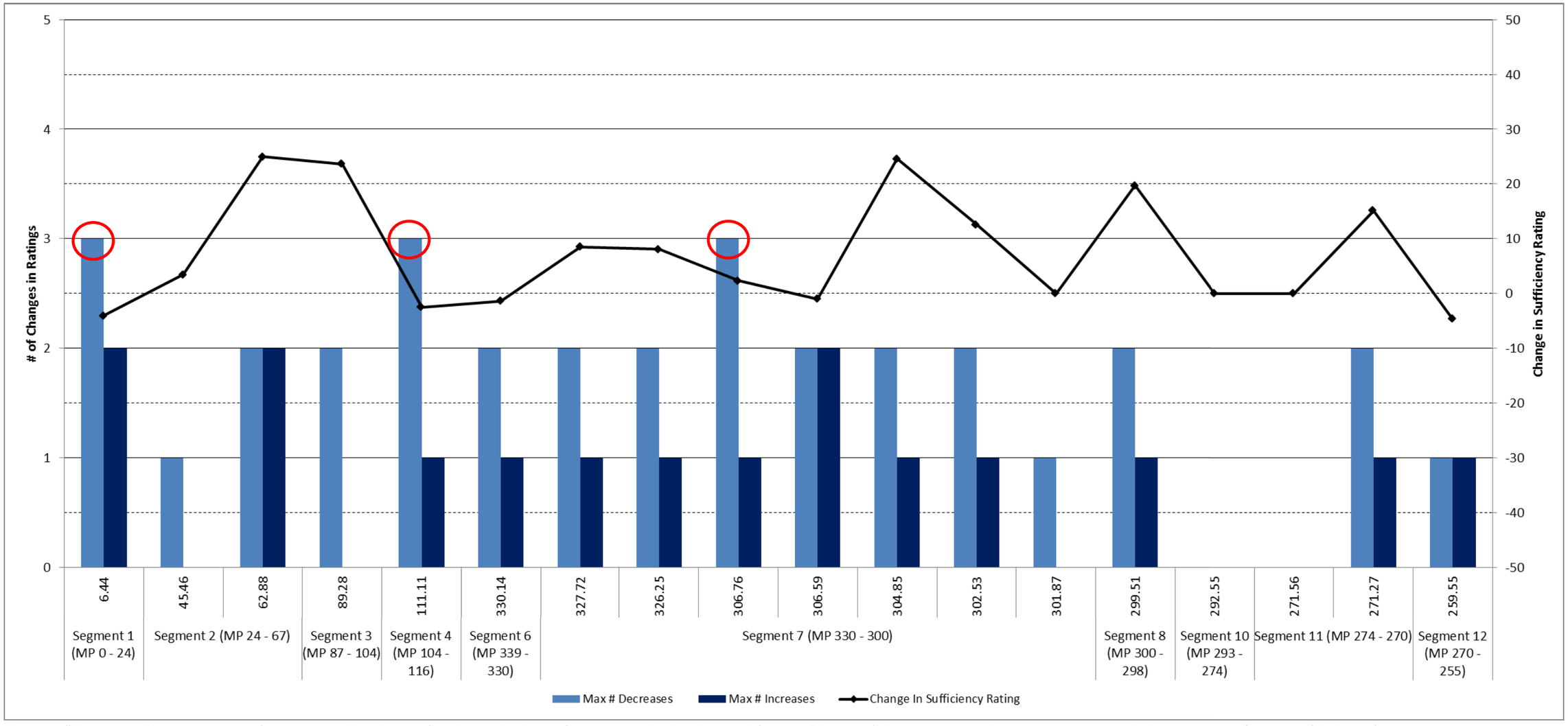
Pavement Historical Investment

Segment	Pavement History Value (bid projects)	Pavement History Score (bid projects)	Pavement History (bid projects)	PeCos ($/mile/yr)	PeCos Score	PeCos	Resulting Historical Investment
1	4.52	-0.33	Low	$140.11	-0.48	Low	Low
2	5.66	0.18	Medium	$2,379.82	-0.15	Medium	Medium
3	5.74	0.21	Medium	$0.00	-0.50	Low	Medium
4	1.29	-1.78	Low	$7,591.61	0.62	High	Medium
5	4.00	-0.56	Low	$8,998.17	0.83	High	Medium
6	4.78	-0.22	Medium	$10.09	-0.50	Low	Medium
7	4.68	-0.26	Medium	$44.18	-0.50	Low	Medium
8	5.00	-0.12	Medium	$4.42	-0.50	Low	Medium
9	7.50	1.00	High	$3.07	-0.50	Low	High
10	5.58	0.14	Medium	$8,423.75	0.74	High	High
11	4.63	-0.28	Medium	$26.86	-0.50	Low	Medium
12	3.42	-0.82	Low	$6,287.74	0.43	High	Medium
13	3.63	-0.73	Low	$7,649.41	0.63	High	Medium
14	5.63	0.16	Medium	$653.81	-0.41	Low	Medium
15	6.00	0.33	Medium	$137.93	-0.48	Low	Medium
16	6.00	0.33	Medium	$633.30	-0.41	Low	Medium
17	6.00	0.33	Medium	$1,751.89	-0.24	Medium	Medium

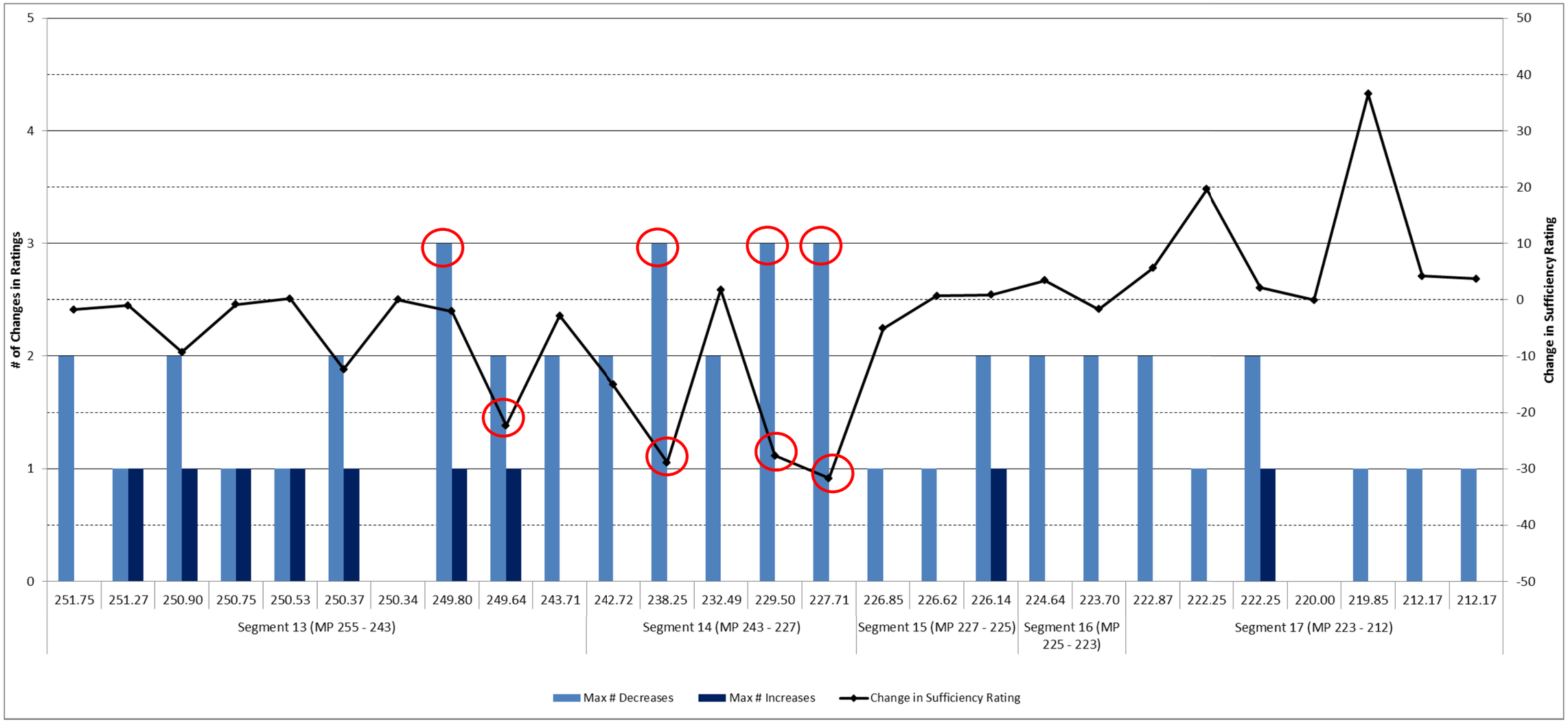
Bridge Performance Needs Analysis

Segment	Segment Length (Miles)	Segment Mileposts (MP)	# of Bridges in Segment	# Functionally Obsolete Bridges	Final Need	Contributing Factors			Comments
						Bridge	Current Ratings 5 or Less	Historical Review	
191-1	24	0-24	1	0	None	None			
191-2	43	24-67	2	0	Medium	Cochise UPRR OP (No. 157 MP 62.88)	Deck=5	Not identified through Historical Review	
191-3	17	87-104	2	0	Low	Monk Draw Bridge SB (No. 292 MP 89.28)	Evaluation=5	Not identified through Historical Review	
191-4	12	104-116	1	0	Low	None			
191-5	5	116-121	0	0	N/A	None			
70-6	9	339-330	1	0	Low	None			
70-7	19	330-300	8	0	Low	Hunzinger Wash Bridge (No. 561 MP 313.62)	Superstructure=5; Evaluation=5	Not identified through Historical Review	
						Black Rock Wash Bridge (No. 515 MP 306.76)	Superstructure=5; Evaluation=5	Identified through Historical Review	
						Holyoak Wash Bridge (No. 514 MP 302.53)	Deck=5; Substructure=5; Superstructure=5; Evaluation=5	Not identified through Historical Review	
70-8	2	300-298	1	0	None	None			
70-9	5	298-293	0	0	N/A	None			
70-10	19	293-274	1	0	None	None			
70-11	4	274-270	2	0	Low	Peridot RR OP (No. 477 MP 271.27)	Deck=5	Not identified through Historical Review	
70-12	15	270-255	1	0	Low	None			
70/60E-13	12	255-243	11	1	High	McMillen Wash Bridge (No 1028 MP 251.75)	Superstructure=5; Evaluation=5	Not identified through Historical Review	
						Globe Viaduct (No. 1787 MP 250.90)	Deck=5	Not identified through Historical Review	
						Pinal Creek Bridge (No. 549 MP 250.37)	Deck=5; Substructure=5; Evaluation=5	Not identified through Historical Review	
						Pinal Creek Bridge (No. 36 MP 249.80)	Deck=5; Substructure=5; Evaluation=5	Identified through Historical Review	
						Pinal Creek Bridge (No. 266 MP 249.64)	Deck=4; Substructure=4; Superstructure=5; Evaluation=4	Identified through Historical Review	
						Bloody Tanks Bridge (No. 173 MP 243.71)	Deck=5; Substructure=5; Evaluation=5	Not identified through Historical Review	
60E-14	16	243-227	5	0	High	Bloody Tanks Wash Bridge (No. 45 MP 242.72)	Superstructure=5; Evaluation=5	Not identified through Historical Review	
						Pinto Creek Bridge (No. 351 MP 238.25)	Deck=4; Substructure=4; Superstructure=4; Evaluation=4	Identified through Historical Review	
						Waterfall Canyon Bridge (No. 328 MP 229.50)	Substructure=5; Superstructure=4; Evaluation=4	Identified through Historical Review	
						Queen Creek Bridge (No. 406 MP 227.71)	Deck=4; Substructure=4; Superstructure=4; Evaluation=4	Identified through Historical Review	
60E-15	2	227-225	3	2	Low	None			
60E-16	2	225-223	2	0	None	Wash Bridge (No. 319 MP 224.64)	Evaluation=5	Not identified through Historical Review	
						Silver King Wash Bridge (No. 318 MP 223.70)	Evaluation=5	Not identified through Historical Review	
60E-17	11	223-212	7	0	Low	Wash Bridge (No. 288 MP 222.87)	Evaluation=5	Not identified through Historical Review	
						Queen Creek Bridge WB (No. 296 MP 222.25)	Superstructure=5; Evaluation=5	Not identified through Historical Review	

Bridge Ratings History



Maximum # Decreases: Maximum number of times that the Deck Rating, Substructure Rating, or Superstructure Rating decreased from 1997 to 2014. (Higher number could indicate a more dramatic decline in the performance of the bridge)
Maximum # Increases: Maximum number of times that the Deck Rating, Substructure Rating, or Superstructure Rating increased from 1997 to 2014. (Higher number could indicate a higher level of investment)
Change in Sufficiency Rating: Cumulative change in Sufficiency Rating from 1997 to 2014. (Bigger negative number could indicate a more dramatic decline in the performance of the bridge)



Maximum # Decreases: Maximum number of times that the Deck Rating, Substructure Rating, or Superstructure Rating decreased from 1997 to 2014. (Higher number could indicate a more dramatic decline in the performance of the bridge)
Maximum # Increases: Maximum number of times that the Deck Rating, Substructure Rating, or Superstructure Rating increased from 1997 to 2014. (Higher number could indicate a higher level of investment)
Change in Sufficiency Rating: Cumulative change in Sufficiency Rating from 1997 to 2014. (Bigger negative number could indicate a more dramatic decline in the performance of the bridge)

Mobility Performance Needs Analysis

Segment	Segment Mileposts (MP)	Segment Length (miles)		Roadway Variables								Traffic Variables					Relevant Mobility Related Existing Infrastructure
			Final Need	Functional Classification	Environmental Type (Urban/Rural)	Terrain	# of Lanes/ Direction	Weighted Average Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing V/C	Future 2035 V/C	% Trucks	NB/WB Buffer Index (PTI-TTI)	SB/EB Buffer Index (PTI-TTI)	
191-1	0-24	24	Low	State Highway	Rural	Level	2	55	No	Undivided	12%	0.12	0.17	17%	3.28	6.17	This segment includes one rest area
191-2	24-67	43	Low	State Highway	Rural	Level	2	55	No	Undivided	26%	0.07	0.10	17%	8.67	4.93	This segment includes a Border Patrol Check Point effecting NB traffic
191-3	87-104	17	Medium	State Highway	Rural	Level	4	55	No	Divided	3%	0.03	0.04	17%	8.12	10.43	
191-4	104-116	12	None	State Highway	Rural	Level	4	65	No	Undivided	30%	0.14	0.20	17%	N/A	N/A	
191-5	116-121	5	Low	State Highway	Urban	Level	4	40	No	Undivided	13%	0.28	0.39	17%	N/A	N/A	
70-6	330-339	9	Low	State Highway	Urban	Level	4	40	No	Undivided	0%	0.32	0.69	5%	N/A	N/A	This segment includes one rest area
70-7	330-300	19	Low	State Highway	Rural	Level	2	55	No	Undivided	13%	0.13	0.21	5%	N/A	N/A	
70-8	300-298	2	Low	State Highway	Rural	Level	2	65	No	Undivided	6%	0.08	0.15	5%	N/A	N/A	
70-9	298-293	5	Low	State Highway	Rural	Level	2	50	No	Undivided	53%	0.17	0.29	5%	N/A	N/A	- This segment includes one rest area
70-10	293-274	19	Low	State Highway	Rural	Level	2	55	No	Undivided	37%	0.11	0.19	5%	N/A	N/A	
70-11	274-270	4	Low	State Highway	Rural	Level	2	55	No	Undivided	77%	0.12	0.26	5%	N/A	N/A	
70-12	270-255	15	Low	State Highway	Rural	Level	2	60	No	Undivided	10%	0.13	0.23	11%	N/A	0.31	This segment includes a climbing/passing lane
70/60E-13	255-243	12	Low	State Highway	Urban	Level	4	45	No	Undivided	0%	0.30	0.46	12%	1.56	2.05	
60E-14	243-227	16	Medium	State Highway	Rural	Mountainous	2	50	No	Undivided	68%	1.16	2.11	14%	0.40	0.87	
60E-15	227-225	2	None	State Highway	Rural	Rolling	2	45	No	Undivided	98%	1.29	3.83	14%	0.60	1.13	This segment includes one rest area
60E-16	225-223	2	None	State Highway	Rural	Level	2	55	No	Undivided	55%	0.28	0.71	14%	0.83	0.04	
60E-17	223-212	11	None	State Highway	Rural	Level	4	65	No	Divided	11%	0.11	0.26	13%	0.15	0.23	

Mobility Performance Needs Analysis (continued)

Segment	Segment Mileposts (MP)	Segment Length (miles)	Initial Need	Need Adjustments	Final Need	Planned and Programmed Future Projects
				Recent Projects Since 2014		
191-1	0-24	24	Low	None	Low	Additional future planned projects or recommendations include: DMS NB/SB MP 2
191-2	24-67	43	Low	MP 37.97-45.80: Roadway excavation and borrow for widening of shoulders	Low	Additional future planned projects or recommendations include: Reconstruct I-10 Interchange MP 67.5. Although there has been a recently completed project, it does not address the issues associated with the initial need.
191-3	87-104	17	Medium	None	Medium	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 87-104*; DMS SB MP 90
191-4	104-116	12	None	None	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 104-116*; US 191 alternate route MP 104-116; Restripe to 5 lanes MP 110.9-116; Pavement preservation MP 114-116
191-5	116-121	5	Low	None	Low	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 116-121*; US 191 alternate route MP 116-121; Restripe to 5 lanes MP 116-118/120-121; Pavement preservation MP 116-118; DMS NB MP 116; Sidewalk and intersection improvement projects MP 120-121
70-6	330-339	9	Low	None	Low	Additional future planned projects or recommendations include: Widen roadway MP 330-339*; Concrete sidewalk and pedestrian bridge parallel to US 70 MP 330-335; Intersection improvements MP 337-339
70-7	330-300	19	Low	None	Low	Additional future planned projects or recommendations include: Widen roadway MP 300-330*; Construct Pedestrian Bridge MP 329-330; Add center turn lane MP 312.25
70-8	300-298	2	Low	None	Low	Additional future planned projects or recommendations include: Widen roadway MP 298-300*; Pathway and intersection improvements MP 291-300
70-9	298-293	5	Low	None	Low	Additional future planned projects or recommendations include: Widen roadway MP 293-298*; Eliminate passing zone MP 294.6-295.5; Continuous two-way left turn lane MP 294-298; Eliminate passing zone MP 296.5-297.7
70-10	293-274	19	Low	None	Low	Additional future planned projects or recommendations include: Widen roadway MP 274-293*; Climbing lane MP 282-288
70-11	274-270	4	Low	MP 270-271.27: Construct a 6 foot wide asphalt pathway, concrete sidewalk and pedestrian lighting	Low	Additional future planned projects or recommendations include: Widen roadway MP 270-274*; Construct passing lane MP 270-271. No change was warranted for the segment since the recent projects completed span less than half the distance of the segment.
70-12	270-255	15	Low	MP 255.30-270: Construct 6 foot wide asphalt pathway, concrete sidewalk and pedestrian lighting	Low	Additional future planned projects or recommendations include: Widen roadway MP 255-270*; Intersection improvement MP 260; Climbing lane MP 262-264; Construct passing lane MP 267-270. Although the recently completed project addresses mobility needs, it does not address the on-street bicycle accommodation therefore the level of need was not changed.
70/60E-13	255-243	12	Low	None	Low	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 243-252; Speed limit study MP 243-252; Construct Sidewalk MP 243-252; Widen to four lane MP 243-254; Access management MP 243-245.5/246.5-247; Turn lanes MP 244.5; Restripe to five lane MP 244-244.25; Intersection Improvement 244.6; DMS EB MP 247; Widen roadway MP 253-255*; DMS EB MP 253; Intersection Study MP 254; Paved Shoulder 243-252
60E-14	243-227	16	High	MP 229.48-241.93 (H5818): Construct climbing and passing lanes	Medium	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 227-243; Paved Shoulder MP 227-243; Shoulder improvements EB/WB MP 227-242; Widen to four lane MP 235.5-243; Construct Ped Bridge Extension MP 239-240; Realign Intersection MP 242. An adjustment for the Final Need was warranted based on projects completed or under construction which supersede performance data
60E-15	227-225	2	High	MP 225-226.87 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None	No additional future planned projects or recommendations were identified
60E-16	225-223	2	Low	MP 223-225 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None	No additional future planned projects or recommendations were identified
60E-17	223-212	11	None	MP 221.72-223 (H7900): Reconstructing the existing two-lane undivided roadway into a four-lane divided highway and reconstructing the existing three-lane roadway into a four-lane roadway with a raised median	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 212-223; Construct new WB lanes MP 216.3-219.9; New Queen Valley TI MP 215-214; Construct new EB lanes MP 219.9-222.3

Mobility Contributing Factors (Step 3)

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
191-1	0-24	24	Low	3	3	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: DMS NB/SB MP 2	- This segment includes one rest area - 100% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 75% involve collisions with other motor vehicles, 50% involve inattention/distraction, and 50% occur in daylight condition. -Segment averages 7 access points per mile
191-2	24-67	43	Low	5	3	60%	2	40%	0	0%	Border Patrol Check Point MP 43 NB	Additional future planned projects or recommendations include: Reconstruct I-10 Interchange MP 67.5. Although there has been a recently completed project, it does not address the issues associated with the initial need.	- This segment includes a Border Patrol Check Point effecting NB traffic - Approximately 30% of this segment has pavement failure - 60% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 67% involve collisions with other motor vehicles, 33% involve inattention/distraction, and occur 100% in daylight conditions. -Segment averages 8 access points per mile
191-3	87-104	17	Medium	1	1	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 87-104*; DMS SB MP 90	- 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve overturning, 100% involve speed too fast for conditions, and 100% involve dry conditions. -Segment averages 2 access points per mile
191-4	104-116	12	None	4	4	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 104-116*; US 191 alternate route MP 104-116; Restripe to 5 lanes MP 110.9-116; Pavement preservation MP 114-116	- 100% of closures were related to incidents/accidents - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with other motor vehicles, 100% failure to yield right-of-way, and 100% occur in dark-unlighted conditions. -Segment averages 13 access points per mile
191-5	116-121	5	Low	5	5	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 116-121*; US 191 alternate route MP 116-121; Restripe to 5 lanes MP 116-118/120-121; Pavement preservation MP 116-118; DMS NB MP 116; Sidewalk and intersection improvement projects MP 120-121	- 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 60% involve collisions with other motor vehicles, 40% failure to yield right-of-way, and 40% occur in dark-unlighted conditions.

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
70-6	330-339	9	Low	2	2	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 330-339*; Concrete sidewalk and pedestrian bridge parallel to US 70 MP 330-335; Intersection improvements MP 337-339	- This segment includes one rest area - 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with other motor vehicles, 30% involve inattention/distraction, and 80% occur in daylight conditions.
70-7	330-300	19	Low	3	3	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 300-330*; Construct Pedestrian Bridge MP 329-330; Add center turn lane MP 312.25	- 100% of closures were related to incidents/accidents - Key characteristics of the incidents/accidents for this segment are: 50% involve overturning, 25% involve speed too fast for conditions, and 100% occur in dark-unlighted conditions. -Segment averages 9 access points per mile
70-8	300-298	2	Low	1	0	0%	1	100%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 298-300*; Pathway and intersection improvements MP 291-300	- 100% of closures were related to obstruction -Segment averages 7 access points per mile
70-9	298-293	5	Low	1	1	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 293-298*; Eliminate passing zone MP 294.6-295.5; Continuous two-way left turn lane MP 294-298; Eliminate passing zone MP 296.5-297.7	- This segment includes one rest area - 100% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with a pedestrian, 50% involve no improper action, and 100% occur in dark-unlighted conditions. -Segment averages 14 access points per mile
70-10	293-274	19	Low	6	6	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 274-293*; Climbing lane MP 282-288	- 100% of closures were related to incidents/accidents - 5 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 40% involve collisions with other motor vehicles, 40% involve drove in opposing lane, and 40% occur in dark-unlighted conditions. -Segment averages 2 access points per mile
70-11	274-270	4	Low	2	2	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 270-274*; Construct passing lane MP 270-271. No change was warranted for the segment since the recent projects completed span less than half the distance of the segment.	- 100% of closures were related to incidents/accidents - 1 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with pedestrian, and 100% occur in dark-unlighted conditions. -Segment averages 9 access points per mile

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
70-12	270-255	15	Low	7	7	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 255-270*; Intersection improvement MP 260; Climbing lane MP 262-264; Construct passing lane MP 267-270. Although the recently completed project addresses mobility needs, it does not address the on-street bicycle accommodation therefore the level of need was not changed.	- This segment includes a climbing/passing lane - 100% of closures were related to incidents/accidents - 4 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 50% involve collisions with pedestrian, 25% involve no improper action, and 25% occur in dark-unlighted conditions. -Segment averages 4 access points per mile
70/60E-13	255-243	12	Low	3	2	67%	1	33%	0	0%	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 243-252; Speed limit study MP 243-252; Construct Sidewalk MP 243-252; Widen to four lane MP 243-254; Access management MP 243-245.5/246.5-247; Turn lanes MP 244.5; Restripe to five lane MP 244-244.25; Intersection Improvement 244.6; DMS EB MP 247; Widen roadway MP 253-255*; DMS EB MP 253; Intersection Study MP 254; Paved Shoulder 243-252	- 67% of closures were related to incidents/accidents - 8 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 66% involve collisions with other motor vehicle, 26% involve failure to yield right-of-way, and 63% occur in daylight conditions.
60E-14	243-227	16	Medium	47	39	83%	4	9%	4	9%	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 227-243; Paved Shoulder MP 227-243; Shoulder improvements EB/WB MP 227-242; Widen to four lane MP 235.5-243; Construct Ped Bridge Extension MP 239-240; Realign Intersection MP 242. An adjustment for the Final Need was warranted based on projects completed or under construction which supersede performance data	- Segment includes mountainous terrain - 83% of closures were related to incidents/accidents - 9 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 38% involve fixed object, 66% involve speed too fast for conditions, and 69% occur in daylight conditions. -Segment averages 4 access points per mile

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
60E-15	227-225	2	None	9	6	67%	0	0%	3	33%	None	No additional future planned projects or recommendations were identified	- This segment includes one rest area - 67% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 50% involve collisions with pedestrian, 25% involve no improper action, and 50% occur in daylight conditions.
60E-16	225-223	2	None	5	5	100%	0	0%	0	0%	None	No additional future planned projects or recommendations were identified	- 100% of closures were related to incidents/accidents - Key characteristics of the incidents/accidents for this segment are: 100% involve collision with motor vehicle, 100% involve drove in opposing lane, and 100% occur in daylight conditions -Segment averages 7 access points per mile
60E-17	223-212	11	None	8	8	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 212-223; Construct new WB lanes MP 216.3-219.9; New Queen Valley TI MP 215-214; Construct new EB lanes MP 219.9-222.3	- 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 50% involve collision with motor vehicle, 42% involve speed too fast for conditions, and 67% occur in daylight conditions. -Segment averages 2 access points per mile

Safety Performance Needs Analysis

Segment Number		**191-1**	**191-2**	**191-3**	**191-4**	**191-5**	**70-6**
Segment Length (miles)		**24**	**43**	**17**	**12**	**5**	**9**
Segment Milepost (MP)		**0-24**	**24-67**	**87-104**	**104-116**	**116-121**	**339-330**
Final Need		None	None	Low	None	High	Low
Segment Crash Overview		1 Crashes were fatal 3 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles	1 Crashes were fatal 2 Crashes had incapacitating injuries 0 Crashes involve trucks 1 Crashes involve Motorcycles	2 Crashes were fatal 0 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles	0 Crashes were fatal 1 Crashes had incapacitating injuries 0 Crashes involve trucks 1 Crashes involve Motorcycles	2 Crashes were fatal 3 Crashes had incapacitating injuries 0 Crashes involve trucks 1 Crashes involve Motorcycles	2 Crashes were fatal 8 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles
Segment Crash Summaries (Fatal and Serious Injury Crashes)	**First Harmful Event Type**	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Involve Collision with Motor Vehicle 40% Involve Collision with Pedestrian 0% Involve Overturning	100% Involve Collision with Motor Vehicle 0% Involve Overturning 0% Involve Collision with Pedestrian
	Collision Type	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	40% Involve Left Turn 40% Involve Other 20% Involve Angle	50% Involve Rear End 30% Involve Angle 20% Involve Left Turn
	Violation or Behavior	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	40% Involve Failure to Yield Right-of-Way 20% Involve No Improper Action 20% Involve Did Not Use Crosswalk	30% Involve Disregarded Traffic Signal 30% Inattention/Distraction 10% Involve No Improper Action
	Lighting Conditions	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	40% Occur in Dark-Lighted Conditions 40% Occur in Dark-Unlighted 20% Occur in Daylight Conditions	80% Occur in Daylight Conditions 10% Occur in Dark-Lighted Conditions 10% Occur in Dark-Unlighted
	Surface Conditions	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	100% Involve Dry Conditions 0% Involve Wet Conditions 0% Involve Other	100% Involve Dry Conditions 0% Involve Wet Conditions 0% Involve Other
	First Unit Event	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	100% Involve a first unit event of Motor Vehicle in Transport 0% Involve a first unit event of Crossed Centerline 0% Involve a first unit event of Ran Off the Road (Right)	100% Involve a first unit event of Motor Vehicle in Transport 0% Involve a first unit event of Crossed Centerline 0% Involve a first unit event of Ran Off the Road (Right)
	Driver Physical Condition	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Under the Influence of Drugs or Alcohol 20% No Apparent Influence 20% Unknown	30% No Apparent Influence 30% Unknown 20% Under the Influence of Drugs or Alcohol
	Safety Device Usage	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	40% Not Applicable 20% Shoulder And Lap Belt Used 20% Not Reported	40% Shoulder And Lap Belt Used 40% None Used 10% Air Bag Deployed/Shoulder-Lap Belt
Hot Spot Crash Summaries		No identified hot spot	No identified hot spot	No identified hot spot	No identified hot spot	No identified hot spot	No identified hot spot
Previously Completed Safety-Related Projects		None	None	None	None	None	None
District Interviews/Discussions							
Contributing Factors		N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	- Pavement surface conditions - Shoulder/ rumble stripe conditions - Traffic control device reflectivity - Lighting - High traffic volumes - Crosswalk visibility	- Traffic control device reflectivity - Intersection geometry - High traffic volumes

Segment Number		70-7	70-8	70-9	70-10	70-11	70-12
Segment Length (miles)		19	2	5	19	4	15
Segment Milepost (MP)		330-300	300-298	298-293	293-274	274-270	270-255
Final Need		None	N/A	N/A	High	N/A	High
Segment Crash Overview		0 Crashes were fatal 4 Crashes had incapacitating injuries 1 Crashes involve trucks 0 Crashes involve Motorcycles	0 Crashes were fatal 0 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles	1 Crashes were fatal 0 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles	5 Crashes were fatal 0 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles	1 Crashes were fatal 0 Crashes had incapacitating injuries 0 Crashes involve trucks 0 Crashes involve Motorcycles	4 Crashes were fatal 0 Crashes had incapacitating injuries 1 Crashes involve trucks 0 Crashes involve Motorcycles
Segment Crash Summaries (Fatal and Serious Injury Crashes)	First Harmful Event Type	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	40% Involve Collision with Motor Vehicle 40% Involve Overturning 20% Involve Unknown	N/A - Sample size too small	N/A - Sample size too small
	Collision Type	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Involve Single Vehicle 20% Involve Head On 20% Involve Other	N/A - Sample size too small	N/A - Sample size too small
	Violation or Behavior	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Involve Unknown 20% Involve Drove in Opposing Lane 20% Inattention/Distraction	N/A - Sample size too small	N/A - Sample size too small
	Lighting Conditions	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	40% Occur in Dark-Unlighted Conditions 40% Occur in Dark-Unknown Lighting 20% Occur in Daylight Conditions	N/A - Sample size too small	N/A - Sample size too small
	Surface Conditions	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Involve Dry Conditions 40% Involve Unknown Conditions 0% Involve Wet Conditions	N/A - Sample size too small	N/A - Sample size too small
	First Unit Event	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	20% Involve a first unit event of Ran Off the Road (Right) 20% Involve a first unit event of Crossed Centerline 20% Involve a first unit event of Overturn	N/A - Sample size too small	N/A - Sample size too small
	Driver Physical Condition	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Unknown 20% Under the Influence of Drugs or Alcohol 20% No Apparent Influence	N/A - Sample size too small	N/A - Sample size too small
	Safety Device Usage	N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	60% Unknown 20% Shoulder And Lap Belt Used 20% None Used	N/A - Sample size too small	N/A - Sample size too small
Hot Spot Crash Summaries		No identified hot spot	No identified hot spot	No identified hot spot	No identified hot spot	No identified hot spot	No identified hot spot
Previously Completed Safety-Related Projects		None	None	None	None	None	None
District Interviews/Discussions							
Contributing Factors		N/A - Sample size too small	N/A - Sample size too small	N/A - Sample size too small	- Shoulder/ rumble stripe conditions - Traffic control device reflectivity - Clear zone slope and obstructions - High traffic volumes - Driver physical conditions - Shoulder width - Intersection geometry	N/A - Sample size too small	N/A - Sample size too small

Segment Number		70/60E-13		60E-14		60E-15		60E-16		60E-17		Corridor-Wide Crash Characteristics	
Segment Length (miles)		12		16		2		2		11			
Segment Milepost (MP)		255-243		243-227		227-225		225-223		223-212			
Final Need		High		Medium		N/A		N/A		None			
Segment Crash Overview		8	Crashes were fatal	9	Crashes were fatal	1	Crashes were fatal	0	Crashes were fatal	2	Crashes were fatal	39	Crashes were fatal
		27	Crashes had incapacitating injuries	20	Crashes had incapacitating injuries	3	Crashes had incapacitating injuries	1	Crashes had incapacitating injuries	10	Crashes had incapacitating injuries	82	Crashes had incapacitating injuries
		0	Crashes involve trucks	1	Crashes involve trucks	1	Crashes involve trucks	0	Crashes involve trucks	0	Crashes involve trucks	4	Crashes involve trucks
		3	Crashes involve Motorcycles	9	Crashes involve Motorcycles	0	Crashes involve Motorcycles	0	Crashes involve Motorcycles	3	Crashes involve Motorcycles	18	Crashes involve Motorcycles
Segment Crash Summaries (Fatal and Serious Injury Crashes)	First Harmful Event Type	66%	Involve Collision with Motor Vehicle	38%	Involve Collision with Fixed Object	N/A - Sample size too small		N/A - Sample size too small		50%	Involve Collision with Motor Vehicle	52%	Involve Collision with Motor Vehicle
		11%	Involve Collision with Fixed Object	31%	Involve Collision with Motor Vehicle					25%	Involve Overturning	15%	Involve Collision with Fixed Object
		9%	Involve Collision with Pedestrian	14%	Involve Overturning					17%	Involve Collision with Fixed Object	13%	Involve Overturning
	Collision Type	29%	Involve Rear End	66%	Involve Single Vehicle	N/A - Sample size too small		N/A - Sample size too small		50%	Involve Single Vehicle	36%	Involve Single Vehicle
		23%	Involve Single Vehicle	14%	Involve Head On					17%	Involve Angle	18%	Involve Rear End
		17%	Involve Angle	7%	Involve Angle					17%	Involve Rear End	13%	Involve Angle
	Violation or Behavior	26%	Involve Failure to Yield Right-of-Way	38%	Involve Speed too Fast for Conditions	N/A - Sample size too small		N/A - Sample size too small		42%	Involve Speed too Fast for Conditions	22%	Involve Speed too Fast for Conditions
		20%	Involve Inattention/Distraction	17%	Involve No Improper Action					25%	Involve Unknown	17%	Involve Inattention/Distraction
		17%	Involve Speed too Fast for Conditions	14%	Involve Inattention/Distraction					17%	Involve Failure to Keep in Proper Lane	12%	Involve Unknown
	Lighting Conditions	63%	Occur in Daylight Conditions	69%	Occur in Daylight Conditions	N/A - Sample size too small		N/A - Sample size too small		67%	Occur in Daylight Conditions	58%	Occur in Daylight Conditions
		23%	Occur in Dark-Lighted Conditions	24%	Occur in Dark-Unlighted Conditions					33%	Occur in Dark-Unlighted Conditions	22%	Occur in Dark-Unlighted Conditions
		6%	Occur in Dusk Conditions	3%	Occur in Dark-Lighted Conditions					0%	Occur in Dawn Conditions	12%	Occur in Dark-Lighted Conditions
	Surface Conditions	94%	Involve Dry Conditions	76%	Involve Dry Conditions	N/A - Sample size too small		N/A - Sample size too small		100%	Involve Dry Conditions	87%	Involve Dry Conditions
		3%	Involve Wet Conditions	7%	Involve Wet Conditions					0%	Involve Wet Conditions	7%	Involve Unknown Conditions
		3%	Involve Unknown	7%	Involve Slush					0%	Other	3%	Involve Wet Conditions
	First Unit Event	74%	Involve a first unit event of Motor Vehicle in Transport	45%	Involve a first unit event of Ran Off the Road (Right)	N/A - Sample size too small		N/A - Sample size too small		50%	Involve a first unit event of Motor Vehicle in Transport	47%	Involve a first unit event of Motor Vehicle in Transport
		9%	Involve a first unit event of Ran Off the Road (Right)	28%	Involve a first unit event of Crossed Centerline					33%	Involve a first unit event of Ran Off the Road (Right)	21%	Involve a first unit event of Ran Off the Road (Right)
		9%	Involve a first unit event of Other Non-Collision	10%	Involve a first unit event of Motor Vehicle in Transport					17%	Involve a first unit event of Ran Off the Road (Left)	16%	Involve a first unit event of Crossed Centerline
	Driver Physical Condition	66%	No Apparent Influence	45%	No Apparent Influence	N/A - Sample size too small		N/A - Sample size too small		42%	No Apparent Influence	43%	No Apparent Influence
		14%	Under the Influence of Drugs or Alcohol	28%	Unknown					42%	Unknown	31%	Unknown
		14%	Unknown	24%	Under the Influence of Drugs or Alcohol					8%	Under the Influence of Drugs or Alcohol	19%	Under the Influence of Drugs or Alcohol
	Safety Device Usage	46%	Shoulder And Lap Belt Used	48%	Shoulder And Lap Belt Used	N/A - Sample size too small		N/A - Sample size too small		33%	None Used	36%	Shoulder And Lap Belt Used
		29%	None Used	31%	None Used					25%	Shoulder And Lap Belt Used	31%	None Used
		11%	Unknown	14%	Helmet Used					17%	Helmet Used	11%	Unknown
Hot Spot Crash Summaries		NB/WB: MP 246-249, SB/EB: MP 246-249		NB/WB: MP 227-229, SB/EB: MP 232-234		No identified hot spot		No identified hot spot		No identified hot spot			
Previously Completed Safety-Related Projects		None		MP 228.10-228.85(H5818): Construct concrete barrier, installing guardrail and fence and related items		None		None		None			
District Interviews/Discussions													
Contributing Factors		- Shoulder/ rumble stripe conditions - Speed too fast for the conditions - Clear zone slope and obstructions - High traffic volumes - Shoulder width		- Pavement surface conditions - Shoulder/ rumble stripe conditions - Speed too fast for the conditions - Clear zone slope and obstructions - Driver physical conditions - Intersection geometry - Crossover crashes		N/A - Sample size too small		N/A - Sample size too small		-Shoulder/ rumble stripe conditions - Speed too fast for the conditions - High traffic volumes - Safety device usage - Shoulder width - Crossover crashes		- Pavement surface conditions - Shoulder/ rumble stripe conditions - Shoulder width - Clear zone slope and obstructions	

