FINAL REPORT

US 93/US 60 Corridor Profile Study

Nevada State Line to SR 303L

PREPARED FOR ADOT MARCH 2017

ADOT WORK TASK NO.
MPD 030-16

ADOT CONTRACT NO.
11-013174

Prepared by

WILSON & COMPANY

In Association With

BURGESS & NIPLE

Structural Grace, Inc

PARSONS

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ACRONYMS & ABBREVIATIONS

AADT	Average Annual Daily Traffic
ABISS	Arizona Bridge Information and Storage System
ADOT	Arizona Department of Transportation
ARZC	Arizona & California Railroad
ASLD	Arizona State Land Department
AZTDM	Arizona Statewide Travel Demand Model
BCA	Benefit Cost Analysis
BI	Bridge Index
BLM	Bureau of Land Management
BNSF	BNSF Railway
BqAZ	Building a Quality Arizona
CANAMEX	Canada-America-Mexico Trade Corridor
CCTV	Closed Circuit Television
CPS	Corridor Profile Study
CR	Cracking Rating
DMS	Dynamic Message Sign
DCR	Design Concept Report
EB	Eastbound
FAST	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FI	Freight Index
FY	Fiscal Year
GA	General Aviation
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
KART	Kingman Area Regional Transit
LCCA	Life-Cycle Cost Analysis
LOS	Level of Service
LRTP	Long-Range Transportation Plan
MAG	Maricopa Association of Governments
MAP 21	Moving Ahead for Progress in the 21st Century
MI	Mobility Index
MP	Milepost
MPD	Multimodal Planning Division
NACOG	Northern Arizona Council of Governments
NB	Northbound
NPV	Net Present Value
O-D	Origin-Destination
OP	Overpass
P2P	Planning-to-Programming
PA	Project Assessment
PARA	Planning Assistance for Rural Areas
PDI	Pavement Distress Index
PI	Pavement Index
POE	Port of Entry
PUD	Planned Development Unit
PES	Performance Effectiveness Score
PS	Prioritization Score
PSR	Pavement Serviceability Rating
PTI	Planning Time Index
RTP	Regional Transportation Plan
RWIS	Road Weather Information System
SATS	Small Area Transportation Study

ACRONYMS & ABBREVIATIONS (Continued)

SB	Southbound
SERI	Species of Economic and Recreational Importance
SHSP	Strategic Highway Safety Plan
SI	Safety Index
SOV	Single Occupancy Vehicle
SHSP	Strategic Highway Safety Plan
SR	State Route
SWAP	Arizona 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
US	United States Route
USDOT	United States Department of Transportation
V/C	Volume to Capacity Ratio
VMT	Vehicle Miles Traveled
WACOG	Western Arizona Council of Governments
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 United States (US) Route 93 and US Route 60 (US 93/US 60). This study examines key performance measures relative to the US 93/US 60 corridor, and the results of this performance evaluation are used to identify potential strategic improvements. The intent of the ADOT 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 CPSs within three separate groupings. The US 93/US 60 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 has been accomplished by following the process described below:

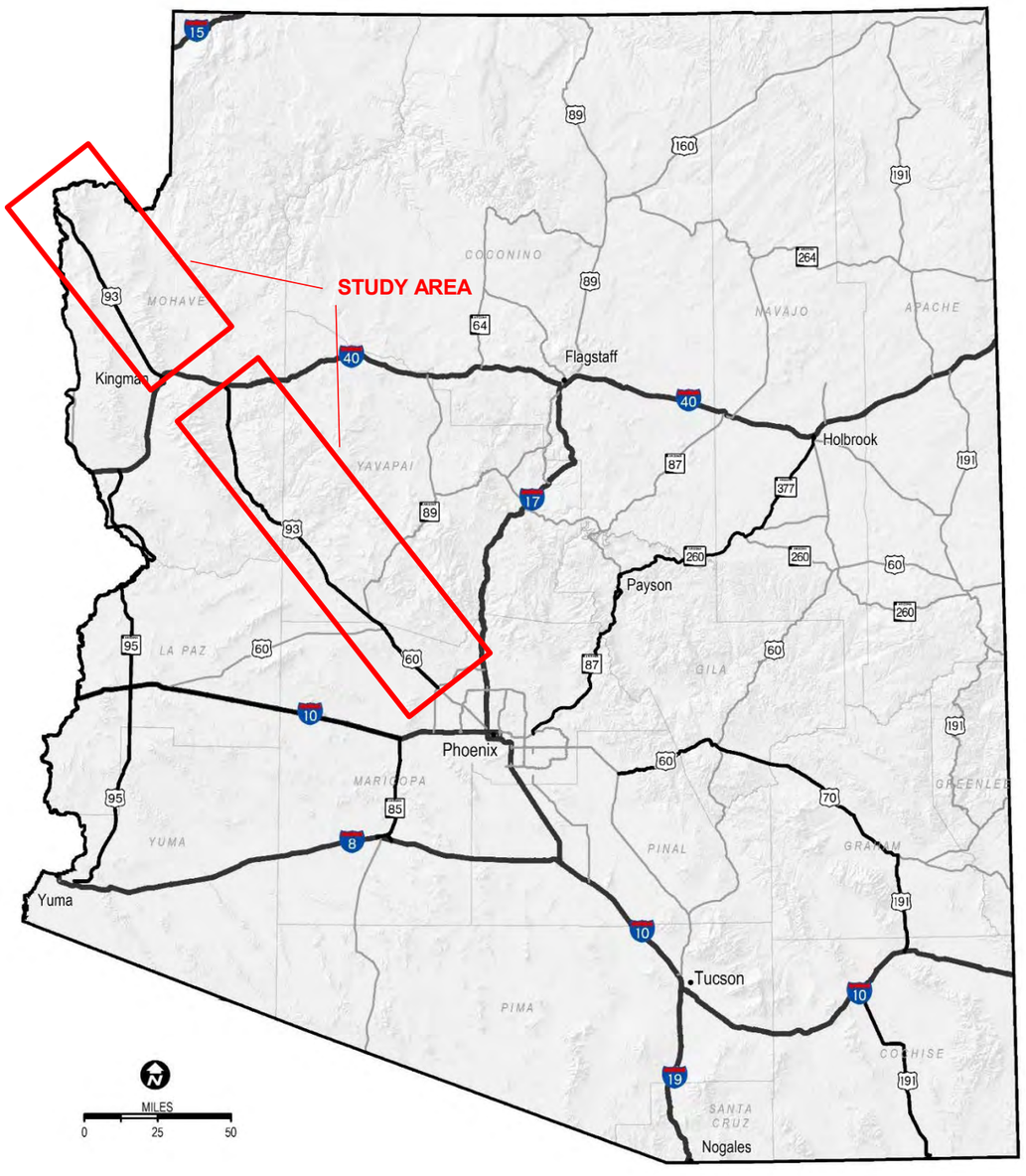
- Inventory past improvement recommendations
- Define corridor goals and objectives
- Assess existing performance based on quantifiable performance measures
- Propose various solutions to improve corridor performance
- Identify specific solutions that can provide quantifiable benefits relative to the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

The objective of this 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. It defines solutions and improvements for the US 93/US 60 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

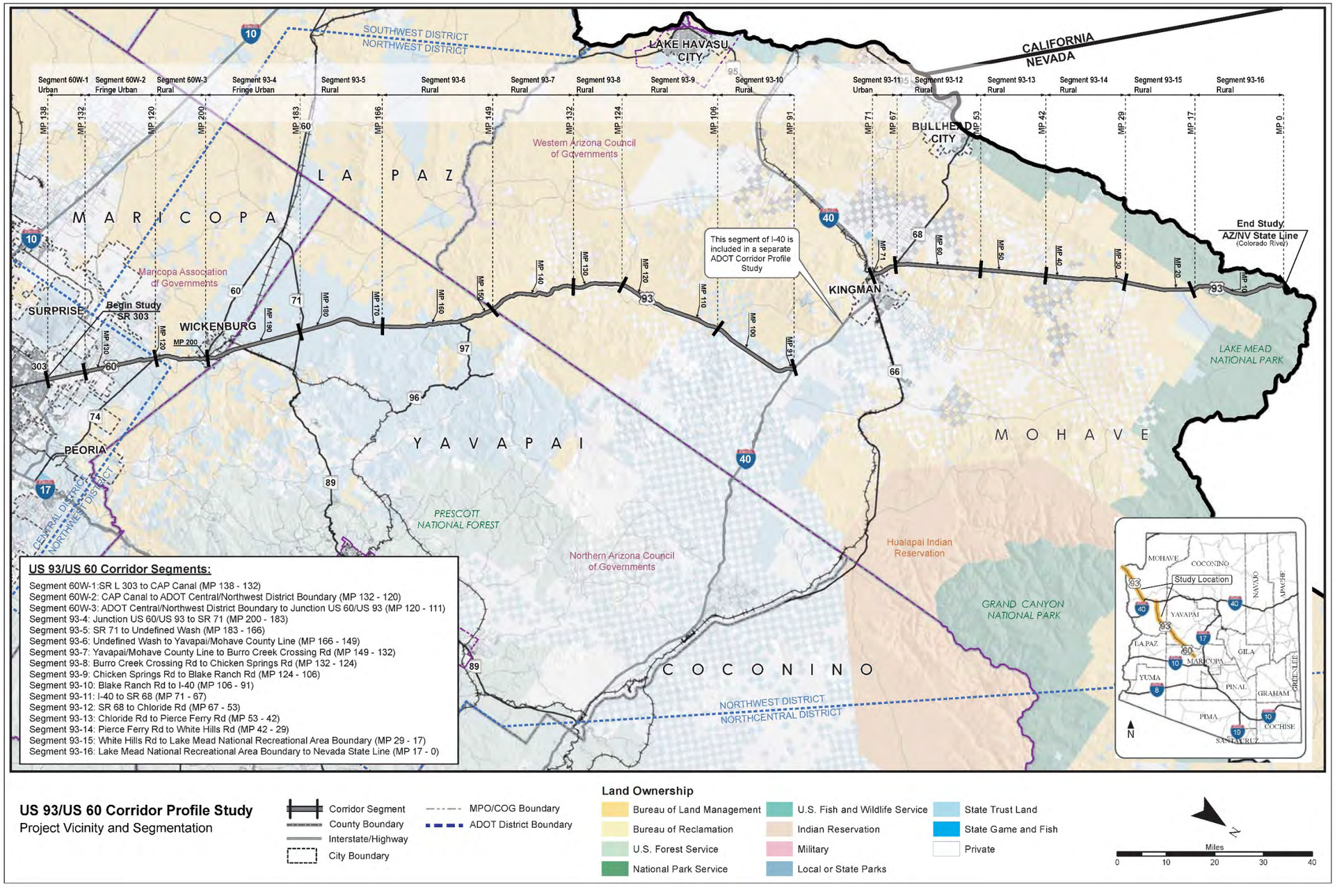
The US 93/US 60 Corridor Profile Study limits extend from the Mike O'Callaghan–Pat Tillman Memorial Bridge at the Colorado River, which is the Arizona/Nevada State Line, to Arizona State Route 303 Loop (Loop 303). US 93 extends 200 miles south from the State Line to its junction with US 60 in Wickenburg, Arizona, at a roundabout on the west bank of the Hassayampa River. The US 60 portion of the corridor extends from the roundabout over a new, four-lane bridge across the Hassayampa River for approximately 28 miles south to Loop 303 in Surprise, Arizona.

The US 93/US 60 study corridor has been divided into 16 segments for analysis and evaluation. The corridor was segmented at logical breaks where the physical or operational 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 shown in **Figure ES-2**.

It is important to note that I-40, which runs across the northern portion of Arizona between California and New Mexico is important for the continuity of travel associated with the US- 93/US 60 corridor. A segment of US 93 is coincident with I-40 between the US 93/I-40 Traffic Interchange (TI) 18 miles east of Kingman, Arizona, (Exit 71) and the US 93-Beale Street/I-40 TI on the west side of Kingman (Exit 48). This segment of I-40 is included in the *I-40 West Corridor Profile Study* – California State Line to Junction I-17. The Draft Final Report for this study was released in June 2016.

Another important distinction of the US 93/US 60 corridor is designation of the US 93 portion as the future route for Interstate 11 (I-11) throughout Arizona. The 2015 Fixing America's Surface Transportation Act, or FAST Act, formally designated I-11 to follow US 93 from Wickenburg to the Arizona/Nevada State Line. Identification of highway segments for study consideration was based on roadway, traffic, and jurisdictional characteristics to allow for the appropriate level of analysis for similar operating environments. I-11 is planned to extend northward from the Arizona/Nevada State Line to the US/Canadian International Border.

Figure ES-2: Corridor Location and Segments



CORRIDOR PERFORMANCE

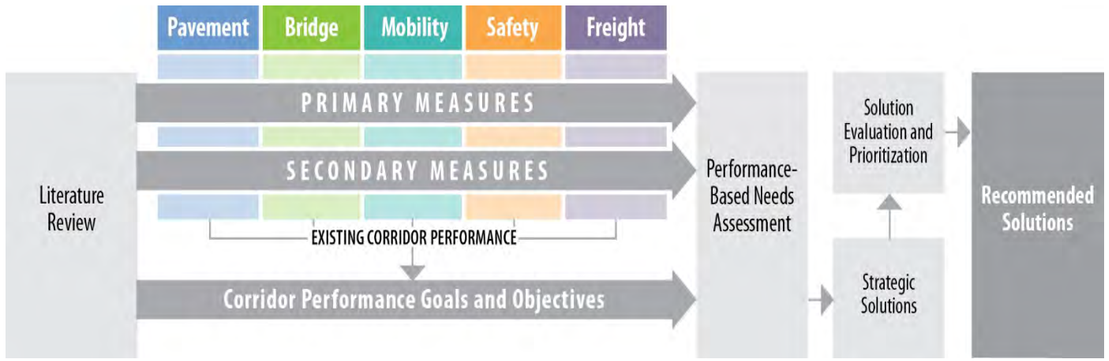
A series of performance measures is used to assess the US 93/US 60 corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

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.

Figure ES-3 illustrates the performance evaluation framework, which includes a two-tiered system of performance measures (primary and secondary) to assess 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 provides for 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 Rating, substructure, or superstructure 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 threshold 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

The performance evaluation of the US 93/US 60 corridor indicates the Freight and Safety Performance Areas exhibit the lowest – “poor/below average” – performance with the Pavement and Mobility Performance Areas showing the highest – “good/above average” – performance. The majority of the corridor segments have a “fair/average” performance relative to the Bridge Index.

Based on results of the performance evaluation, the following general observations may be made related to the performance of the US 93/US 60 corridor:

- Pavement Performance generally is “good,” with the exception of a few isolated locations in Segment 14
- Performance with respect to Bridges generally is “fair” overall, with no functionally obsolete bridges in any segment
- Nine of the segments have at least one bridge with a performance rating of five and the remaining six segments have at least one bridge with a performance rating of six
- All but one of the segments (Segment 60W-1) exhibit “good” performance relative to the Mobility Index
- 38% of the segments exhibit a “good” performance rating, while 38% of the segments exhibit a “poor” performance rating, resulting in a freight index with an overall performance rating of “fair”
- Seven segments along the corridor exhibit “below average,”performance, four segments exhibit “average” performance, and five segments exhibit “good” performance, resulting in an overall performance rating of “fair” for the Safety Index
- Very few crash “hot spots” are present within the corridor

Table ES-2 provides a summary of all primary and secondary performance measures for the US 93/US 60 corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary and secondary measure shown.

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 Peak Hour V/C		Closure Extent (instances/ milepost/year/mile)		Directional TII (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		
60W-1[1*a]	6	4.01	3.97	3.83	0%	6.81	97.17	0%	5.00	0.77	1.04	0.44	0.42	0.10	0.20	1.10	1.02	1.50	1.36	100%	20%
60W-2[1* a]	12	3.98	4.08	4.03	0%	6.26	93.89	0%	5.00	0.68	1.01	0.27	0.28	0.00	0.10	1.04	1.12	1.32	1.73	99%	16%
60W-3[2^ a]	9	4.40	4.21	4.21	0%	6.67	91.57	0%	6.00	0.48	0.75	0.20	0.20	0.09	0.27	1.00	2.38	2.43	9.65	72%	10%
93-4[1* b]	17	3.82	3.63	3.68	0%	6.76	83.15	0%	6.00	0.61	0.73	0.39	0.38	0.06	0.51	1.35	1.25	5.93	2.13	81%	15%
93-5[2^ b]	17	3.81	3.63	3.81	0%	5.39	86.23	0%	5.00	0.30	0.36	0.17	0.17	0.18	0.18	Insufficient Data				82%	10%
93-6[2^ a]	17	3.71	3.58	3.84	13%	6.37	96.25	0%	5.00	0.28	0.33	0.19	0.19	0.05	0.15	1.03	1.04	1.41	1.42	80%	8%
93-7[2^ a]	17	3.86	3.81	3.79	3%	6.05	94.49	0%	5.00	0.13	0.15	0.10	0.10	0.11	0.02	1.06	1.11	1.61	1.63	91%	11%
93-8[2^ a]	8	3.87	4.10	3.56	13%	6.32	96.75	0%	5.00	0.13	0.15	0.10	0.10	0.00	0.10	1.00	1.00	1.84	1.15	98%	11%
93-9[2^ b]	18	4.19	4.06	3.99	0%	6.48	87.50	0%	5.00	0.26	0.31	0.25	0.25	0.24	0.06	1.00	1.00	1.00	1.03	48%	6%
93-10[2^ a]	15	4.19	4.03	3.95	0%	6.29	93.36	0%	5.00	0.16	0.18	0.17	0.17	0.00	0.24	1.03	1.00	1.45	1.50	47%	6%
93-11[1*a]	4	4.20	3.69	4.07	13%	6.36	94.90	0%	6.00	0.66	0.78	0.58	0.61	0.15	0.46	1.81	1.00	11.65	2.85	100%	19%
93-12[2^ a]	14	4.12	4.10	4.04	4%	5.90	96.11	0%	5.00	0.22	0.25	0.26	0.26	0.03	0.06	1.00	1.00	1.10	1.16	77%	21%
93-13[2^ a]	11	3.88	3.78	3.78	0%	6.00	97.18	0%	6.00	0.21	0.23	0.26	0.26	0.11	0.02	1.00	1.00	1.06	1.15	87%	8%
93-14[2^ a]	13	3.43	3.59	3.49	8%	6.00	97.70	0%	6.00	0.23	0.27	0.24	0.24	0.02	0.09	1.00	1.00	1.07	1.21	54%	10%
93-15[2^ a]	12	3.80	3.62	4.00	0%	No Bridges				0.23	0.27	0.23	0.23	0.00	0.12	1.00	1.00	1.10	1.63	54%	7%
93-16[2^ a]	17	4.53	4.38	4.39	0%	7.31	91.03	0%	6.00	0.23	0.27	0.24	0.23	0.06	0.12	1.00	1.00	1.13	1.46	84%	0%
Weighted Corridor Average		3.98	3.89	3.90	3%	6.40	93.52	0.00%	5.28	5.28	0.40	0.24	0.23	0.08	0.16	1.06	1.11	1.96	1.87	76%	10%