Freight Performance Needs Analysis

Segment	Segment Mileposts (MP)	Segment Length (miles)		Roadway Variables								Traffic Variables					Relevant Freight Related Existing Infrastructure
			Final Need	Functional Classification	Environmental Type (Urban/Rural)	Terrain	# of Lanes/ Direction	Weighted Average Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing V/C	Future 2035 V/C	% Trucks	NB/WB Buffer Index (TPTI-TTTI)	SB/EB Buffer Index (TPTI-TTTI)	
191-1	0-24	24	High	State Highway	Rural	Level	2	55	No	Undivided	12%	0.12	0.17	17%	7.17	10.02	This segment includes one rest area
191-2	24-67	43	High	State Highway	Rural	Level	2	55	No	Undivided	26%	0.07	0.10	17%	1.68	18.13	This segment includes a Border Patrol Check Point effecting NB traffic
191-3	87-104	17	High	State Highway	Rural	Level	4	55	No	Divided	3%	0.03	0.04	17%	7.58	15.61	
191-4	104-116	12	N/A	State Highway	Rural	Level	4	65	No	Undivided	30%	0.14	0.20	17%	N/A	N/A	
191-5	116-121	5	N/A	State Highway	Urban	Level	4	40	No	Undivided	13%	0.28	0.39	17%	N/A	N/A	
70-6	330-339	9	N/A	State Highway	Urban	Level	4	40	No	Undivided	0%	0.32	0.69	5%	N/A	N/A	This segment includes one rest area
70-7	330-300	19	N/A	State Highway	Rural	Level	2	55	No	Undivided	13%	0.13	0.21	5%	N/A	N/A	
70-8	300-298	2	N/A	State Highway	Rural	Level	2	65	No	Undivided	6%	0.08	0.15	5%	N/A	N/A	
70-9	298-293	5	N/A	State Highway	Rural	Level	2	50	No	Undivided	53%	0.17	0.29	5%	N/A	N/A	- This segment includes one rest area
70-10	293-274	19	N/A	State Highway	Rural	Level	2	55	No	Undivided	37%	0.11	0.19	5%	N/A	N/A	
70-11	274-270	4	N/A	State Highway	Rural	Level	2	55	No	Undivided	77%	0.12	0.26	5%	N/A	N/A	
70-12	270-255	15	Low	State Highway	Rural	Level	2	60	No	Undivided	10%	0.13	0.23	11%	N/A	0.87	This segment includes a climbing/passing lane
70/60E-13	255-243	12	High	State Highway	Urban	Level	4	45	No	Undivided	0%	0.30	0.46	12%	3.05	4.71	
60E-14	243-227	16	Medium	State Highway	Rural	Mountainous	2	50	No	Undivided	68%	1.16	2.11	14%	1.16	0.76	
60E-15	227-225	2	Low	State Highway	Rural	Rolling	2	45	No	Undivided	98%	1.29	3.83	14%	0.74	2.98	This segment includes one rest area
60E-16	225-223	2	Low	State Highway	Rural	Level	2	55	No	Undivided	55%	0.28	0.71	14%	1.84	0.12	
60E-17	223-212	11	None	State Highway	Rural	Level	4	65	No	Divided	11%	0.11	0.26	13%	0.16	0.40	

Freight Performance Needs Analysis (continued)

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
191-1	0-24	24	High	3	3	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: DMS NB/SB MP 2	- This segment includes one rest area - 100% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 75% involve collisions with other motor vehicles, 50% involve inattention/distraction, and 50% occur in daylight condition. -Segment averages 7 access points per mile
191-2	24-67	43	High	5	3	60%	2	40%	0	0%	Border Patrol Check Point MP 43 NB	Additional future planned projects or recommendations include: Reconstruct I-10 Interchange MP 67.5. Although there has been a recently completed project, it does not address the issues associated with the initial need.	- This segment includes a Border Patrol Check Point effecting NB traffic - Approximately 30% of this segment has pavement failure - 60% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 67% involve collisions with other motor vehicles, 33% involve inattention/distraction, and occur 100% in daylight conditions. -Segment averages 8 access points per mile
191-3	87-104	17	High	1	1	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 87-104*; DMS SB MP 90	- 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve overturning, 100% involve speed too fast for conditions, and 100% involve dry conditions. -Segment averages 2 access points per mile
191-4	104-116	12	N/A	4	4	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 104-116*; US 191 alternate route MP 104-116; Restripe to 5 lanes MP 110.9-116; Pavement preservation MP 114-116	- 100% of closures were related to incidents/accidents - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with other motor vehicles, 100% failure to yield right-of-way, and 100% occur in dark-unlighted conditions. -Segment averages 13 access points per mile
191-5	116-121	5	N/A	5	5	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: I-10 to US 70 Reconstruct to 4 lane divided MP 116-121*; US 191 alternate route MP 116-121; Restripe to 5 lanes MP 116-118/120-121; Pavement preservation MP 116-118; DMS NB MP 116; Sidewalk and intersection improvement projects MP 120-121	- 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 60% involve collisions with other motor vehicles, 40% failure to yield right-of-way, and 40% occur in dark-unlighted conditions.
70-6	330-339	9	N/A	2	2	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 330-339*; Concrete sidewalk and pedestrian bridge parallel to US 70 MP 330-335; Intersection improvements MP 337-339	- This segment includes one rest area - 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with other motor vehicles, 30% involve inattention/distraction, and 80% occur in daylight conditions.

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
70-7	330-300	19	N/A	3	3	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 300-330*; Construct Pedestrian Bridge MP 329-330; Add center turn lane MP 312.25	- 100% of closures were related to incidents/accidents - Key characteristics of the incidents/accidents for this segment are: 50% involve overturning, 25% involve speed too fast for conditions, and 100% occur in dark-unlighted conditions. -Segment averages 9 access points per mile
70-8	300-298	2	N/A	1	0	0%	1	100%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 298-300*; Pathway and intersection improvements MP 291-300	- 100% of closures were related to obstruction -Segment averages 7 access points per mile
70-9	298-293	5	N/A	1	1	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 293-298*; Eliminate passing zone MP 294.6-295.5; Continuous two-way left turn lane MP 294-298; Eliminate passing zone MP 296.5-297.7	- This segment includes one rest area - 100% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with a pedestrian, 50% involve no improper action, and 100% occur in dark-unlighted conditions. -Segment averages 14 access points per mile
70-10	293-274	19	N/A	6	6	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 274-293*; Climbing lane MP 282-288	- 100% of closures were related to incidents/accidents - 5 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 40% involve collisions with other motor vehicles, 40% involve drove in opposing lane, and 40% occur in dark-unlighted conditions. -Segment averages 2 access points per mile
70-11	274-270	4	N/A	2	2	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 270-274*; Construct passing lane MP 270-271. No change was warranted for the segment since the recent projects completed span less than half the distance of the segment.	- 100% of closures were related to incidents/accidents - 1 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 100% involve collisions with pedestrian, and 100% occur in dark-unlighted conditions. -Segment averages 9 access points per mile
70-12	270-255	15	Low	7	7	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Widen roadway MP 255-270*; Intersection improvement MP 260; Climbing lane MP 262-264; Construct passing lane MP 267-270. Although the recently completed project addresses mobility needs, it does not address the on-street bicycle accommodation therefore the level of need was not changed.	- This segment includes a climbing/passing lane - 100% of closures were related to incidents/accidents - 4 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 50% involve collisions with pedestrian, 25% involve no improper action, and 25% occur in dark-unlighted conditions. -Segment averages 4 access points per mile

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total # of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
70/60E-13	255-243	12	High	3	2	67%	1	33%	0	0%	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 243-252; Speed limit study MP 243-252; Construct Sidewalk MP 243-252; Widen to four lane MP 243-254; Access management MP 243-245.5/246.5-247; Turn lanes MP 244.5; Restripe to five lane MP 244-244.25; Intersection Improvement 244.6; DMS EB MP 247; Widen roadway MP 253-255*; DMS EB MP 253; Intersection Study MP 254; Paved Shoulder 243-252	- 67% of closures were related to incidents/accidents - 8 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 66% involve collisions with other motor vehicle, 26% involve failure to yield right-of-way, and 63% occur in daylight conditions.
60E-14	243-227	16	Medium	47	39	83%	4	9%	4	9%	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 227-243; Paved Shoulder MP 227-243; Shoulder improvements EB/WB MP 227-242; Widen to four lane MP 235.5-243; Construct Ped Bridge Extension MP 239-240; Realign Intersection MP 242. An adjustment for the Final Need was warranted based on projects completed or under construction which supersede performance data	- Segment includes mountainous terrain - 83% of closures were related to incidents/accidents - 9 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 38% involve fixed object, 66% involve speed too fast for conditions, and 69% occur in daylight conditions. -Segment averages 4 access points per mile
60E-15	227-225	2	Low	9	6	67%	0	0%	3	33%	None	No additional future planned projects or recommendations were identified	- This segment includes one rest area - 67% of closures were related to incidents/accidents - 1 crash was fatal - Key characteristics of the incidents/accidents for this segment are: 50% involve collisions with pedestrian, 25% involve no improper action, and 50% occur in daylight conditions.
60E-16	225-223	2	Low	5	5	100%	0	0%	0	0%	None	No additional future planned projects or recommendations were identified	- 100% of closures were related to incidents/accidents - Key characteristics of the incidents/accidents for this segment are: 100% involve collision with motor vehicle, 100% involve drove in opposing lane, and 100% occur in daylight conditions -Segment averages 7 access points per mile
60E-17	223-212	11	None	8	8	100%	0	0%	0	0%	None	Additional future planned projects or recommendations include: Construct Alternative Alignment MP 212-223; Construct new WB lanes MP 216.3-219.9; New Queen Valley TI MP 215-214; Construct new EB lanes MP 219.9-222.3	- 100% of closures were related to incidents/accidents - 2 crashes were fatal - Key characteristics of the incidents/accidents for this segment are: 50% involve collision with motor vehicle, 42% involve speed too fast for conditions, and 67% occur in daylight conditions. -Segment averages 2 access points per mile

Appendix E: Life-Cycle Cost Analysis

Pinal Creek Bridge (#0036) / ROUTE US60 / MP 249.80

Bridge Information	
Bridge Deck Area (A225)	7558 SF
Year Built (N27)	1920
Exp Service Life	75 YR
Total Bridge Length (N49)	106 LF
Number of Spans (N45+N46)	6
Skew Angle (N34)	41 DEG
Average Elevation	3454.30 FT
Max Pier Height	16.00 FT
* Amount of Widening for Bridge	0 FT
Revised Deck Area (Bridge Replace)	7558 FT
**Scour Critical Rating (N113)	7

Deterioration Slope

Item	Deterioration Line Equation			Year Drop
	Slope =	Days	Years	
Substr	y =	0.000000x	0.000x	#DIV/0!
Superstr	y =	-0.000555x	-0.203x	4.94
Deck	y =	-0.000555x	-0.203x	4.94

**Input 0 if no widening. Input should include widening on both sides of bridge if applicable.

**If scour critical rating is 3 or lower, Option 2 should consider the implementation of scour countermeasures.

Notes:

1. Widening is intended only to correct lane and/or shoulder width deficiencies. It is not intended for adding traffic capacity (i.e. adding general purpose lanes).

Cost Multipliers		
Elevation > 4000ft	3454	1.00
Pier Height > 30ft	16	1.00
Length to # span ratio	17.67	1.25
Skew > 30degrees	41.00	1.10
Project Cost Multiplier	All Options	2.20

L to # Span Multiplier	
L/ # Span Ratio	Multiplier
=>100	1.00
=>60	1.10
<60	1.25

Skew Multiplier	
Skew	Multiplier
<30	1.00
=>30	1.10

Adjusted Bridge Replace Cost	
Base Bridge Replacement Cost (Per SF)	$125.00
Bridge Replacement Cost w/ Multipliers (Per SF)	$171.88

Elevation Multiplier	
Elev	Multiplier
<4000	1.00
=>4000	1.25

Pier H Multiplier	
Pier H	Multiplier
<30	1.00
=>30	1.10

User input cell

Only manipulate cell value after consulting with team

Bridge History (Inspections/As-builts)

Description	Category	Year
Original bridge was built in 1920 (WPA-127)		
Underdeck has spalls with exposed rebars totalling appx 10sf. Rebar section loss appx 10% to 25%.		
Several underdeck delamination totalling appx 190sf.		
This is a concrete slab bridge so deck is the superstructure.		
Abutments have a diagonal crack. Piers have several hairline cracks.		
No repairs requested in the bridge inspection reports since 2004. No rehab work done.		

Replace / Rehab / Repair Information

BRIDGE DECK				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Deck)	Full Deck Replacement	$85.94	25	Rating = 8
Rehab (Deck Concrete Overlay)	Overlay (Concrete)	$10.00	15	+ 2
Rehab (Deck Epoxy Overlay)	Overlay (Epoxy)	$5.00	10	+ 1
Repair (Deck)	Patch Spalls / Seal Cracks	$3.00	See Deterioration Slope	+ 0
Replace (Bridge)	Full Bridge Replacement	$171.88	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 0
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 0

SUPERSTRUCTURE - STEEL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Stl)	Full SuperStr Replacement	$85.94	50	Rating = 8
Rehab (Supr - Stl)	Weld New Structural Components	$42.97	15	+ 2
Repair (Supr - Stl)	Weld Repair / Crack Relief	$5.00	See Deterioration Slope	+ 1

SUPERSTRUCTURE - CONCRETE				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Conc)	Full SuperStr Replacement	$85.94	50	Rating = 8
Rehab (Supr - Conc)	Replace Structural Component	$42.97	15	+ 2
Repair (Supr - Conc)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$171.88	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

SUBSTRUCTURE - STRUCTURAL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Substr)	Full SubStr Replacement	$85.94	75	Rating = 8
Rehab (Substr)	Replace Structural Component	$42.97	50	+ 2
Repair (Substr)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1

SUBSTRUCTURE - SCOUR				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Rehab (Substr - Scour)	Add scour protection slabs	$42.97	50	+ 2
Repair (Substr - Scour)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$171.88	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

Notes:

1. Individual replacements assume 50% of total bridge replacement costs

2. Individual rehabs (in cells that are not highlighted) assume 25% of total bridge replacement costs

3. When superstructure replacement is selected, either deck replacement or deck rehab should be selected as well.

Pinal Creek Bridge (#00266) / ROUTE US60 / MP 249.64

Bridge Information	
Bridge Deck Area (A225)	9963 SF
Year Built (N27)	1942
Exp Service Life	75 YR
Total Bridge Length (N49)	135 LF
Number of Spans (N45+N46)	7
Skew Angle (N34)	40 DEG
Average Elevation	3443.00 FT
Max Pier Height	15.13 FT
* Amount of Widening for Bridge	0 FT
Revised Deck Area (Bridge Replace)	9963 FT
**Scour Critical Rating (N113)	7

Deterioration Slope

Item	Deterioration Line Equation			Year Drop
	Slope =	Days	Years	
Substr	y =	-0.000355x	-0.130x	7.72
Superstr	y =	-0.000555x	-0.203x	4.94
Deck	y =	-0.000355x	-0.130x	7.72

***Input 0 if no widening. Input should include widening on both sides of bridge if applicable.**

****If scour critical rating is 3 or lower, Option 2 should consider the implementation of scour countermeasures.**

Notes:

1. Widening is intended only to correct lane and/or shoulder width deficiencies. It is not intended for adding traffic capacity (i.e. adding general purpose lanes).

Cost Multipliers		
Elevation > 4000ft	3443	1.00
Pier Height > 30ft	15	1.00
Length to # span ratio	19.29	1.25
Skew > 30degrees	40.00	1.10
Project Cost Multiplier	All Options	2.20

L to # Span Multiplier

L/ # Span Ratio	Multiplier
=>100	1.00
=>60	1.10
<60	1.25

Skew Multiplier

Skew	Multiplier
<30	1.00
=>30	1.10

Adjusted Bridge Replace Cost	
Base Bridge Replacement Cost (Per SF)	$125.00
Bridge Replacement Cost w/ Multipliers (Per SF)	$171.88

Elevation Multiplier

Elev	Multiplier
<4000	1.00
=>4000	1.25

Pier H Multiplier

Pier H	Multiplier
<30	1.00
=>30	1.10

User input cell

Only manipulate cell value after consulting with team

Bridge History (Inspections/As-builts)

Description	Category	Year
Original bridge was built in 1942 (FA-91(C)).		
Underdeck has several spalls with exposed rebars totalling. Rebar section loss is appx 10%.		
This is a concrete slab bridge so deck is the superstructure.		
Abutments have a diagonal crack. Piers have several hairline cracks.		
One repair in 2008 to remove existing AC, seal deck and overlay was recommended. This repair could not be verified. No rehab work done.		

Replace / Rehab / Repair Information

BRIDGE DECK				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Deck)	Full Deck Replacement	$85.94	25	Rating = 8
Rehab (Deck Concrete Overlay)	Overlay (Concrete)	$10.00	15	+ 2
Rehab (Deck Epoxy Overlay)	Overlay (Epoxy)	$5.00	10	+ 1
Repair (Deck)	Patch Spalls / Seal Cracks	$3.00	See Deterioration Slope	+ 0
Replace (Bridge)	Full Bridge Replacement	$171.88	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 0
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 0

SUPERSTRUCTURE - STEEL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Stl)	Full SuperStr Replacement	$85.94	50	Rating = 8
Rehab (Supr - Stl)	Weld New Structural Components	$42.97	15	+ 2
Repair (Supr - Stl)	Weld Repair / Crack Relief	$5.00	See Deterioration Slope	+ 1

SUPERSTRUCTURE - CONCRETE				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Conc)	Full SuperStr Replacement	$85.94	50	Rating = 8
Rehab (Supr - Conc)	Replace Structural Component	$42.97	15	+ 2
Repair (Supr - Conc)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$171.88	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

SUBSTRUCTURE - STRUCTURAL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Substr)	Full SubStr Replacement	$85.94	75	Rating = 8
Rehab (Substr)	Replace Structural Component	$42.97	50	+ 2
Repair (Substr)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1

SUBSTRUCTURE - SCOUR				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Rehab (Substr - Scour)	Add scour protection slabs	$42.97	50	+ 2
Repair (Substr - Scour)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$171.88	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

Notes:

1. Individual replacements assume 50% of total bridge replacement costs

2. Individual rehabs (in cells that are not highlighted) assume 25% of total bridge replacement costs

3. When superstructure replacement is selected, either deck replacement or deck rehab should be selected as well.

Waterfall Canyon (#0328) / ROUTE US60 / MP 229.50

Bridge Information	
Bridge Deck Area (A225)	4176 SF
Year Built (N27)	1929
Exp Service Life	75 YR
Total Bridge Length (N49)	96 LF
Number of Spans (N45+N46)	4
Skew Angle (N34)	0 DEG
Average Elevation	3703.14 FT
Max Pier Height	20.90 FT
* Amount of Widening for Bridge	0 FT
Revised Deck Area (Bridge Replace)	4176 FT
**Scour Critical Rating (N113)	N

Deterioration Slope

Item	Deterioration Line Equation			Year Drop
	Slope =	Days	Years	
Substr	y =	-0.000601x	-0.219x	4.56
Superstr	y =	-0.000300x	-0.110x	9.13
Deck	y =	0.000000x	0.000x	#DIV/0!

***Input 0 if no widening. Input should include widening on both sides of bridge if applicable.**

****If scour critical rating is 3 or lower, Option 2 should consider the implementation of scour countermeasures.**

Notes:

1. Widening is intended only to correct lane and/or shoulder width deficiencies. It is not intended for adding traffic capacity (i.e. adding general purpose lanes).

Cost Multipliers		
Elevation > 4000ft	3703	1.00
Pier Height > 30ft	21	1.00
Length to # span ratio	24.00	1.25
Skew > 30degrees	0.00	1.00
Project Cost Multiplier	All Options	2.20

L to # Span Multiplier	
L/ # Span Ratio	Multiplier
=>100	1.00
=>60	1.10
<60	1.25

Skew Multiplier	
Skew	Multiplier
<30	1.00
=>30	1.10

Adjusted Bridge Replace Cost	
Base Bridge Replacement Cost (Per SF)	$125.00
Bridge Replacement Cost w/ Multipliers (Per SF)	$156.25

Elevation Multiplier	
Elev	Multiplier
<4000	1.00
=>4000	1.25

Pier H Multiplier	
Pier H	Multiplier
<30	1.00
=>30	1.10

User input cell

Only manipulate cell value after consulting with team

Bridge History (Inspections/As-builts)

Description	Category	Year
Original bridge was built in 1929 (AFE-666(7)).		
Latest deck inspection indicates that the deack wearing surface is in good condition.		
cracks.		
Girders exhibit scalling and small spalls with exposed steel reinforcing that bearing area near the piers.		
Several concrete spalls with exposed rebar are present at the piers due to impact from debris.		
Reccomendation to repair the concrete spalls with exposed rebar at the piers have been made but not addressed.		

Replace / Rehab / Repair Information

BRIDGE DECK

ITEM	DESCRIPTION	UNIT COST (Per SF)	LIFE (YRS)	RATING BENEFIT
Replace (Deck)	Full Deck Replacement	$78.13	25	Rating = 8
Rehab (Deck Concrete Overlay)	Overlay (Concrete)	$10.00	15	+ 2
Rehab (Deck Epoxy Overlay)	Overlay (Epoxy)	$5.00	10	+ 1
Repair (Deck)	Patch Spalls / Seal Cracks	$3.00	See Deterioration Slope	+ 0
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 0
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 0

SUPERSTRUCTURE - STEEL

ITEM	DESCRIPTION	UNIT COST (Per SF)	LIFE (YRS)	RATING BENEFIT
Replace (Supr - Stl)	Full SuperStr Replacement	$78.13	50	Rating = 8
Rehab (Supr - Stl)	Weld New Structural Components	$39.06	15	+ 2
Repair (Supr - Stl)	Weld Repair / Crack Relief	$5.00	See Deterioration Slope	+ 1

SUPERSTRUCTURE - CONCRETE

ITEM	DESCRIPTION	UNIT COST (Per SF)	LIFE (YRS)	RATING BENEFIT
Replace (Supr - Conc)	Full SuperStr Replacement	$78.13	50	Rating = 8
Rehab (Supr - Conc)	Replace Structural Component	$39.06	15	+ 2
Repair (Supr - Conc)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

SUBSTRUCTURE - STRUCTURAL

ITEM	DESCRIPTION	UNIT COST (Per SF)	LIFE (YRS)	RATING BENEFIT
Replace (Substr)	Full SubStr Replacement	$78.13	75	Rating = 8
Rehab (Substr)	Replace Structural Component	$39.06	50	+ 2
Repair (Substr)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1

SUBSTRUCTURE - SCOUR

ITEM	DESCRIPTION	UNIT COST (Per SF)	LIFE (YRS)	RATING BENEFIT
Rehab (Substr - Scour)	Add scour protection slabs	$39.06	50	+ 2
Repair (Substr - Scour)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

Notes:

1. Individual replacements assume 50% of total bridge replacement costs

2. Individual rehabs (in cells that are not highlighted) assume 25% of total bridge replacement costs

3. When superstructure replacement is selected, either deck replacement or deck rehab should be selected as well.

Queen Creek Bridge (#0406) / ROUTE US60 / MP 227.71

Bridge Information	
Bridge Deck Area (A225)	19618 SF
Year Built (N27)	1949
Exp Service Life	75 YR
Total Bridge Length (N49)	577 LF
Number of Spans (N45+N46)	5
Skew Angle (N34)	0 DEG
Average Elevation	3135 FT
Max Pier Height	89.0 FT
* Amount of Widening for Bridge	0 FT
Revised Deck Area (Bridge Replace)	19618 FT
**Scour Critical Rating (N113)	8

Deterioration Slope

Item	Deterioration Line Equation			Year Drop
	Slope =	Days	Years	
Substr	y =	-0.000405x	-0.148x	6.76
Superstr	y =	-0.000537x	-0.196x	5.10
Deck	y =	-0.000493x	-0.180x	5.56

*Input 0 if no widening. Input should include widening on both sides of bridge if applicable.

**If scour critical rating is 3 or lower, Option 2 should consider the implementation of scour countermeasures.

Notes:

1. Widening is intended only to correct lane and/or shoulder width deficiencies. It is not intended for adding traffic capacity (i.e. adding general purpose lanes).

Cost Multipliers		
Elevation > 4000ft	3135	1.00
Pier Height > 30ft	89	1.10
Length to # span ratio	115.40	1
Skew > 30degrees	0.00	1.00
Project Cost Multiplier	All Options	2.20

L to # Span Multiplier	
L/ # Span Ratio	Multiplier
=>100	1.00
=>60	1.10
<60	1.25

Skew Multiplier	
Skew	Multiplier
<30	1.00
=>30	1.10

Adjusted Bridge Replace Cost	
Base Bridge Replacement Cost (Per SF)	$180.00
Bridge Replacement Cost w/ Multipliers (Per SF)	$198.00

Elevation Multiplier	
Elev	Multiplier
<4000	1.00
=>4000	1.25

Pier H Multiplier	
Pier H	Multiplier
<30	1.00
=>30	1.10

User input cell

Only manipulate cell value after consulting with team

Bridge History (Inspections/As-builts)

Description	Category	Year
Original bridge was built in 1949 (F-16(10)). The bridge is considered of historical significance, so any necessary repairs will need to be coordinated with the respective Historic Preservation Office.		
The last bridge inspection reports stated that a scoping report for bridge replacement has started.		
The bridge inspection reports shows repairs recommended since 2004 have not been addressed. The latest In-Depth Inspection Report repeats the following repairs:		
1) Address the cracks in the connection angles at several columns.		
2) Replace broken hangers connecting the upper lateral bracing to the deck floorbeams.		
3) Replace missing rivets/bolts throughout the structure.		
4) Drill crack arrest holes to prevent further growth of th crack in the diaphragms.		
5) Repair and patch deack spall.		
Deck has underdeck efflorescence and several deck spalls.		
Cracks exist in the bottom girder diaphragms and in the welds between the diaphragms and girder flange.		
Cracks exist in the top connection angles between the spandrel columns and floor beams		
Concrete substructure has several spalls with rebar exposed.		

Replace / Rehab / Repair Information

BRIDGE DECK				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Deck)	Full Deck Replacement	$99.00	25	Rating = 8
Rehab (Deck Concrete Overlay)	Overlay (Concrete)	$10.00	15	+ 2
Rehab (Deck Epoxy Overlay)	Overlay (Epoxy)	$5.00	10	+ 1
Repair (Deck)	Patch Spalls / Seal Cracks	$3.00	See Deterioration Slope	+ 0
Replace (Bridge)	Full Bridge Replacement	$198.00	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 0
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 0

SUPERSTRUCTURE - STEEL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Stl)	Full SuperStr Replacement	$99.00	50	Rating = 8
Rehab (Supr - Stl)	Weld New Structural Components	$49.50	15	+ 2
Repair (Supr - Stl)	Weld Repair / Crack Relief	$5.00	See Deterioration Slope	+ 1

SUPERSTRUCTURE - CONCRETE				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Conc)	Full SuperStr Replacement	$99.00	50	Rating = 8
Rehab (Supr - Conc)	Replace Structural Component	$49.50	15	+ 2
Repair (Supr - Conc)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$198.00	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

SUBSTRUCTURE - STRUCTURAL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Substr)	Full SubStr Replacement	$99.00	75	Rating = 8
Rehab (Substr)	Replace Structural Component	$49.50	50	+ 2
Repair (Substr)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1

SUBSTRUCTURE - SCOUR				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Rehab (Substr - Scour)	Add scour protection slabs	$49.50	50	+ 2
Repair (Substr - Scour)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$198.00	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

Notes:

1. Individual replacements assume 50% of total bridge replacement costs

2. Individual rehabs (in cells that are not highlighted) assume 25% of total bridge replacement costs

3. When superstructure replacement is selected, either deck replacement or deck rehab should be selected as well.

Pavement Life-Cycle Cost Analysis Worksheet

Project Details	
Project title	US 70 San Carlos Pavement Improvement
Route	US 70
Milepost begin	283
Milepost end	284

Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Asphalt	<<Select from Pull-down List>>
# of directions of travel (1 = one-way; 2 = two-way)	=	2	
# of lanes (in one direction)	=	1	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	0	
Right shoulder width (ft)	=	8	
Total roadway analysis segment length (centerline miles)	=	1	
Current year	=	2016	
Elevation (> 4,000 ft or < 4,000 ft)?	=	> 4,000 ft	<<Select from Pull-down List>>
Roadway width (ft) [each direction lanes & shoulders]	=	20	
Total lane-miles [total traffic direction lanes & shoulders]	=	3.3	
Total square feet [total traffic direction lanes & shoulders]	=	211,200	
Total square yards [total traffic direction lanes & shoulders]	=	23,467	

LCCA Parameters		
Analysis period (years)	=	40
Year of net present value	=	2017
First year of improvements	=	2021
Discount rate (%) - low	=	3%
Discount rate (%) - high	=	7%

Design Alternatives (DA)

Characteristics			Pavement Material Cost ($)		
Treatment Type	*Pavement Thickness*	*Typical Service Life (years)*	*Lane-miles*	*Square Feet*	*Square Yards*
Concrete Reconstruction	8"-12"	26-30	$350,000	$5.5	$50
Asphalt Reconstruction	8"-12"	22-26	$280,000	$4.4	$40
Concrete Medium Rehab	1"-3"	20-24	$75,000	$1.2	$11
Concrete Light Rehab	<1"	14-18	$50,000	$0.8	$7
Asphalt Medium Rehab	3"-8"	16-20	$105,000	$1.7	$15
Asphalt Light Rehab	<3"	10-14	$70,000	$1.1	$10

Reconstruction: Other Materials Cost Factor
1.60

Rehab: Other Materials Cost Factor
1.20

Total Cost Factor (e.g., includes design, mobilization, traffic control, contingency, etc.)
2.44

			Total Unit Cost ($) [includes material costs and indirect costs]			Total Bi-Directi
Treatment Type	Pavement Thickness	Typical Service Life (years)	Lane-miles	Square Feet	Square Yards	
Concrete Reconstruction	8"-12"	26-30	$1,366,400	$21.6	$194	
Asphalt Reconstruction	8"-12"	22-26	$1,093,120	$17.3	$155	
Concrete Medium Rehab	1"-3"	20-24	$219,600	$3.5	$31	
Concrete Light Rehab	<1"	14-18	$146,400	$2.3	$21	
Asphalt Medium Rehab	3"-8"	16-20	$307,440	$4.9	$44	
Asphalt Light Rehab	<3"	10-14	$204,960	$3.2	$29	

Pavement Service Life, Intervals, and Sequence of Improvements

US 70 MP 283 - MP 284

Design Alternative	Typical Service Life Value	Typical Service Life Range	Average Historical Interval Value	Interval to Use in LCCA Before Reconstruction	Interval to Use in LCCA After Reconstruction
Concrete Reconstruction	28	26-30	0	-	14
Asphalt Reconstruction	24	22-26	0	-	12
Concrete Medium Rehab	22	20-24	0	11	11
Concrete Light Rehab	16	14-18	0	8	8
Asphalt Medium Rehab	18	16-20	12	9	9
Asphalt Light Rehab	12	10-14	5.5	5	6
None	0	0	-	-	-

Note: The typical service life values and ranges are determined based on the elevation of the roadway segment using the reference tables below. The typical service life values should be used as the intervals between improvements in the design alternatives except when historical frequency values are available based on the frequency and type of improvements in the past at this location. Historical frequency values should only be used if they are lower than the typical values and only up until reconstruction is implemented, after which typical service life values should be used.

Elevation Below 4000' (Desert Environment)		
Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	32	30-34
Asphalt Reconstruction	28	26-30
Concrete Medium Rehab	26	24-28
Concrete Light Rehab	20	18-22
Asphalt Medium Rehab	22	20-24
Asphalt Light Rehab	16	14-18
None	0	0

Elevation Above 4000' (Mountain Environment)		
Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	28	26-30
Asphalt Reconstruction	24	22-26
Concrete Medium Rehab	22	20-24
Concrete Light Rehab	16	14-18
Asphalt Medium Rehab	18	16-20
Asphalt Light Rehab	12	10-14
None	0	0

Assumed LCCA Sequence of Improvements Based on the Initial Design Alternative Improvement	
Concrete Reconstruction (CR):	CR, CLR, CMR, CLR, CR, CLR, CMR. . .
Asphalt Reconstruction (AR):	AR, ALR, AMR, ALR, AR, ALR, AMR. . .
Concrete Medium Rehab (CMR):	CMR, CLR, CR, CLR, CMR, CLR, CR. . .
Concrete Light Rehab (CLR):	CLR, CR, CLR, CMR, CLR, CR, CLR. . .
Asphalt Medium Rehab (AMR):	AMR, ALR, AR, ALR, AMR, ALR, AR. . .
Asphalt Light Rehab (ALR):	ALR, AR, ALR, AMR, ALR, AR, ALR. . .