SCALES

Performance	Non-Interstate		All				Urban and Fringe Urban	All	Uninterrupted		All	
Good/Above Average	> 3.50	< 5%	> 6.5	> 80	< 12%	> 6	< 0.71[1/2]	≤ 0.22	< 1.15^	< 1.30^	≥ 90%	≥ 17%
Fair/Average	2.90 - 3.50	5% - 20%	5.0 - 6.5	50 - 80	12% - 40%	5 - 6	0.71 - 0.89[1/2]	> 0.22 - ≤ 0.62	1.15 - 1.33^	1.30 - 1.50^	60% - 90%	11 - 17%
Poor/Below Average	< 2.90	> 20%	< 5.0	< 50	> 40%	< 5	> 0.89[1/2]	> 0.62	>1.33^	> 1.50^	≤ 60%	< 11%

Performance	Rural	Interrupted	
Good/Above Average	< 0.56[2]	< 1.30*	< 3.00*
Fair/Average	0.56 - 0.76[2]	1.30 - 2.00*	3.00 - 6.00*
Poor/Below Average	> 0.76[2]	> 2.00*	> 6.00*

^Uninterrupted Flow Facility
*Interrupted Flow Facility
[a]2 or 3 or 4 Lane Divided Highway
[b]2 or 3 Lane Undivided Highway
[1]Urban Operating Environment
[2]Rural Operating Environment

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		Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors [a]	Fatal + Incapacitating Injury Crashes Involving Trucks	Fatal + Incapacitating Injury Crashes Involving Motorcyles	Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Freight Index	Directional TTI (trucks only))		Directional PTI (trucks only)		Closure Duration (minutes/ milepost/ year/mile)		Bridge Vertical Clearance (feet)
			NB/WB	SB/EB						NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	
60W-1[1*a]	6	1.99	1.19	2.80	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.69	1.14	1.05	1.75	1.15	16.90	34.63	No UP
60W-2[1* a]	12	0.74	0.80	0.68	69%	Insufficient Data	Insufficient Data	Insufficient Data	0.67	1.09	1.15	1.32	1.67	0.00	19.97	No UP
60W-3[2^ a]	9	1.44	1.52	1.35	57%	Insufficient Data	Insufficient Data	Insufficient Data	0.14	1.00	2.90	1.91	12.05	11.22	38.69	No UP
93-4[1* b]	17	2.58	2.51	2.66	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.32	1.60	1.38	3.92	2.38	18.86	179.42	No UP
93-5[2^ b]	17	1.73	0.82	2.64	43%	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data					41.69	41.69	No UP
93-6[2^ a]	17	1.07	0.61	1.53	29%	Insufficient Data	Insufficient Data	Insufficient Data	0.61	1.14	1.11	1.66	1.60	15.28	33.08	No UP
93-7[2^ a]	17	0.19	0.29	0.10	42%	Insufficient Data	Insufficient Data	Insufficient Data	0.53	1.20	1.15	2.03	1.71	37.55	13.75	No UP
93-8[2^ a]	8	0.03	0.00	0.07	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.45	1.05	1.00	3.28	1.18	0.00	6.78	No UP
93-9[2^ b]	18	1.60	1.94	1.27	45%	Insufficient Data	Insufficient Data	Insufficient Data	1.00	1.00	1.00	1.01	1.00	53.24	8.74	No UP
93-10[2^ a]	15	0.97	0.51	1.43	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.69	1.06	1.03	1.41	1.49	0.00	34.91	No UP
93-11[1*a]	4	2.55	1.30	3.80	17%	Insufficient Data	Insufficient Data	Insufficient Data	0.21	2.00	1.09	6.85	2.85	7.50	60.45	16.85
93-12[2^ a]	14	0.62	0.66	0.59	67%	Insufficient Data	Insufficient Data	Insufficient Data	0.86	1.05	1.06	1.15	1.18	6.60	8.33	No UP
93-13[2^ a]	11	1.71	1.34	2.09	59%	Insufficient Data	Insufficient Data	Insufficient Data	0.87	1.04	1.06	1.12	1.18	27.33	7.04	No UP
93-14[2^ a]	13	1.10	1.61	0.59	33%	Insufficient Data	Insufficient Data	Insufficient Data	0.81	1.05	1.07	1.14	1.32	4.22	20.32	No UP
93-15[2^ a]	12	0.77	1.33	0.21	28%	Insufficient Data	Insufficient Data	Insufficient Data	0.72	1.05	1.16	1.14	1.63	0.00	19.72	No UP
93-16[2^ a]	17	0.42	0.82	0.02	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.66	1.05	1.08	1.55	1.48	7.25	27.11	17.08
Weighted Corridor Average		1.16	1.09	1.24	0%	Insufficient Data	Insufficient Data	Insufficient Data	0.68	1.14	1.19	1.84	2.02	17.82	36.15	1.73

SCALES

Performance Level	2 or 3 or 4 Lane Divided Highway					Uninterrupted			All	
Good/Above Average	< 0.77[a]	< 44%[a]	< 4%[a]	< 16%[a]	< 2%[a]	> 0.77^	< 1.15^	< 1.30^	< 44.18	> 16.5
Fair/Average	0.77 - 1.23[a]	44% - 54%[a]	4% - 7%[a]	16% - 26%[a]	2% - 4%[a]	0.67-.77^	1.15 - 1.33^	1.30 - 1.50^	44.18 - 124.86	16.0-16.5
Poor/Below Average	> 1.23[a]	> 54%[a]	> 7%[a]	> 26%[a]	> 4%[a]	< 0.67^	> 1.33^	> 1.50^	> 124.86	< 16.0
Performance Level	**2 or 3 lane Undivided Highway**					**Interrupted**				
Good/Above Average	< 0.94[b]	< 51%[b]	< 6%[b]	< 19%[b]	< 5%[b]	> 0.33*	< 1.30*	< 3.00*		
Fair/Average	0.94 - 1.06[b]	51% - 57%[b]	6% - 10%[b]	19% - 27%[b]	5% - 8%[b]	0.17-.33*	1.30 - 2.00*	3.00 - 6.00*		
Poor/Below Average	> 1.06[b]	> 57%[b]	> 10%[b]	> 27%[b]	> 8%[b]	< 0.17*	> 2.00*	> 6.00*		

^Uninterrupted Flow Facility
*Interrupted Flow Facility
[a]2 or 3 or 4 Lane Divided Highway
[b]2 or 3 Lane Undivided Highway
[1]Urban Operating Environment
[2]Rural Operating Environment

Notes: *"Insufficient Data" indicates there were 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 93/US 60 corridor is an important travel corridor in the central/northwestern part of Arizona. It provides a critical surface transportation link to Las Vegas from the Phoenix metropolitan area and the broader Central and Northwestern areas of the State. As a north-south US highway, US 93 continues through Nevada, Idaho, and Montana into Canada, and, as noted earlier, this route has been designated as a segment of the future I-11. Significant upgrades to both US 93 and US 60 have been accomplished in the past decade. US 93 has been upgraded to a four-lane divided highway from Nevada to I-40 in Kingman and through most of its length from I-40 south to Wickenburg.

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 93/US 60 performance areas were identified, and corridor goals and objectives then were formulated for each of the five performance areas that aligned with the overall statewide goals established by the LRTP. In addition, three "emphasis areas" – Mobility, Safety, and Freight – were identified for the US 93/US 60 corridor within the framework of the State Strategic Highway Safety Plan (SHSP).

Taking into account the corridor goals, corridor objectives, and SHSP 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 three emphasis areas, the corridor-wide weighted average performance objectives were identified with a higher standard than for the other performance areas.

Achieving corridor and segment performance objectives will help ensure 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 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

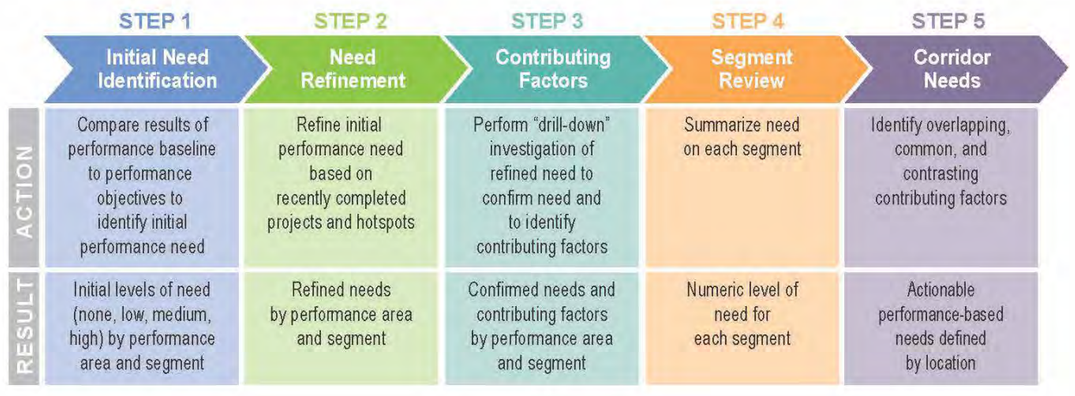


Figure ES-5: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)

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, with the average need score for each segment presented in the last row of the table. A weighting factor of 1.5 has been applied to the need scores of the performance areas identified as emphasis areas in the State SHSP. The emphasis areas of immediate relevance to the US 93/US 60 corridor are: Mobility, Safety," and Freight. Relative to all segments across all Performance Areas, there are no segments with a High average need; nine of the sixteen segments have a Medium average need; and the remaining seven have a Low average need. More information on the identified final needs in each performance area is provided below.