Pavement Improvement Project History

US 70 MP 283 - MP 284

Year	Project Number	Tracs No.	Direction of Improvement	Treatment Type	Improvement Description	Thickness (inches)	Beg. MP	End MP	Length (miles)
1995	STP-022-4(31)P		EB/WB	Asphalt Medium Rehab	Asphaltic Concrete with Rubber (AR-AC)	1.5	280	287	7
2001	U-070-A-501		EB/WB	Asphalt Light Rehab	Seal Coat	0.6	280	287	7
2007	070-A-NFA		EB/WB	Asphalt Reconstruction	Remove existing material	31.5	282	284	2
				Asphalt Reconstruction	Aggregate Base	8	282	284	2
				Asphalt Reconstruction	Asphaltic Concrete	5	282	284	2
				Asphalt Reconstruction	ACFC	0.5	282	284	2
				Asphalt Medium Rehab	Mill existing material	2.5	282	284	2
				Asphalt Medium Rehab	Asphaltic Concrete	2.5	282	284	2
2009			EB/WB	Asphalt Light Rehab	Flush Coat	0	283	287	4
2012	STP -070-A(212)A		EB/WB	Asphalt Light Rehab	Seal Coat	0.3	280	283	3

Interval between Improvements in Years
After Asphalt Reconstruction:
After Asphalt Medium Rehab: 12
After Asphalt Light Rehab: 8
After Asphalt Light Rehab: 3

Treatment Type Options	Estimated Historical Interval Value between Improvements in Years
Concrete Reconstruction	
Asphalt Reconstruction	
Concrete Medium Rehab	
Concrete Light Rehab	
Asphalt Medium Rehab	12
Asphalt Light Rehab	5.5

Design Alternative # 1 - Concrete Reconstruction

US 70 MP 283 - MP 284

Concrete Reconstruction

Number of Years	Year	Concrete Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Concrete Reconstruction	$4,554,667	$4,046,762	$3,474,733
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	Concrete Light Rehab	$488,000	$286,649	$144,382
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Concrete Medium Rehab	$732,000	$339,425	$126,047
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Concrete Light Rehab	$488,000	$163,472	$39,923
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Concrete Light Rehab	$274,500	$74,766	$13,985
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$4,761,541	$3,771,100
AGENCY COST	$5,988,167	

Design Alternative # 2 - Asphalt Reconstruction

US 70 MP 283 - MP 284

Enter Name of Design Alternative

Number of Years	Year	Asphalt Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Reconstruction	$3,643,733	$3,237,410	$2,779,787
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	Asphalt Light Rehab	$683,200	$425,748	$231,423
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	Asphalt Medium Rehab	$1,024,800	$534,835	$231,311
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	Asphalt Light Rehab	$683,200	$273,271	$83,879
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Reconstruction	$3,643,733	$1,220,588	$298,090
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Reconstruction	$2,580,978	$702,986	$131,492
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$4,988,867	$3,492,998
AGENCY COST	$7,097,689	

Design Alternative # 3 - Asphalt Medium Rehab

US 70 MP 283 - MP 284

Enter Name of Design Alternative

Number of Years	Year	Asphalt Medium Rehab	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Medium Rehab	$1,024,800	$910,522	$781,815
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	Asphalt Light Rehab	$683,200	$465,226	$283,504
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	Asphalt Reconstruction	$3,643,733	$2,140,309	$1,078,049
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	Asphalt Light Rehab	$683,200	$281,469	$89,750
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	Asphalt Medium Rehab	$1,024,800	$353,589	$89,706
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Medium Rehab	$569,333	$155,070	$29,006
Enter Year of Last Used DA Improvement ››		2053	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$3,996,045	$2,293,819
AGENCY COST	$6,490,400	

Design Alternative # 4 - Asphalt Light Rehab

US 70 MP 283 - MP 284

Enter Name of Design Alternative

Number of Years	Year	Asphalt Light Rehab	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Light Rehab	$683,200	$607,014	$521,210
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	Asphalt Reconstruction	$3,643,733	$2,792,618	$1,981,950
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	Asphalt Light Rehab	$683,200	$367,254	$165,002
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	Asphalt Medium Rehab	$1,024,800	$461,354	$164,921
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	Asphalt Light Rehab	$683,200	$235,726	$59,804
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	Asphalt Reconstruction	$3,643,733	$1,052,890	$212,534
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Reconstruction	$3,340,089	$909,746	$170,166
Enter Year of Last Used DA Improvement ››		2059	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$4,607,111	$2,935,255
AGENCY COST	$7,021,778	

Summary of LCCA Results

US 70 MP 283 - MP 284

	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehab	Asphalt Light Rehab
Net Present Value - 3%	$4,761,541	$4,988,867	$3,996,045	$4,607,111
Net Present Value - 7%	$3,771,100	$3,492,998	$2,293,819	$2,935,255
Agency Cost	$5,988,167	$7,097,689	$6,490,400	$7,021,778

Cost Ratio at 3% Discount Rate

1.19 Ratio of Concrete Reconstruction to Lowest Cost Rehab

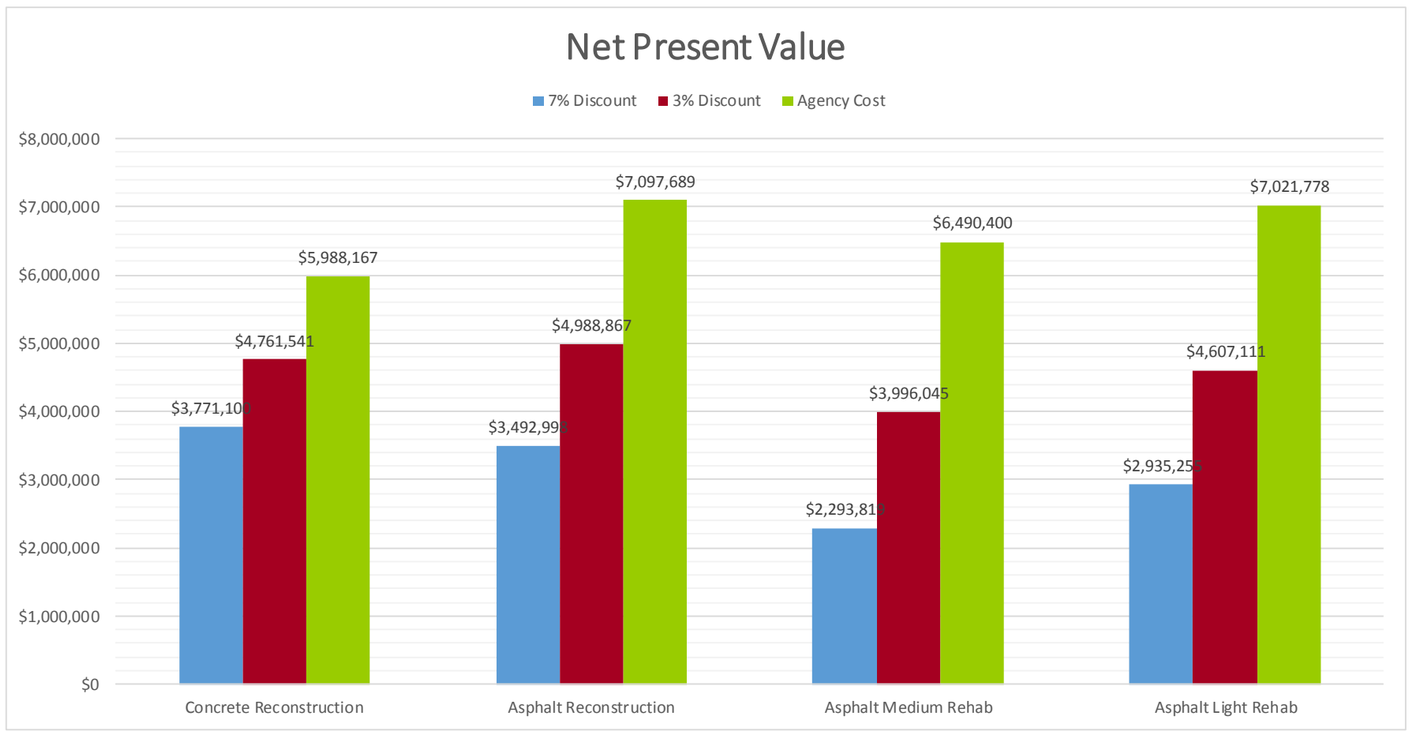
1.25 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Cost Ratio at 7% Discount Rate

1.64 Ratio of Concrete Reconstruction to Lowest Cost Rehab

1.52 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Note: A cost ratio < 1.15 means the Net Present Value (NPV) of reconstruction is within 15% of the NPV of the lowest cost rehab so reconstruction should likely be the initial improvement solution. A cost ratio > 1.15 means the NPV of reconstruction is more than 15% of the NPV of the lowest cost rehab so rehab should likely be the initial improvement solution.



Appendix F: Crash Modification Factors and Factored Unit Construction Costs

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
REHABILITATION							
Rehabilitate Pavement (AC)	$276,500	Mile	2.20	$610,000	Mill and replace 1"-3" AC pvmt; accounts for 38' width; for one direction of travel on two lane roadway; includes pavement, striping, delineators, RPMs, rumble strips	0.70	Combination of rehabilitate pavement (0.92), striping, delineators, RPMs (0.77 for combination), and rumble strips (0.89) = 0.70
Rehabilitate Bridge	$65	SF	2.20	$140	Based on deck area; bridge only - no other costs included	0.95	Assumed - should have a minor effect on crashes at the bridge
GEOMETRIC IMPROVEMENT							
Re-profile Roadway	$974,500	Mile	2.20	$2,140,000	Includes excavation of approximately 3", pavement replacement (AC), striping, delineators, RPMs, rumble strips, for one direction of travel of 2-lane roadway (38' width)	0.70	Assumed - this is similar to rehab pavement. This solution is intended to address vertical clearance at bridge, not profile issue; factor the cost as a ratio of needed depth to 3".
Realign Roadway	$2,960,000	Mile	2.20	$6,510,000	All costs per direction except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.50	Based on CalTrans and NC DOT
Improve Skid Resistance	$675,000	Mile	2.20	$1,490,000	Average cost of pvmt replacement and variable depth paving to increase super-elevation; for one direction of travel on two lane roadway; includes pavement, striping, delineators, RPMs, rumble strips	0.66	Combination of avg of 5 values from clearinghouse (0.77) and calculated value from HSM (0.87) for skid resistance; striping, delineators, RPMs (0.77 for combination), and rumble strips (0.89) = 0.66
INFRASTRUCTURE IMPROVEMENT							
Reconstruct to Urban Section	$1,000,000	Mile	2.20	$2,200,000	Includes widening by 16' total (AC = 12'+2'+2') to provide median, curb & gutter along both side of roadway, single curb for median, striping (doesn't include widening for additional travel lane).	0.88	From HSM
Construct Auxiliary Lanes (AC)	$914,000	Mile	2.20	$2,011,000	For addition of aux lane (AC) in one direction of travel; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.78	Average of 4 values from clearinghouse
Construct Climbing Lane (High)	$3,000,000	Mile	2.20	$6,600,000	In one direction; all costs except bridges; applicable to areas with large fills and cuts, retaining walls, rock blasting, steep slopes on both sides of road	0.75	From HSM
Construct Climbing Lane (Medium)	$2,250,000	Mile	2.20	$4,950,000	In one direction; all costs except bridges; applicable to areas with medium or large fills and cuts, retaining walls, rock blasting, steep slopes on one side of road	0.75	From HSM
Construct Climbing Lane (Low)	$1,500,000	Mile	2.20	$3,300,000	In one direction; all costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.75	From HSM
Construct Reversible Lane (Low)	$2,400,000	Lane-Mile	2.20	$5,280,000	All costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.73 for uphill and 0.88 for downhill	Based on proposed conditions on I-17 with 2 reversible lanes and a conc barrier

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Construct Reversible Lane (High)	$4,800,000	Lane-Mile	2.20	$10,560,000	All costs except bridges; applicable to areas with large fills and cuts, retaining walls, rock blasting, mountainous terrain	0.73 for uphill and 0.88 for downhill	Based on proposed conditions on I-17 with 2 reversible lanes and a conc barrier
Construct Passing Lane	$1,500,000	Mile	2.20	$3,300,000	In one direction; all costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.63	Average of 3 values from clearinghouse
Construct Entry/Exit Ramp	$730,000	Each	2.20	$1,610,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, typical earthwork & 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 miles upstream/downstream from the gore.
Relocate Entry/Exit Ramp	$765,000	Each	2.20	$1,680,000	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 miles upstream/downstream from the gore.
Construct Turn Lanes	$42,500	Each	2.20	$93,500	Includes 14' roadway widening (AC) for one additional turn lane (250' long) on one leg of an intersection; includes AC pavement, curb & gutter, sidewalk, ramps, striping, and minor signal modifications	0.81	Avg of 7 values from HSM; CMF applied to intersection related crashes; this solution also applies when installing a deceleration lane
Modify Entry/Exit Ramp	$445,000	Each	2.20	$979,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, minor earthwork, & 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.
Widen & Modify Entry/Exit Ramp	$619,000	Each	2.20	$1,361,800	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, minor earthwork, & drainage; For converting 1-lane ramp to 2-lane ramp and converting to parallel-type ramp	0.21	Will be same as "Modify Ramp"
Replace Pavement (AC) (with overexcavation)	$1,446,500	Mile	2.20	$3,180,000	Accounts for 38' width; for one direction of travel on two lane roadway; includes pavement, overexcavation, striping, delineators, RPMs, rumble strips	0.70	Same as rehab
Replace Pavement (PCCP) (with overexcavation)	$1,736,500	Mile	2.20	$3,820,000	Accounts for 38' width; for one direction of travel on two lane roadway; includes pavement, overexcavation, striping, delineators, RPMs, rumble strips	0.70	Same as rehab
Replace Bridge (Short)	$125	SF	2.20	$280	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing small washes	0.95	Assumed - should have a minor effect on crashes at the bridge
Replace Bridge (Medium)	$160	SF	2.20	$350	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing over the mainline freeway, crossroads, or large washes	0.95	Assumed - should have a minor effect on crashes at the bridge
Replace Bridge (Long)	$180	SF	2.20	$400	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing large rivers or canyons	0.95	Assumed - should have a minor effect on crashes at the bridge

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Widen Bridge	$175	SF	2.20	$390	Based on deck area; bridge only - no other costs included	0.90	Assumed - should have a minor effect on crashes at the bridge
Install Pedestrian Bridge	$135	SF	2.20	$300	Includes cost to construct bridge based on linear feet of the bridge. This costs includes and assumes ramps and sidewalks leading to the structure.	0.1 (ped only)	Assumed direct access on both sides of structure
Implement Automated Bridge De-icing	$115	SF	2.20	$250	Includes cost to replace bridge deck and install system	0.72 (snow/ice)	Average of 3 values on clearinghouse for snow/ice
Install Wildlife Crossing Under Roadway	$650,000	Each	2.20	$1,430,000	Includes cost of structure for wildlife crossing under roadway and 1 mile of fencing in each direction that is centered on the wildlife crossing	0.25 (wildlife)	Assumed; CMF applies to wildlife-related crashes within 0.5 miles both upstream and downstream of the wildlife crossing in both directions
Install Wildlife Crossing Over Roadway	$1,140,000	Each	2.20	$2,508,000	Includes cost of structure for wildlife crossing over roadway and 1 mile of fencing in each direction that is centered on the wildlife crossing	0.25 (wildlife)	Assumed; CMF applies to wildlife-related crashes within 0.5 miles both upstream and downstream of the wildlife crossing in both directions
Construct Drainage Structure - Minor	$280,000	Each	2.20	$616,000	Includes 3-36" pipes and roadway reconstruction (approx. 1,000 ft) to install pipes	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Construct Drainage Structure - Intermediate	$540,000	Each	2.20	$1,188,000	Includes 5 barrel 8'x6' RCBC and roadway reconstruction (approx. 1,000 ft) to install RCBC	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Construct Drainage Structure - Major	$8,000	LF	2.20	$17,600	Includes bridge that is 40' wide and reconstruction of approx. 500' on each approach	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Install Acceleration Lane	$127,500	Each	2.20	$280,500	For addition of an acceleration lane (AC) on one leg of an intersection that is 1,000' long plus a taper; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.85	Average of 6 values from the FHWA Desktop Reference for Crash Reduction Factors
OPERATIONAL IMPROVEMENT							
Implement Variable Speed Limits (Wireless, Overhead)	$718,900	Mile	2.20	$1,580,000	In one direction; includes 1 sign assembly per mile (foundation and structure), wireless communication, detectors	0.92	From 1 value from clearinghouse
Implement Variable Speed Limits (Wireless, Ground-mount)	$169,700	Mile	2.20	$373,300	In one direction; includes 2 signs per mile (foundations and posts), wireless communication, detectors	0.92	From 1 value from clearinghouse
Implement Variable Speed Limits (Wireless, Solar, Overhead)	$502,300	Mile	2.20	$1,110,000	In one direction; includes 1 sign assembly per mile (foundation and structure), wireless communication, detectors, solar power	0.92	From 1 value from clearinghouse
Implement Variable Speed Limits (Wireless, Solar, Ground-mount)	$88,400	Mile	2.20	$194,500	In one direction; includes 2 signs per mile (foundations and posts), wireless communication, detectors, solar power	0.92	From 1 value from clearinghouse
Implement Ramp Metering (Low)	$25,000	Each	2.20	$55,000	For each entry ramp location; urban area with existing ITS backbone infrastructure; includes signals, poles, timer, pull boxes, etc	0.64	From 1 value from clearinghouse; CMF applied to crashes 0.25 miles after gore
Implement Ramp Metering (High)	$150,000	Mile	2.20	$330,000	Area without existing ITS backbone infrastructure; in addition to ramp meters, also includes conduit, fiber optic lines, and power	0.64	From 1 value from clearinghouse
Implement Signal Coordination	$140,000	Mile	2.20	$308,000	Includes conduit, conductors, and controllers for 4 intersections that span a total of approximately 2 miles	0.90	Assumed

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Implement Left-Turn Phasing	$7,500	Each	2.20	$16,500	Includes four new signal heads (two in each direction) and associated conductors for one intersection	0.88 (protected) 0.98 (perm/prot or prot/perm)	From HSM; CMF = 0.94 for each protected approach and 0.99 for each perm/prot or prot/perm approach. CMFs of different approaches should be multiplied together. CMF applied to crashes within intersection
ROADSIDE DESIGN							
Install Guardrail	$130,000	Mile	2.20	$286,000	One side of road	0.62 (ROR)	0.62 is avg of 2 values from clearinghouse
Install Cable Barrier	$80,000	Mile	2.20	$176,000	In median	0.81	0.81 is average of 5 values from clearinghouse
Widen Shoulder (AC)	$256,000	Mile	2.20	$563,000	Assumes 10' of existing shoulder (combined left and right), includes widening shoulder by a total of 4'; new pavement for 4' width and mill and replace existing 10' width; includes pavement, minor earthwork, striping edge lines, RPMs, high-visibility delineators, safety edge, and rumble strips	0.68 (1-4') 0.64 (>= 4')	0.86 is avg of 5 values from clearing house for widening shoulder 1-4'. 0.76 is calculated from HSM for widening shoulder >= 4'. (Cost needs to be updated if dimension of existing and widened shoulder differ from Description.)
Rehabilitate Shoulder (AC)	$113,000	Mile	2.20	$249,000	One direction of travel (14' total shldr width-4' left and 10' right); includes paving (mill and replace), striping, high-visibility delineators, RPMs, safety edge, and rumble strips for both shoulders	0.72	0.98 is average of 34 values on clearinghouse for shldr rehab/replace; include striping, delineators, RPMs (0.77 combined CMF), and rumble strips (0.89). (Cost needs to be updated if dimension of existing shoulder differs from Description.)
Replace Shoulder (AC)	$364,000	Mile	2.20	$801,000	One direction of travel (14' total shldr width-4' left and 10' right); includes paving (full reconstruction), striping, high-visibility delineators, RPMs, safety edge, and rumble strips for both shoulders	0.72	0.98 is average of 34 values on clearinghouse for shldr rehab/replace; include striping, delineators, RPMs (0.77 combined CMF), and rumble strips (0.89). (Cost needs to be updated if dimension of existing shoulder differs from Description.)
Install Rumble Strip	$5,500	Mile	2.20	$12,000	Both edges - one direction of travel; includes only rumble strip; no shoulder rehab or paving or striping	0.89	Average of 75 values on clearinghouse and consistent with HSM
Install Centerline Rumble Strip	$2,800	Mile	2.20	$6,000	Includes rumble strip only; no pavement rehab or striping	0.85	From HSM
Install Wildlife Fencing	$340,000	Mile	2.20	$748,000	Fencing only plus jump outs for 1 mile (both directions)	0.50 (wildlife)	Assumed
Remove Tree/Vegetation	$200,000	Mile	2.20	$440,000	Intended for removing trees that shade the roadway to allow sunlight to help melt snow and ice (see Increase Clear Zone CMF for general tree/vegetation removal in clear zone)	0.72 (snow/ice)	Average of 3 values on clearinghouse for snow/ice
Increase Clear Zone	$59,000	Mile	2.20	$130,000	In one direction; includes widening the clear zone by 10' to a depth of 3'	0.71	Median of 14 values from FHWA Desktop Reference for Crash Reduction Values
Install Access Barrier Fence	$15	LF	2.20	$33	8' fencing along residential section of roadway	0.10 (ped only)	Equal to ped overpass
Install Rock-Fall Mitigation - Wire Mesh	$1,320,000	Mile	2.20	$2,904,000	Includes wire mesh and rock stabilization (one direction)	0.75 (debris)	Assumed

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install Rock-Fall Mitigation - Containment Fence & Barrier	$2,112,000	Mile	2.20	$4,646,000	Includes containment fencing, concrete barrier, and rock stabilization (one direction)	0.75 (debris)	Assumed
Install Raised Concrete Barrier in Median	$650,000	Mile	2.20	$1,430,000	Includes concrete barrier with associated striping and reflective markings; excludes lighting in barrier (one direction)	0.90 (Cross-median and head on crashes eliminated completely)	All cross median and head-on fatal or incapacitating injury crashes are eliminated completely; all remaining crashes have 0.90 applied
Formalize Pullout (Small)	$7,500	Each	2.20	$17,000	Includes paving and signage (signs, posts, and foundations) - approximately 4,200 sf	0.97	Assumed - similar to Install Other General Warning Signs; CMF applied to crashes within 0.25 miles after sign
Formalize Pullout (Medium)	$27,500	Each	2.20	$61,000	Includes paving and signage (signs, posts, and foundations) - approximately 22,500 sf	0.97	Assumed - similar to Install Other General Warning Signs; CMF applied to crashes within 0.25 miles after sign
Formalize Pullout (Large)	$80,500	Each	2.20	$177,100	Includes paving and signage (signs, posts, and foundations) - approximately 70,000 sf	0.97	Assumed - similar to Install Other General Warning Signs; CMF applied to crashes within 0.25 miles after sign
INTERSECTION IMPROVEMENTS							
Construct Traffic Signal	$150,000	Each	2.20	$330,000	4-legged intersection; includes poles, foundations, conduit, controller, heads, luminaires, mast arms, etc.	0.95	From HSM; CMF applied to crashes within intersection only
Improve Signal Visibility	$35,000	Each	2.20	$77,000	4-legged intersection; signal head size upgrade, installation of new back-plates, and installation of additional signal heads on new poles.	0.85	Avg of 7 values from clearinghouse; CMF applied to crashes within intersection only
Install Raised Median	$360,000	Mile	2.20	$792,000	Includes removal of 14' wide pavement and construction of curb & gutter; does not include cost to widen roadway to accommodate the median; if the roadway needs to be widened, include cost from New General Purpose Lane	0.83	Avg from HSM
Install Transverse Rumble Strip/Pavement Markings	$3,000	Each	2.20	$7,000	Includes ped markings and rumble strips only across a 30' wide travelway; no pavement rehab or other striping	0.95	Avg of 17 values from clearinghouse; CMF applied to crashes within 0.5 miles after the rumble strips and markings
Construct Single-Lane Roundabout	$1,500,000	Each	2.20	$3,300,000	Removal of signal at 4-legged intersection; realignment of each leg for approx. 800 feet including paving, curbs, sidewalk, striping, lighting, signing	0.22	From HSM; CMF applied to crashes within intersection only
Construct Double-Lane Roundabout	$1,800,000	Each	2.20	$3,960,000	Removal of signal at 4-legged intersection; realignment of each leg for approx. 800 feet including paving, curbs, sidewalk, striping, lighting, signing	0.40	From HSM; CMF applied to crashes within intersection only
ROADWAY DELINEATION							
Install High-Visibility Edge Line Striping	$10,800	Mile	2.20	$23,800	2 edge lines and lane line - one direction of travel	0.77	Avg of 3 values from clearinghouse. Assumes package of striping, delineators, and RPMs. (If implemented separately, CMF will be higher.)

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install High-Visibility Delineators	$6,500	Mile	2.20	$14,300	Both edges - one direction of travel		Avg of 3 values from clearinghouse. Assumes package of striping, delineators, and RPMs. (If implemented separately, CMF will be higher.)
Install Raised Pavement Markers	$2,000	Mile	2.20	$4,400	Both edges - one direction of travel		Avg of 3 values from clearinghouse. Assumes package of striping, delineators, and RPMs. (If implemented separately, CMF will be higher.)
Install In-Lane Route Markings	$6,000	Each	2.20	$13,200	Installation of a series of three in-lane route markings in one lane	0.95	Assumed; CMF applied to crashes within 1.0 mile before the gore
IMPROVED VISIBILITY							
Cut Side Slopes	$80	LF	2.20	$200	For small grading to correct sight distance issues; not major grading	0.85	Intent of this solution is to improve sight distance. Most CMF's are associated with vehicles traveling on slope. Recommended CMF is based on FDOT and NCDOT but is more conservative.
Install Lighting (connect to existing power)	$270,000	Mile	2.20	$594,000	One side of road only; offset lighting, not high-mast; does not include power supply; includes poles, luminaire, pull boxes, conduit, conductor	0.75 (night)	Average of 3 values on clearinghouse & consistent with HSM
Install Lighting (solar powered LED)	$10,000	Pole	2.20	$22,000	Offset lighting, not high-mast; solar power LED; includes poles, luminaire, solar panel	0.75 (night)	Average of 3 values on clearinghouse & consistent with HSM
DRIVER INFORMATION/WARNING							
Install Dynamic Message Sign (DMS)	$250,000	Each	2.20	$550,000	Includes sign, overhead structure, and foundations; wireless communication; does not include power supply	1.00	Not expected to reduce crashes
Install Dynamic Weather Warning Beacons	$40,000	Each	2.20	$88,000	Assumes solar operation and wireless communication or connection to existing power and communication; ground mounted; includes posts, foundations, solar panel, and dynamic sign	0.80 (weather related)	Avg of 3 values from FHWA Desktop Reference for Crash Reduction Factors; CMF applies to crashes within 0.25 miles after a sign
Install Dynamic Speed Feedback Signs	$25,000	Each	2.20	$55,000	Assumes solar operation and no communication; ground mounted; includes regulatory sign, posts, foundations, solar panel, and dynamic sign	0.94	Average of 2 clearinghouse values; CMF applies to crashes within 0.50 miles after a sign
Install Chevrons	$18,400	Mile	2.20	$40,500	On one side of road - includes signs, posts, and foundations	0.79	Average of 11 clearinghouse values
Install Curve Warning Signs	$2,500	Each	2.20	$5,500	Includes 2 signs, posts, and foundations	0.83	Average of 4 clearinghouse values; CMF applies to crashes within 0.25 miles after a sign
Install Traffic Control Device Warning Signs (e.g., stop sign ahead, signal ahead, etc.)	$2,500	Each	2.20	$5,500	Includes 2 signs, posts, and foundations	0.85	FHWA Desktop Reference for Crash Reduction Factors; CMF applies to crashes within 0.25 miles after a sign
Install Other General Warning Signs (e.g., intersection ahead, wildlife in area, slow vehicles, etc.)	$2,500	Each	2.20	$5,500	Includes 2 signs, posts, and foundations	0.97	Assumed; CMF applies to crashes within 0.25 miles after a sign

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install Wildlife Warning System	$162,000	Each	2.20	$356,400	Includes wildlife detection system at a designated wildlife crossing, flashing warning signs (assumes solar power), advance signing, CCTV (solar and wireless), game fencing for approximately 0.25 miles in each direction - centered on the wildlife crossing, and regular fencing for 1.0 mile in each direction - centered on the wildlife crossing.	0.50 (wildlife)	Assumed; CMF applies to wildlife-related crashes within 0.5 miles both upstream and downstream of the wildlife crossing in both directions
Install Warning Sign with Beacons	$15,000	Each	2.20	$33,000	In both directions; includes warning sign, post, and foundation, and flashing beacons (assumes solar power) at one location	0.75	FHWA Desktop Reference for Crash Reduction Factors for Installing Flashing Beacons as Advance Warning; CMF applies to crashes within 0.25 miles after a sign
Install Larger Stop Sign with Beacons	$10,000	Each	2.20	$22,000	In one direction; includes large stop sign, post, and foundation, and flashing beacons (assumes solar power) at one location	0.85/0.81	Use 0.85 for adding beacons to an existing sign; 0.81 for installing a larger sign with flashing beacons; CMF applies to intersection related crashes
DATA COLLECTION							
Install Roadside Weather Information System (RWIS)	$60,000	Each	2.20	$132,000	Assumes wireless communication and solar power, or connection to existing power and communications	1.00	Not expected to reduce crashes
Install Closed Circuit Television (CCTV) Camera	$25,000	Each	2.20	$55,000	Assumes connection to existing ITS backbone or wireless communication; does not include fiber-optic backbone infrastructure; includes pole, camera, etc	1.00	Not expected to reduce crashes
Install Vehicle Detection Stations	$15,000	Each	2.20	$33,000	Assumes wireless communication and solar power, or connection to existing power and communications	1.00	Not expected to reduce crashes
Install Flood Sensors (Activation)	$15,000	Each	2.20	$33,000	Sensors with activation cabinet to alert through texting (agency)	1.00	Not expected to reduce crashes
Install Flood Sensors (Gates)	$100,000	Each	2.20	$220,000	Sensors with activation cabinet to alert through texting (agency) and beacons (public) plus gates	1.00	Not expected to reduce crashes
WIDEN CORRIDOR							
Construct New General Purpose Lane (PCCP)	$1,740,000	Mile	2.20	$3,830,000	For addition of 1 GP lane (PCCP) 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 DOT uses 0.90 and Florida DOT uses 0.87
Construct New General Purpose Lane (AC)	$1,200,000	Mile	2.20	$2,640,000	For addition of 1 GP 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 DOT uses 0.90 and Florida DOT uses 0.88
Convert a 2-Lane undivided highway to a 5-Lane highway	$1,576,000	Mile	2.20	$3,467,200	For expanding a 2-lane undivided highway to a 5-lane highway (4 through lanes with TWLTL), includes standard shoulder widths but no curb, gutter, or sidewalks	0.60	Assumed to be slightly lower than converting from a 4-lane to a 5-lane highway
Install Center Turn Lane	$1,053,000	Mile	2.20	$2,316,600	For adding a center turn lane (i.e., TWLTL); assumes symmetrical widening on both sides of the road; includes standard shoulder widths but no curb, gutter, or sidewalk	0.75	From FHWA Desktop Reference for Crash Reduction Factors, CMF Clearinghouse, and SR 87 CPS comparison

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Construct 4-Lane Divided Highway (Using Existing 2-Lane Road for one direction)	$3,000,000	Mile	2.20	$6,600,000	In both directions; one direction uses existing 2-lane road; other direction assumes addition of 2 new lanes (AC) with standard shoulders; includes all costs except bridges	0.67	Assumed
Construct 4-Lane Divided Highway (No Use of Existing Roads)	$6,000,000	Mile	2.20	$13,200,000	In both directions; assumes addition of 2 new lanes (AC) with standard shoulders in each direction; includes all costs except bridges	0.67	Assumed
Construct Bridge over At-Grade Railroad Crossing	$10,000,000	Each	2.20	$22,000,000	Assumes bridge width of 4 lanes (AC) with standard shoulders; includes abutments and bridge approaches; assumes vertical clearance of 23'4" + 6'8" superstructure	0.72 (All train-related crashes eliminated)	Removes all train-related crashes at at-grade crossing; all other crashes CMF = 0.72
Construct Underpass at At-Grade Railroad Crossing	$15,000,000	Each	2.20	$33,000,000	Assumes underpass width of 4 lanes (AC) with standard shoulders; includes railroad bridge with abutments and underpass approaches; assumes vertical clearance of 16'6" + 6'6" superstructure	0.72 (All train-related crashes eliminated)	Removes all train-related crashes at at-grade crossing; all other crashes CMF = 0.72
Construct High-Occupancy Vehicle (HOV) Lane	$900,000	Mile	2.20	$1,980,000	For addition of 1 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
ALTERNATE ROUTE							
Construct Frontage Roads	$2,400,000	Mile	2.20	$5,280,000	For 2-lane AC frontage road; includes all costs except bridges; for generally at-grade facility with minimal walls	0.90	Assumed - similar to new general purpose lane
Construct 2-Lane Undivided Highway	$3,000,000	Mile	2.20	$6,600,000	In both directions; assumes addition of 2 new lanes (AC) with standard shoulders in each direction; includes all costs except bridges	0.90	Assuming new alignment for a bypass

^ Factor accounts for traffic control, erosion control, construction surveying and quality control, mobilization, construction engineering, contingencies, indirect cost allocation, and miscellaneous work

Appendix G: Performance Area Risk Factors

Pavement Performance Area

- Elevation
- Mainline Daily Traffic Volume
- Mainline Daily Truck Volume

Elevation

Variance above 4000' divided by 1000; (Elev-4000)/1000

Score	Condition
0	< 4000’
0-5	4000’- 9000’
5	> 9000’

Mainline Daily Traffic Volume

Exponential equation; score = $5-(5*e^{(ADT*-0.000039)})$

Score	Condition
0	< 6,000
0-5	6,000 – 160,000
5	>160,000

Mainline Daily Truck Volume

Exponential equation; score = $5-(5*e^{(ADT*-0.00025)})$

Score	Condition
0	<900
0-5	900-25,000
5	>25,000

Bridge Performance Area

- Mainline Daily Traffic Volume
- Elevation
- Carries Mainline Traffic
- Detour Length
- Scour Critical Rating
- Vertical Clearance

Mainline Daily Traffic Volume

Exponential equation; score = $5-(5*e^{(ADT*-0.000039)})$

Score	Condition
0	<6,000
0-5	6,000-160,000
5	>160,000

Elevation

Variance above 4000' divided by 1000; (Elev-4000)/1000

Score	Condition
0	< 4000’
0-5	4000’- 9000’
5	> 9000’

Carries Mainline Traffic

Score	Condition
0	Does not carry mainline traffic
5	Carries mainline traffic

Detour Length

Divides detour length by 10 and multiplies by 2.5

Score	Condition
0	0 miles
0-5	0-20 miles
5	> 20 miles

Scour Critical Rating

Variance below 8

Score	Condition
0	Rating > 8
0-5	Rating 8 - 3
5	Rating < 3

Vertical Clearance

Variance below 16’ x 2.5; (16 –Clearance) x 2.5

Score	Condition
0	>16’
0-5	16’-14’
5	<14’

Mobility Performance Area

- Mainline VMT
- Buffer Index (PTI-TTI)
- Detour Length
- Outside Shoulder Width

Mainline VMT

Exponential equation; score = 5-(5*e(ADT*-0.0000139))

Score	Condition
0	<16,000
0-5	16,000-400,000
5	>400,000

Buffer Index

Buffer Index x 10

Score	Condition
0	Buffer Index = 0.00
0-5	Buffer Index 0.00-0.50
5	Buffer Index > 0.50

Detour Length

Score	Condition
0	Detour < 10 miles
5	Detour > 10 miles

Outside Shoulder Width

Variance below 10', if only 1 lane in each direction

Score	Condition
0	10' or above or >1 lane in each direction
0-5	10'-5' and 1 lane in each direction
5	5' or less and 1 lane in each direction

Safety Performance Area

- Mainline Daily Traffic Volume
- Interrupted Flow
- Elevation
- Outside Shoulder Width
- Vertical Grade

Mainline Daily Traffic Volume

Exponential equation; score = 5-(5*$e^{(ADT*-0.000039)}$)

Score	Condition
0	<6,000
0-5	6,000-160,000
5	>160,000

Interrupted Flow

Score	Condition
0	Not interrupted flow
5	Interrupted Flow

Elevation

Variance above 4000' divided by 1000; (Elev-4000)/1000

Score	Condition
0	< 4000'
0-5	4000'- 9000'
5	> 9000'

Outside Shoulder Width

Variance below 10'

Score	Condition
0	10' or above
0-5	10' - 5'
5	5' or less

Grade

Variance above 3% x 1.5

Score	Condition
0	< 3%
0-5	3% - 6.33%
5	>6.33%

Freight Performance Area

- Mainline Daily Truck Volume
- Detour Length
- Truck Buffer Index (TPTI-TTTI)
- Outside Shoulder Width

Mainline Daily Truck Volume

Exponential equation; score = 5-(5*$e^{(ADT*-0.00025)}$)

Score	Condition
0	<900
0-5	900-25,000
5	>25,000

Detour Length

Score	Condition
0	Detour < 10 miles
5	Detour > 10 miles

Truck Buffer Index

Truck Buffer Index x 10

Score	Condition
0	Buffer Index = 0.00
0-5	Buffer Index 0.00-0.50
5	Buffer Index > 0.50

Outside Shoulder Width

Variance below 10', if only 1 lane in each direction

Score	Condition
0	10' or above or >1 lane in each direction
0-5	10'-5' and 1 lane in each direction
5	5' or less and 1 lane in each direction

Performance Area Risk Factors

Solution Number	Mainline Traffic Vol (vpd) (2-way)	Solution Length (miles)	Bridge Detour Length (miles) (N19)	Elevation (ft)	Scour Critical Rating (0-9)	Carries Mainline Traffic (Y/N)	Bridge Vert. Clear (ft)	Mainline Truck Vol (vpd) (2-way)	Detour Length > 10 miles (Y/N)	Truck Buffer Index	Non-Truck Buffer Index	Grade (%)	Interrupted Flow (Y/N)	Outside/ Right Shoulder Width (ft)	1-lane each direction
191.1A	1,384	4.3	25	1,000	8	y	16.00	235	y	18.13	8.67	1	y	2.35	y
191.1B	1,384	4.3	25	1,000	8	y	16.00	235	y	18.13	8.67	1	y	2.35	y
191.2	8,312	2		3,000				1,413	n	18.13	8.67	1	y	2.63	y
70.4-1	3,295	18		2,000				165	y	0.20	0.2	3	n	5.07	y
70.4-3	4,230	2		2,000				465	y	0.20	0.2	3	n	5.38	y
70.4-4	4,230	2		2,000				465	y	0.20	0.2	3	n	5.38	y
70.4-7	3,295	7		2,000				165	y	0.20	0.2	3	n	5.07	y
70.5	4,230	2		2,000				465	y	0.20	0.2	3	n	5.38	y
60.6	11,008	1	65	3,500	7	y	16.00	1,321	y	4.70	2	3	y	2.35	n
60.7	11,008	1	65	3,500	7	y	16.00	1,321	y	4.70	2	3	y	2.35	n
60.8	11,008	5.5		3,500				1,321	y	4.70	2	3	y	4.59	n
60.9	11,008			3,500				1,321	y	4.70			y	4.59	n
60.10	9,069	1.25	65	3,000	8	y	16.00	1,270	y	1.16	0.87	3	n	2.35	y
60.11	9,069	1	65	3,700	8	y	16.00	1,270	y	1.16	0.87	3	n	2.35	n
60.12A	9,069	3		3,500				1,270	y	1.16	0.87	5	n	4.82	y
60.12B	9,069	16	65	3,500	8	y	16.00	907	y	1.16	0.87	5	n	4.82	y
60.12C	9,069	16	65	3,500	8	y	16.00	907	y	1.16	0.87	5	n	4.82	y
60.13	9,069	2		4,200				907	y	1.16	0.87	5	n	4.82	y
60.14	9,069	2		3,500				907	y	1.16	0.87	5	n	4.82	y

Solution Number	Bridge	Pavement	Mobility	Safety	Freight	Risk Score (0 to 10)				
						Bridge	Pavement	Mobility	Safety	Freight
191.1A	y	y	y	y	y	3.42	0.37	7.70	4.10	7.64
191.1B	y	y	y	y	y	3.42	0.37	7.70	4.10	7.64
191.2	n	n	y	y	y	0.00	0.00	5.52	4.55	5.75
70.4-1	n	n	y	y	y	0.00	0.00	7.37	2.21	6.07
70.4-3	n	n	y	y	y	0.00	0.00	6.09	2.15	6.09
70.4-4	n	n	y	y	y	0.00	0.00	6.09	2.15	6.09
70.4-7	n	n	y	y	y	0.00	0.00	6.65	2.21	6.07
70.5	n	y	y	y	y	0.00	0.87	6.09	2.15	6.09
60.6	y	n	y	y	y	4.24	0.00	3.62	4.69	5.02
60.7	y	n	y	y	y	4.24	0.00	3.62	4.69	5.02
60.8	n	y	y	y	y	0.00	2.10	4.69	4.69	5.02
60.9	n	y	n	n	y	0.00	2.10	0.00	0.00	5.02
60.10	y	n	y	y	y	3.83	0.00	7.86	2.59	8.18
60.11	y	n	y	y	y	3.83	0.00	5.30	2.59	5.68
60.12A	n	n	y	y	y	0.00	0.00	8.29	3.79	8.18
60.12B	y	y	y	y	y	3.83	1.66	9.67	3.79	8.01
60.12C	y	y	y	y	y	3.83	1.66	9.67	3.79	8.01
60.13	n	n	y	y	y	0.00	0.00	8.06	3.87	8.01
60.14	n	n	y	y	y	0.00	0.00	8.06	3.79	8.01

Appendix H: Candidate Solution Cost Estimates

Solution	Candidate #	Location #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Unit Cost	Construction Cost	Factored Construction Cost	Preliminary Engineering Cost (3%)	Design Cost (10%)	Right-of-Way Cost ($6/sf or $12/sf)	Total Cost
CS191.1	CS191.1A	L4	US 191 Elfrida to I-10 Freight Mitigation: Realign Roadway	A	Realign Roadway (MP 59.9 - 64.2)	59.9	64.2	mi	4.3	$ 2,960,000.00	$12,728,000	$28,001,600	$840,000	$2,800,000	$13,622,400	$45,264,000
					Replace Cochise RR Bridge	59.9	64.2	SF	3250	$ 180.00	$585,000	$1,287,000	$40,000	$130,000	$0	$1,457,000
					Solution Total						**$13,313,000**	**$29,288,600**	**$880,000**	**$2,930,000**	**$13,622,400**	**$46,721,000**
	CS191.1B	L4	US 191 Elfrida to I-10 Freight Mitigation: Realign Roadway and Construct Passing Lanes	B	Construct Passing Lanes (NB and SB)	59.9	64.2	mi	4.3	$ 1,500,000.00	$6,450,000	$14,190,000	$400,000	$1,400,000	$0	$15,990,000
					Realign Roadway (MP 59.9 - 64.2)	59.9	64.2	mi	4.3	$ 2,960,000.00	$12,728,000	$28,001,600	$840,048	$2,800,000	$13,622,400	$45,264,048
					Replace Cochise RR Bridge	59.9	64.2	SF	3250	$ 180.00	$585,000	$1,287,000	$38,610	$100,000	$0	$1,425,610
					Solution Total						**$19,763,000**	**$43,478,600**	**$1,278,658**	**$4,300,000**	**$13,622,400**	**$62,679,658**
CS191.2	CS191.2A	L10	US191/Armory Road Intersection Safety Improvements	-	Install Warning Signs with Beacons	118	118	each	1	$ 15,000.00	$15,000	$33,000	$990	$3,300	$0	$37,290
					Improve Signal Visibility	118	118	each	1	$ 35,000.00	$35,000	$77,000	$2,310	$7,700	$0	$87,010
					Subtotal						**$50,000**	**$110,000**	**$3,300**	**$11,000**	**$0**	**$124,300**
	CS191.2B	L10	US191/Discovery Park Intersection Safety Improvements	-	Improve Signal Visibility	119	119	each	1	$ 35,000.00	$35,000	$77,000	$2,310	$7,700	$0	$87,010
					Install Dynamic Speed Feedback Signs	119	119	each	1	$ 25,000.00	$25,000	$55,000	$1,650	$5,500	$0	$62,150
					Subtotal						**$60,000**	**$132,000**	**$3,960**	**$13,200**	**$0**	**$149,160**
	CS191.2C	L10	US191/Lone Star Intersection Safety Improvements	-	Install Traffic Signal	119.5	119.5	each	1	$ 150,000.00	$150,000	$330,000	$9,900	$33,000	$0	$372,900
					Install Warning Signs with Beacons	119.5	119.5	each	1	$ 15,000.00	$15,000	$33,000	$990	$3,300	$0	$37,290
					Subtotal						**$165,000**	**$363,000**	**$10,890**	**$36,300**	**$0**	**$410,190**
	CS191.2D	L10	US191/16th Street Intersection Safety Improvements	-	Install Warning Signs with Beacons	120.5	120.5	each	1	$ 15,000.00	$15,000	$33,000	$990	$3,300	$0	$37,290
					Subtotal						**$15,000**	**$33,000**	**$990**	**$3,300**	**$0**	**$37,290**
					Solution Total						**$290,000**	**$638,000**	**$19,140**	**$63,800**	**$0**	**$720,940**
CS70.4	CS70.4-10	L15	US 70 San Carlos Safety Improvements	-	Install High-Visibility Signage	274	292	each	1	$ 2,500.00	$2,500	$5,500	$165	$550	$0	$6,215
					Install Centerline Rumble Strip	274	292	mile	18	$ 2,800.00	$50,400	$110,880	$3,326	$11,090	$0	$125,296
					Widen Shoulders (San Carlos Area)	274	292	mi	30	$ 256,000.00	$7,680,000	$16,896,000	$506,880	$1,689,600	$0	$19,092,480
					Install Warning Signs with Beacons (MP 292)	291	293	each	1	$ 15,000.00	$15,000	$33,000	$990	$3,300	$0	$37,290
					Install Dynamic Speed Feedback Signs (MP 292)	291	293	each	1	$ 25,000.00	$25,000	$55,000	$1,650	$5,500		$62,150
					Install Warning Signs with Beacon (MP 280)	279	281	each	1	$ 15,000.00	$15,000	$33,000	$990	$3,300	$0	$37,290
					Install Dynamic Speed Feedback Signs (MP 280)	279	281	each	1	$ 25,000.00	$25,000	$55,000	$1,650	$5,500		$62,150
					Install Warning Signs with Beacon (MP 278.5)	277.5	279.5	each	1	$ 15,000.00	$15,000	$33,000	$990	$3,300	$0	$37,290
					Install Dynamic Speed Feedback Signs (MP 278.5)	277.5	279.5	each	1	$ 25,000.00	$25,000	$55,000	$1,650	$5,500		$62,150
					Formalize Pullouts (signage, ROW for pullouts) (WB MP 274.5)	274.5	274.5	each	1	$ 7,400.00	$7,400	$16,280	$488	$1,630	$0	$18,398
					Formalize Pullouts (signage, ROW for pullouts) (EB MP 279)	279	279	each	1	$ 27,400.00	$27,400	$60,280	$1,808	$6,030	$0	$68,118
					Formalize Pullouts (signage, ROW for pullouts) (EB MP 289)	289	289	each	1	$ 80,500.00	$80,500	$177,100	$5,313	$17,710	$0	$200,123
					Formalize Pullouts (signage, ROW for pullouts) (WB 292)	292	292	each	1	$ 80,500.00	$80,500	$177,100	$5,313	$17,710	$0	$200,123
					Construct Passing Lane (WB)	282	288	mi	6	$ 1,500,000.00	$9,000,000	$19,800,000	$594,000	$1,980,000	$0	$22,374,000
	CS70.4-11				Install High-Visibility Signage	270	274	each	1	$ 2,500.00	$2,500	$5,500	$165	$550	$0	$6,215
					Install Centerline Rumble Strip	270	274	mi	4	$ 2,800.00	$11,200	$24,640	$739	$2,460	$0	$27,839
					Widen Shoulders	270	274	mi	8	$ 256,000.00	$2,048,000	$4,505,600	$135,168	$450,560	$0	$5,091,328
					Install Warning Signs (MP 273)	273	272	each	1	$ 2,500.00	$2,500	$5,500	$165	$550	$0	$6,215
					Install Speed Feedback Signs	273	272	each	1	$ 25,000.00	$25,000	$55,000	$1,650	$5,500	$0	$62,150
	CS70.4-12				Install High-Visibility Signage	268	270	each	1	$ 2,500.00	$2,500	$5,500	$165	$550	$0	$6,215
					Install Centerline Rumble Strip	268	270	mi	2	$ 2,800.00	$5,600	$12,320	$370	$1,230	$0	$13,920
					Widen Shoulders	268	270	mi	4	$ 256,000.00	$1,024,000	$2,252,800	$67,584	$225,280	$0	$2,545,664
					Install Warning Signs (EB 269)	268	269	each	1	$ 2,500.00	$2,500	$5,500	$165	$550	$0	$6,215
					Install Speed Feedback Signs	268	269	each	1	$ 25,000.00	$25,000	$55,000	$1,650	$5,500	$0	$62,150
					Construct Passing Lane (EB)	262	264	mi	2	$ 1,500,000.00	$3,000,000	$6,600,000	$198,000	$660,000	$0	$7,458,000
					Solution Total						**$23,197,500**	**$51,034,500**	**$1,531,035**	**$5,103,450**	**$0**	**$57,668,985**

Solution	Candidate #	Location #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Unit Cost	Construction Cost	Factored Construction Cost	Preliminary Engineering Cost (3%)	Design Cost (10%)	Right-of-Way Cost ($6/sf or $12/sf)	Total Cost
CS70.5	CS70.5	L16	US 70 Cutter Safety Improvements	-	Install Lighting	258.2	259.5	mi	2.6	$ 270,000.00	$702,000	$1,544,400	$46,332	$154,440	$0	$1,745,172
					Install Center Turn Lane	258.4	259.5	mi	1.1	$ 450,000.00	$495,000	$1,089,000	$32,670	$108,900	$0	$1,230,570
					Install Warning Signs (EB 259 and WB MP 260)	259	260	each	2	$ 2,500.00	$5,000	$11,000	$330	$1,100	$0	$12,430
					Solution Total						**$1,202,000**	**$2,644,400**	**$79,332**	**$264,440**	**$0**	**$2,988,172**
CS60.6	CS60.15	L19	US 60 Pinal Creek Bridge (No. 36)	-	Replace Bridge	249.8	249.8	SF	7558	$ 125.00	$944,750	$2,078,450	$62,354	$207,850	$0	$2,348,654
					Solution Total						**$944,750**	**$2,078,450**	**$62,354**	**$207,850**	**$0**	**$2,348,654**
CS60.7	CS60.16	L20	US 60 Pinal Creek Bridge (No. 266)	-	Replace Bridge	249.6	249.6	SF	9963	$ 125.00	$1,245,375	$2,739,825	$82,195	$273,980	$0	$3,096,000
					Solution Total						**$1,245,375**	**$2,739,825**	**$82,195**	**$273,980**	**$0**	**$3,096,000**
CS60.8	CS60.8	L22	US 60 Globe-Miami Safety Improvements	-	Install Lighting	244.5	250.0	mi	11	$ 270,000.00	$2,970,000	$6,534,000	$196,020	$653,400	$0	$7,383,420
					Install Dynamic Speed Feedback Signs	246	250	each	4	$ 25,000.00	$100,000	$220,000	$6,600	$22,000	$0	$248,600
					Install Warning Signs with Beacons	246.5	247.5	each	2	$ 15,000.00	$30,000	$66,000	$1,980	$6,600	$0	$74,580
					Solution Total						**$3,100,000**	**$6,820,000**	**$204,600**	**$682,000**	**$0**	**$7,706,600**
CS60.9	CS60.9	L24	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	-	Re-profile Roadway	253.51	253.76	mi	0.25	$ 974,500.00	$243,625	$535,975	$16,079	$53,600	$0	$605,654
					Solution Total						**$243,625**	**$535,975**	**$16,079**	**$53,600**	**$0**	**$605,654**
CS60.10	CS60.17	L27	US 60 Queen Creek Bridge (No. 406)	-	Replace Bridge	227.7	227.7	SF	19618	$ 180.00	$3,531,240	$7,768,728	$233,062	$776,870	$0	$8,778,660
					Solution Total						**$3,531,240**	**$7,768,728**	**$233,062**	**$776,870**	**$0**	**$8,778,660**
CS60.11	CS60.18	L28	US 60 Waterfall Canyon Bridge (No. 328)		Replace Bridge	229.5	229.5	SF	4176	$ 160.00	$668,160	$1,469,952	$44,099	$147,000	$0	$1,661,051
					Solution Total						**$668,160**	**$1,469,952**	**$44,099**	**$147,000**	**$0**	**$1,661,051**
CS60.12	CS60.12A	L30/L32	US 60 Superior to Miami Shoulder Widening	A	Widen Shoulders (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5)	227	243	mi	6	$ 256,000.00	$1,587,200	$3,491,840	$104,755	$349,180	$0	$3,945,775
					Install Rock-Fall Mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75)	227	243	mi	1.2	$ 1,320,000.00	$1,584,000	$3,484,800	$104,544	$348,480	$0	$3,937,824
					Install Dynamic Weather Warning Beacons	227	243	each	2	$ 40,000.00	$80,000	$176,000	$5,280	$17,600	$0	$198,880
					Install RWIS	227	243	each	2	$ 60,000.00	$120,000	$264,000	$7,920	$26,400	$0	$298,320
					Solution Total						**$3,371,200**	**$7,416,640**	**$222,499**	**$741,660**	**$0**	**$8,380,799**
	CS60.12C	L30/L32	US 60 Superior to Miami Climbing Lanes	B	Construct Climbing Lanes (EB 227-227.9, 230.4–232.6) and (WB 236.4–236.6, 238.1–239.5)	227	243	mi	4.7	$ 3,000,000.00	$14,100,000	$31,020,000	$930,600	$3,102,000	$0	$35,052,600
					Convert 2-lane to 5-Lane Section	234.20	236.40	mi	2.20	$ 1,576,000.00	$3,467,200	$7,627,840	$228,835	$762,780	$6,969,600	$15,589,055
					Bridges (2 - Replace)	227	243	SF	23794	$ 180.00	$4,282,920	$9,422,424	$282,673	$942,240	$0	$10,647,337
					Bridges (2 - Widen)	227	243	SF	2421	$ 175.00	$423,675	$932,085	$27,963	$93,210	$0	$1,053,258
					Install Rock-Fall Mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75)	227	243	mi	1.2	$ 1,320,000.00	$1,584,000	$3,484,800	$104,544	$348,480	$0	$3,937,824
					Install Dynamic Weather Warning Beacons	227	243	each	2	$ 40,000.00	$80,000	$176,000	$5,280	$17,600	$0	$198,880
					Install RWIS	227	243	each	2	$ 60,000.00	$120,000	$264,000	$7,920	$26,400	$0	$298,320
					Solution Total						**$24,057,795**	**$52,927,149**	**$1,587,814**	**$5,292,710**	**$6,969,600**	**$66,478,953**
	CS60.12D	L30/L32	US 60 Superior to Miami Construct New Four-Lane Divided (Use Exst for One Direction)	C	Construct New 4-Lane divided	227	243	mi	16	$ 10,000,000.00	$160,000,000	$352,000,000	$10,560,000	$35,200,000	$100,000,000	$497,760,000
					Solution Total						**$160,000,000**	**$352,000,000**	**$10,560,000**	**$35,200,000**	**$100,000,000**	**$497,760,000**

Solution	Candidate #	Location #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Unit Cost	Construction Cost	Factored Construction Cost	Preliminary Engineering Cost (3%)	Design Cost (10%)	Right-of-Way Cost ($6/sf or $12/sf)	Total Cost
CS60.13	CS60.13	L31	US 60 Top-of-the-World Safety Improvements	-	Install Warning Signs (WB MP 234.25, EB MP 232)	232	234	each	2	$ 2,500.00	$5,000	$11,000	$330	$1,100	$0	$12,430
					Install Dynamic Speed Feedback Signs (WB MP 234, EB MP 232.5)	232	234	each	2	$ 25,000.00	$50,000	$110,000	$3,300	$11,000	$0	$124,300
					Install High Visibility Edge Line Striping	232	234	mi	2	$ 10,800.00	$21,600	$47,520	$1,426	$4,750	$0	$53,696
					Install Centerline Rumble Strip	232	234	mi	2	$ 2,800.00	$5,600	$12,320	$370	$1,230	$0	$13,920
					Solution Total						**$82,200**	**$180,840**	**$5,425**	**$18,080**	**$0**	**$204,345**
CS60.14	CS60.14	L31	US 60 Queen Creek Safety Improvements	-	Widen Shoulders	227	229	mi	3.2	$ 256,000.00	$819,200	$1,802,240	$54,067	$180,220	$0	$2,036,527
					Install Warning Signs	227	229	each	1	$ 2,500.00	$2,500	$5,500	$165	$550	$0	$6,215
					Install Dynamci Speed Feedback Signs	227	229	each	2	$ 25,000.00	$50,000	$110,000	$3,300	$11,000	$0	$124,300
					Install Centerline Rumble Strip	227	229	mi	2	$ 2,800.00	$5,600	$12,320	$370	$1,230	$0	$13,920
					Install Guardrail EB	227	229	mi	1.6	$ 130,000.00	$208,000	$457,600	$13,728	$45,760	$0	$517,088
					Install Guardrail WB	227	229	mi	1.6	$ 130,000.00	$208,000	$457,600	$13,728	$45,760	$0	$517,088
					Solution Total						**$1,293,300**	**$2,845,260**	**$85,358**	**$284,520**	**$0**	**$3,215,138**

Appendix I: Performance Effectiveness Scores

Candidate Solution Need Benefit Scoring

				Solution #	191.1A	191.1B	191.2	70.4-1	70.4-3	70.4-4	70.4-7	70.5	60.6	60.7	60.8	60.9	60.10	60.11	60.12A	60.12B	60.12C	60.13	60.14
				Description	US 191 Elfrida to I-10 Freight Mitigation: Realign roadway, replace Cochise RR bridge	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	US191 Safford Safety Improvements	US 70 San Carlos Safety Improvements	US 70 San Carlos Safety Improvements	US 70: EB climbing lane	US 70: WB passing lane	US 70 Cutter Safety Improvements	Pinal Creek Bridge (#36)	Pinal Creek Bridge (#226)	US 60 Globe-Miami Safety Improvements	US 60 Pinal SPRR UP Freight Mitigation	Queen Creek Bridge (#406)	Waterfall Canyon Bridge (#328)	US 60 Superior to Miami Widen shoulder	US 60 Superior to Miami Climbing/ Passing Lanes	US 60 Superior to Miami Construct New 4-lane divided	US 60 Top-of-the-World Safety Improvements	US 60 Queen Creek Safety Improvements
	LEGEND:			Project Beg MP	59.9	59.9	117.5	274	268	262	282	258	249.78	249.61	244.5	253.4	227.6	229.47	227	227	227	232	227
		- user entered value		Project End MP	64.2	64.2	121	292	270	264	288	260	249.8	249.64	250	253.8	227.71	229.5	243	243	243	234	229
		- calculated value for reference only		Project Length (miles)	4.3	4.3	2	18	2	2	6	2	1	1	5.5	0.25	1.25	1	6.1	16	16	2	1.6
		- calculated value for entry/use in other spreadsheet		Segment Beg MP	24	24	116	274	255	255	274	255	243	243	243	243	227	227	227	227	227	227	227
		- for input into Performance Effectiveness Score spreadsheet		Segment End MP	67	67	121	293	270	270	293	270	255	255	255	255	243	243	243	243	243	243	243
		- assumed values (do not modify)		Segment Length (miles)	43	43	5	19	15	15	19	15	12	12	12	12	16	16	16	16	16	16	16
				Segment #	191-2	191-2	191-5	70-10	70-12	70-12	70-10	70-12	70/60-13	70/60-13	70/60-13	70/60-13	60-14	60-14	60-14	60-14	60-14	60-14	60-14
				Current # of Lanes (both directions)	2	2	4	2	2	2	2	2	4	4	4	4	2	2	2	2	2	2	2
				Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way
				Additional Lanes (one-way)		1				1	1									0.07	1		
				Pro-Rated # of Lanes	2.00	2.20	4.00	2.00	2.00	2.13	2.32	2.00	4.00	4.00	4.00	4.00	2.00	2.00	2.00	2.14	4.00	2.00	2.00
		Notes and Directions		**Description**																			
SAFETY	DIRECTIONAL SAFETY	Input current value from performance system (direction 1)		Orig Segment Directional Safety Index (NB/WB)	0.530	0.530	1.340	1.500	1.670	1.670	1.500	1.670	1.640	1.640	1.640	1.640	2.230	2.230	2.230	2.230	2.230	2.230	2.230
		Input current value from performance system (direction 1)		Orig Segment Directional Fatal Crashes (NB/WB)	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3
		Input current value from performance system (direction 1)		Orig Segment Directional Incap Crashes (NB/WB)	1	1	2	0	0	0	0	0	13	13	13	13	8	8	8	8	8	8	8
		Input current value from performance system (direction 1)		Original Fatal Crashes in project limits (NB/WB)	0	0				0	1		0	0		0	0	0			3		1
		Input current value from performance system (direction 1)		Original Incap Crashes in project limits (NB/WB)	0	0				0	0		0	0		0	0	0			8		4
		Input CMF value (direction 1) - If no CMF enter 1.0		CMF 1 (direction 1)(lowest CMF)	0.5	0.5				1	0.63		0.95	0.95		1	0.95	0.95			0.67		0.62
		Input CMF value (direction 1) - If no CMF enter 1.0		CMF 2 (direction 1)	0.68	0.63	Calculated in separate worksheet	Calculated in separate worksheet	Calculated in separate worksheet	1	1	Calculated in separate worksheet	1	1	Calculated in separate worksheet	1	1	1	Calculated in separate worksheet	Calculated in separate worksheet	1	Calculated in separate worksheet	0.97
		Input CMF value (direction 1) - If no CMF enter 1.1		CMF 3 (direction 1)	0.93	0.93				1	1		1	1		1	1	1			1		0.94
		Input CMF value (direction 1) - If no CMF enter 1.2		CMF 4 (direction 1)	1	1				1	1		1	1		1	1	1			1		0.85
		Input CMF value (direction 1) - If no CMF enter 1.0		CMF 5 (direction 1)	1	1				1	1		1	1		1	1	1			1		0.64
		Calculated Value (direction 1)		Total CMF (NB/WB)	0.500	0.500	See Worksheet	See Worksheet	See Worksheet	1.000	0.630	See Worksheet	0.950	0.950	See Worksheet	1.000	0.950	0.950	See Worksheet	See Worksheet	0.670	See Worksheet	0.500
		Calculated Value (direction 1)		Fatal Crash reduction (direction 1)	0.000	0.000	0.306	1.000	0.500	0.000	0.370	0.660	0.000	0.000	0.791	0.000	0.000	0.000	0.320	0.670	0.990	0.000	0.500
		Calculated Value (direction 1)		Incap Crash reduction (direction 1)	0.000	0.000	0.343	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.920	0.000	0.000	0.000	1.600	1.325	2.640	0.517	2.000
		Enter in Safety Index spreadsheet to calculate new Safety Index (direction 1)		Post-Project Segment Directional Fatal Crashes (direction 1)	1.000	1.000	0.694	1.000	1.500	2.000	1.630	1.340	3.000	3.000	2.209	3.000	3.000	3.000	2.680	2.330	2.010	3.000	2.500
		Enter in Safety Index spreadsheet to calculate new Safety Index (direction 1)		Post-Project Segment Directional Incap Crashes (direction 1)	1.000	1.000	1.658	0.000	0.000	0.000	0.000	0.000	13.000	13.000	9.080	13.000	8.000	8.000	6.400	6.675	5.360	7.483	6.000
		Input value from updated Safety Index spreadsheet (direction 1)		Post-Project Segment Directional Safety Index (direction 1)	0.530	0.530	0.980	0.750	1.250	1.670	1.220	1.120	1.640	1.640	1.190	1.640	2.230	2.230	1.960	1.750	2.120	2.210	1.830
		Enter in Safety Needs spreadsheet to calculate new segment level Safety Need (direction 1)		Post-Project Segment Directional Safety Index (direction 1)	0.530	0.530	0.980	0.750	1.250	1.670	1.220	1.120	1.640	1.640	1.190	1.640	2.230	2.230	1.960	1.750	2.120	2.210	1.830
		Input current value from performance system (direction 2)		Orig Segment Directional Safety Index (SB/EB)	0.030	0.030	1.250	2.250	1.670	1.670	2.250	1.670	2.550	2.550	2.550	2.550	4.230	4.230	4.230	4.230	4.230	4.230	4.230
		Input current value from performance system (direction 2)		Orig Segment Directional Fatal Crashes (direction 2)	0	0	1	3	2	2	3	2	5	5	5	5	6	6	6	6	6	6	6
		Input current value from performance system (direction 2)		Orig Segment Directional Incap Crashes (direction 2)	1	1	1	0	0	0	0	0	15	15	15	15	12	12	12	12	12	12	12
		Input current value from performance system (direction 2)		Original Fatal Crashes in project limits (direction 2)	0	0				0	3	ted in separate wor	0	0		0	0	0			6	2	1
		Input current value from performance system (direction 2)		Original Incap Crashes in project limits (direction 2)	0	0				0	0		0	0		0	1	0			12	2	2
		Input CMF value (direction 2) - If no CMF enter 1.0		CMF 1 (direction 2)(lowest CMF)	0.5	0.5				0.63	0.63		0.95	0.95		1	0.95	0.95			0.67		0.64
		Input CMF value (direction 2) - If no CMF enter 1.0		CMF 2 (direction 2)	0.68	0.63	Calculated in separate worksheet	Calculated in separate worksheet	Calculated in separate worksheet	1	1		1	1	Calculated in separate worksheet	1	1	1	Calculated in separate worksheet	Calculated in separate worksheet	1	Calculated in separate worksheet	0.97
		Input CMF value (direction 2) - If no CMF enter 1.1		CMF 3 (direction 2)	0.93	0.93				1	1		1	1		1	1	1			1		0.94
		Input CMF value (direction 2) - If no CMF enter 1.2		CMF 4 (direction 2)	1	1				1	1		1	1		1	1	1			1		0.85
		Input CMF value (direction 2) - If no CMF enter 1.0		CMF 5 (direction 2)	1	1				1	1		1	1		1	1	1			1		0.62
		Calculated Value (direction 2)		Total CMF (direction 2)	0.500	0.500	See Worksheet	See Worksheet	See Worksheet	0.630	0.630	See Worksheet	0.950	0.950	See Worksheet	1.000	0.950	0.950	See Worksheet	See Worksheet	0.670	See Worksheet	0.500
		Calculated Value (direction 2)		Fatal Crash reduction (direction 2)	0.000	0.000	0.269	1.500	0.500	0.000	1.110	0.500	0.000	0.000	1.960	0.000	0.000	0.000	0.640	0.670	1.980	0.374	0.500
		Calculated Value (direction 2)		Incap Crash reduction (direction 2)	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.340	0.000	0.050	0.000	2.740	2.929	3.960	0.374	1.000
		Enter in Safety Index spreadsheet to calculate new Safety Index (direction 2)		Post-Project Segment Directional Fatal Crashes (direction 2)	0.000	0.000	0.731	1.500	1.500	2.000	1.890	1.500	5.000	5.000	3.040	5.000	6.000	6.000	5.360	5.330	4.020	5.626	5.500
		Enter in Safety Index spreadsheet to calculate new Safety Index (direction 2)		Post-Project Segment Directional Incap Crashes (direction 2)	1.000	1.000	0.750	0.000	0.000	0.000	0.000	0.000	15.000	15.000	9.660	15.000	11.950	12.000	9.260	9.071	8.040	11.626	11.000
		Input value from updated Safety Index spreadsheet (direction 2)		Post-Project Segment Directional Safety Index (direction 2)	0.030	0.030	1.320	1.130	1.250	1.670	1.420	1.250	2.550	2.550	1.560	2.550	4.230	4.230	3.720	3.690	2.840	3.990	3.880
		Enter in Safety Needs spreadsheet to calculate new segment level Safety Need (direction 2)		Post-Project Segment Directional Safety Index (direction 2)	0.030	0.030	1.320	1.130	1.250	1.670	1.420	1.250	2.550	2.550	1.560	2.550	4.230	4.230	3.720	3.690	2.840	3.990	3.880
	SAFETY INDEX	Calculated Value - verify that it matches current performance system		Current Safety Index	0.280	0.280	1.295	1.875	1.670	1.670	1.875	1.670	2.095	2.095	2.095	2.095	3.230	3.230	3.230	3.230	3.230	3.230	3.230
		Enter in Safety Needs spreadsheet to calculate new segment level Safety Need		Post-Project Safety Index	0.280	0.280	1.160	0.940	1.250	1.670	1.320	1.180	2.095	2.095	1.380	2.095	3.230	3.230	2.840	2.720	2.480	3.100	2.860
	Needs	User entered value from Safety Needs spreadsheet and for use in Performance Effectiveness spreadsheet		Original Segment Safety Need	0.174	0.174	2.857	5.959	5.160	5.160	5.959	5.160	6.418	6.418	6.409	6.418	11.646	11.646	11.646	11.646	11.646	11.646	11.646
		User entered value from Safety Needs spreadsheet and for use in Performance Effectiveness spreadsheet		Post-Project Segment Safety Need	0.174	0.174	2.205	0.777	4.347	5.160	3.84	3.286	6.418	6.418	3.680	6.418	11.63	11.646	10.14	9.682	8.766	11.133	10.213

				Solution #	191.1A	191.1B	191.2	70.4-1	70.4-3	70.4-4	70.4-7	70.5	60.6	60.7	60.8	60.9	60.10	60.11	60.12A	60.12B	60.12C	60.13	60.14
				Description	US 191 Elfrida to I-10 Freight Mitigation: Realign roadway, replace Cochise RR bridge	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	US191 Safford Safety Improvements	US 70 San Carlos Safety Improvements	US 70 San Carlos Safety Improvements	US 70: EB climbing lane	US 70: WB passing lane	US 70 Cutter Safety Improvements	Pinal Creek Bridge (#36)	Pinal Creek Bridge (#226)	US 60 Globe-Miami Safety Improvements	US 60 Pinal SPRR UP Freight Mitigation	Queen Creek Bridge (#406)	Waterfall Canyon Bridge (#328)	US 60 Superior to Miami Widen shoulder	US 60 Superior to Miami Climbing/ Passing Lanes	US 60 Superior to Miami Construct New 4-lane divided	US 60 Top-of-the-World Safety Improvements	US 60 Queen Creek Safety Improvements
	LEGEND:			Project Beg MP	59.9	59.9	117.5	274	268	262	282	258	249.78	249.61	244.5	253.4	227.6	229.47	227	227	227	232	227
		- user entered value		Project End MP	64.2	64.2	121	292	270	264	288	260	249.8	249.64	250	253.8	227.71	229.5	243	243	243	234	229
		- calculated value for reference only		Project Length (miles)	4.3	4.3	2	18	2	2	6	2	1	1	5.5	0.25	1.25	1	6.1	16	16	2	1.6
		- calculated value for entry/use in other spreadsheet		Segment Beg MP	24	24	116	274	255	255	274	255	243	243	243	243	227	227	227	227	227	227	227
		- for input into Performance Effectiveness Score spreadsheet		Segment End MP	67	67	121	293	270	270	293	270	255	255	255	255	243	243	243	243	243	243	243
		- assumed values (do not modify)		Segment Length (miles)	43	43	5	19	15	15	19	15	12	12	12	12	16	16	16	16	16	16	16
				Segment #	191-2	191-2	191-5	70-10	70-12	70-12	70-10	70-12	70/60-13	70/60-13	70/60-13	70/60-13	60-14	60-14	60-14	60-14	60-14	60-14	60-14
				Current # of Lanes (both directions)	2	2	4	2	2	2	2	2	4	4	4	4	2	2	2	2	2	2	2
				Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way
				Additional Lanes (one-way)		1				1	1									0.07	1		
				Pro-Rated # of Lanes	2.00	2.20	4.00	2.00	2.00	2.13	2.32	2.00	4.00	4.00	4.00	4.00	2.00	2.00	2.00	2.14	4.00	2.00	2.00
		Notes and Directions		**Description**																			
MOBILITY	**MOBILITY INDEX**	Input current value from performance system		Original Segment Mobility Index	0.090	0.090	0.330	0.170	0.190	0.190	0.170	0.190	0.400	0.400	0.400	0.400	1.730	1.730	1.730	1.730	1.730	1.730	1.730
		Enter in Mobility Index Spreadsheet to determine new segment level Mobility Index		Post-Project # of Lanes (both directions)	2.00	2.20	4.00	2.00	2.00	2.13	2.32	2.00	4.00	4.00	4.00	4.00	2.00	2.00	2.00	2.14	4.00	2.00	2.00
		Input value from updated Mobility Index spreadsheet		Post-Project Segment Mobility Index	0.09	0.05	0.33	0.17	0.19	0.14	0.10	0.19	0.40	0.40	0.40	0.40	1.73	1.73	1.73	1.73	0.27	1.73	1.73
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need		Post-Project Segment Mobility Index	0.090	0.050	0.330	0.170	0.190	0.140	0.100	0.190	0.400	0.400	0.400	0.400	1.730	1.730	1.730	1.730	0.270	1.730	1.730
	FUT V/C	Input current value from performance system		Original Segment Future V/C	0.100	0.100	0.390	0.190	0.230	0.230	0.190	0.230	0.460	0.460	0.460	0.460	2.110	2.110	2.110	2.110	2.110	2.110	2.110
		Input value from updated Mobility Index spreadsheet		Post-Project Segment Future V/C	0.100	0.050	0.390	0.190	0.230	0.170	0.110	0.230	0.460	0.460	0.460	0.460	2.110	2.110	2.110	2.110	0.330	2.110	2.110
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need		Post-Project Segment Future V/C	0.100	0.050	0.390	0.190	0.230	0.170	0.110	0.230	0.460	0.460	0.460	0.460	2.110	2.110	2.110	2.110	0.330	2.110	2.110
	PEAK HOUR V/C	Input current value from performance system (direction 1)		Original Segment Peak Hour V/C (NB/WB)	0.070	0.070	0.270	0.110	0.130	0.130	0.110	0.130	0.290	0.290	0.290	0.290	1.220	1.220	1.220	1.220	1.220	1.220	1.220
		Input current value from performance system (direction 2)		Original Segment Peak Hour V/C (SB/EB)	0.070	0.070	0.280	0.110	0.130	0.130	0.110	0.130	0.300	0.300	0.300	0.300	1.090	1.090	1.090	1.090	1.090	1.090	1.090
		***If One-Way project**, enter in Mobility Index Spreadsheet to determine new segment level Peak Hour V/C. **If Two-Way project,** disregard		Adjusted total # of Lanes for use in directional peak hr	N/A	N/A	N/A	N/A	N/A	2.27	2.63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Input value from updated Mobility Index spreadsheet (direction 1)		Post-Project Segement Peak Hr V/C (NB/WB)	0.070	0.040	0.27	0.11	0.13	0.10	0.06	0.13	0.29	0.29	0.29	0.29	1.220	1.220	1.220	1.220	0.19	1.220	1.220
		Input value from updated Mobility Index spreadsheet (direction 2)		Post-Project Segement Peak Hr V/C (SB/EB)	0.070	0.040	0.28	0.11	0.13	0.10	0.06	0.13	0.30	0.30	0.30	0.30	1.090	1.090	1.090	1.090	0.17	1.090	1.090
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need		Post-Project Segment Peak Hr V/C (direction 1)	0.070	0.040	0.270	0.110	0.130	0.100	0.060	0.130	0.290	0.290	0.290	0.290	1.220	1.220	1.220	1.220	0.190	1.220	1.220
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need		Post-Project Segment Peak Hr V/C (direction 2)	0.070	0.040	0.280	0.110	0.130	0.100	0.060	0.130	0.300	0.300	0.300	0.300	1.090	1.090	1.090	1.090	0.170	1.090	1.090
	TTI AND PTI	Calculated Value (both directions)		Safety Reduction Factor	0.750	0.750	0.896	0.501	0.749	1.000	0.704	0.707	1.000	1.000	0.659	1.000	1.000	1.000	0.879	0.842	0.768	0.960	0.885
		Calculated Value (both directions)		Safety Reduction	0.250	0.250	0.104	0.499	0.251	0.000	0.296	0.293	0.000	0.000	0.341	0.000	0.000	0.000	0.121	0.158	0.232	0.040	0.115
		Calculated Value (both directions)		Mobility Reduction Factor	0.750	0.750	1.000	1.000	1.000	0.737	0.588	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.156	1.000	1.000
		Calculated Value (both directions)		Mobility Reduction	0.250	0.250	0.000	0.000	0.000	0.263	0.412	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.844	0.000	0.000
		Input current value from performance system (direction 1)		Original Directional Segment TTI (NB/WB)	1.160	1.160	N/A	N/A	N/A	N/A	N/A	N/A	1.150	1.150	1.150	1.150	1.070	1.070	1.070	1.070	1.070	1.070	1.070
		Input current value from performance system (direction 1)		Original Directional Segment PTI (NB/WB)	9.830	9.830	N/A	N/A	N/A	N/A	N/A	N/A	2.720	2.720	2.720	2.720	1.470	1.470	1.470	1.470	1.470	1.470	1.470
		Input current value from performance system (direction 2)		Original Directional Segment TTI (SB/EB)	1.160	1.160	N/A	N/A	1.100	1.100	N/A	1.100	1.310	1.310	1.310	1.310	1.190	1.190	1.190	1.190	1.190	1.190	1.190
		Input current value from performance system (direction 2)		Original Directional Segment PTI (SB/EB)	6.090	6.090	N/A	N/A	1.400	1.400	N/A	1.400	3.360	3.360	3.360	3.360	2.060	2.060	2.060	2.060	2.060	2.060	2.060
		Calculated Value (both directions)		Reduction Factor for Segment TTI	0.075	0.075	0.000	0.000	0.000	0.000	0.124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.253	0.000	0.000
		Calculated Value (both directions)		Reduction Factor for Segment PTI	0.125	0.125	0.031	0.150	0.000	0.000	0.171	0.088	0.000	0.000	0.102	0.000	0.000	0.000	0.036	0.047	0.238	0.012	0.034
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need (direction 1)		Post-Project Directional Segment TTI (direction 1)	1.073	1.073	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	1.150	1.150	1.150	1.150	1.070	1.070	1.070	1.070	1.035	1.070	1.070
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need (direction 1)		Post-Project Directional Segment PTI (direction 1)	8.601	8.601	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	2.720	2.720	2.442	2.720	1.470	1.470	1.417	1.400	1.119	1.452	1.419
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need (direction 2)		Post-Project Directional Segment TTTI (direction 2)	1.073	1.073	#VALUE!	#VALUE!	1.100	1.100	N/A	1.100	1.310	1.310	1.310	1.310	1.190	1.190	1.190	1.190	1.095	1.190	1.190
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need (direction 2)		Post-Project Directional Segment TPTI (direction 2)	5.329	5.329	#VALUE!	#VALUE!	1.400	1.400	N/A	1.28	3.360	3.360	3.016	3.360	2.060	2.060	1.985	1.962	1.569	2.035	1.989
	CLOSURE EXTENT	Input current value from performance system (direction 1)		Orig Segment Directional Closure Extent (NB/WB)	0.020	0.020	0.120	0.090	0.040	0.040	0.090	0.040	0.000	0.000	0.000	0.000	0.330	0.330	0.330	0.330	0.330	0.330	0.330
		Input current value from performance system (direction 2)		Orig Segment Directional Closure Extent (SB/EB)	0.000	0.000	0.080	0.040	0.310	0.310	0.040	0.310	0.120	0.120	0.120	0.120	1.570	1.570	1.570	1.570	1.570	1.570	1.570
		Input value from HCRS		Segment Closures with fatalities/injuries	1	1	3	5	4	4	4	4	1	1	1	1	15	15	15	15	15	15	15
		Input value from HCRS		Total Segment Closures	5	5	5	6	7	7	7	7	3	3	3	3	47	47	47	47	47	47	47
		Calculated Value (both directions)		% Closures with Fatality/Injury	0.20	0.20	0.60	0.83	0.57	0.57	0.57	0.57	0.33	0.33	0.33	0.33	0.32	0.32	0.32	0.32	0.32	0.32	0.32
		Calculated Value (both directions)		Closure Reduction	0.050	0.050	0.063	0.416	0.144	0.000	0.169	0.168	0.000	0.000	0.114	0.000	0.000	0.000	0.039	0.050	0.074	0.013	0.037
		Calculated Value (both directions)		Closure Reduction Factor	0.950	0.950	0.937	0.584	0.856	1.000	0.831	0.832	1.000	1.000	0.886	1.000	1.000	1.000	0.961	0.950	0.926	0.987	0.963
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need (direction 1)		Post-Project Segment Directional Closure Extent (direction 1)	0.019	0.019	0.112	0.053	0.034	0.040	0.075	0.033	0.000	0.000	0.000	0.000	0.330	0.330	0.317	0.313	0.306	0.326	0.318
		Enter in Mobility Needs spreadsheet to update segment level Mobility Need (direction 2)		Post-Project Segment Directional Closure Extent (direction 2)	0.000	0.000	0.075	0.023	0.265	0.310	0.040	0.258	0.120	0.120	0.106	0.120	1.570	1.570	1.510	1.491	1.454	1.550	1.513
	BICYCLE ACCOM	Input current value from performance system		Orig Segment Bicycle Accomodation %	100.0%	100.0%	27.0%	4.0%	23.0%	23.0%	4.0%	23.0%	54.0%	54.0%	54.0%	54.0%	49.0%	49.0%	49.0%	49.0%	49.0%	49.0%	49.0%
		Input current value from performance system		Orig Segment Outside Shoulder width	14	14	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		Input value from updated Mobility Index spreadsheet		Post-Project Segment Outside Shoulder width	14	14	3	14	14	5	5	5	14	14	5	14	14	14	14	5	5	5	5
		Input value from updated Mobility Index spreadsheet		Post-Project Segment Bicycle Accomodation (%)	100.0%	100.0%	27.0%	100.0%	100.0%	23.0%	4.0%	23.0%	65.0%	65.0%	54.0%	54.0%	100.0%	100.0%	87.8%	49.0%	100.0%	49.0%	100.0%
		Enter in Mobility Needs spreadsheet to calculate new segment level Mobility Need		Post-Project Segment Bicycle Accomodation (%)	100.0%	100.0%	27.0%	100.0%	100.0%	23.0%	4.0%	23.0%	65.0%	65.0%	54.0%	54.0%	100.0%	100.0%	87.8%	49.0%	100.0%	49.0%	100.0%
	Needs	User entered value from Mobility Needs spreadsheet and for use in Performance Effectiveness spreadsheet		Original Segment Mobility Need	0.774	0.774	0.921	0.886	0.964	0.964	0.886	0.964	0.991	0.991	0.991	0.991	14.691	14.691	14.691	14.691	14.691	14.691	14.691
		User entered value from Mobility Needs spreadsheet and for use in Performance Effectiveness spreadsheet		Post-Project Segment Mobility Need	0.669	0.638	0.921	0.194	0.351	0.949	0.813	0.917	0.881	0.881	0.986	0.991	14.537	14.537	14.115	14.502	1.168	14.691	13.795