Pavement Needs

- Segments 93-6, 93-7, 93-8, 93-11. 93-12, and 93-14 have been determined to have Low average need. All other segments within the corridor have been determined to have no pavement needs, i.e., segments do not meet established thresholds for strategic investment.
- Six segments (93-6, 93-7, 93-8, 93-11, 93-12, 93-14) were identified as having Pavement hot spot failures, but two of these segments (93-11, 93-12) have had high levels of historical investment with multiple mill and overlay projects and reconstruction. Six other segments have been the object of high levels of historical investment with multiple mill and overlay projects and reconstruction – 93-1, 93-2, 93-9, 93-10, 93-15, and 93-15.

Bridge Needs

- Eight of 16 corridor segments exhibit a "Low" level of need (60W-1, 60W-2, 93-6, 93-7, 93-8, 93-9, 93-10, and 93-12). Segment 93-5 exhibits a "Medium" level of need.
- Four of 82 bridges have received high levels of historical bridge maintenance investment.
- There are no programmed projects for existing bridges within the US 93/US 60 corridor.

Mobility Needs

- Low mobility needs were identified with 13 of the 16 US3/US 60 corridor segments.
- One segment (60W-3) was determined to have Medium mobility needs.
- The number of closures in the US 93/US 60 corridor, due to incidents/accidents, are above the statewide average in all segments of the corridor.
- Programmed improvements are identified for three segments (93-9, 93-14, and 93-15).

Safety Needs

- Fifteen of the 16 corridor segments exhibit needs relative to Safety Performance:
  - Seven segments (60W-2, 93-6, 93-7, 93-10, 93-12, 93-15, and 93-16) have a Low level of need
  - One segment (93-14) has a Medium level of need
  - Seven segments (60W-1, 60W-3, 93-4, 93-5, 93-9, 93-11, and 93-13) have a High level of need

Freight Needs

- Nine of 16 segments of the corridor exhibit needs
  - Two segments (93-4 and 93-15) have a Low level of need
  - Three segments (93-10, 93-11, and 93-16) have a Medium level of need
  - Four segments (60W-3, 93-6, 93-7, and 93-8) have a High level of need

Overlapping Needs

This section identifies overlapping performance needs of the US 93/US 60 corridor, which provides guidance to develop strategic solutions that address more than one performance area with elevated needs. Completing projects that address multiple needs may present the opportunity for cost savings as well as more effectively improving overall performance. Overlapping needs are summarized below (south to north):

- US 60W, Mileposts (MP) 138 – 120, has overlapping needs with respect to Bridge, Mobility, and Safety performance areas
- US 60W, MP 120 – 111, has overlapping needs with respect to Mobility, Safety, and Freight performance areas
- US 93, MP 200 – 183, has overlapping needs with respect to Mobility, Safety, and Freight performance areas
- US 93, MP 183 – 166, has overlapping needs with respect to Bridge, Mobility, and Safety performance areas
- US 93, MP 166 – 132, has overlapping needs with respect to all five performance areas. Two pavement hotpots exist in this area: MP 153 – 149 NB and MP 133 – 132 SB
- US 93, MP 132 – 124, has overlapping needs with respect to Pavement, Bridge, Mobility, and Freight performance areas
- US 93, MP 124 – 106, has overlapping needs with respect to Bridge, Mobility, and Safety performance areas
- US 93, MP 106 – 91, has overlapping needs with respect to Bridge, Safety, and Freight performance areas.
- US 93, MP 71 – 67, has overlapping needs with respect to Pavement, Mobility, Safety, and Freight performance areas
- US 93, MP 67 – 53, has overlapping needs with respect to Pavement, Bridge, Mobility, and Safety performance areas
- US 93, MP 42 – 29, has overlapping needs with respect to Pavement, Mobility, and Safety performance areas. Pavement hotspots exist at MP 35 – 34 SB and MP 33 – 32 SB
- US 93, MP 29 – MP 17, has overlapping needs with respect to Mobility and Safety performance areas

Table ES-3: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)															
	60W-1	60W-2	60W-3	93-4	93-5	93-6	93-7	93-8	93-9	93-10	93-11	93-12	93-13	93-14	93-15	93-16
	MP 138-122	MP 132-120	MP 120-111	MP 200-183	MP 183-166	MP 166-149	MP 149-132	MP 132-124	MP 124-106	MP 106-91	MP 71-67	MP 67-53	MP 53-42	MP 42-29	MP 29-17	MP 17-0
Pavement	None*	None	None	None	None	Low	Low	Low	None	None	Low	Low	None	Low	None	None
Bridge	Low	Low	None	None	Medium	Low	Low	Low	Low	Low	None	Low	None	None	N/A#	None
Mobility+	Low	Low	Medium	Low	None	Low	Low	Low	Low	None	Low	Low	None	Low	Low	Low
Safety+	High	Low	High	High	High	Low	Low	None	High	Low	High	Low	High	Medium	Low	Low
Freight+	None	None	High	Low	None	High	High	High	None	Low	Medium	None	None	None	Low	Low
Average Need	**1.08**	**0.62**	**1.85**	**1.15**	**1.00**	**1.46**	**1.46**	**1.23**	**1.08**	**0.62**	**1.54**	**0.77**	**0.69**	**0.85**	**0.82**	**0.69**

** 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.*

+ Identified as an emphasis area for the US 93/US 60 corridor.

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

Average Need Scale	
None*	< 0.1
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. The US 93/US 60 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. The bridge likely will be addressed through current ADOT bridge traditional 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 used to identify the need was collected

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 93/US 60 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

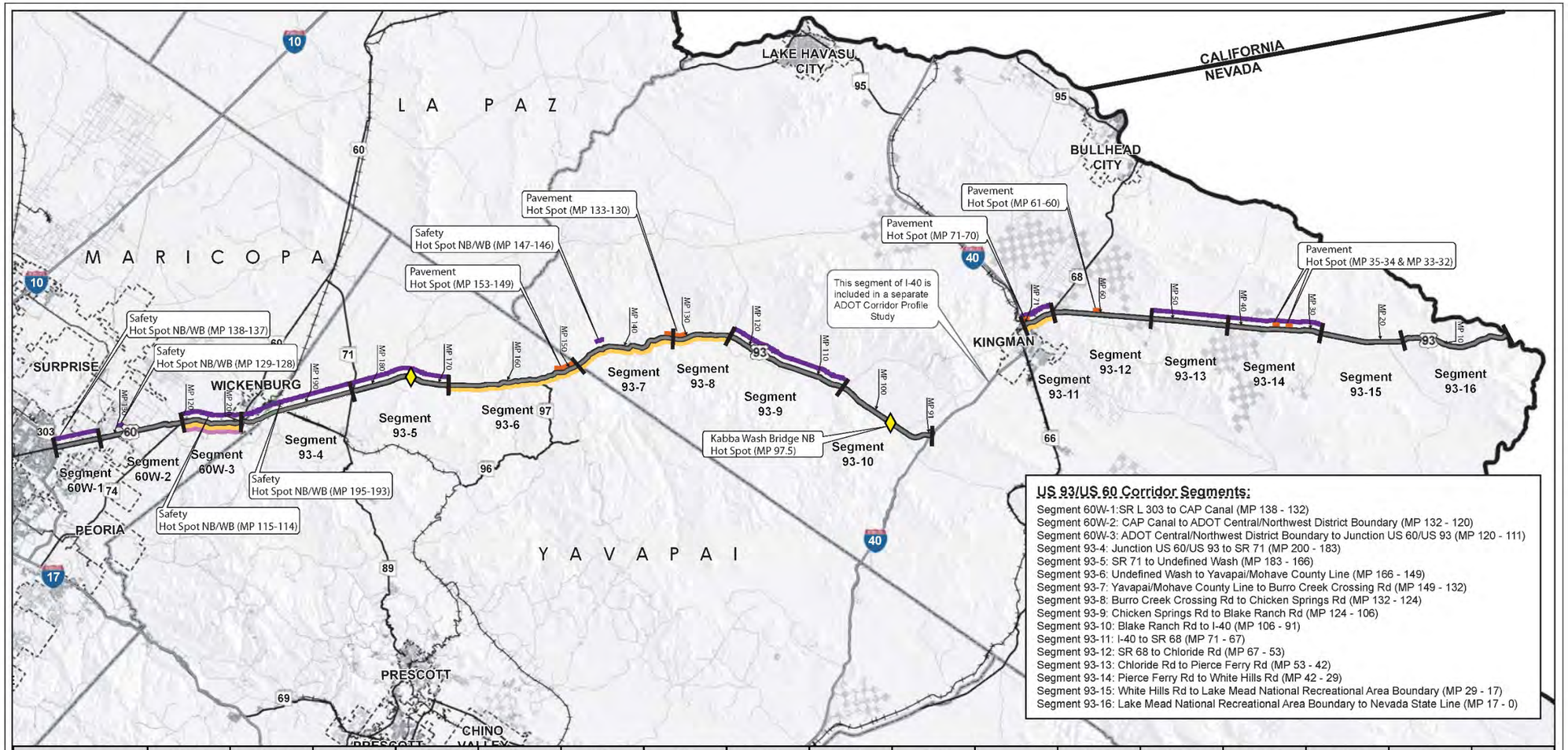
Candidate solutions include some or all of the following characteristics:

- 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	60W-1	60W-2	60W-3	93-4	93-5	93-6	93-7	93-8	93-9	93-10	Interstate 40	93-11	93-12	93-13	93-14	93-15	93-16
	MP 138- 122	MP 132-120	MP 120-111	MP 200-183	MP 183-166	MP 166-149	MP 149-132	MP 132-124	MP 124-106	MP 106-91		MP 71-67	MP 67-53	MP 53-42	MP 42-29	MP 29-17	MP 17-0
Pavement	-	-	-	-	-	Hot Spot	-	Hot Spot	-	-		Hot Spot	Hot Spot	-	Hot Spot	-	-
Bridge	-	-	-	-	Medium	-	-	-	-	Hot Spot		-	-	-	-	-	-
Mobility*	-	-	Medium	-	-	-	-	-	-	-		-	-	-	-	-	-
Safety*	High/Hot Spot	Hot Spot	High/Hot Spot	High/Hot Spot	High	-	Hot Spot	-	High	-		High	-	High	Medium	-	-
Freight*	-	-	High	-	-	High	High	High	-	-		Medium	-	-	-	-	-

US 93/US 60 Corridor Profile Study
Strategic Investment Areas

* Identified as Emphasis Area for US93/US60 Corridor
'-' symbol indicates a segment level of need of Low or None, which is not considered strategic

Note: Figures shows strategic investment areas, which are segments with Medium and High levels of need and locations of hot spots.

Corridor Segment
Interstate/Highway
County Boundary
City Boundary

Performance Area Needs
Pavement
Mobility
Safety
Freight
Bridge

Level of Need
Low
Medium
High

N
Miles
0 10 20 30 40

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 is 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 can eliminate 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.

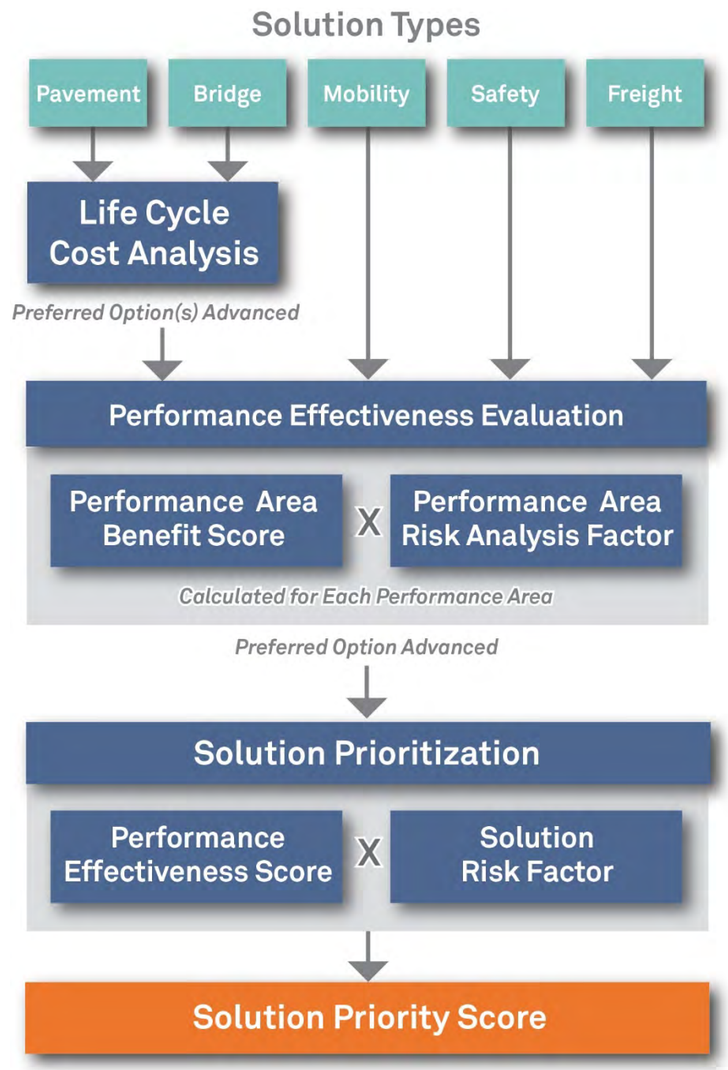
Solution Risk Analysis

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 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 ES-7: Candidate Solution Evaluation Process



SUMMARY OF CORRIDOR RECOMMENDATIONS

Prioritized Candidate Solution Recommendations

Table ES-4 and **Figure ES-8** show prioritized candidate solutions recommended for the US 93/US 60 corridor. Implementation of these solutions is anticipated to improve the performance of the US 93/US 60 corridor, primarily in the Mobility, Safety, and Freight performance areas. The highest priority solutions address needs in the Surprise area (MP US 60 138-132) and Wickenburg area (MP US 60 115-114 and MP US 93 198.5-190).

Other Corridor Observations

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 93/US 60 corridor:

- Work with Arizona Department of Public Safety (DPS) and other local agencies to designate the US 93/US 60 corridor as a "Recreational Corridor" to emphasize safe driving during long or holiday weekends

Policy and Initiatives 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 93/US 60, 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

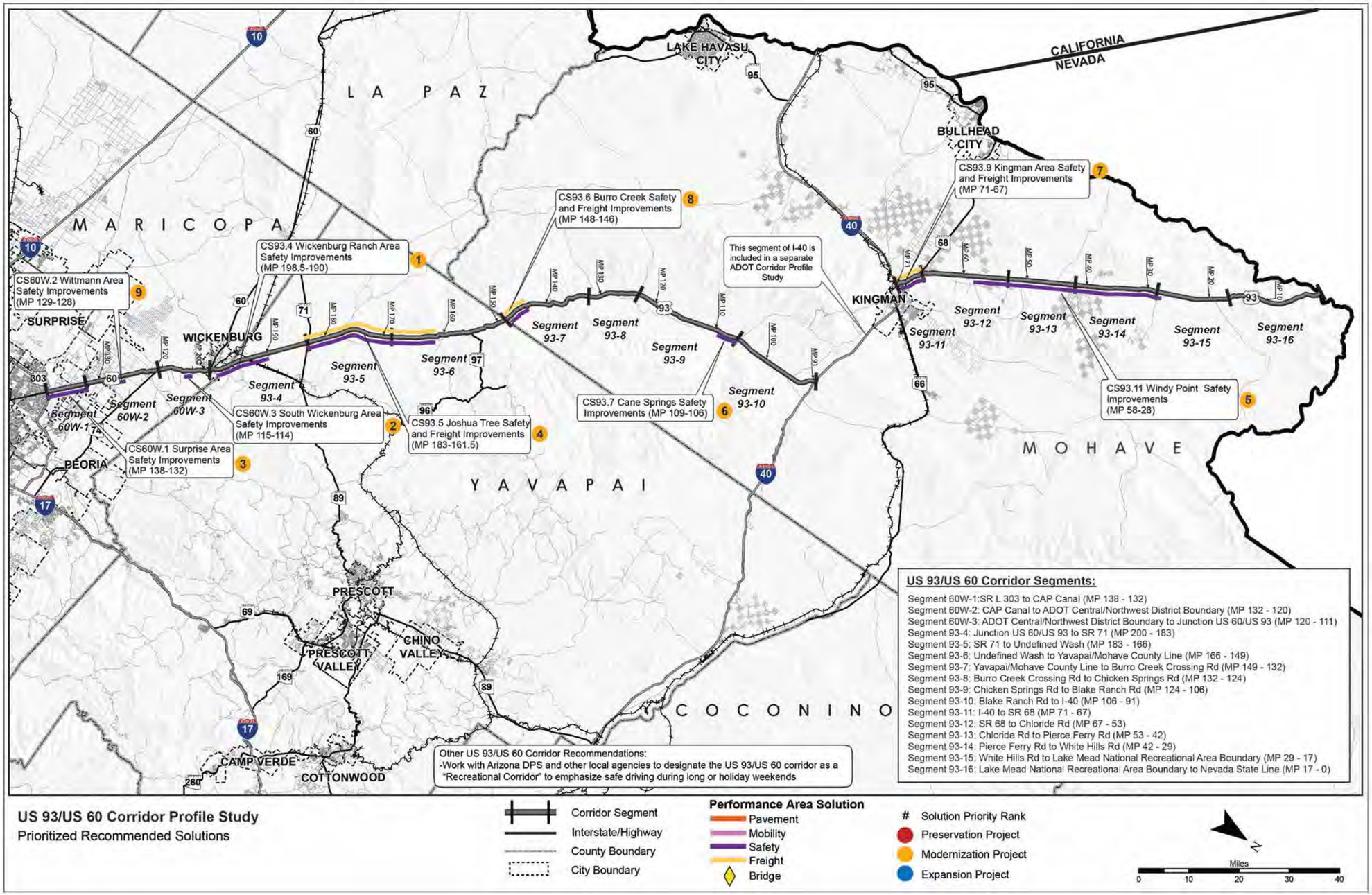
Candidate solutions developed for the US 93/US 60 corridor will be considered along with other candidate projects in the ADOT statewide programming process. It is important to note that the candidate solutions are intended to represent strategic solutions to address existing performance needs related to the Pavement, Bridge, Mobility, Safety, and Freight performance areas. Therefore, the strategic solutions are not intended to preclude recomme3ndations 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 Solution List