				Solution #	191.1A	191.1B	191.2	70.4-1	70.4-3	70.4-4	70.4-7	70.5	60.6	60.7	60.8	60.9	60.10	60.11	60.12A	60.12B	60.12C	60.13	60.14
				Description	US 191 Elfrida to I-10 Freight Mitigation: Realign roadway, replace Cochise RR bridge	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	US191 Safford Safety Improvements	US 70 San Carlos Safety Improvements	US 70 San Carlos Safety Improvements	US 70: EB climbing lane	US 70: WB passing lane	US 70 Cutter Safety Improvements	Pinal Creek Bridge (#36)	Pinal Creek Bridge (#226)	US 60 Globe-Miami Safety Improvements	US 60 Pinal SPRR UP Freight Mitigation	Queen Creek Bridge (#406)	Waterfall Canyon Bridge (#328)	US 60 Superior to Miami Widen shoulder	US 60 Superior to Miami Climbing/ Passing Lanes	US 60 Superior to Miami Construct New 4-lane divided	US 60 Top-of-the-World Safety Improvements	US 60 Queen Creek Safety Improvements
	LEGEND:			Project Beg MP	59.9	59.9	117.5	274	268	262	282	258	249.78	249.61	244.5	253.4	227.6	229.47	227	227	227	232	227
		- user entered value		Project End MP	64.2	64.2	121	292	270	264	288	260	249.8	249.64	250	253.8	227.71	229.5	243	243	243	234	229
		- calculated value for reference only		Project Length (miles)	4.3	4.3	2	18	2	2	6	2	1	1	5.5	0.25	1.25	1	6.1	16	16	2	1.6
		- calculated value for entry/use in other spreadsheet		Segment Beg MP	24	24	116	274	255	255	274	255	243	243	243	243	227	227	227	227	227	227	227
		- for input into Performance Effectiveness Score spreadsheet		Segment End MP	67	67	121	293	270	270	293	270	255	255	255	255	243	243	243	243	243	243	243
		- assumed values (do not modify)		Segment Length (miles)	43	43	5	19	15	15	19	15	12	12	12	12	16	16	16	16	16	16	16
				Segment #	191-2	191-2	191-5	70-10	70-12	70-12	70-10	70-12	70/60-13	70/60-13	70/60-13	70/60-13	60-14	60-14	60-14	60-14	60-14	60-14	60-14
				Current # of Lanes (both directions)	2	2	4	2	2	2	2	2	4	4	4	4	2	2	2	2	2	2	2
				Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way
				Additional Lanes (one-way)		1				1	1									0.07	1		
				Pro-Rated # of Lanes	2.00	2.20	4.00	2.00	2.00	2.13	2.32	2.00	4.00	4.00	4.00	4.00	2.00	2.00	2.00	2.14	4.00	2.00	2.00
		Notes and Directions	**Description**																				
FREIGHT	TTTI AND TPTI	Input current value from performance system (direction 1)	Original Directional Segment TTTI (NB/WB)		1.000	1.000	N/A	N/A	N/A	N/A	N/A	N/A	1.240	1.240	1.240	1.240	1.180	1.180	1.180	1.180	1.180	1.180	1.180
		Input current value from performance system (direction 1)	Original Directional Segment TPTI (NB/WB)		2.680	2.680	N/A	N/A	N/A	N/A	N/A	N/A	4.290	4.290	4.290	4.290	2.340	2.340	2.340	2.340	2.340	2.340	2.340
		Input current value from performance system (direction 2)	Original Directional Segment TTTI (SB/EB)		1.540	1.540	N/A	N/A	1.140	1.140	N/A	1.140	1.480	1.480	1.480	1.480	1.600	1.600	1.600	1.600	1.600	1.600	1.600
		Input current value from performance system (direction 2)	Original Directional Segment TPTI (SB/EB)		19.670	19.670	N/A	N/A	2.010	2.010	N/A	2.010	6.190	6.190	6.190	6.190	2.360	2.360	2.360	2.360	2.360	2.360	2.360
		Calculated Value (both directions)	Reduction Factor for Segment TTTI (both directions)		0.038	0.038	0.000	0.000	0.000	0.000	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.127	0.000	0.000
		Calculated Value (both directions)	Reduction Factor for Segment TPTI (both directions)		0.063	0.063	0.016	0.075	0.000	0.000	0.086	0.044	0.000	0.000	0.051	0.000	0.000	0.000	0.018	0.024	0.119	0.006	0.017
		Enter in Freight Needs spreadsheet to update segment level Freight Need (direction 1)	Post-Project Directional Segment TTTI (direction 1)		0.981	0.981	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	1.240	1.240	1.240	1.240	1.180	1.180	1.180	1.180	1.031	1.180	1.180
		Enter in Freight Needs spreadsheet to update segment level Freight Need (direction 1)	Post-Project Directional Segment TPTI (direction 1)		2.513	2.513	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	4.290	4.290	4.070	4.290	2.340	2.340	2.298	2.285	2.061	2.326	2.300
		Enter in Freight Needs spreadsheet to update segment level Freight Need (direction 2)	Post-Project Directional Segment TTTI (direction 2)		1.482	1.482	#VALUE!	#VALUE!	1.140	1.140	N/A	1.140	1.480	1.480	1.480	1.480	1.600	1.600	1.600	1.600	1.397	1.600	1.600
		Enter in Freight Needs spreadsheet to update segment level Freight Need (direction 2)	Post-Project Directional Segment TPTI (direction 2)		18.441	18.441	#VALUE!	#VALUE!	2.010	2.010	N/A	1.922	6.190	6.190	5.873	6.190	2.360	2.360	2.317	2.304	2.079	2.346	2.319
	FREIGHT INDEX	Value from above	Original Segment TPTI (direction 1)		2.680	2.680	N/A	N/A	N/A	N/A	N/A	N/A	4.290	4.290	4.290	4.290	2.340	2.340	2.340	2.340	2.340	2.340	2.340
		Value from above	Original Segment TPTI (direction 2)		19.670	19.670	N/A	N/A	2.010	2.010	N/A	2.010	6.190	6.190	6.190	6.190	2.360	2.360	2.360	2.360	2.360	2.360	2.360
		Calculated Value	Original Segment Freight Index		0.089	0.089	#DIV/0!	#DIV/0!	0.498	0.498	#DIV/0!	0.498	0.191	0.191	0.191	0.191	0.426	0.426	0.426	0.426	0.426	0.426	0.426
		Calculated Value	Post-Project Segment TPTI (direction 1)		2.513	2.513	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	4.290	4.290	4.070	4.290	2.340	2.340	2.298	2.285	2.061	2.326	2.300
		Calculated Value	Post-Project Segment TPTI (direction 2)		18.441	18.441	#VALUE!	#VALUE!	2.010	2.010	N/A	1.922	6.190	6.190	5.873	6.190	2.360	2.360	2.317	2.304	2.079	2.346	2.319
		Enter in Freight Needs spreadsheet to update segment level Freight Need	Post-Project Segment Freight Index		0.095	0.095	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.191	0.191	0.200	0.191	0.426	0.426	0.433	0.440	0.483	0.428	0.433
	CLOSURE DURATION	Input current value from performance system (direction 1)	Orig Segment Directional Closure Duration (NB/WB)		2.410	2.410	26.320	21.730	7.710	7.710	21.730	7.710	0.000	0.000	0.000	0.000	68.540	68.540	68.540	68.540	68.540	68.540	68.540
		Input current value from performance system (direction 2)	Orig Segment Directional Closure Duration (SB/EB)		0.700	0.700	40.040	25.560	127.150	127.150	25.560	127.150	19.070	19.070	19.070	19.070	378.720	378.720	378.720	378.720	378.720	378.720	378.720
		Calculated Value	Segment Closures with fatalities		1	1	3	5	4	4	4	4	1	1	1	1	15	15	15	15	15	15	15
		Calculated Value	Total Segment Closures		5	5	5	6	7	7	7	7	3	3	3	3	47	47	47	47	47	47	47
		Calculated Value	% Closures with Fatality		0.20	0.20	0.60	0.83	0.57	0.57	0.57	0.57	0.33	0.33	0.33	0.33	0.32	0.32	0.32	0.32	0.32	0.32	0.32
		Calculated Value	Closure Reduction		0.050	0.050	0.063	0.416	0.144	0.000	0.169	0.168	0.000	0.000	0.114	0.000	0.000	0.000	0.039	0.050	0.074	0.013	0.037
		Calculated Value	Closure Reduction Factor		0.950	0.950	0.937	0.584	0.856	1.000	0.831	0.832	1.000	1.000	0.886	1.000	1.000	1.000	0.961	0.950	0.926	0.987	0.963
		Enter in Freight Needs spreadsheet to update segment level Freight Need (direction 1)	Post-Project Segment Directional Closure Duration (direction 1)		2.290	2.290	24.674	12.700	6.602	7.710	18.055	6.417	0.000	0.000	0.000	0.000	68.540	68.540	65.899	65.086	63.461	67.660	66.034
		Enter in Freight Needs spreadsheet to update segment level Freight Need (direction 2)	Post-Project Segment Directional Closure Duration (direction 2)		0.665	0.665	37.536	14.938	108.877	127.150	25.560	105.831	19.070	19.070	16.901	19.070	378.720	378.720	364.126	359.636	350.655	373.855	364.874
	VERT CLR	Input current value from performance system	Original Segment Vertical Clearance		22.04	22.04	None	No UP	No UP	No UP	No UP	No UP	15.84	15.84	15.84	15.84	13.03	13.03	13.03	13.03	13.03	13.03	13.03
		Input current value from performance system	Original vertical clearance for specific bridge		22.04	22.04	None	No UP	No UP	No UP	No UP	No UP	15.84	15.84	15.84	15.84	13.03	13.03	13.03	13.03	13.03	13.03	13.03
		Input post-project value (depends on solution)	Post-Project vertical clearance for specific bridge		22.04	22.04	None	No UP	No UP	No UP	No UP	No UP	15.84	15.84	15.84	15.84	13.03	13.03	13.03	13.03	13.03	13.03	13.03
		Input post-project value (depends on solution)(force segment clearance to equal this specific bridge)	Post-Project Segment Vertical Clearance		22.04	22.04	None	No UP	No UP	No UP	No UP	No UP	15.84	15.84	15.84	15.84	13.03	13.03	13.03	13.03	13.03	13.03	13.03
		Enter in Freight Needs spreadsheet to update segment level Freight Need	Post-Project Segment Vertical Clearance		22.04	22.04	None	No UP	No UP	No UP	No UP	No UP	15.84	15.84	15.84	15.84	13.03	13.03	13.03	13.03	13.03	13.03	13.03
	Needs	User entered value from Freight Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Original Segment Freight Need		3.736	3.736	0.047	0.033	0.84	0.84	0.033	0.84	2.7	2.7	2.7	2.7	6.2	6.2	6.2	6.2	6.2	6.2	6.2
		User entered value from Freight Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Post-Project Segment Freight Need		3.622	3.622	0.047	0.033	0.84	0.84	0.033	0.84	2.7	2.7	2.7	2.00	6.2	6.2	6.1	6.1	5.4	6.2	6.1

				Solution #	191.1A	191.1B	191.2	70.4-1	70.4-3	70.4-4	70.4-7	70.5	60.6	60.7	60.8	60.9	60.10	60.11	60.12A	60.12B	60.12C	60.13	60.14
				Description	US 191 Elfrida to I-10 Freight Mitigation: Realign roadway, replace Cochise RR bridge	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	US191 Safford Safety Improvements	US 70 San Carlos Safety Improvements	US 70 San Carlos Safety Improvements	US 70: EB climbing lane	US 70: WB passing lane	US 70 Cutter Safety Improvements	Pinal Creek Bridge (#36)	Pinal Creek Bridge (#226)	US 60 Globe-Miami Safety Improvements	US 60 Pinal SPRR UP Freight Mitigation	Queen Creek Bridge (#406)	Waterfall Canyon Bridge (#328)	US 60 Superior to Miami Widen shoulder	US 60 Superior to Miami Climbing/ Passing Lanes	US 60 Superior to Miami Construct New 4-lane divided	US 60 Top-of-the-World Safety Improvements	US 60 Queen Creek Safety Improvements
	LEGEND:			Project Beg MP	59.9	59.9	117.5	274	268	262	282	258	249.78	249.61	244.5	253.4	227.6	229.47	227	227	227	232	227
		- user entered value		Project End MP	64.2	64.2	121	292	270	264	288	260	249.8	249.64	250	253.8	227.71	229.5	243	243	243	234	229
		- calculated value for reference only		Project Length (miles)	4.3	4.3	2	18	2	2	6	2	1	1	5.5	0.25	1.25	1	6.1	16	16	2	1.6
		- calculated value for entry/use in other spreadsheet		Segment Beg MP	24	24	116	274	255	255	274	255	243	243	243	243	227	227	227	227	227	227	227
		- for input into Performance Effectiveness Score spreadsheet		Segment End MP	67	67	121	293	270	270	293	270	255	255	255	255	243	243	243	243	243	243	243
		- assumed values (do not modify)		Segment Length (miles)	43	43	5	19	15	15	19	15	12	12	12	12	16	16	16	16	16	16	16
				Segment #	191-2	191-2	191-5	70-10	70-12	70-12	70-10	70-12	70/60-13	70/60-13	70/60-13	70/60-13	60-14	60-14	60-14	60-14	60-14	60-14	60-14
				Current # of Lanes (both directions)	2	2	4	2	2	2	2	2	4	4	4	4	2	2	2	2	2	2	2
				Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way
				Additional Lanes (one-way)		1				1	1									0.07	1		
				Pro-Rated # of Lanes	2.00	2.20	4.00	2.00	2.00	2.13	2.32	2.00	4.00	4.00	4.00	4.00	2.00	2.00	2.00	2.14	4.00	2.00	2.00
		Notes and Directions	**Description**																				
BRIDGE	**BRIDGE INDEX**	Input current value from performance system	Original Segment Bridge Index		5.37	5.37	N/A	7.00	6.00	6.00	7.00	6.00	5.17	5.17	5.17	5.17	4.56	4.56	4.56	4.56	4.56	4.56	4.56
		Input current value from performance system	Original lowest rating for specific bridge		5	5	N/A	7	6	6	7	6	4	4	4	4	4	4	4	4	4	4	4
		Input post-project value (For repair +1, rehab +2, replace=8)	Post-Project lowest rating for specific bridge		8	8	N/A	7	6	6	7	6	4	4	4	4	4	4	4	4	4	4	4
		Enter in Bridge Index spreadsheet to calculate new Bridge Index	Post-Project lowest rating for specific bridge		8	8	N/A	7	6	6	7	6	8	8	4	4	8	8	4	4	4	4	4
		Input updated segment value from updated Bridge Index spreadsheet	Post-Project Segment Bridge Index		8	8	N/A	7.00	6.00	6.00	7.00	6.00	5.32	5.44	5.17	5.17	5.35	4.72	4.56	5.51	5.33	4.56	4.56
		Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment Bridge Index		8.00	8.00	N/A	7.00	6.00	6.00	7.00	6.00	5.32	5.44	5.17	5.17	5.35	4.72	4.56	5.51	5.33	4.56	4.56
	SUFF RATING	Input current value from performance system	Original Segment Sufficiency Rating		76.93	76.93	N/A	80.00	63.20	63.20	80.00	63.20	78.89	78.89	78.89	78.89	36.03	36.03	36.03	36.03	36.03	36.03	36.03
		Input current value from performance system	Original Sufficiency Rating for specific bridge		74.30	74.30	N/A	80.00	63.20	63.20	80.00	63.20	45.20	45.20	45.20	45.20	27	27	27	27	27	27	27
		Input post-project value (For repair +10, rehab +20, replace=98)	Post-Project Sufficiency Rating for specific bridge		98.00	98.00	N/A	80.00	63.20	63.20	80.00	63.20	98.00	98.00	45.20	45.20	98	98	27	98	98	27	27
		Enter in Bridge Index spreadsheet to calculate new Bridge Index	Post-Project Sufficiency Rating for specific bridge		98.00	98.00	N/A	80.00	63.20	63.20	80.00	63.20	98.00	98.00	45.20	45.20	98.00	98.00	26.80	98.00	98.00	26.80	26.80
		Input updated segment value from updated Bridge Index spreadsheet	Post-Project Segment Sufficiency Rating		98.00	98.00	N/A	80.00	63.20	63.20	80.00	63.20	98.00	98.00	78.89	78.89	98.00	98.00	36.03	98.00	98.00	36.03	36.03
		Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment Sufficiency Rating		98.00	98.00	N/A	80.00	63.20	63.20	80.00	63.20	98.00	98.00	78.89	78.89	98.00	98.00	36.03	98.00	98.00	36.03	36.03
	BR RTNG	Input current value from performance system	Original Segment Bridge Rating		5	5	N/A	7	6	6	7	6	4	4	4	4	4	4	4	4	4	4	4
		Input updated segment value from updated Bridge Index spreadsheet	Post-Project Segment Bridge Rating		8	8	N/A	7	6	6	7	6	8	8	4	4	8	8	4	8	8	4	4
		Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment Bridge Rating		8	8	N/A	7	6	6	7	6	8	8	4	4	8	8	4	8	8	4	4
	% FUN OB	Input current value from performance system	Original Segment % Functionally Obsolete		0.00%	0.00%	N/A	0.00%	0.00%	0.00%	0.00%	0.00%	49.40%	49.40%	49.40%	49.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Input updated value from updated Bridge Index spreadsheet (only remove bridge from FO if replace or rehab)	Post-Project Segment % Functionally Obsolete		0.00%	0.00%	N/A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49.40%	49.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment % Functionally Obsolete		0.00%	0.00%	N/A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49.40%	49.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Needs	User entered value from Bridge Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Original Segment Bridge Need		1.76	1.76	0	0	0.736	0.736	0	0.736	2.393	2.393	2.393	2.393	3.264	3.264	3.264	3.264	3.264	3.264	3.264
		User entered value from Bridge Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Post-Project Segment Bridge Need		0	0	0	0	0.736	0.736	0	0.736	1.680	1.560	2.393	2.393	1.650	2.280	3.264	1.480	1.670	3.264	3.264
PAVEMENT	**PAVEMENT INDEX**	Input current value from performance system	Original Segment Pavement Index		3.06	3.06	3.28	3.87	3.97	3.97	3.87	3.97	3.65	3.65	3.65	3.65	3.43	3.43	3.43	3.43	3.43	3.43	3.43
		Input current value from performance system	Original Segment IRI in project limits		130.3	130.3	108.61	91.22	67.52	67.52	91.22	67.52	108.6	108.6	108.6	108.6	116.83	116.83	116.83	116.83	116.83	116.83	116.83
		Input current value from performance system	Original Segment Cracking in project limits		7.6	7.6	6.5	1.6	3	3	1.6	3	1.2	1.2	1.2	1.2	4.4	4.4	4.4	4.4	4.4	4.4	4.4
		Input post-project value (For rehab, increase to 45; for replace increase to 30)	Post-Project IRI in project limits		30	30	45	91.22	67.52	67.52	91.22	67.52	108.6	108.6	108.6	108.6	116.83	116.83	116.83	116.83	73.415	116.83	116.83
		Enter in Pavement Index spreadsheet to calculate new Pavement Index	Post-Project IRI in project limits		30	30	45	91.22	67.52	67.52	91.22	67.52	108.6	108.6	108.6	108.6	116.83	116.83	116.83	116.83	73.415	116.83	116.83
		Input post-project value (Lower to 0 for rehab or replace)	Post-Project Cracking in project limits		0	0	0	1.6	3	3	3	3	1.2	1.2	1.2	1.2	4.4	4.4	4.4	4.4	2.2	4.4	4.4
		Enter in Pavement Index spreadsheet to calculate new Pavement Index	Post-Project Cracking in project limits		0	0	0	1.6	3	3	3	3	1.2	1.2	1.2	1.2	4.4	4.4	4.4	4.4	2.2	4.4	4.4
		Input updated segment value from updated Pavement Index spreadsheet	Post-Project Segment Pavement Index		3.53	3.53	3.67	3.87	3.97	3.97	3.97	3.97	3.65	3.65	3.65	3.65	3.43	3.43	3.43	3.43	4.02	3.43	3.43
		Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment Pavement Index		3.53	3.53	3.67	3.87	3.97	3.97	3.97	3.97	3.65	3.65	3.65	3.65	3.43	3.43	3.43	3.43	4.02	3.43	3.43
	DIRECTION PSR	Input current value from performance system (direction 1)	Original Segment Directional PSR (NB/WB)		3.53	3.53	3.28	3.55	3.83	3.83	3.83	3.83	3.43	3.43	3.43	3.43	3.24	3.24	3.24	3.24	3.24	3.24	3.24
		Input current value from performance system (direction 2)	Original Segment Directional PSR (SB/EB)		3.53	3.53	3.28	3.55	3.83	3.83	3.83	3.83	3.9	3.9	3.9	3.9	3.24	3.24	3.24	3.24	0	3.24	3.24
		Value from above	Original Segment IRI in project limits		130.3	130.3	108.61	91.22	67.52	67.52	91.22	67.52	108.6	108.6	108.6	108.6	116.83	116.83	116.83	116.83	116.83	116.83	116.83
		Value from above	Post-Project directional IRI in project limits		30	30	45	91.22	67.52	67.52	91.22	67.52	108.6	108.6	108.6	108.6	116.83	116.83	116.83	116.83	73.415	116.83	116.83
		Input updated segment value from updated Pavement Index spreadsheet (direction 1)	Post-Project Segment Directional PSR (direction 1)		3.53	3.53	3.64	3.55	3.83	3.83	3.83	3.83	3.43	3.43	3.43	3.43	3.24	3.24	3.24	3.24	3.24	3.24	3.24
		Input updated segment value from updated Pavement Index spreadsheet (direction 2)	Post-Project Segment Directional PSR (direction 2)		3.53	3.53	3.64	3.55	3.83	3.83	3.83	3.83	3.9	3.9	3.9	3.9	3.24	3.24	3.24	3.24	4.46	3.24	3.24
		Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment Directional PSR (direction 1)		3.53	3.53	3.64	3.55	3.83	3.83	3.83	3.83	3.43	3.43	3.43	3.43	3.24	3.24	3.24	3.24	3.24	3.24	3.24
		Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment Directional PSR (direction 2)		3.53	3.53	3.64	3.55	3.83	3.83	3.83	3.83	3.9	3.9	3.9	3.9	3.24	3.24	3.24	3.24	4.46	3.24	3.24
	% FAIL	Input current value from performance system	Original Segment % Failure		0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	19.0%	19.0%	19.0%	19.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%
		Input value from updated Pavement Index spreadsheet	Post-Project Segment % Failure		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	19.0%	19.0%	19.0%	19.0%	31.0%	31.0%	31.0%	31.0%	15.6%	31.0%	31.0%
		Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment % Failure		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.0%	19.0%	19.0%	19.0%	31.0%	31.0%	31.0%	31.0%	15.6%	31.0%	31.0%
	Needs	User entered value from Pavement Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Original Segment Pavement Need		2.248	2.248	1.074	0.053	0	0	0.053	0	0.4	0.4	0.4	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		User entered value from Pavement Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Post-Project Segment Pavement Need		0.00	0.00	1.074	0.053	0.00	0.00	0.053	0.00	0.4	0.4	0.4	0.4	0.9	0.9	0.9	0.9	0.390	0.9	0.9

CMF APPLICATION

CS 191.2 (MP117.5-121)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir
117.75	118.25	0.75	0.85	1	1	NB
118.75	119.25	0.85	0.95	1	1	NB
119.25	119.75	0.75	0.95	1	1	SB
120.25	120.75	0.75	1	1	1	SB

Segment Crashes

	NB/WB	SB/EB
Fatal	1	1
Incap	2	1

Crashes in Solution Limits

	NB/WB	SB/EB
Fatal	1	1
Incap	2	1

Crash Reduction

	NB/WB	SB/EB
Fatal	0.306	0.269
Incap	0.343	0.250

Post-Solution Crashes

	NB/WB	SB/EB
Fatal	0.694	0.731
Incap	1.658	0.750

CS 70.4-1 (274-292)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir
274	292	0.64	0.85	0.97	1	EB
274	292	0.64	0.85	0.97	1	WB
291	292	0.75	0.94	1	1	EB
291	292	0.75	0.94	1	1	WB
279	281	0.75	0.94	1	1	EB
279	281	0.75	0.94	1	1	WB
277.5	279.5	0.75	0.94	1	1	EB
277.5	279.5	0.75	0.94	1	1	WB
274.5	275.5	0.8	1	1	1	WB
278	279	0.8	1	1	1	EB
288	289	0.8	1	1	1	EB
292	293	0.8	1	1	1	WB

Segment Crashes

	NB/WB	SB/EB
Fatal	2	3
Incap	0	0

Crashes in Solution Limits

	NB/WB	SB/EB
Fatal	2	3
Incap	0	0

Crash Reduction

	NB/WB	SB/EB
Fatal	1.000	1.500
Incap	0.000	0.000

Post-Solution Crashes

	NB/WB	SB/EB
Fatal	1.000	1.500
Incap	0.000	0.000

CS 70.4-3 (268-270)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir
268	270	0.64	0.75	0.85	0.94	EB

Segment Crashes

	NB/WB	SB/EB
Fatal	2	2
Incap	0	0

Crashes in Solution Limits

	NB/WB	SB/EB
Fatal	0	1
Incap	0	0

Crash Reduction

	NB/WB	SB/EB
Fatal	0.000	0.500
Incap	0.000	0.000

Post-Solution Crashes

	NB/WB	SB/EB
Fatal	2.000	1.500
Incap	0.000	0.000

CS 70.5 (258-260)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir
257.0	259	0.75	0.81	0.97	1	EB
257.0	259	0.75	0.81	0.97	1	WB

Segment Crashes	NB/WB	SB/EB
Fatal	2	2
Incap	0	0

Crashes in Solution Limits	NB/WB	SB/EB
Fatal	2	1
Incap	0	0

Crash Reduction	NB/WB	SB/EB
Fatal	0.660	0.500
Incap	0.000	0.000

Post-Solution Crashes	NB/WB	SB/EB
Fatal	1.340	1.500
Incap	0.000	0.000

CS 60.8 (244.5-250)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	
244.5	245.9	0.75	1	1	1	WB	
246.0	246.5	0.54	1	1	1	EB	
246.0	246.5	0.54	1	1	1	WB	
246.0	246.5	0.54	0.75	1	1	WB	dark only
246.5	247.5	0.54	0.66	1	1	EB	
246.5	247.5	0.54	0.66	1	1	WB	
246.5	247.5	0.54	0.66	0.75	1	EB	dark only
247.5	248.9	0.54	1	1	1	EB	
247.5	248.9	0.54	1	1	1	WB	
248.9	250	0.54	1	1	1	EB	
248.9	250	0.54	1	1	1	WB	

Segment Crashes	NB/WB	SB/EB
Fatal	3	5
Incap	13	15

Crashes in Solution Limits	NB/WB	SB/EB
Fatal	2	5
Incap	9	13

Crash Reduction	NB/WB	SB/EB
Fatal	0.750	1.960
Incap	3.920	5.340

Post-Solution Crashes	NB/WB	SB/EB
Fatal	2.250	3.040
Incap	9.080	9.660

CS 60.12A (227 - 243)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	
227	243	0.68	1	1	1	EB	*
227	243	0.68	1	1	1	WB	*
227	243	0.68	0.75	0.8	1	EB	^
227	243	0.68	0.75	0.8	1	WB	^
227	243	0.75	1	1	1	EB	+
227	243	0.75	1	1	1	WB	+

Segment Crashes	NB/WB	SB/EB
Fatal	3	6
Incap	8	12

Crashes in Solution Limits	NB/WB	SB/EB
Fatal	1	2
Incap	6	9

Crash Reduction	NB/WB	SB/EB
Fatal	0.320	0.640
Incap	1.600	2.740

Post-Solution Crashes	NB/WB	SB/EB
Fatal	2.680	5.360
Incap	6.400	9.260

*MP (227 - 227.6, 227.7 - 228.3, 228.5 - 232, 238 - 239.5)

^MP (WB MP 227.78 - 228, WB MP 233 – 233.28, WB MP 240.27 – 240.37, WB MP 239.55 – 239.41, WB MP 239.61-239.72)

+MP233, MP 240

CS 60.12B (227 - 243)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	
227	227.9	0.93	0.95	1	1	EB	
230.4	232.6	0.63	0.8	1	1	EB	
230.4	232.6	0.63	1	1	1	EB	
236.4	236.6	0.63	1	1	1	WB	
234.2	236.4	0.7	0.8	1	1	EB	
234.2	236.4	0.7	1	1	1	EB	
234.2	236.4	0.7	1	1	1	WB	
228	228	0.75	0.8	1	1	WB	
227	243	0.75	1	1	1	EB	*
227	243	0.8	1	1	1	EB	*
227	243	0.8	1	1	1	WB	*

*Apply only to those locations outside all other milepost locations

Segment Crashes

	NB/WB	SB/EB
Fatal	3	6
Incap	8	12

Crash Reduction

	NB/WB	SB/EB
Fatal	0.670	0.670
Incap	1.325	2.929

Crashes in Solution Limits

	NB/WB	SB/EB
Fatal	3	6
Incap	8	12

Post-Solution Crashes

	NB/WB	SB/EB
Fatal	2.330	5.330
Incap	6.675	9.071

CS 60.13 (232 - 234)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir
23.75	234.25	0.85	0.87	0.97	1	WB
232	234	0.85	0.87	0.94	1	EB

Segment Crashes

	NB/WB	SB/EB
Fatal	3	6
Incap	8	12

Crash Reduction

	NB/WB	SB/EB
Fatal	0.000	0.374
Incap	0.517	0.374

Crashes in Solution Limits

	NB/WB	SB/EB
Fatal	0	2
Incap	3	2

Post-Solution Crashes

	NB/WB	SB/EB
Fatal	3.000	5.626
Incap	7.483	11.626

Performance Area Scoring

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Pavement					Bridge					Safety					Mobility					Freight					Total Risk Factored Performance Area Benefit
				Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	
191.1A	US 191 Elfrida to I-10 Freight Mitigation: Widen shoulders, realign roadway, replace Cochise RR bridge	59.9-64	46.721	2.248	0.000	2.248	0.37	0.821	1.760	0.000	1.760	3.42	6.019	0.174	0.174	0.000	4.10	0.000	0.774	0.669	0.105	7.70	0.808	3.736	3.622	0.114	7.64	0.871	8.520
191.1B	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	59.9-64	62.680	2.248	0.000	2.248	0.37	0.821	1.760	0.000	1.760	3.42	6.019	0.174	0.174	0.000	4.10	0.000	0.774	0.638	0.136	7.70	1.047	3.736	3.622	0.114	7.64	0.871	8.758
191.2	US191 Safford Safety Improvements	117-121	0.638	1.074	1.074	0.000	0.00	0.000	0.000	0.000	0.000	0.00	0.000	2.857	2.205	0.652	4.55	2.966	0.921	0.921	0.000	5.52	0.000	0.047	0.047	0.000	5.75	0.000	2.966
70.4	US 70 San Carlos Safety Improvements	268-292	57.669	0.106	0.000	0.106	0.00	0.000	1.472	1.472	0.000	0.00	0.000	22.238	14.150	8.088	2.20	17.827	3.700	2.307	1.393	6.76	9.410	1.746	1.746	0.000	0.00	0.000	27.237
70.5	US 70 Cutter Safety Improvements	257-260	2.988	0.000	0.000	0.000	0.87	0.000	0.736	0.736	0.000	0.00	0.000	5.160	3.286	1.874	2.15	4.028	0.964	0.917	0.047	6.09	0.286	0.840	0.840	0.000	6.09	0.000	4.314
60.6	Pinal Creek Bridge (#36)	249.8	2.349	0.400	0.400	0.000	0.00	0.000	2.393	1.680	0.713	4.24	3.026	6.418	6.418	0.000	4.69	0.000	0.991	0.881	0.110	3.62	0.400	2.700	2.700	0.000	5.02	0.000	3.426
60.7	Pinal Creek Bridge (#226)	249.64	3.096	0.400	0.400	0.000	0.00	0.000	2.393	1.560	0.833	4.24	3.535	6.418	6.418	0.000	4.69	0.000	0.991	0.881	0.110	3.62	0.400	2.700	2.700	0.000	5.02	0.000	3.935
60.8	US 60 Globe-Miami Safety Improvements	244.5-251	7.707	0.400	0.400	0.000	2.10	0.000	2.393	2.393	0.000	0.00	0.000	6.409	3.680	2.729	4.69	12.807	0.991	0.991	0.000	4.69	-0.002	2.700	2.700	0.000	5.02	0.000	12.805
60.9	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	253.4-253.8	0.606	0.400	0.400	0.000	2.10	0.000	2.393	2.393	0.000	0.00	0.000	6.418	6.418	0.000	0.00	0.000	0.991	0.991	0.000	0.00	0.000	2.700	2.000	0.700	5.02	3.511	3.511
60.10	Queen Creek Bridge (#406)	227.71	8.779	0.900	0.900	0.000	0.00	0.000	3.264	1.650	1.614	3.83	6.175	11.646	11.630	0.016	2.59	0.041	14.691	14.537	0.154	7.86	1.210	6.200	6.200	0.000	8.18	0.000	7.426
60.11	Waterfall Canyon Bridge (#328)	229.5	1.661	0.900	0.900	0.000	0.00	0.000	3.264	2.280	0.984	3.83	3.765	11.646	11.646	0.000	2.59	0.000	14.691	14.537	0.154	5.30	0.816	6.200	6.200	0.000	5.68	0.000	4.580
60.12A	US 60 Superior to Miami Widen Shoulder	227-243	8.381	0.900	0.900	0.000	0.00	0.000	3.264	3.264	0.000	0.00	0.000	11.646	10.140	1.506	3.79	5.709	14.691	14.115	0.577	8.29	4.777	6.200	6.100	0.100	8.18	0.818	11.305
60.12B	US 60 Superior to Miami Climbing/ Passing Lanes	227-243	66.479	0.900	0.900	0.000	1.66	0.000	3.264	1.480	1.784	3.83	6.825	11.646	9.682	1.964	3.79	7.446	14.691	14.502	0.189	9.67	1.829	6.200	6.100	0.100	8.01	0.801	16.901
60.12C	US 60 Superior to Miami Construct New 4-Lane Divided	227-243	497.760	0.900	0.390	0.510	1.66	0.849	3.264	1.670	1.594	3.83	6.099	11.646	8.766	2.880	3.79	10.918	14.691	1.168	13.523	9.67	130.723	6.200	5.400	0.800	8.01	6.408	154.996
60.13	US 60 Top-of-the-World Safety Improvements	232-234	0.204	0.900	0.900	0.000	0.00	0.000	3.264	3.264	0.000	0.00	0.000	11.646	11.133	0.513	3.87	1.986	14.691	14.691	0.000	8.06	0.002	6.200	6.200	0.000	8.01	0.000	1.987
60.14	US 60 Queen Creek Safety Improvements	227-229	3.215	0.900	0.900	0.000	0.00	0.000	3.264	3.264	0.000	0.00	0.000	11.646	10.213	1.433	3.79	5.433	14.691	13.795	0.896	8.06	7.219	6.200	6.100	0.100	8.01	0.801	13.452

Performance Effectiveness Scoring Results

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Safety Emphasis Area						Mobility Emphasis Area						Freight Emphasis Area					
				Existing Corridor Need	Post-Solution Corridor Need	Raw Score	Risk Factor	Emphasis Factor	Factored Score	Existing Corridor Need	Post-Solution Corridor Need	Raw Score	Risk Factor	Emphasis Factor	Factored Score	Existing Corridor Need	Post-Solution Corridor Need	Raw Score	Risk Factor	Emphasis Factor	Factored Score
191.1A	US 191 Elfrida to I-10 Freight Mitigation: Widen shoulders, realign roadway, replace Cochise RR bridge	59.9-64	46.721	0.464	0.464	0.000	4.10	1.50	0.000	0.299	0.279	0.020	7.70	1.50	0.231	3.241	3.238	0.003	7.64	1.50	0.034
191.1B	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	59.9-64	62.68	0.464	0.464	0.000	4.10	1.50	0.000	0.299	0.272	0.027	7.70	1.50	0.312	3.241	3.238	0.003	7.64	1.50	0.034
191.2	US191 Safford Safety Improvements	117-121	0.638	0.464	0.462	0.002	4.55	1.50	0.014	0.299	0.299	0.000	5.52	1.50	0.000	3.241	3.241	0.000	5.75	1.50	0.000
70.4	US 70 San Carlos Safety Improvements	268-292	57.669	1.856	1.785	0.071	8.72	1.50	0.235	1.116	1.108	0.008	26.20	1.50	0.077	12.964	12.964	0.000	24.32	1.50	0.000
70.5	US 70 Cutter Safety Improvements	257-260	2.988	0.464	0.448	0.016	2.15	1.50	0.052	0.299	0.279	0.020	6.09	1.50	0.183	3.241	3.241	0.000	6.09	1.50	0.000
60.6	Pinal Creek Bridge (#36)	249.8	2.349	0.464	0.464	0.000	4.69	1.50	0.000	0.299	0.279	0.020	3.62	1.50	0.109	3.241	3.241	0.000	5.02	1.50	0.000
60.7	Pinal Creek Bridge (#226)	249.64	3.096	0.464	0.464	0.000	4.69	1.50	0.000	0.299	0.279	0.020	3.62	1.50	0.109	3.241	3.241	0.000	5.02	1.50	0.000
60.8	US 60 Globe-Miami Safety Improvements	244.5-251	7.707	0.464	0.445	0.019	4.69	1.50	0.134	0.299	0.299	0.000	4.69	1.50	0.000	3.241	3.239	0.002	5.02	1.50	0.015
60.9	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	253.4-253.8	0.606	0.464	0.464	0.000	0.00	1.50	0.000	0.299	0.299	0.000	0.00	1.50	0.000	3.241	3.239	0.002	5.02	1.50	0.015
60.10	Queen Creek Bridge (#406)	227.71	8.779	0.464	0.464	0.000	2.59	1.50	0.000	0.299	0.279	0.020	7.86	1.50	0.236	3.241	3.241	0.000	8.18	1.50	0.000
60.11	Waterfall Canyon Bridge (#328)	229.5	1.661	0.464	0.464	0.000	2.59	1.50	0.000	0.299	0.279	0.020	5.30	1.50	0.159	3.241	3.241	0.000	5.68	1.50	0.000
60.12A	US 60 Superior to Miami Widen Shoulder	227-243	8.381	0.464	0.450	0.014	3.79	1.50	0.080	0.299	0.279	0.020	8.29	1.50	0.249	3.241	3.236	0.005	8.18	1.50	0.061
60.12B	US 60 Superior to Miami Climbing/ Passing Lanes	227-243	66.479	0.464	0.446	0.018	3.79	1.50	0.102	0.299	0.279	0.020	9.67	1.50	0.290	3.241	3.238	0.003	8.01	1.50	0.036
60.12C	US 60 Superior to Miami Construct New 4-Lane Divided	227-243	497.76	0.464	0.426	0.038	3.79	1.50	0.216	0.299	0.182	0.117	9.67	1.50	1.697	3.241	3.230	0.011	8.01	1.50	0.132
60.13	US 60 Top-of-the-World Safety Improvements	232-234	0.204	0.464	0.455	0.009	3.87	1.50	0.052	0.299	0.299	0.000	8.06	1.50	0.000	3.241	3.239	0.002	8.01	1.50	0.024
60.14	US 60 Queen Creek Safety Improvements	227-229	3.215	0.464	0.451	0.013	3.79	1.50	0.074	0.299	0.279	0.020	8.06	1.50	0.242	3.241	3.239	0.002	8.01	1.50	0.024

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Total Factored Benefit	VMT Factor	NPV Factor	Performance Effectiveness Score		miles	2014 ADT	1-way or 2-way	VMT
191.1A	US 191 Elfrida to I-10 Freight Mitigation: Widen shoulders, realign roadway, replace Cochise RR bridge	59.9-64	46.721	8.785	0.40	20.2	1.5		4.30	1384	2	5952.2487
191.1B	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	59.9-64	62.68	9.105	0.40	20.2	1.2		4.30	1384	2	5952.2487
191.2	US191 Safford Safety Improvements	117-121	0.638	2.980	1.03	8.8	42.4		2.00	8312	2	16623.286
70.4	US 70 San Carlos Safety Improvements	268-292	57.669	27.549	3.42	15.3	25.0		24.00	3295	2	79071.113
70.5	US 70 Cutter Safety Improvements	257-260	2.988	4.548	0.55	8.8	7.4		2.00	4230	2	8460
60.6	Pinal Creek Bridge (#36)	249.8	2.349	3.535	0.71	30.6	32.7		1.00	11008	2	11008
60.7	Pinal Creek Bridge (#226)	249.64	3.096	4.044	0.71	30.6	28.4		1.00	11008	2	11008
60.8	US 60 Globe-Miami Safety Improvements	244.5-251	7.707	12.954	2.84	8.8	42.1		5.50	11008	2	60546.611
60.9	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	253.4-253.8	0.606	3.526	0.19	20.2	22.1		0.25	11008	2	2752
60.10	Queen Creek Bridge (#406)	227.71	8.779	7.662	0.73	30.6	19.5		1.25	9069	2	11336.25
60.11	Waterfall Canyon Bridge (#328)	229.5	1.661	4.739	0.59	30.6	51.7		1.00	9069	2	9069
60.12A	US 60 Superior to Miami Widen Shoulder	227-243	8.381	11.695	1.57	15.3	33.6		3.00	9069	2	27207
60.12B	US 60 Superior to Miami Climbing/ Passing Lanes	227-243	66.479	17.329	4.33	20.2	22.8		16.00	9069	2	145104
60.12C	US 60 Superior to Miami Construct New 4-Lane Divided	227-243	497.76	157.041	4.33	20.2	27.6		16.00	9069	2	145104
60.13	US 60 Top-of-the-World Safety Improvements	232-234	0.204	2.064	0.31	8.8	27.2		0.50	9069	2	4534.5
60.14	US 60 Queen Creek Safety Improvements	227-229	3.215	13.792	0.91	8.8	34.5		1.60	9069	2	14510.4

Appendix J: Solution Prioritization Scores

Performance Evaluation Risk Factors and Prioritization

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Pavement		Bridge		Safety		Mobility		Freight		Total Factored Score	Risk Factors					Weighted Risk Factor	Segment Need	Prioritization Score
				Score	%	Score	%	Score	%	Score	%	Score	%		Pavement	Bridge	Safety	Mobility	Freight			
191.1A	US 191 Elfrida to I-10 Freight Mitigation: Widen shoulders, realign roadway, replace Cochise RR bridge	59.9-64	46.721	0.821	9.6%	6.019	70.7%	0.000	0.0%	0.808	9.5%	0.871	10.2%	8.520	1.14	1.51	1.78	1.36	1.36	1.445	1.38	**3.0**
191.1B	US 191 Elfrida to I-10 Freight Mitigation: Construct passing lanes, realign roadway, replace Cochise RR bridge	59.9-64	62.68	0.821	9.4%	6.019	68.7%	0.000	0.0%	1.047	12.0%	0.871	9.9%	8.758	1.14	1.51	1.78	1.36	1.36	1.442	1.38	**2.3**
191.2	US191 Safford Safety Improvements	117-121	0.638	0.000	0.0%	0.000	0.0%	2.980	100.0%	0.000	0.0%	0.000	0.0%	2.980	1.14	1.51	1.78	1.36	1.36	1.780	2.00	**150.9**
70.4	US 70 San Carlos Safety Improvements	268-292	57.669	0.000	0.0%	0.000	0.0%	18.062	65.7%	9.410	34.3%	0.000	0.0%	27.472	1.14	1.51	1.78	1.36	1.36	1.635	1.39	**56.7**
70.5	US 70 Cutter Safety Improvements	257-260	2.988	0.000	0.0%	0.000	0.0%	4.080	93.4%	0.286	6.6%	0.000	0.0%	4.366	1.14	1.51	1.78	1.36	1.36	1.752	1.31	**17.1**
60.6	Pinal Creek Bridge (#36)	249.8	2.349	0.000	0.0%	3.026	88.3%	0.000	0.0%	0.400	11.7%	0.000	0.0%	3.426	1.14	1.51	1.78	1.36	1.36	1.492	2.23	**108.7**
60.7	Pinal Creek Bridge (#226)	249.64	3.096	0.000	0.0%	3.535	89.8%	0.000	0.0%	0.400	10.2%	0.000	0.0%	3.935	1.14	1.51	1.78	1.36	1.36	1.495	2.23	**94.5**
60.8	US 60 Globe-Miami Safety Improvements	244.5-251	7.707	0.000	0.0%	0.000	0.0%	12.940	100.0%	-0.002	0.0%	0.000	0.0%	12.939	1.14	1.51	1.78	1.36	1.36	1.780	2.23	**167.0**
60.9	US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	253.4-253.8	0.606	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	3.511	100.0%	3.511	1.14	1.51	1.78	1.36	1.36	1.360	2.23	**66.9**
60.10	Queen Creek Bridge (#406)	227.71	8.779	0.000	0.0%	6.175	83.2%	0.041	0.6%	1.210	16.3%	0.000	0.0%	7.426	1.14	1.51	1.78	1.36	1.36	1.487	2.00	**57.9**
60.11	Waterfall Canyon Bridge (#328)	229.5	1.661	0.000	0.0%	3.765	82.2%	0.000	0.0%	0.816	17.8%	0.000	0.0%	4.580	1.14	1.51	1.78	1.36	1.36	1.483	2.00	**153.4**
60.12A	US 60 Superior to Miami Widen Shoulder	227-243	8.381	0.000	0.0%	0.000	0.0%	5.789	50.8%	4.777	42.0%	0.818	7.2%	11.385	1.14	1.51	1.78	1.36	1.36	1.574	2.00	**105.8**
60.12B	US 60 Superior to Miami Climbing/ Passing Lanes	227-243	66.479	0.000	0.0%	6.825	40.1%	7.548	44.4%	1.829	10.8%	0.801	4.7%	17.003	1.14	1.51	1.78	1.36	1.36	1.607	2.00	**73.3**
60.12C	US 60 Superior to Miami Construct New 4-Lane Divided	227-243	497.76	0.849	0.5%	6.099	3.9%	11.134	7.2%	130.723	84.2%	6.408	4.1%	155.212	1.14	1.51	1.78	1.36	1.36	1.395	2.00	**77.1**
60.13	US 60 Top-of-the-World Safety Improvements	232-234	0.204	0.000	0.0%	0.000	0.0%	2.038	99.9%	0.002	0.1%	0.000	0.0%	2.040	1.14	1.51	1.78	1.36	1.36	1.780	2.00	**96.8**
60.14	US 60 Queen Creek Safety Improvements	227-229	3.215	0.000	0.0%	0.000	0.0%	5.507	40.7%	7.219	53.4%	0.801	5.9%	13.526	1.14	1.51	1.78	1.36	1.36	1.531	2.00	**105.6**

Appendix K: Preliminary Scoping Reports for Prioritized Solutions

1.0 GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: US 191 Elfrida to I-10 Freight Mitigation	
City/Town Name: Cochise	**County: Cochise**
Primary Route/Street: US 191	
Beginning Limit: MP 59.9	
End Limit: MP 64	
Project Length: 4.1 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)* ☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*	
LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED
Freight need: Congestion/delay related to trucks due to high PTI in southbound direction.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
For Option A: Realign roadway from MP 59.9 to MP 64.2, replace Cochise RR bridge. *For Option B: Realign roadway from MP 59.9 to MP 64.2, construct passing lane, and replace Cochise RR bridge.*			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

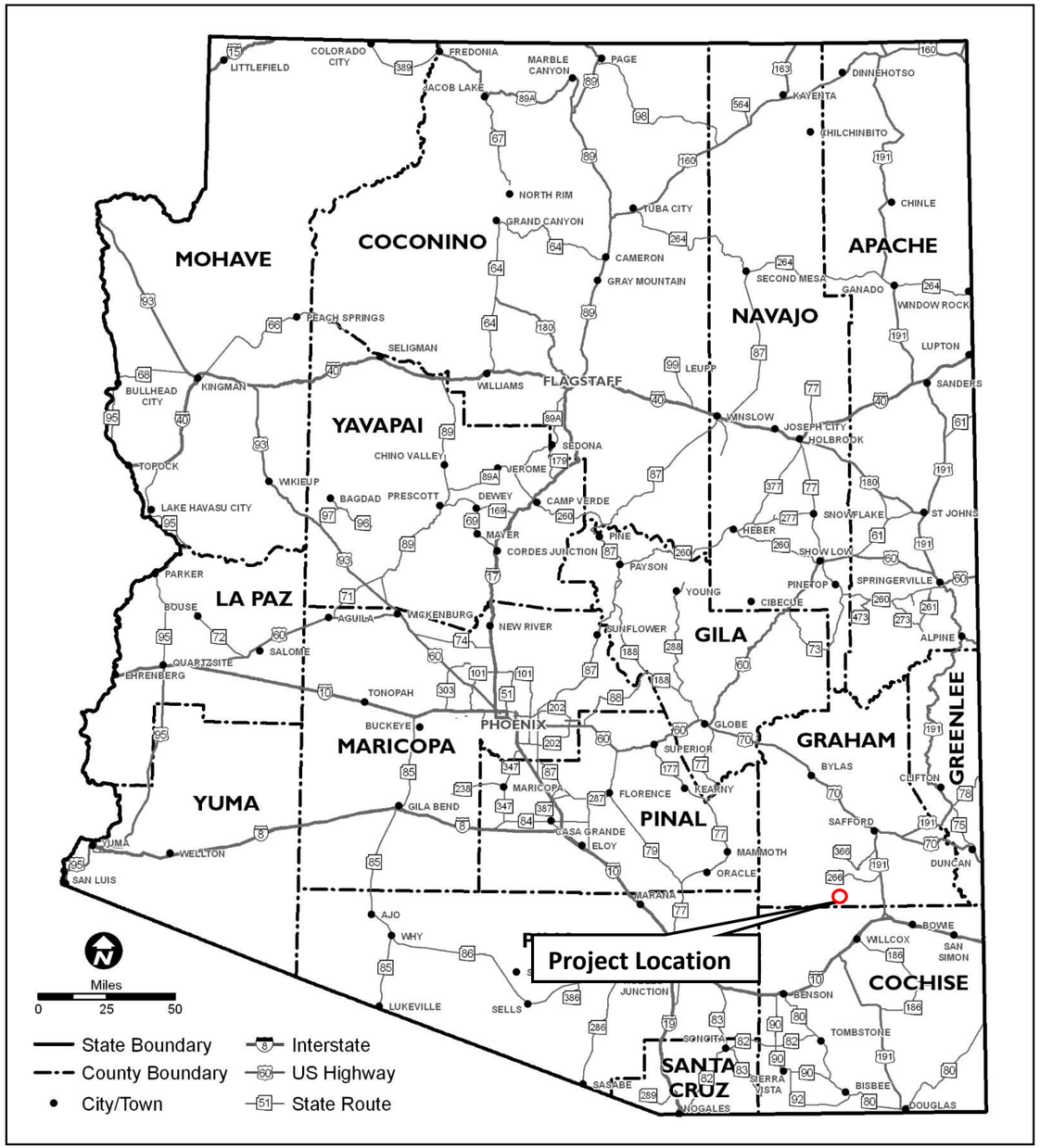
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering Option A: $900,000 Option B: $1,300,000	Design Option A: $3,000,000 Option B: $4,300,000	Right-of-Way Option A: $13,630,000 Option B: $13,700,000	Construction Option A: $29,300,000 Option B: $43,500,000	Total Option A: $46,830,000 Option B: $62,800,000

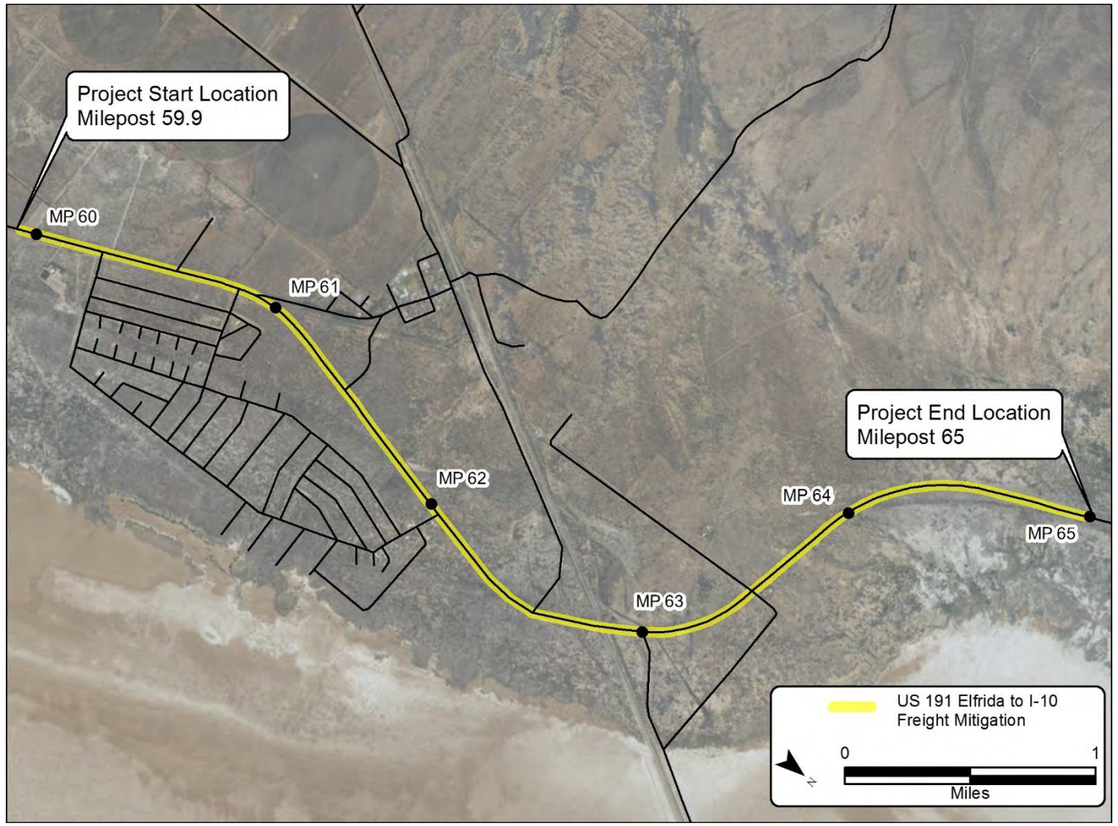
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work** **4) Project Schedule** **5) Itemized Cost Estimate** **6) 15% Design Plan Sheets (as needed)**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Option A: Realign Roadway, Replace Cochise RR Bridge • Option B: Realign Roadway, Construct Passing Lanes (NB and SB), Replace Cochise RR Bridge

2.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 191 Safford Safety Improvements	
City/Town Name: Safford	**County: Graham**
Primary Route/Street: US 191	
Beginning Limit: MP 117	
End Limit: MP 121	
Project Length: 4 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Safety need: Lack of pedestrian lighting and pedestrian facilities, traffic control device reflectivity, intersection geometry, and high traffic volumes lead to need for precautions for incident prevention.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

Strategic intersection improvements to improve signal visibility, crosswalk signals, lighting, and install adequate crosswalk warning signage.

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$20,000	$70,000	$0	$640,000	$730,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

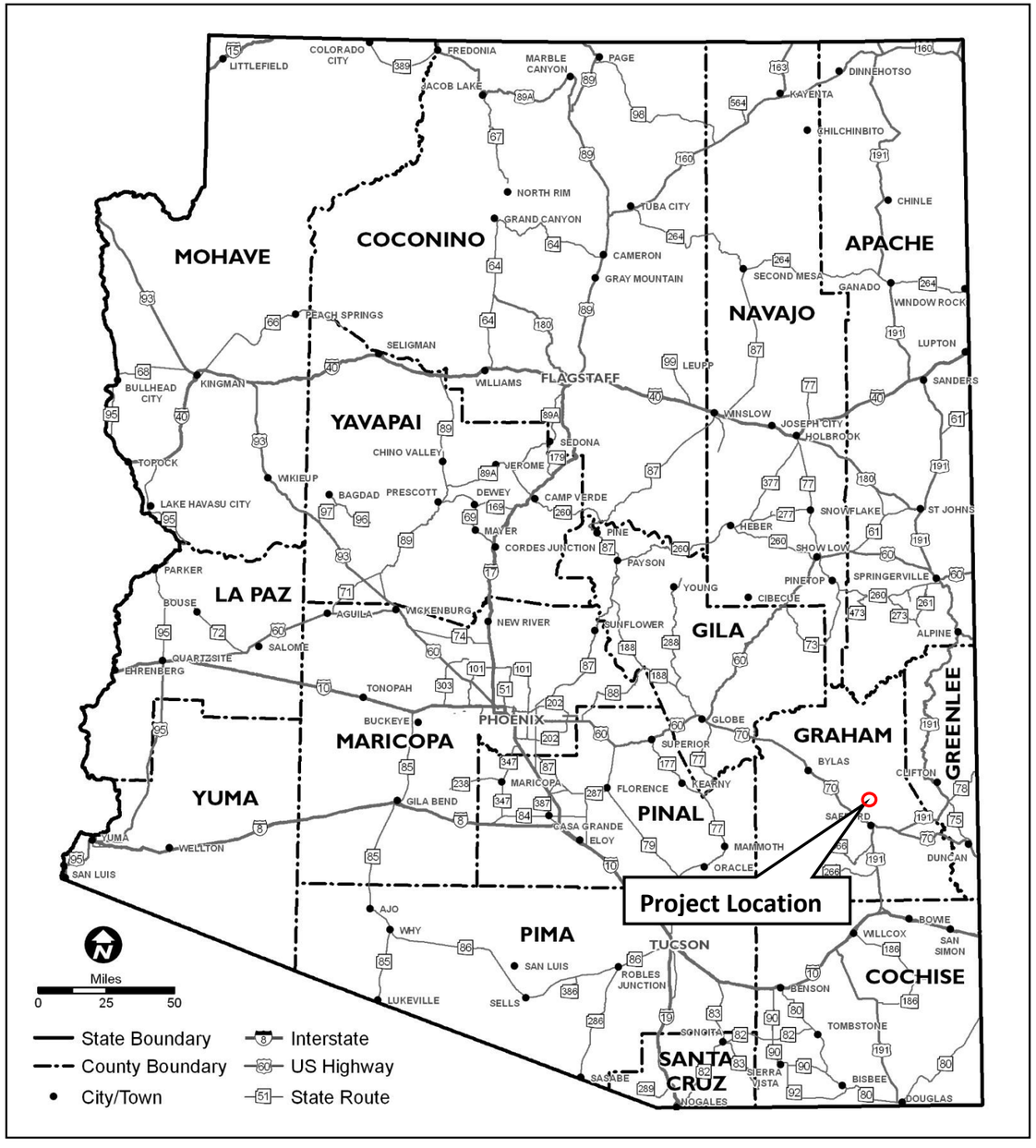
Design Program Year: FY

Construction Program Year: FY

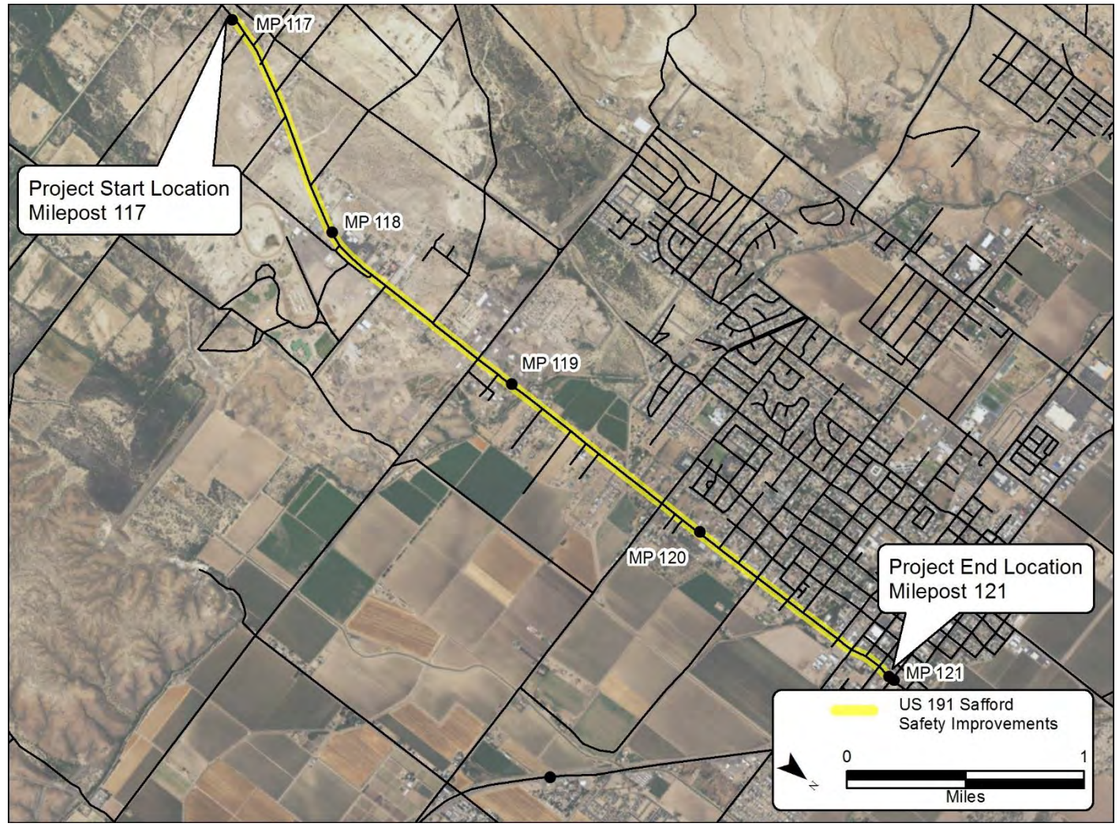
ATTACHMENTS

7) **State Location Map**
8) **Project Vicinity Map**
9) **Project Scope of Work**
10) **Project Schedule**
11) **Itemized Cost Estimate**
12) **15% Design Plan Sheets (as needed)**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • US 191/Armory Road Intersection: Install Warning Signs with Beacons, Improve Signal Visibility • US 191/Discovery Park Intersection: Improve Signal Visibility, Install Dynamic Speed Feedback Signs • US 191/Lone Star Intersection: Install Traffic Signal, Install Warning Signs with Beacons • US 191/16th Street Intersection: Install Warning Signs with Beacons

3.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 70 San Carlos Pavement Improvements	
City/Town Name: San Carlos	**County: Graham**
Primary Route/Street: US 70	
Beginning Limit: MP 283	
End Limit: MP 284	
Project Length: 1 mile	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☐ Federal; ☒ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Pavement need: Hot Spot in westbound lanes MP 283-284 (Hot Spot failure, High IRI). District is currently seeking funding for pavement preservation.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

Replace and rehabilitate pavement.

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

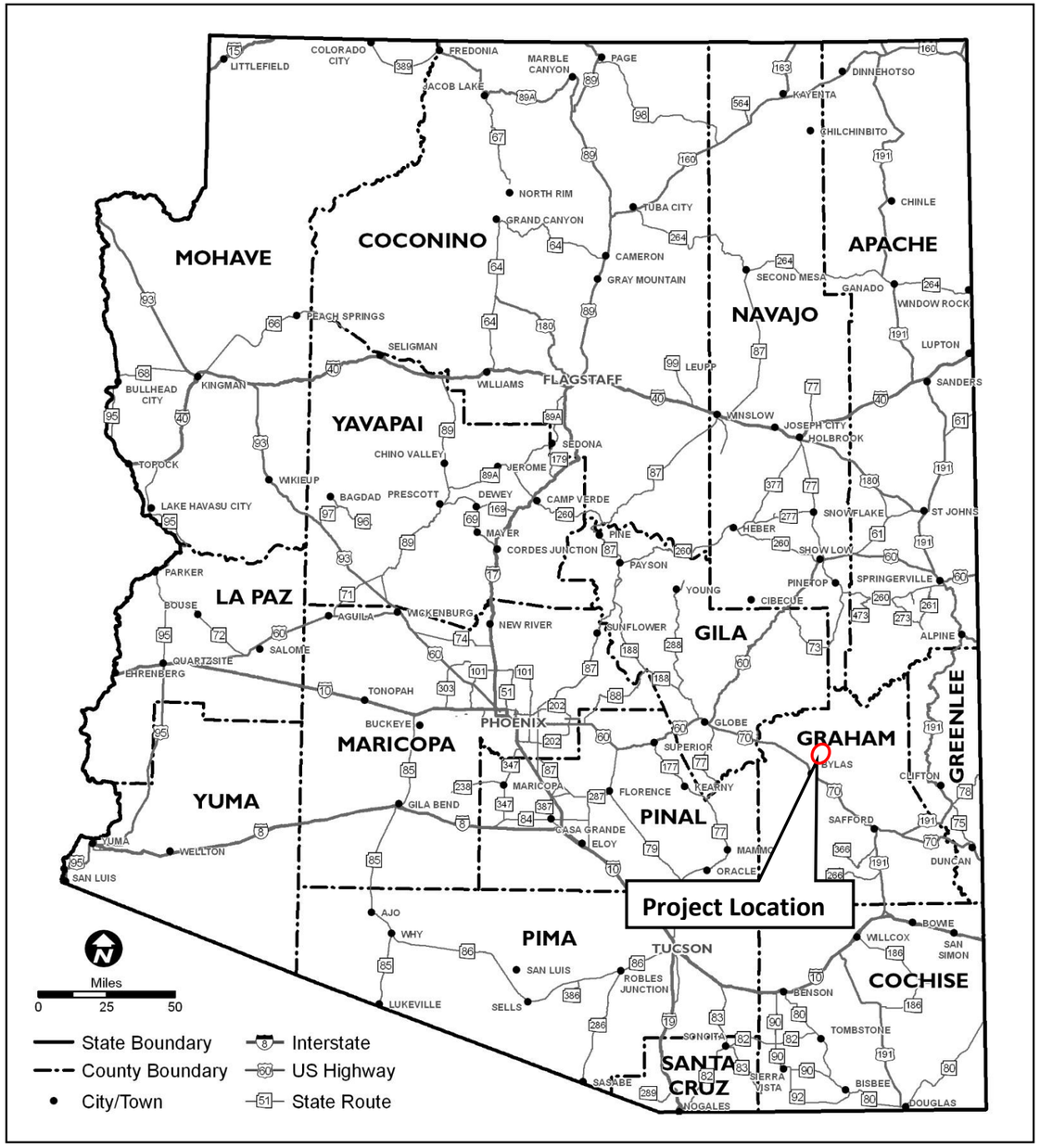
Design Program Year: FY

Construction Program Year: FY

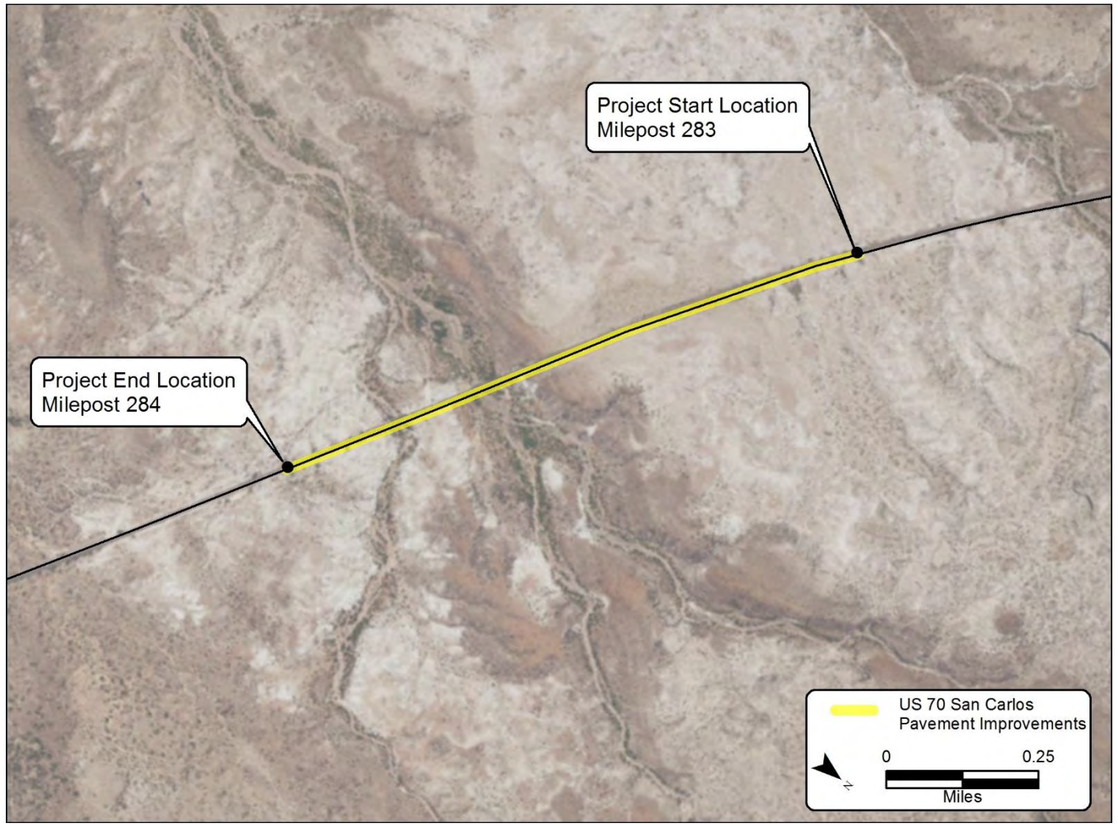
ATTACHMENTS

13) State Location Map
14) Project Vicinity Map
15) Project Scope of Work
16) Project Schedule
17) Itemized Cost Estimate
18) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Option A: Replace Pavement • Option B: Rehabilitate Pavement

4.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 70 San Carlos Safety Improvements	
City/Town Name: San Carlos	**County: Graham/Gila**
Primary Route/Street: US 70	
Beginning Limit: MP 268	
End Limit: MP 292	
Project Length: 24 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☐ Federal; ☒ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Safety need: There is a high ratio of fatal crashes compared to those resulting in incapacitating injuries. This segment has rolling hills and valleys with few safe passing opportunities.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

- Install high-visibility signage
- Install warning signs with beacons at curves and speed feedback signs
- Install warning signs and speed feedback signs entering high pedestrian area
- Install centerline rumble strip
- Widen shoulder, install rumble strip and install safety edge
- Construct passing lanes)
- Formalize pullouts (signage, ROW for pullouts)

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$1,600,000	$5,300,000	$0	$51,100,000	$58,000,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