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	CS93.4	B	Wickenburg Ranch Area Safety Improvements (US 93, MP 198.5-190)	-Install center rumble strips -Install high visibility edge line striping -Install high visibility signage -Install raised pavement markers -Add delineators	$0.95	M	838
		A	Wickenburg Ranch Area Safety Improvements (US 93, MP 198.5-190)	-Construct 4-lane divided roadway MP 190-198.5 (Tegner Street roundabout)	$63.93	E	21
2	CS60W.3	-	South Wickenburg Area Safety Improvements (US 60W, MP 115-114)	-Install left side/median guardrails between MP 114-115 -Install speed feedback sign -Install high visibility edge line striping	$0.83	M	291
3	CS60W.1	-	Surprise Area Safety Improvements (US 60W, MP 138-132)	-Install lighting between 163rd Avenue and Loop 303 -Rehabilitate shoulders/rumble strips and install safety edge -Improve signal visibility	$4.14	M	164
4	CS93.5	B	Joshua Tree Safety and Freight Improvements (US 93, MP 183-161.5)	-Widen shoulder -Install center and outside rumble strips -Install safety edge	$15.6	M	157
		A	Joshua Tree Safety and Freight Improvements (US 93, MP 183-161.5)	-Construct 4-lane divided roadway MP 161.5-183	$163.08	E	13
5	CS93.11	-	Windy Point Safety Improvements (US 93, MP 58-28)	-Widen shoulders -Install rumble strip -Install safety edge	$41.97	M	49
6	CS93.7	B	Cane Springs Safety Improvements (US 93 MP 106-109)	-Widen shoulder -Install center and outside rumble strips -Install safety edge -Install speed feedback signs	$9.41	M	11
		A	Cane Springs Safety Improvements (US 93 MP 106-109)	-Construct 4-lane divided roadway MP 119.7-116.3	$25.71	E	5
7	CS93.9	-	Kingman Area Safety and Freight Improvements (US 93, MP 71-67)	-Install northbound climbing lane MP 71 to SR 68 TI	$22.62	M	10
8	CS93.6	A	Burro Creek Safety and Freight Improvements (US 93, MP 147-146)	-Widen northbound shoulders -Increase northbound clear zones -Add northbound guardrails -Install northbound speed feedback sign -Re-profile northbound roadway at MP 148	$2.37	M	7
		B	Burro Creek Safety and Freight Improvements (US 93, MP 147-146)	-Realign northbound MP 146-147	$14.83	E	3
9	CS60W.2	-	Wittmann Area Safety Improvements (US 60W, MP 132-120)	-Install additional advanced signal warning sign with flashing beacon approximately 1000' upstream and downstream of Center Street -Improve signal visibility	$0.16	M	6

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 United States (US) 93/US 60 between the Nevada State Line and Arizona State Route 303 Loop (Loop 303). The study examines key performance measures relative to the US 93/US 60 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, includes:

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

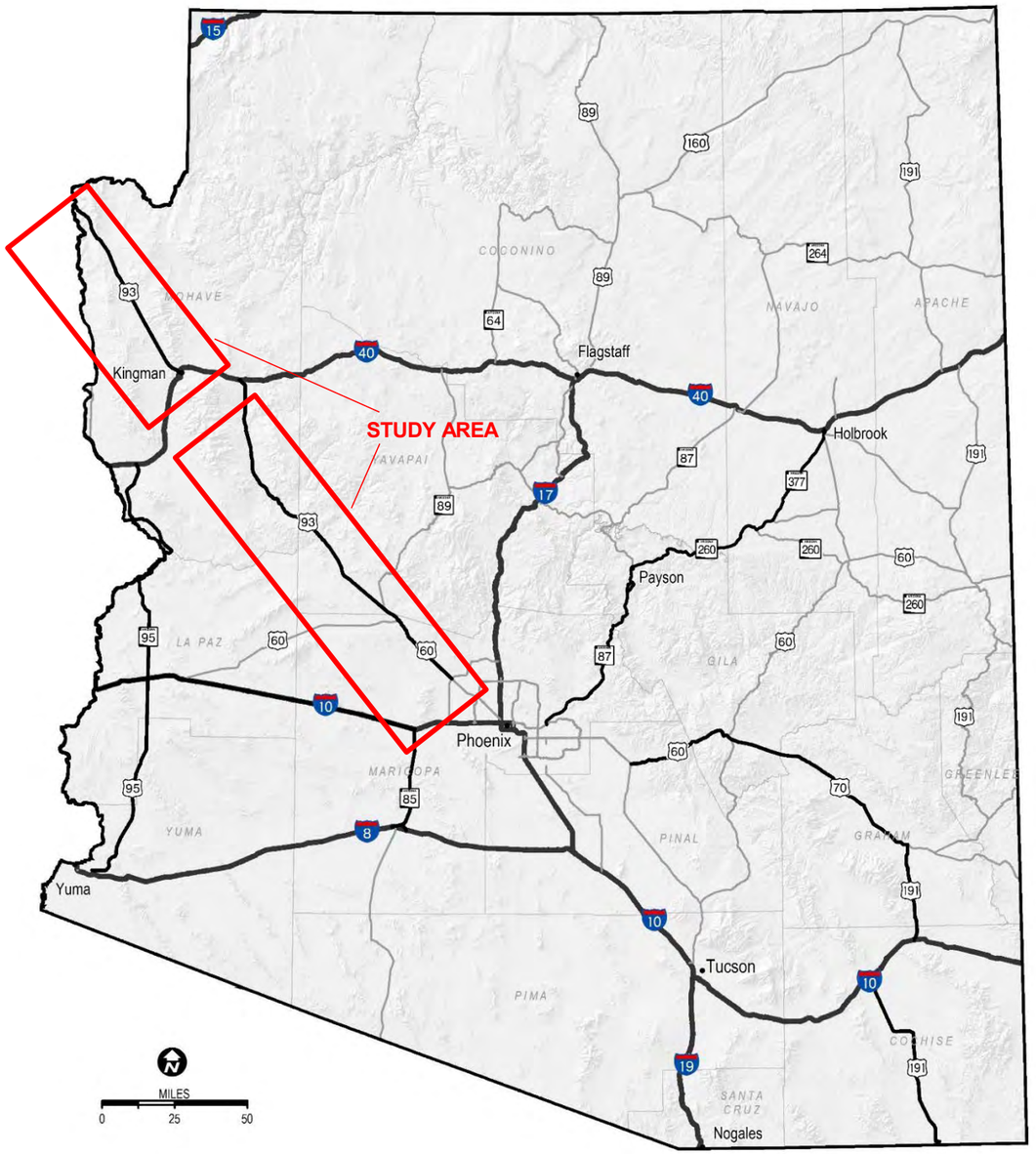
The third round (Round 3) of studies, initiated in Fall 2015, include:

- I-10: California State Line to SR 85 and SR 85: I-10 to I-8
- I-10: SR 202L to the 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 Loop 303

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 93/US 60 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 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 93/US 60 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 93 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 93/US 60 corridor provides a critical surface transportation link to Las Vegas from the Phoenix metropolitan area and the broader Central Arizona area. As a north-south US highway, US 93 continues through Nevada, Idaho, and Montana into Canada. Significant upgrades to both US 93 and US 60 have been accomplished in the past decade. US 93 has been upgraded to a four-lane divided highway from Nevada to I-40 in Kingman and through most of its length from I-40 south to Wickenburg. ADOT has active projects to complete full conversion of this US highway to the upgraded four-lane divided cross-section. US 60, between Wickenburg and Loop 303 on the outskirts of the Phoenix metropolitan area, also has a four-lane divided cross-section. ADOT has expended over the past several years nearly half a billion dollars to widen and improve US 93 from Wickenburg to Hoover Dam at the Arizona/Nevada State Line.

The US 93/US 60 Corridor Profile Study limits extend from the Mike O'Callaghan–Pat Tillman Memorial Bridge at the Colorado River, which is the Arizona/Nevada State Line, to Loop 303 in Surprise, Arizona, northwest of Phoenix. US 93 extends 200 miles south from the State Line to its junction with US 60 in Wickenburg, Arizona, at a roundabout on the west bank of the Hassayampa River. The US 60 portion of the corridor extends from the roundabout over a new bridge across the Hassayampa River south a distance of approximately 28 miles to Loop 303. The 2015 Fixing America's Surface Transportation Act, or FAST Act, formally designated Interstate 11 (I-11) throughout Arizona. As part of that designation, a portion of I-11 will follow US 93 from Wickenburg to the Nevada state line.

1.4 Corridor Segments

The US 93/US 60 corridor is divided into 16 planning segments to allow for an appropriate level of detailed needs analysis, performance evaluation, and comparison between different segments of the corridor. 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 described in **Table 1** and shown in **Figure 2**.

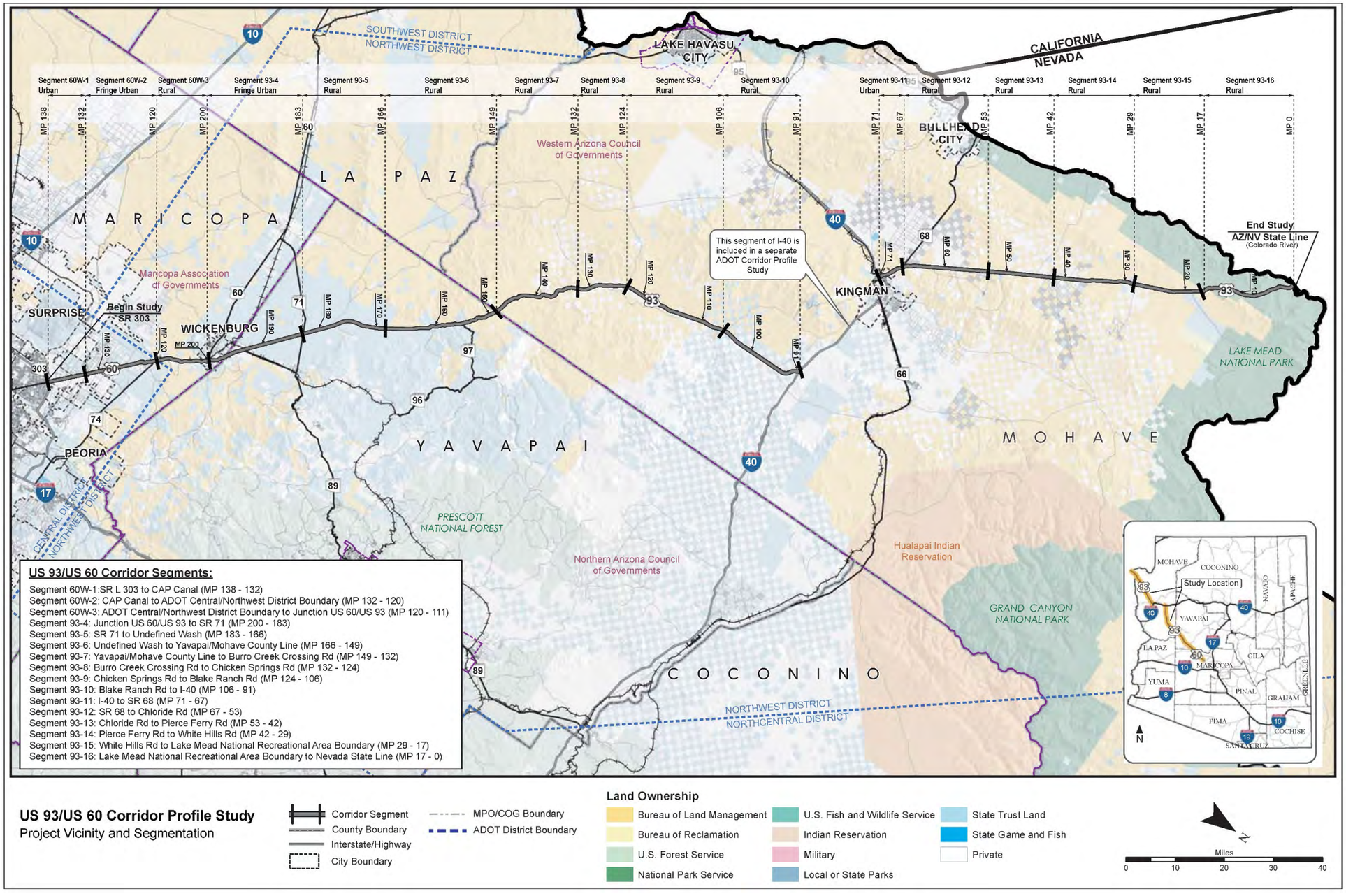
Table 1: US 93/US 60 Corridor Segments

Segment #	Route	Begin	End	Approx. Begin Milepost	Approx. End Milepost	Approx. Length (Miles)	Typical Through Lanes (WN/NB, EB/SB)	2014/2035 Average Annual Daily Traffic Volume (vpd)	Character Description
60W-1	US 60	Loop 303	Central Arizona Project (CAP) Canal	138	132	6	2, 2	16,600/34,600	This 6-mile segment of US 60 is an Urban, four-lane, divided highway with interrupted flow running west of and parallel to the BNSF Railway (BNSF). There are 18 access points, 11 of which have directional turn bays.
60W-2	US 60	CAP Canal	SR 74 (ADOT Central/ Northwest District Boundary)	132	120	12	2, 2	11,800/33,500	This 12-mile segment of US 60, situated on an alluvial fan at the base of the Hieroglyphic Mountains, passes through Wittmann, Circle City and the City of Morristown at SR 74. It is an Urban, four-lane, divided highway with interrupted flow. There are 45 access points, 24 of which have directional turn bays.
60W-3	US 60	SR 74 (ADOT Central/ Northwest District Boundary)	Jct US 60 / US 93 (Wickenburg)	120	111	9	2, 2	14,800/50,800	This 9-mile segment of US 60 a Rural, four-lane, divided highway with uninterrupted flow. It parallels the north/eastside of the Hassayampa River and BNSF railroad, which traces the river's south/west side. There are no major developments for roughly seven miles; however, there a large number of access points (154). Access points occur more frequently at the north end of the segment, as the highway passes through the southern and eastern areas of Wickenburg.
93-4	US 93	Jct US 60/US 93 (Wickenburg)	SR 71	200	183	17	2, 2 & 1, 1	7,900/11,200	For approximately 1.2 miles north of the Hassayampa River to the roundabout at N. Tegner Street, this segment of US 93 (Wickenburg Bypass) is a five-lane Urban roadway with interrupted flow. North of the roundabout for approximately 8.4 miles, US 93 is an Urban, two-lane roadway with paved shoulders and interrupted flow. Within this portion of the roadway, there is a roundabout at the entrance to Trilogy Wickenburg Ranch (approximately 4.1 miles). There is one intersection with directly turn bays prior to Trilogy and one north of Trilogy. One-half mile further north is the junction with SR 89, which occupies an interchange approximately one-half mile along the length of US 93. There are 35 access points in this section of the highway. North of this interchange, US 93 is best characterized as a Rural, two-lane highway with paved shoulders and interrupted flow. Approximately two miles north of the interchange an operating environmental of uninterrupted flows exists, as highway passes into undeveloped desert to the junction with SR 71. Within this portion of the roadway, there is five-mile section of Rural, four-lane divided highway. The south end (beginning) of this section is 7.4 miles south of SR 71. To the north of this south end there are 22 access points, 15 of which occur in the two miles preceding the desert.

Table 1: US 93/US 60 Corridor Segments (continued)

Segment #	Route	Begin	End	Approx. Begin Milepost	Approx. End Milepost	Approx. Length (Miles)	Typical Through Lanes (WB/NB, EB/SB)	2014/2035 Average Annual Daily Traffic Volume (vpd)	Character Description
93-5	US 93	SR 71	Unnamed Wash	183	166	17	2, 1 & 1, 1	11,800/32,700	This 17-mile segment of US 93 is a three-lane roadway with an auxiliary lane for WB-NB SR 71 traffic, then becomes a two-lane roadway with paved shoulders and passing lanes.
93-6	US 93	Unnamed Wash	Yavapai/Mohave County Line	166	149	17	2, 2 & 1, 1	11,200/34,300	This 17-mile segment of US 93 crosses the Santa Maria River at MP 161 and becomes a four-lane divided roadway at MP 168.
93-7	US 93	Yavapai/Mohave County Line	Burro Creek Crossing Road	149	132	17	2, 2	10,600/71,000	This 17-mile segment of US 93 is a four-lane, divided roadway with topography in this segment and includes the Yavapai – Mohave County Line.
93-8	US 93	Burro Creek Crossing Road	Chicken Springs Road	132	124	8	2, 2 & 1, 1	10,600/71,000	This 8-mile segment of US 93 transitions from a 4-lane divided highway to a two-lane road approximately one mile south of Country Club Drive, whereupon it becomes a 4-lane roadway with center left-turn lane to Chicken Springs Road.
93-9	US 93	Chicken Springs Road	Blake Ranch Road	124	106	18	2, 2 & 1, 1	10,700/30,500	This 18-mile segment of US 93 is a four-lane roadway with center left-turn lane and transitions back and forth from a two-lane roadway with paved shoulders to a four-lane, divided roadway.
93-10	US 93	Blake Ranch Road	Interstate 40 (I-40)	106	91	15	2, 2 & 1, 1	13,300/72,300	This 15-mile segment of US 93 junctions with SR 141 and SR 193 (Blake Ranch Road) approximately 4.5 miles south of I-40 and is a four-lane, divided highway, with a transition at the north end to a two-lane roadway with paved shoulders.
93-11	US 93	I-40	SR 68	71	67	4	2, 2	26,000/33,500	This 4-mile segment of US 93 is a four-lane roadway that becomes a divided highway approximately 2.6 miles north of I-40 at SR 68. SR 68 is the primary access to Golden Valley, an unincorporated Census-Designated Place (CDP).
93-12	US 93	SR 68	Chloride Road	67	53	14	2, 2	17.800/70,700	This 14-mile segment of US 93 is a four-lane divided highway. The highway runs through the alluvial fan of the Cerbat Mountains to the east.
93-13	US 93	Chloride Road	Pierce Ferry Road	53	42	11	2, 2	16,600/71,000	This 11-mile segment of US 93 is a four-lane divided highway, entering the upper reaches of the valley formed by Detrital Wash.
93-14	US 93	Pierce Ferry Road	White Hills Road	42	29	13	2, 2	19,100/71,000	This 13-mile segment of US 93 is a four-lane divided highway with little to no development.
93-15	US 93	White Hills Road	Lake Mead National Recreational Area Boundary	29	17	12	2, 2	19,300/71,100	This 12-mile segment of US 93 continues as a four-lane divided highway to the Lake Mead National Recreational Area Boundary.
93-16	US 93	Lake Mead National Recreational Area Boundary	Arizona/Nevada State Line (Colorado River)	17	0	17	2, 2	19,300/71,100	This 17-mile segment of US 93 is a four-lane divided highway, with 2.3 miles of the roadway constructed as a four-lane roadway. The road was recently realigned near the border and connects with the Mike O'Callaghan–Pat Tillman Memorial Bridge.