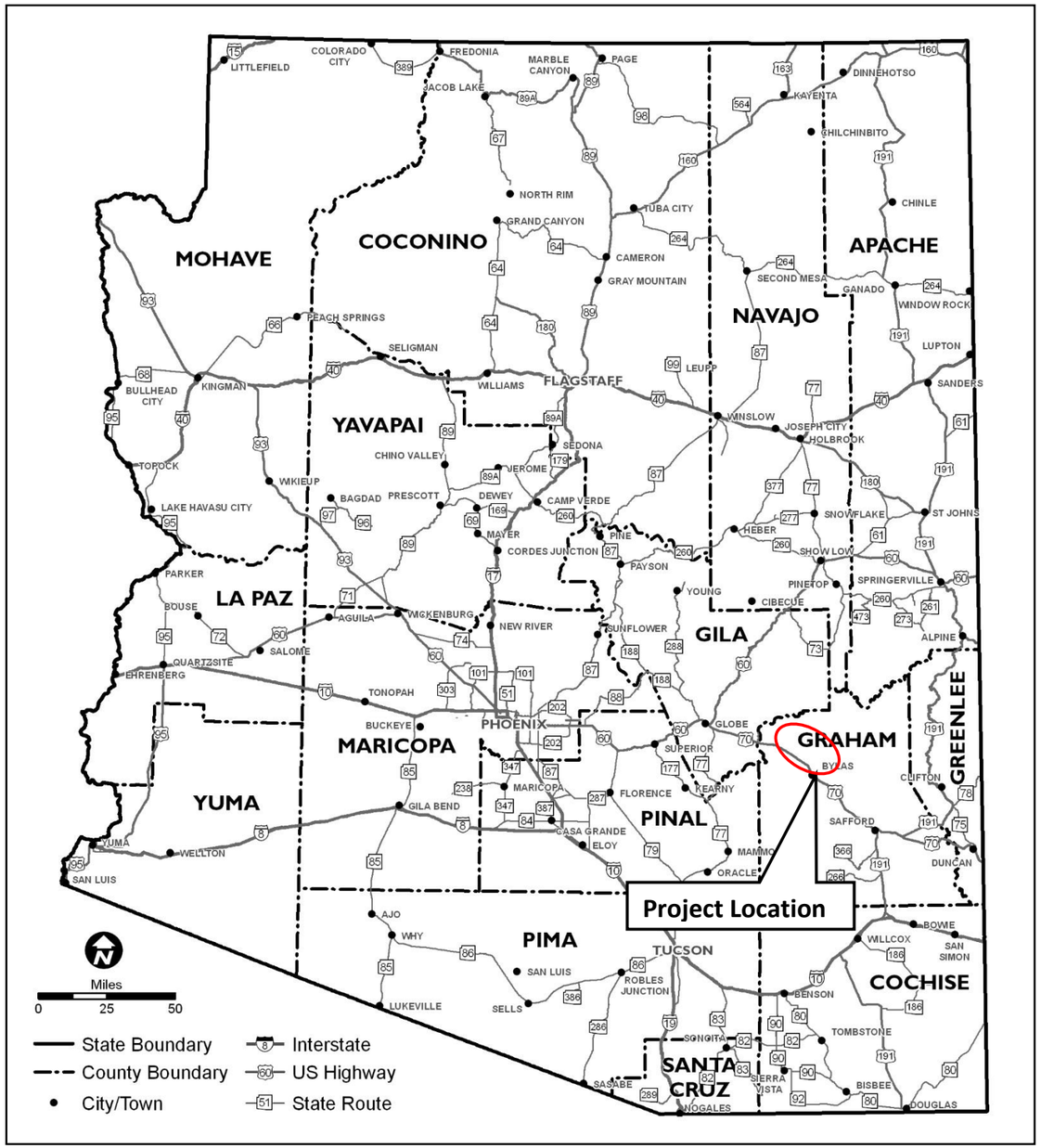
Design Program Year: FY

Construction Program Year: FY

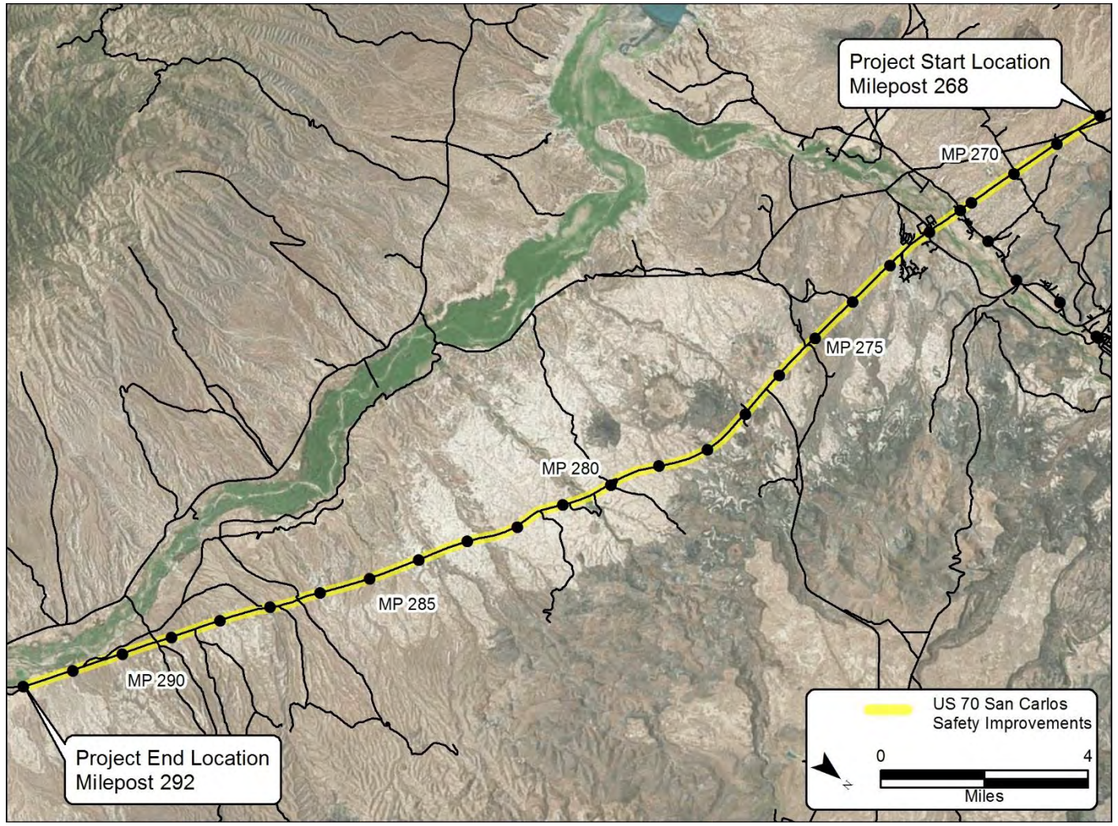
ATTACHMENTS

19) State Location Map
20) Project Vicinity Map
21) Project Scope of Work
22) Project Schedule
23) Itemized Cost Estimate
24) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install high-visibility signage • Install warning signs with beacons at curves and speed feedback signs (MP 292, MP 280, MP 278.5) • Install warning signs and speed feedback signs entering high pedestrian area (WB MP 273, EB MP 269) • Install centerline rumble strip • Widen shoulder, install rumble strip and install safety edge • Construct passing lanes (EB MP 262 - 264 and WB MP 282 - 288) • Formalize pullouts (signage, ROW for pullouts) (WB MP 274.5, EB MP 279, EB MP 289, WB 292

5.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 70 Cutter Safety Improvements	
City/Town Name: Cutter	**County: Gila**
Primary Route/Street: US 70	
Beginning Limit: MP 258	
End Limit: MP 260	
Project Length: 2 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☐ Federal; ☒ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Safety need: There is a high ratio of fatal crashes compared to those resulting in incapacitating injuries. This segment has rolling hills and valleys with few safe passing opportunities.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

- Install warning signage in advance of intersection

- Construct center lane

- Install lighting

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$80,000	$270,000	$0	$2,700,000	$3,050,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

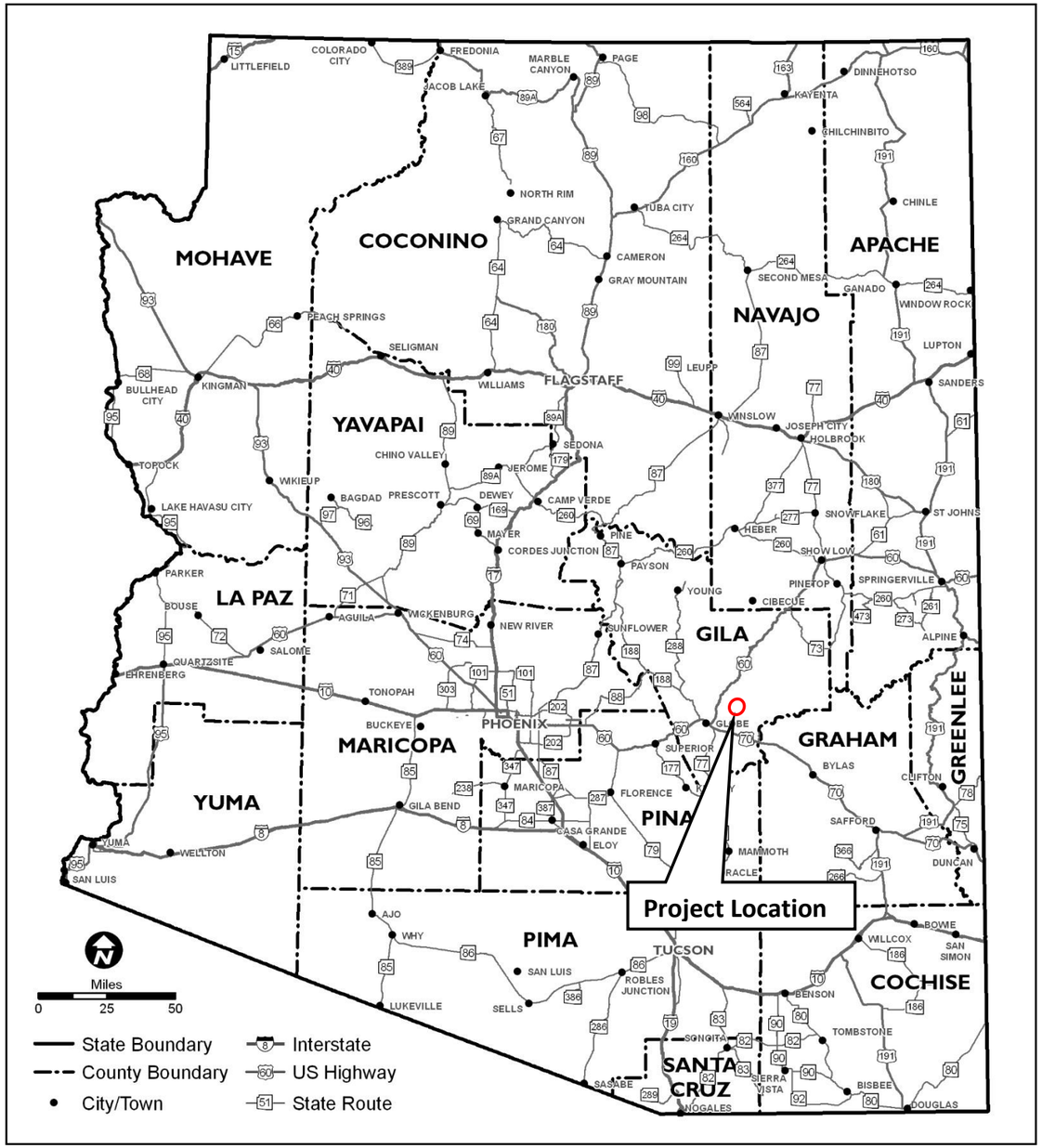
Design Program Year: FY

Construction Program Year: FY

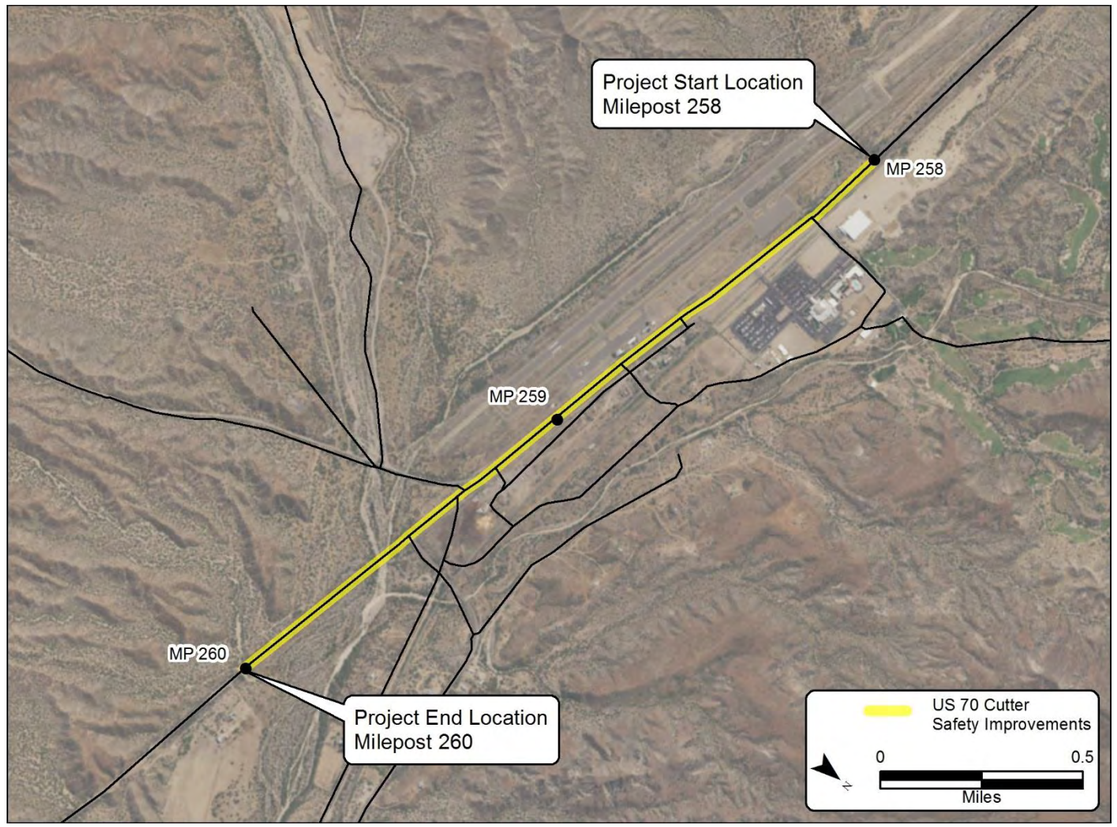
ATTACHMENTS

25) State Location Map
26) Project Vicinity Map
27) Project Scope of Work
28) Project Schedule
29) Itemized Cost Estimate
30) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install warning signage in advance of intersection (EB MP 259 and WB MP 260) • Construct center lane (MP 258.4 – 259.5) • Install lighting (MP 258.2 – 259.5)

6.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Pinal Creek Bridge (No. 36)	
City/Town Name: Globe	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 249.8	
End Limit: MP 249.8	
Project Length: N/A	
Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)* ☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED

High level of strategic need in repairing bridge.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

Replace and rehabilitate bridge.

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$90,000	$210,000	$0	$2,100,000	$2,400,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

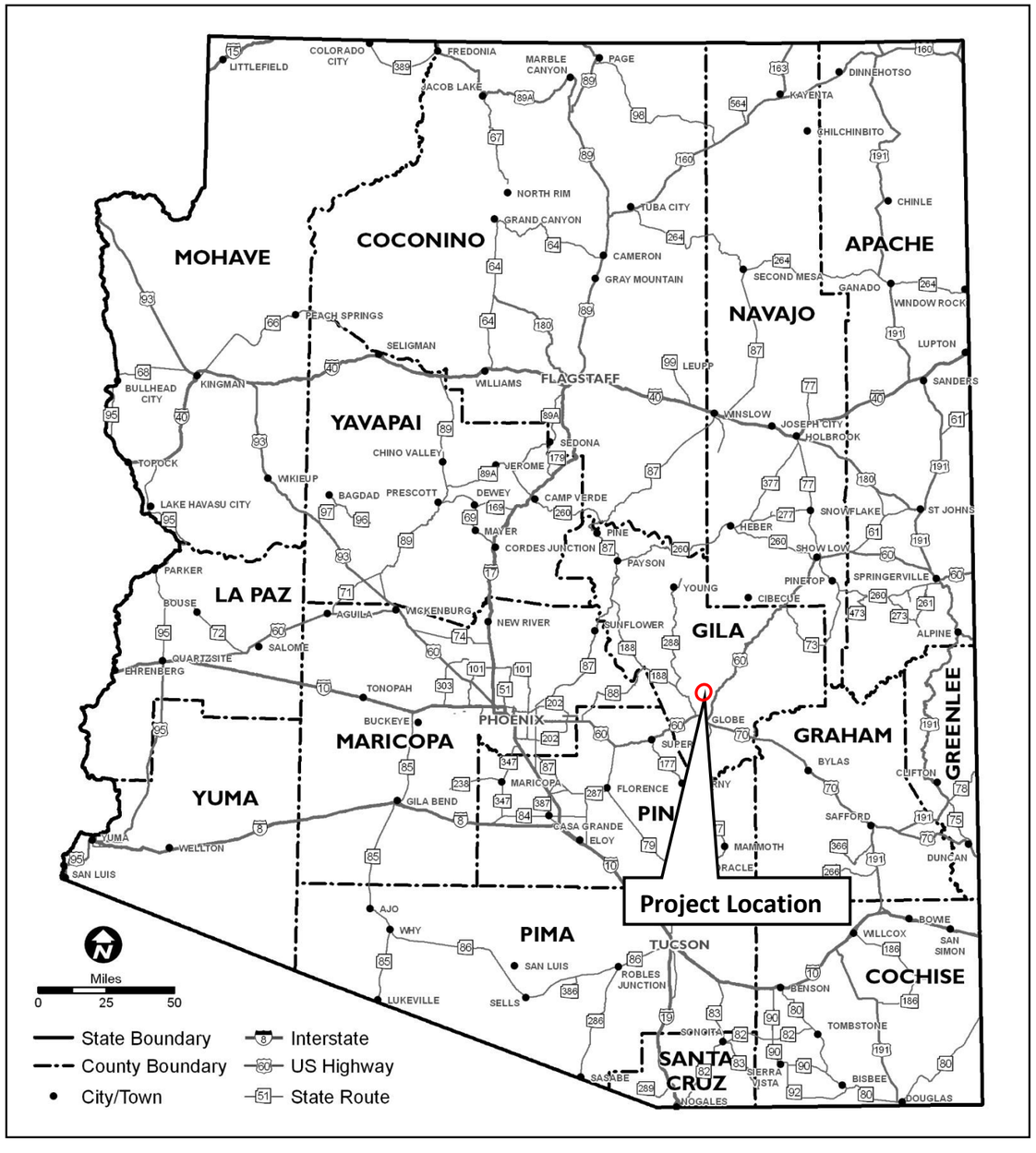
Design Program Year: FY

Construction Program Year: FY

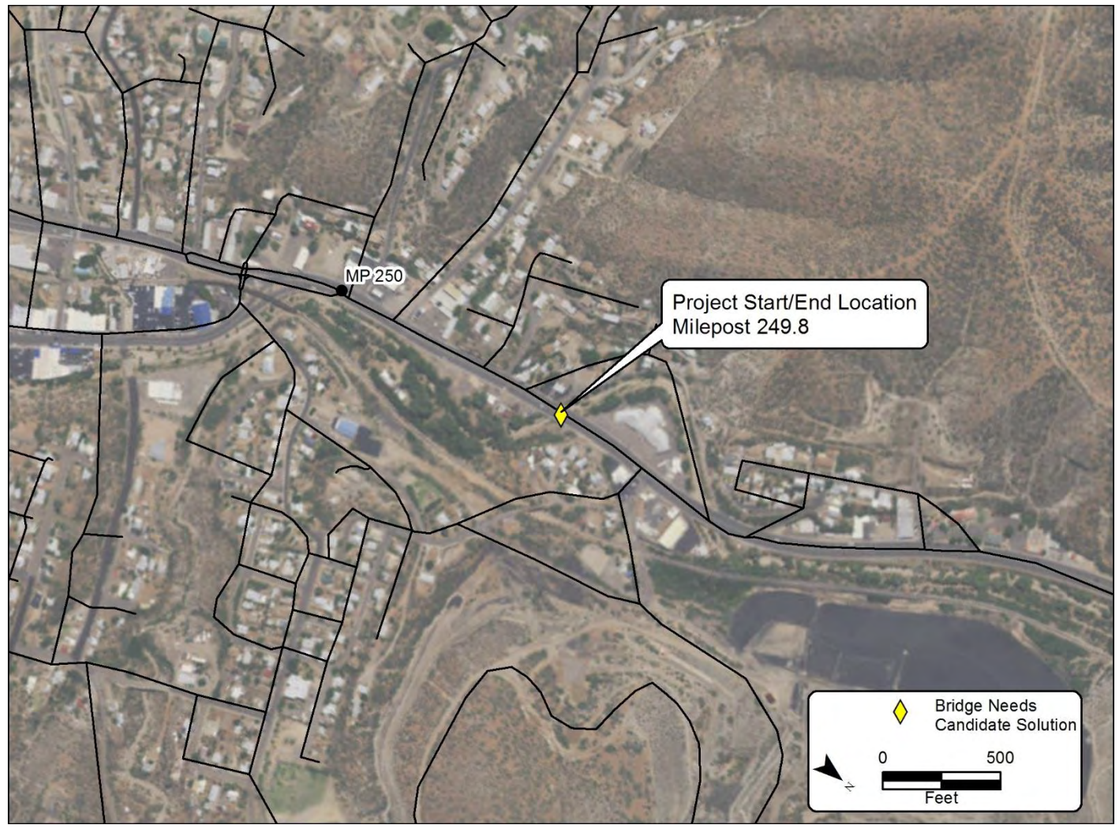
ATTACHMENTS

31) State Location Map
32) Project Vicinity Map
33) Project Scope of Work
34) Project Schedule
35) Itemized Cost Estimate
36) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Option A: Replace bridge • Option B: Rehabilitate bridge

7.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Pinal Creek Bridge (No. 266)	
City/Town Name: Globe	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 249.64	
End Limit: MP 249.64	
Project Length: N/A	
Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)* ☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION
(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED

High level of strategic need in repairing bridge.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

Replace and rehabilitate bridge.

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐

Other ☐ :

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$90,000	$280,000	$0	$2,800,000	$3,170,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

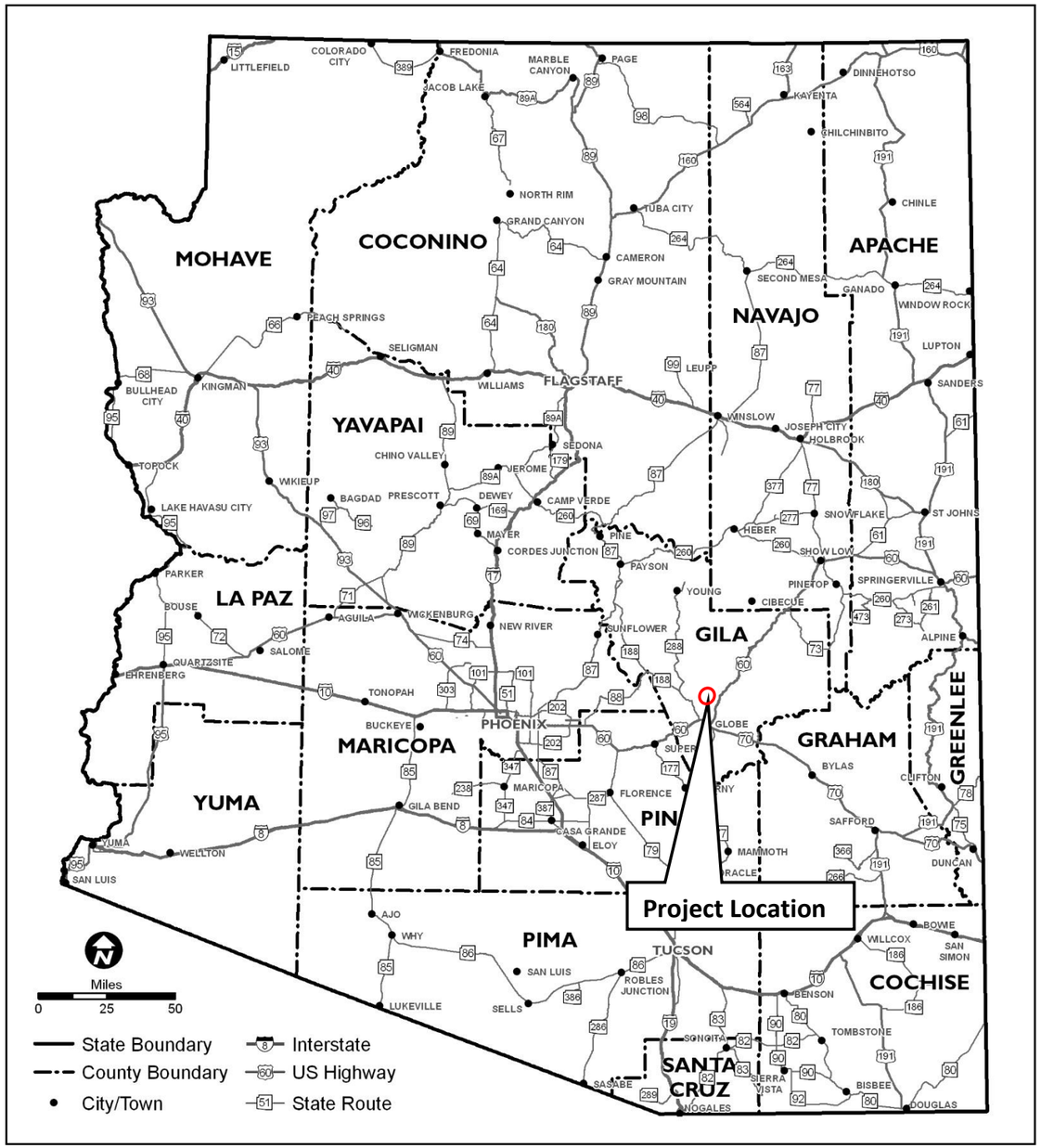
Design Program Year: FY

Construction Program Year: FY

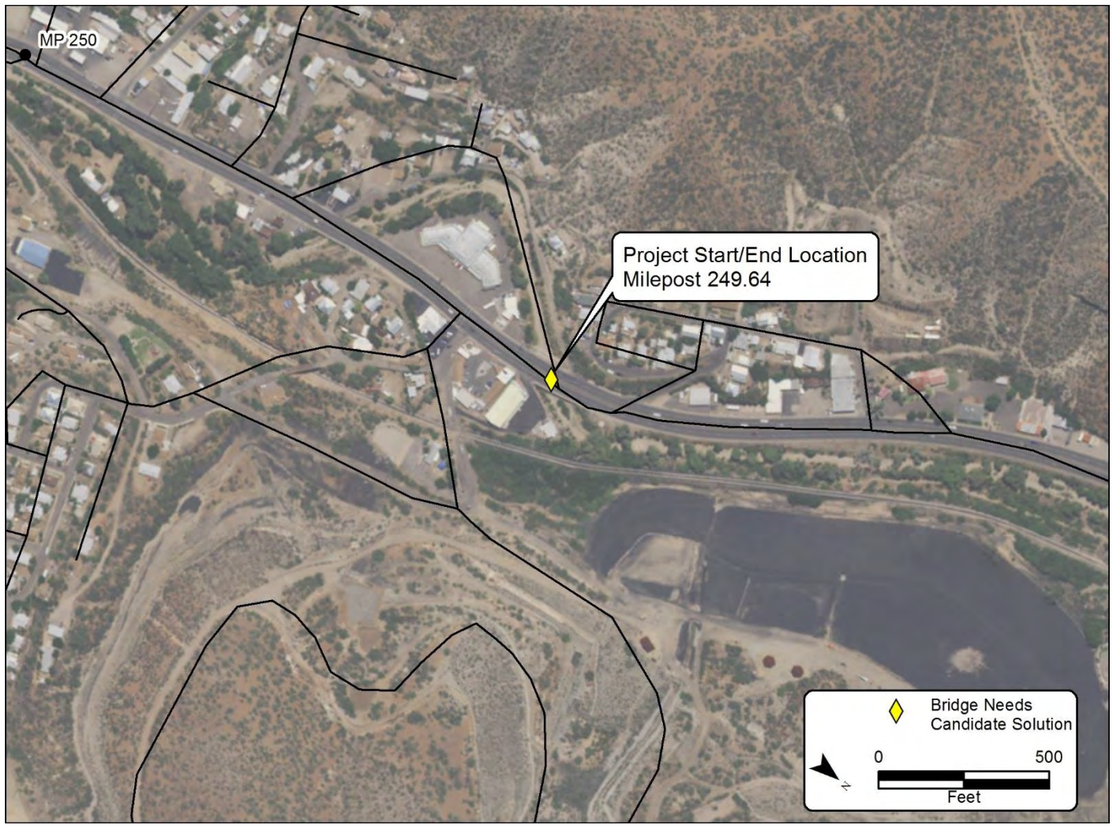
ATTACHMENTS

37) State Location Map
38) Project Vicinity Map
39) Project Scope of Work
40) Project Schedule
41) Itemized Cost Estimate
42) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Option A: Replace bridge • Option B: Rehabilitate bridge

8.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Globe-Miami Safety Improvements	
City/Town Name: Globe, Miami	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 244.5	
End Limit: MP 250	
Project Length: 4.5 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Safety need: Hot Spots at EB/WB MP 246-249; The higher concentration of incidents can be associated with the urbanized areas of Globe and Miami.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

- Install lighting

- Install speed feedback signs

- Install warning signs with beacons in advance of SR 188 intersection

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐

Other ☐ :

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$300,000	$700,000	$0	$7,000,000	$8,000,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

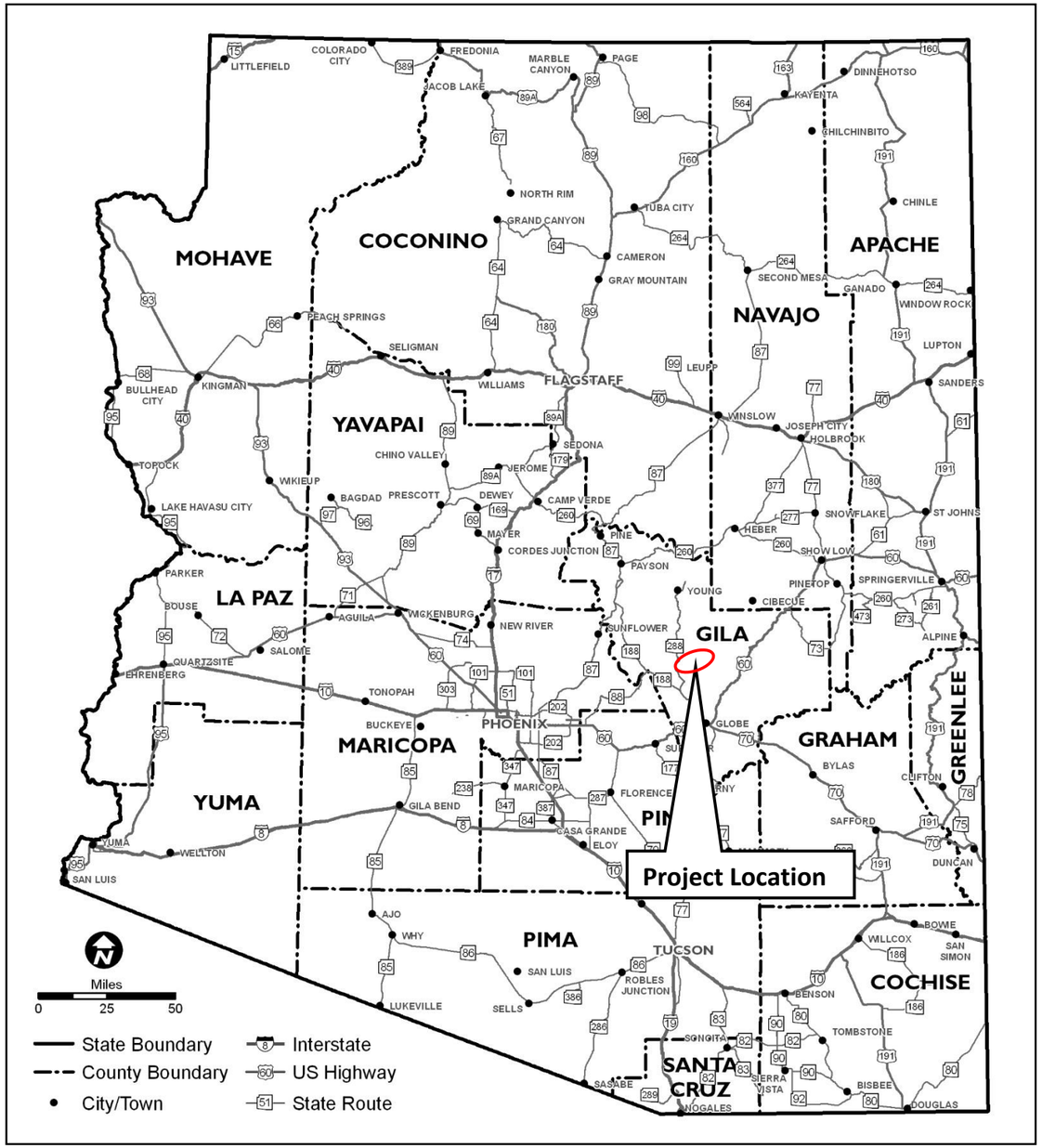
Design Program Year: FY

Construction Program Year: FY

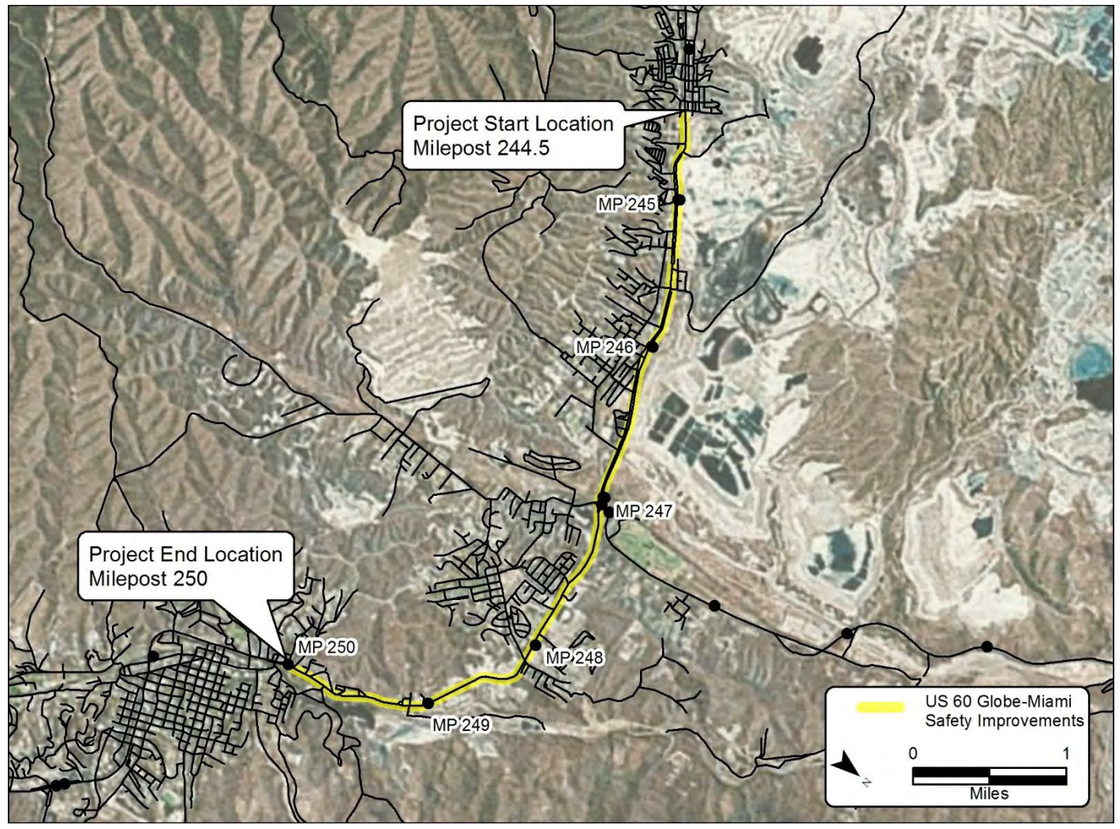
ATTACHMENTS

43) State Location Map
44) Project Vicinity Map
45) Project Scope of Work
46) Project Schedule
47) Itemized Cost Estimate
48) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install lighting (MP 244.5 to 250) • Install speed feedback signs (2 EB and 2 WB between MP 246 - 250) • Install warning signs with beacons in advance of SR 188 intersection

9.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Pinal SPRR UP (No. 0562) Freight Mitigation	
City/Town Name: Globe, Miami	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 253.4	
End Limit: MP 253.6	
Project Length: 0.2 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Freight need: High eastbound PTI (delay), can be contributed to signals located on steep grades in the eastbound direction with significant delay if trucks stop at signal.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

Reprofile mainline

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$20,000	$60,000	$0	$550,000	$630,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

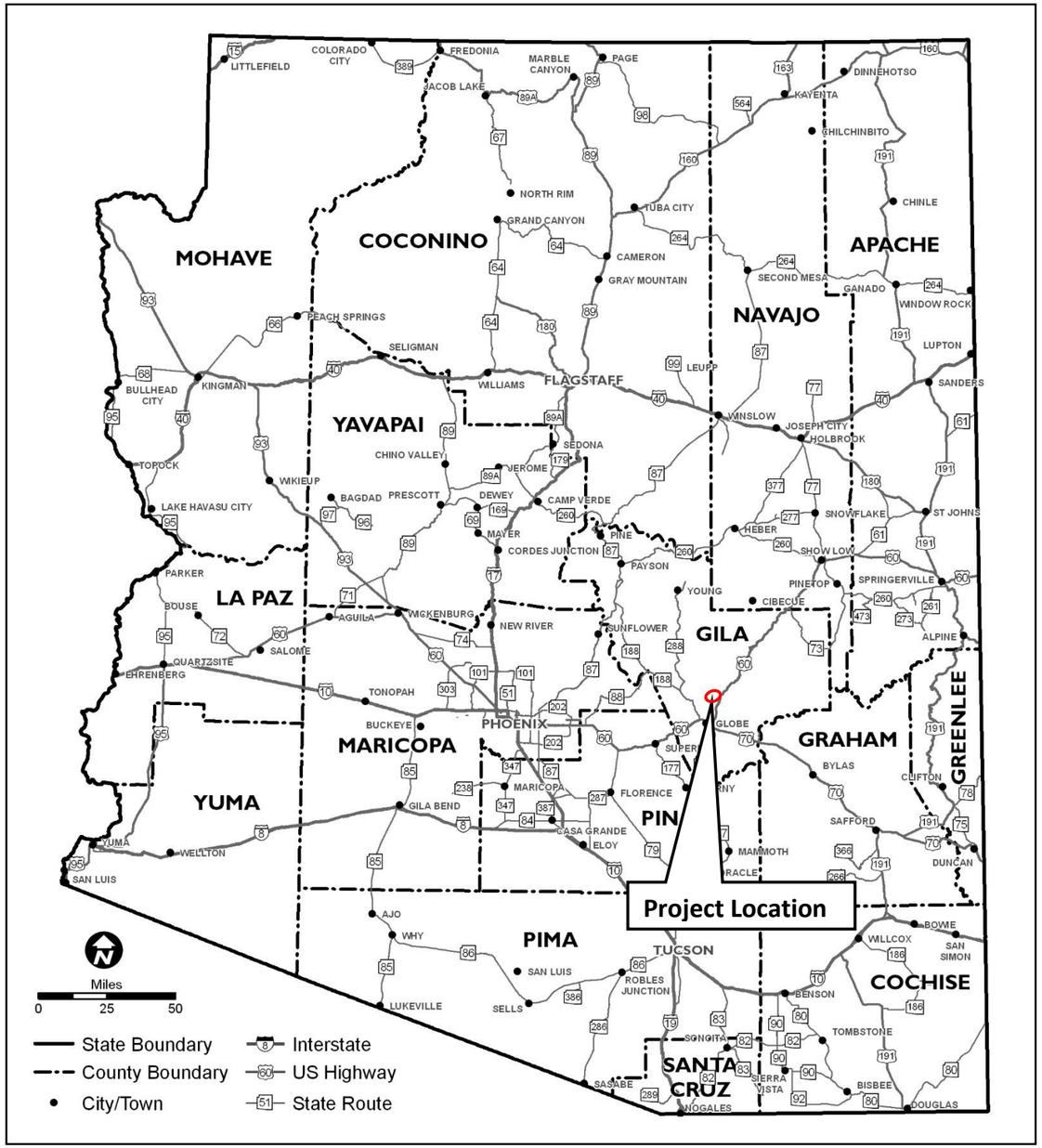
Design Program Year: FY

Construction Program Year: FY

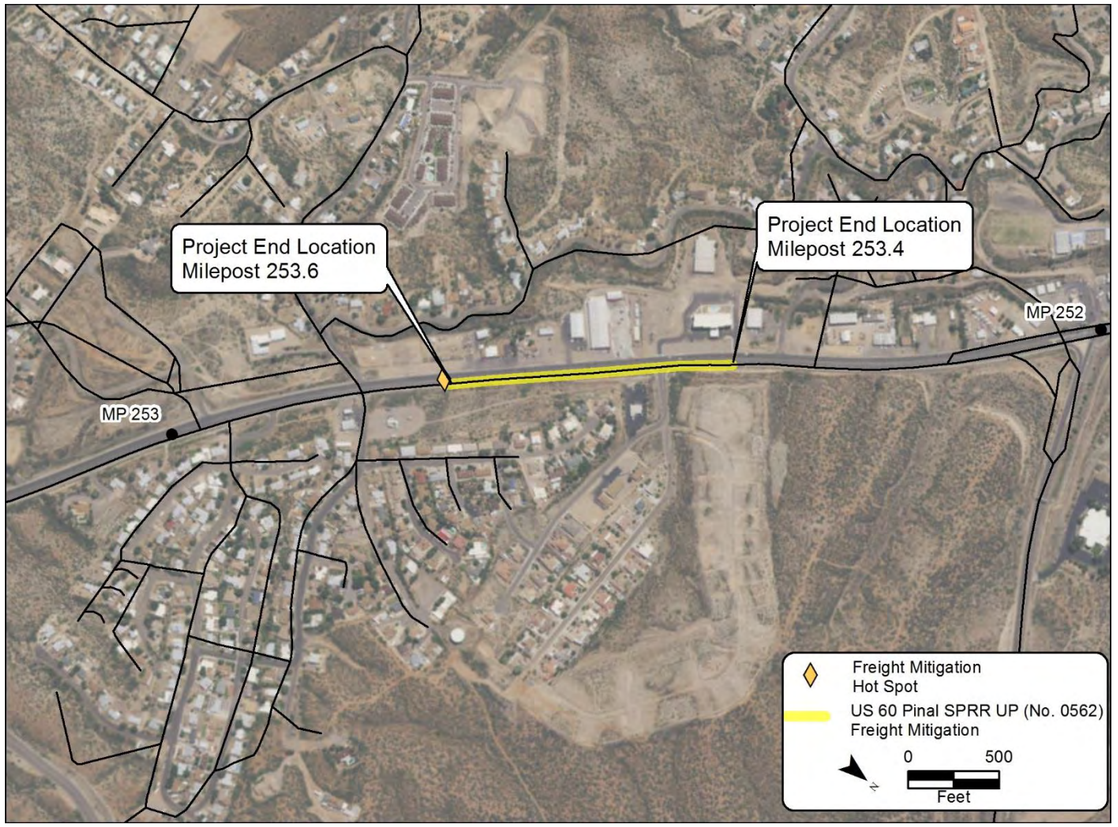
ATTACHMENTS

49) State Location Map
50) Project Vicinity Map
51) Project Scope of Work
52) Project Schedule
53) Itemized Cost Estimate
54) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Reprofile mainline

10.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Queen Creek Bridge (No. 406)	
City/Town Name: Superior	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 227.71	
End Limit: MP 227.71	
Project Length: N/A	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

High level of strategic need in repairing bridge.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

Replace and rehabilitate bridge.

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐

Other ☐ :

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$240,000	$800,000	$0	$7,800,000	$8,840,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

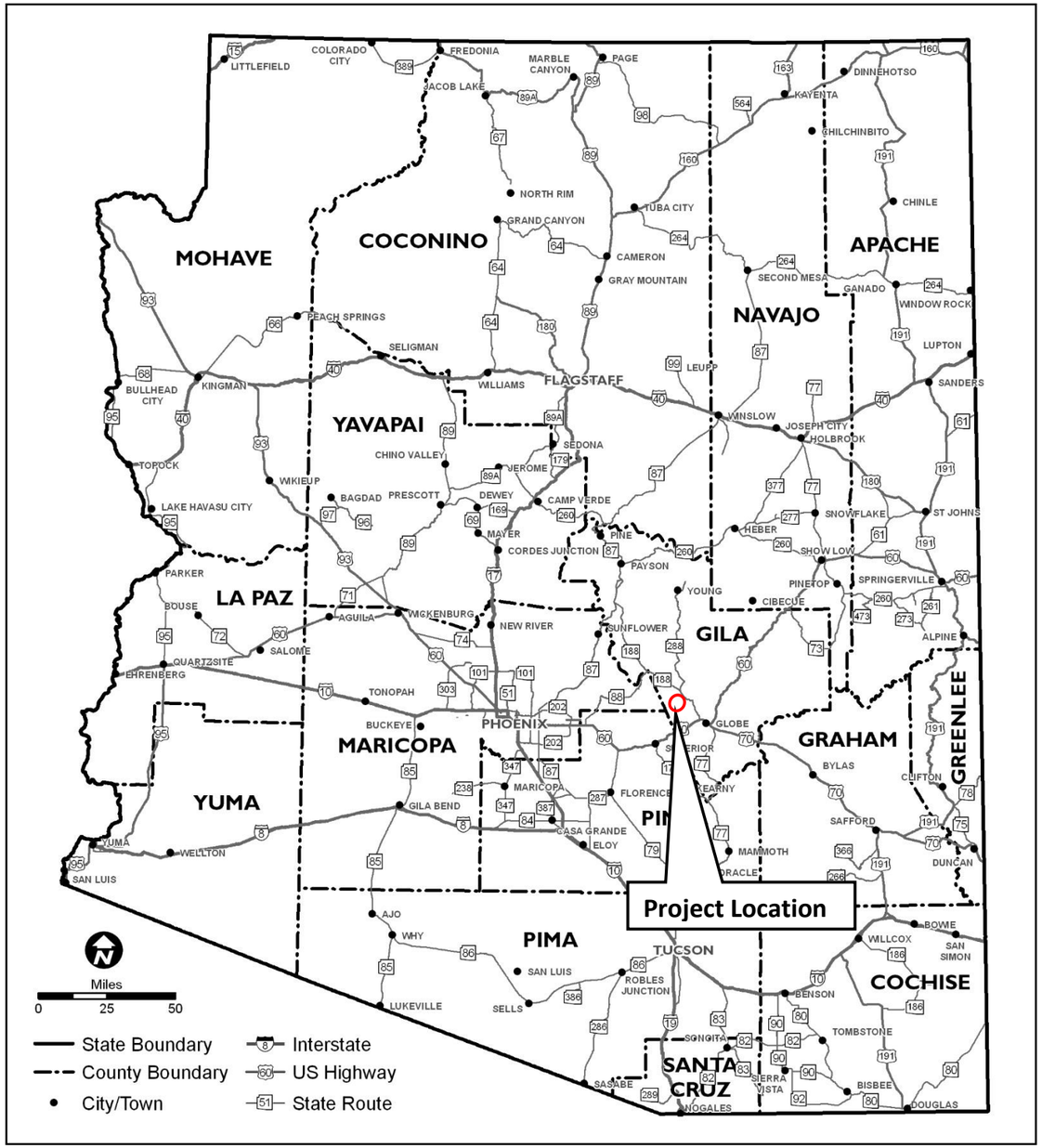
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

55) State Location Map
56) Project Vicinity Map
57) Project Scope of Work
58) Project Schedule
59) Itemized Cost Estimate
60) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Option A: Replace bridge • Option B: Rehabilitate bridge

11.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Queen Creek Bridge (No. 328)	
City/Town Name: Superior	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 229.50	
End Limit: MP 229.50	
Project Length: N/A	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

High level of strategic need in repairing bridge.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Replace and rehabilitate bridge.			

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$50,000	$150,000	$0	$1,500,000	$1,700,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

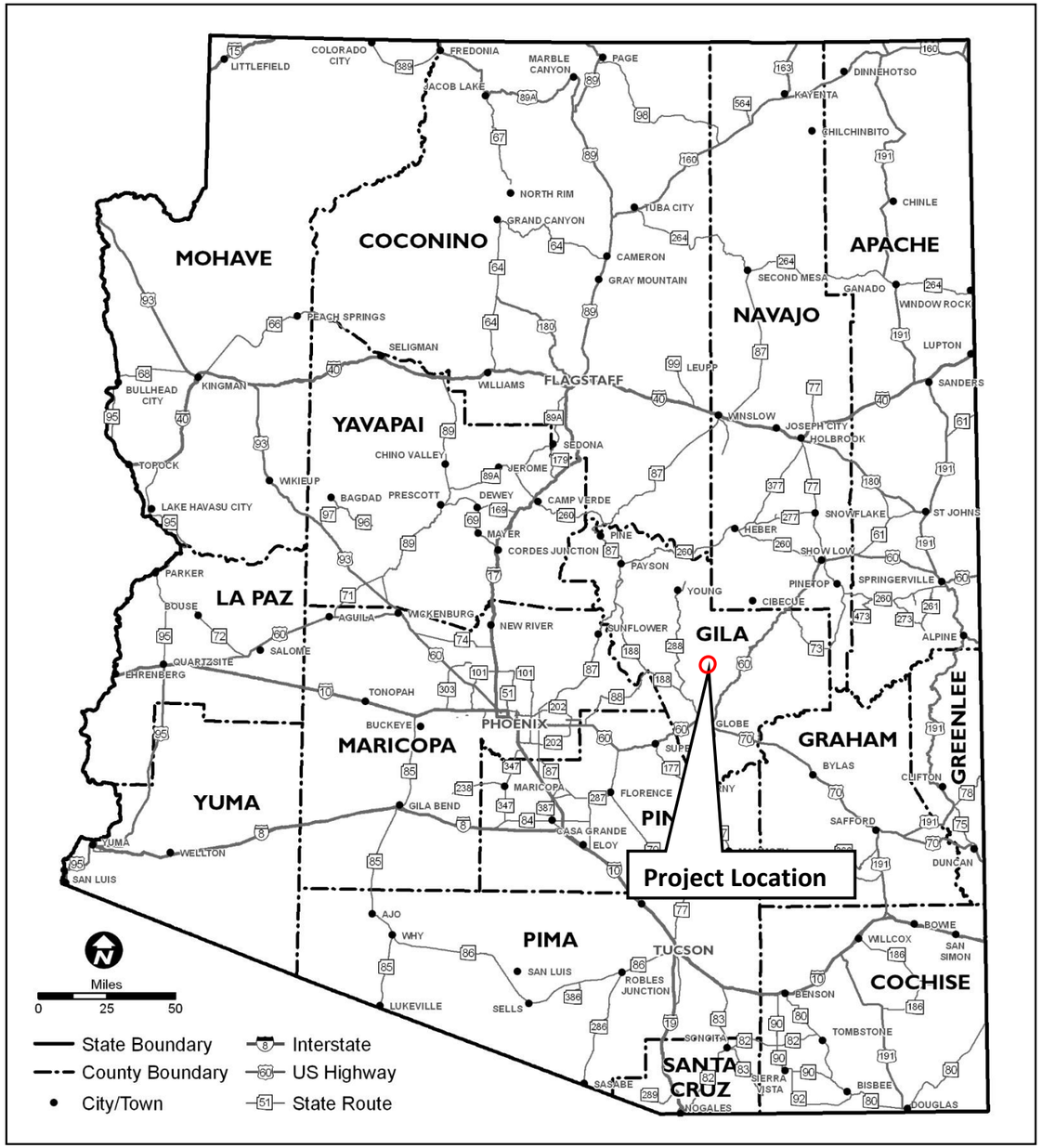
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

61) State Location Map
62) Project Vicinity Map
63) Project Scope of Work
64) Project Schedule
65) Itemized Cost Estimate
66) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Option A: Replace bridge • Option B: Rehabilitate bridge

12.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Superior to Miami Mobility and Freight Mitigation	
City/Town Name: Miami, Top-of-the-World	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 227	
End Limit: MP 243	
Project Length: 16 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Mobility need: PTI/delay, mountainous terrain, high number of closures/duration.

Freight need: High eastbound TTI, High eastbound/westbound PTI, and High Closure Duration eastbound due to mountainous grades

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☒

Option A: Widen shoulder, install rock-fall mitigation, install dynamic weather warning beacons, and install RWIS (MP x, MP y)

Note: Queen Creek Tunnel limits omitted from solution (MP 228.3 – 228.5)

Option B: Eastbound climbing/passing lane, westbound climbing/passing lane, five-lane widening, install rock-fall mitigation, and dynamic weather warning beacons, and install RWIS

Option C: Construct four-lane divided (using 2 existing-lanes for one direction)

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$12,430,000	$41,250,000	$0	$107,000,000	$1,606,800,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

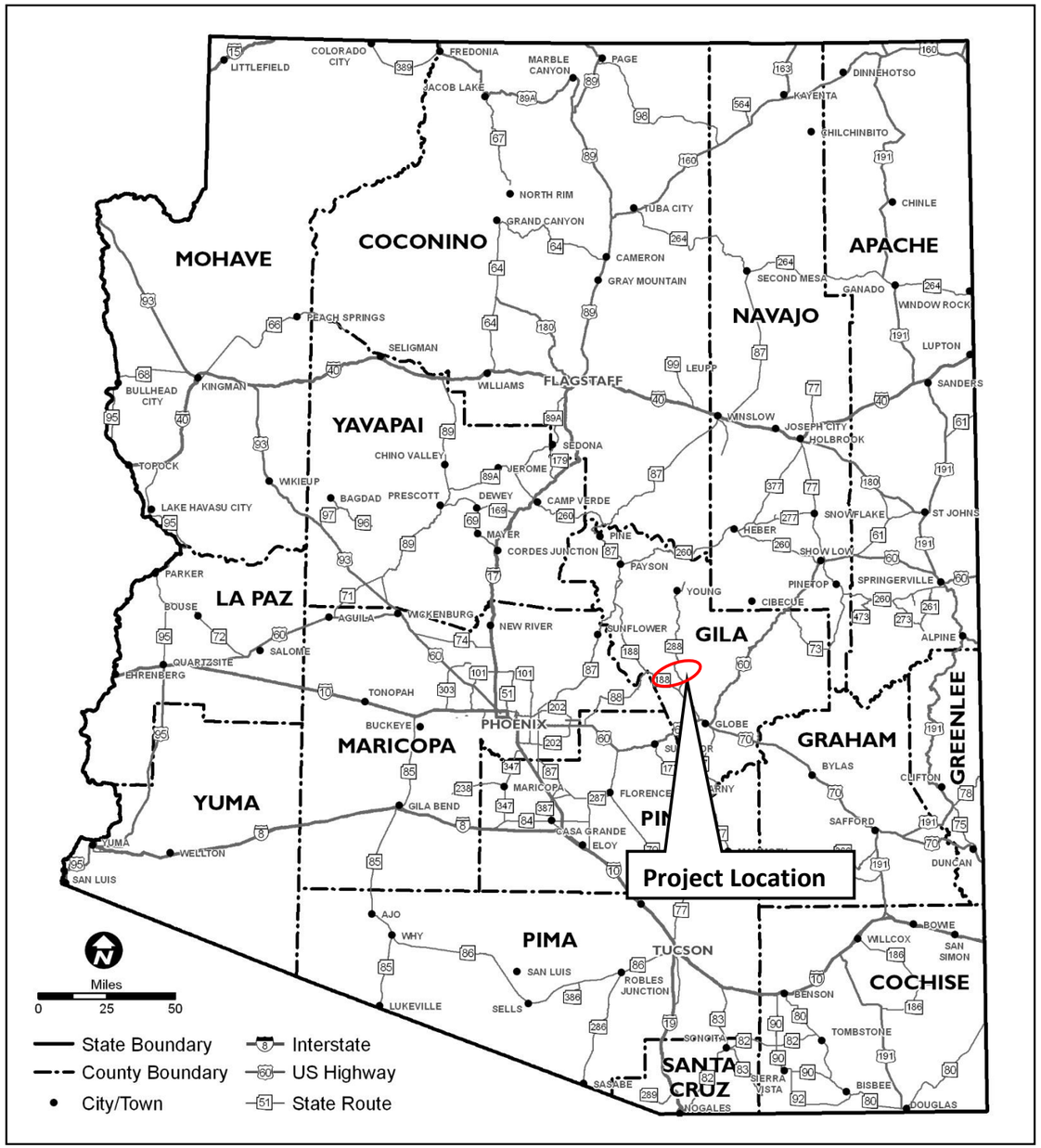
Design Program Year: FY

Construction Program Year: FY

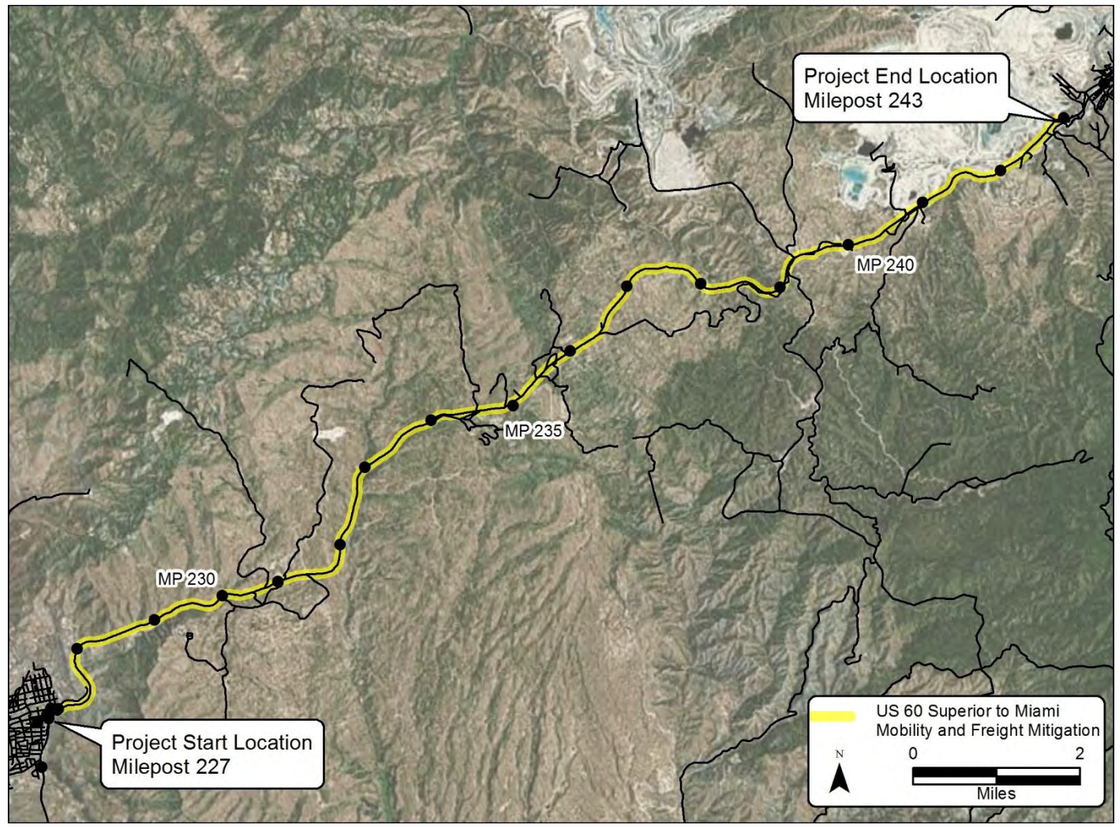
ATTACHMENTS

67) State Location Map
68) Project Vicinity Map
69) Project Scope of Work
70) Project Schedule
71) Itemized Cost Estimate
72) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) Option A: • Widen shoulder (EB MP 227.0 to 227.6, EB MP 227.7 to 228.3, EB MP 228.5 to 232, WB 238.0 to 239.5), • Install rock-fall mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75), • Install dynamic weather warning beacons and install RWIS Option B: • EB climbing/passing lane (MP 227-227.9, MP 230.4 – 232.6), • WB climbing/passing lane (MP 236.4 – 236.6, MP 238.1 – 239.5), • Five-lane widening (MP 234.2 – 236.4), • Install rock-fall mitigation (WB MP 227.7 to 228, WB MP 233 to 233.3, WB MP 240.2 to 240.4, WB MP 239.5 to 239.45, WB MP 239.6 to 239.75), • Install dynamic weather warning beacons, and install RWIS Option C: • Construct four-lane divided (using 2 existing-lanes for one direction

13.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Top-of-the-World Safety Improvements	
City/Town Name: Top-of-the-World	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 232	
End Limit: MP 234	
Project Length: 2 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☒ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Safety need: Hot Spot and eastbound: MP 232-234; The high initial and final need can be associated with the mountainous terrain along this section of the corridor.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

- Install warning signage and speed feedback signs

- Install high visibility edge line striping

- Improve sign visibility

- Install centerline rumble strip

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$8,000	$22,000	$0	$170,000	$200,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

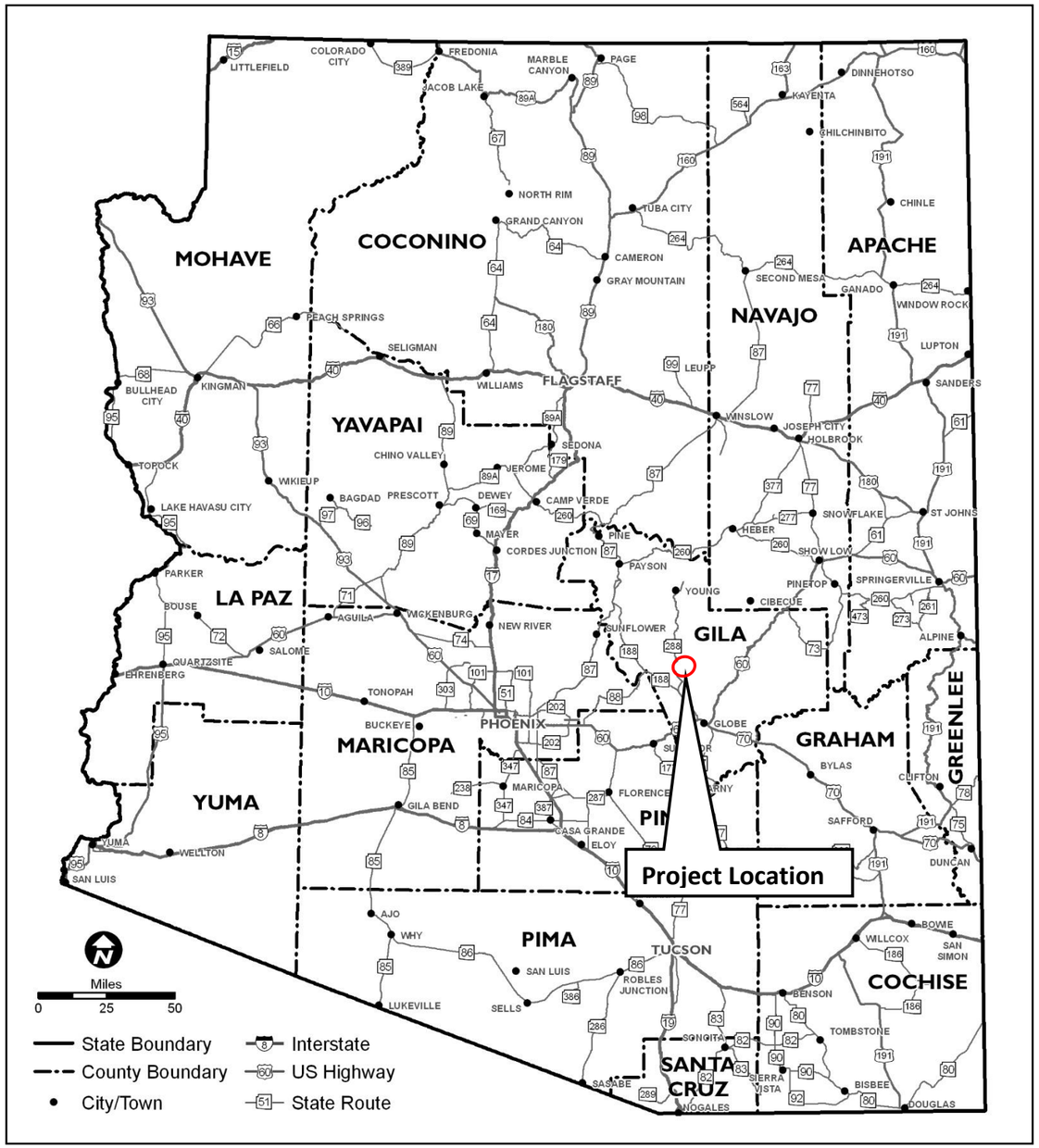
Design Program Year: FY

Construction Program Year: FY

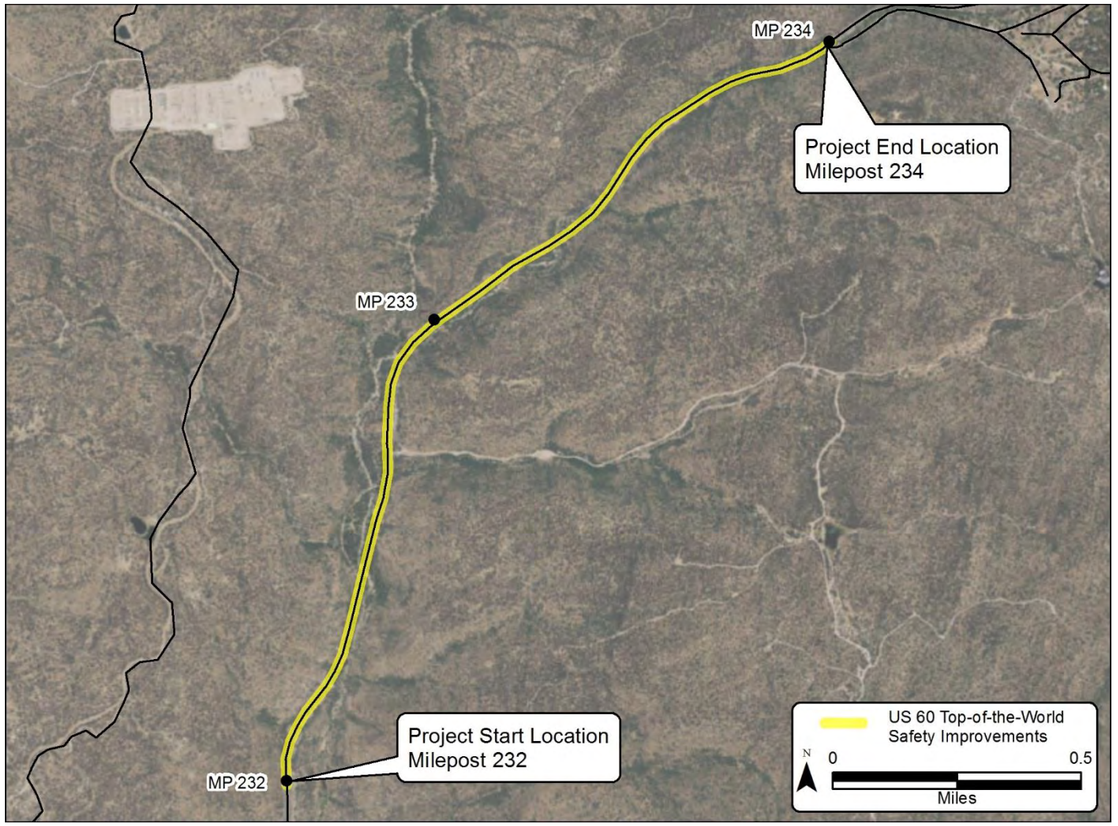
ATTACHMENTS

73) State Location Map
74) Project Vicinity Map
75) Project Scope of Work
76) Project Schedule
77) Itemized Cost Estimate
78) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install warning signage and speed feedback signs • Improve sign visibility • Install centerline rumble strip

14.0 GENERAL PROJECT INFORMATION

Date: March 2017	**ADOT Project Manager:**
Project Name: US 60 Queen Creek Safety Improvements	
City/Town Name: Superior	**County: Gila**
Primary Route/Street: US 60	
Beginning Limit: MP 227	
End Limit: MP 229	
Project Length: 2 miles	

Right-of-Way Ownership(s) (where proposed project construction would occur)**:** *(Check all that apply)*

☐ City/Town**;** ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:

Adjacent Land Ownership(s): *(Check all that apply)*

☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☒ Federal; ☐ Tribal; ☐ Other: State Trust Land

http://gis.azland.gov/webapps/parcel/

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION

(If applicable)

LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**

Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance

PROJECT NEED

Safety need: Hot Spot and eastbound: MP 227-229; The high initial and final need can be associated with the mountainous terrain along this section of the corridor.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

- Widen shoulder, install rumble strip and install safety edge
- Install guardrail
- Install warning signage and speed feedback signs
- Install high visibility edge line striping
- Improve sign visibility
- Install centerline rumble strip
Note: Queen Creek Tunnel limits omitted from solution (MP 228.3 – 228.5)

PROJECT TYPE

Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS

Check any risks identified that may impact the project's scope, schedule, or budget:

☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:

Risk Description: *(If a box is checked above, briefly explain the risk)*

FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$100,000	$300,000	$0	$2,900,000	$3,300,000

PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

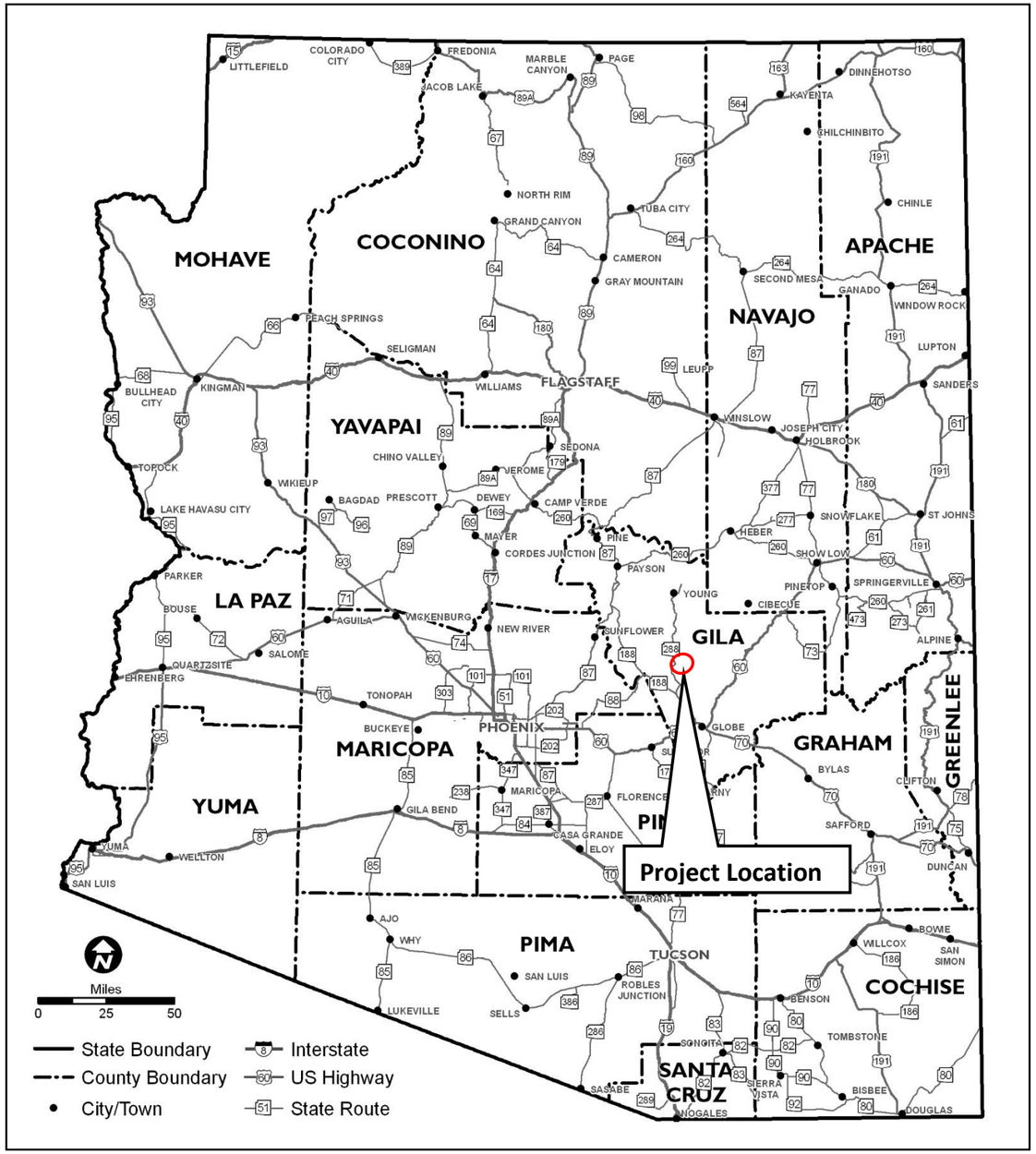
Design Program Year: FY

Construction Program Year: FY

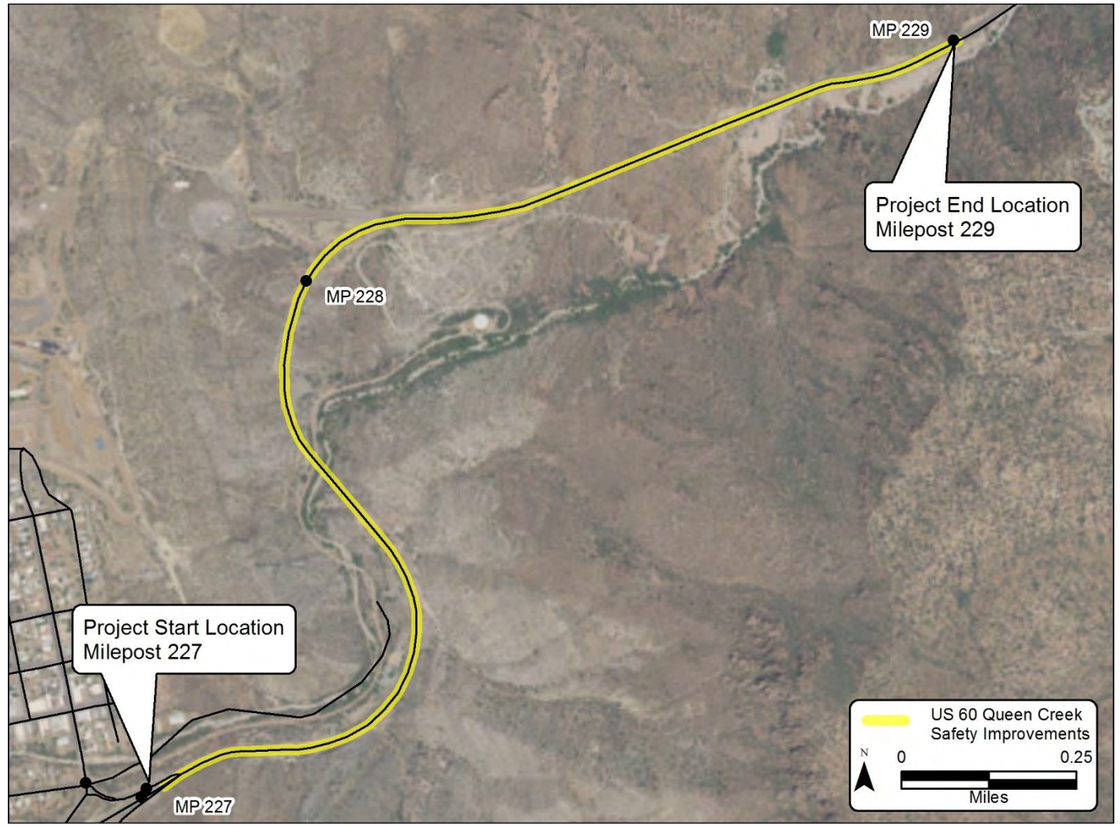
ATTACHMENTS

79) State Location Map
80) Project Vicinity Map
81) Project Scope of Work
82) Project Schedule
83) Itemized Cost Estimate
84) 15% Design Plan Sheets (as needed)

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Widen shoulder, install rumble strip and install safety edge • Install guardrail • Install warning signage and speed feedback signs • Improve sign visibility • Install centerline rumble strip *Note: Queen Creek Tunnel limits omitted from solution (MP 228.3 – 228.5)*