Figure 2: Corridor Location and Segments



1.5 Corridor Characteristics

The US 93/US 60 corridor is an important travel corridor in the central/northeastern part of the state. The corridor functions as a route for recreational, tourist, and regional traffic and provides critical connections between the communities it serves and the rest of the regional and Interstate highway networks.

National Context

The US 93/US 60 corridor is an integral part of the CANAMEX Trade Corridor, which is a High Priority Corridor as defined in the National Highway Systems Designation Act of 1995. US 93 is officially designated in the Act as a segment of the CANAMEX Corridor. US 60 is an interim route for the segment expected to link US 93 with I-10 to the south. Recent designation of a new I-11 as part of the Fixing America's Surface Transportation (FAST) Act, has provided the impetus to study that linkage and identify an official Interstate facility from Nogales through Arizona into Nevada, eventually connecting with I-80 in Utah and continuing to Canada. Current plans show I-11 connecting to US 93 in Wickenburg as a bypass route around the Phoenix metropolitan area to the west of Buckeye on the proposed Hassayampa Freeway. When the linkage is established, US 60 would no longer be considered a segment of the CANAMEX Corridor.

The CANAMEX Corridor Project has the key objective of creating a direct trade route from Canada to Mexico (thus CANAMEX) through the United States, which I-11 ultimately will satisfy. The corridor has been conceived as a means of easing freight movements between Canadian and Mexican terminals and providing an axial hub for intersecting trading routes that have become the backbone of transportation across the whole North American Continent. The initiative includes a rail freight component with the intent of also providing an advanced telecommunications infrastructure.

Regional Connectivity

The US 93/US 60 corridor is Arizona's sole highway route through the northwestern portion of the state. There are three intersecting roadways that provide significant regional connectivity: I-40 in the Kingman area, which is the primary east-west route through Northern Arizona; SR 89 north of Wickenburg, which supports travel to Prescott; and Loop 303 at the northwestern edge of the Phoenix metropolitan area. Between Wickenburg and I-40, there are no connecting roadways to the east or west, and there is no alternative route of travel in the north-south direction. This also is true between Kingman and the Arizona/Nevada State Line.

Other State routes intersect, such as: SR 68, northwest of Wickenburg; SR 66 (Historic US 66) in Kingman; SR 97/96, which connects to the remote community of Hillside; SR 89, which connects US 93 and Wickenburg with Prescott; SR 71, north of Wickenburg that links SR 89 and US 60; US 60 (West) in Wickenburg, a lightly used route primarily supporting travel to small agricultural communities; and SR 74 south of Wickenburg, which connects with I-17. Although these routes provided regional connectivity, they also have a large component of local access to smaller Arizona communities.

Within the corridor are the City of Kingman and Town of Wickenburg. The City of Surprise, located on the northwestern edge of the Phoenix metropolitan area, is at the southern terminus of the corridor. Numerous small communities within the corridor depend on the highway to varying degrees for travel to essential services and for shopping opportunities, including: Dolan Springs, Chloride, Golden Valley, New Kingman-Butler, Wikieup, Hillside, Congress, Morristown, and Wittmann.

Total traffic volumes (average annual daily traffic [AADT] 2014) are approximately 8,000 to 13,000 throughout the length of the corridor, with the exception of US 60 immediately west of the Loop 303 where daily volumes approach 19,000 and in the area of the US 93/I-40 interchange where daily volumes approach 32,000. The Arizona Travel Demand Model (AZTDM2) projects that traffic will more than double by 2035.

Commercial Truck Traffic

Commercial truck traffic is important to the economy of the US 93/US 60 corridor, as this is the primary means of moving goods into and out of the various communities in the corridor. Although BNSF operates up to 100 trains a day through the City of Kingman and the BNSF and Arizona & California Railroad (ARZC) operate 13 per day through Wickenburg, these movements do not include drop shipments of consumer goods in the communities traversed. Commercial trucks account for the transport of all consumer goods to markets and stores in the corridor.

The share of commercial trucks on US 93 varies considerably. Directly south of the Arizona/Nevada State Line, commercial trucks account for 7.5 percent of traffic. This increases to 10.5 percent in the segment between Cerbat Road and SR 68 (the westward route to Golden Valley and Bullhead City). This segment is coincident with the State of Arizona Kingman Port of Entry (POE), which is directly south of the US 93/SR 68 Traffic Interchange (TI). A concentration of trucks queuing to pass through the POE likely accounts for the higher share of trucks represented in the traffic flow. South of SR 68 to I-40 the share of commercial trucks making up the traffic stream decreases to 7.8 percent.

Commercial trucks account for a very large share of traffic on I-40/US 93. Between Exit 48 on the west side of Kingman and Exit 71 to the east, where I-40/US 93 continues south through Round Valley, truck traffic reaches as high as 30 percent of all traffic on the Interstate highway. It is lowest (18.2 percent) between the US 93 TI (Exit 48) and the Stockton Hill Road TI (Exit51), approximately three miles to the east.

Trucks account for only 3.5 percent of the traffic heading south from Round Valley on US 93. Commercial trucks become a greater share of the highway's traffic south of Wikieup, increasing to 9.5 percent of traffic south of SR 97 to SR 71. The share of commercial trucks operating in the corridor increases to 11 percent south of SR 71 and peaks at 11.6 percent between SR 89 and Vulture Mine Road, which is just inside Yavapai County, north of Wickenburg. Within the Town of Wickenburg, truck traffic accounts for 9.5 percent of the traffic on US 93 to it junction with US 60.

Commercial trucks account for a smaller share of US 60 traffic south of Wickenburg. The share steadily increases from 6.6 percent directly east of the Hassayampa River crossing to 7.7 percent south of SR 74. The share of truck traffic peaks at eight percent at Patton Road in Surprise. This level of truck traffic is sustained to the end of the corridor at Loop 303.

Commuter Traffic

The 2010-2014 American Community Survey maintained by the U.S. Census indicates that 95% of Kingman's employed residents worked within Mohave County. However, more than 35% of these persons worked outside of Kingman in another location. A similar relationship exists in Wickenburg, where approximately 94% of employed residents worked in Maricopa County, while more than 38% found employment outside of Wickenburg. In smaller Wikieup, 100% of the residents worked within Yavapai County, but slightly more than 6% found employment outside of Wikieup. Short of conducting an origin-destination (O-D) study, this information reveals there is a significant amount of commuting practiced relative to the two largest communities in the US 93/US 60 Corridor. It is likely that some portion of a large number of commutes occurs in relation to the highway corridor, particularly relative to Wickenburg, which relies heavily on the Phoenix metropolitan area communities approximately 30 miles to the south for employment opportunities. Commutes out of Kingman likely are oriented to employment opportunities in Bullhead City, approximately 30 miles west of Kingman.

Recreation and Tourism

The US 93/US 60 Corridor provides access to Hoover Dam and the Lake Mead National Recreation Area at the northern end of the corridor, as well as some recreation and tourist attractions managed by Bureau of Land Management (BLM), including: Mt. Wilson Wilderness, south of Lake Mead; Willow Beach, south of Lake Mead on the Colorado River; Mt. Tipton Wilderness and the Packsaddle and Windy Point Recreation areas, northwest of Kingman; Historic Route 66, out of Kingman; Cerbat Foothills Recreation Area, in northwest Kingman; Wild Cow Springs Recreation Site, southeast of Kingman; Hualapai Mountain Resort, southeast of Kingman; Burro Creek Recreation Site and Campground, south of Wikieup; Grapevine Mesa/Joshua Tree Forest, a National Natural Landmark; Arrastra Mountain and Tres Alamos wilderness areas, south of Wikieup; Sophie's Flat Trail System, northeast of Wickenburg; and the Vulture Peak and Vulture Peak Trail, south of Wickenburg.

Multimodal Uses

The statewide emphasis is to create a multimodal transportation system. This means that, while the safety and mobility of the State's residents via motor vehicles will remain a primary concern, the overall focus will be widened to include greater attention to all relevant modes of travel, including public transit, bicycle, pedestrian, truck freight, rail freight and passenger service. This section provides a review of the status these latter modes of transportation in the US 93/US 60 Corridor.

Freight Rail

There are two active railroad services with lines in the US 93/US 60 Corridor: BNSF and ARZC. The BNSF line runs out of Phoenix, generally parallel with US 60, to a point northwest of Wickenburg at Matthie, where it turns toward the community of Congress, paralleling SR 89. North of Congress, the line, known as the "Pea Vine" for its winding path through the mountains, continues to Williams, Arizona, where it connects with the BNSF main east west interstate line. The BNSF Railway operates multiple freight trains daily on this main line through Kingman at the north end of the US 93/US 60 Corridor.

The ARZC connects with BNSF Phoenix Subdivision "Pea Vine" line northeast of Wickenburg. This strictly is a transportation connection; no freight handling services occur at this junction. The ARZC continues south from Matthie, operating with trackage rights on the BNSF Phoenix Subdivision.

Passenger Rail

Amtrak operates daily passenger rail service (i.e., one train per day) – Southwest Chief – through Kingman in each direction with a scheduled stop at the Kingman Station. The Southwest Chief provides connections to Los Angeles, California, on the West Coast, and Chicago, Illinois, in the Midwest. Shuttle services connect Amtrak rail passenger service at Kingman with Laughlin and Las Vegas, Nevada.

Bicycles/Pedestrians

The ADOT Bicycle and Pedestrian Plan Update (June 2013) provides some information regarding conditions relevant to bicyclists in the US 93/US 60 Corridor.

- A large portion of the roadway miles forming the US 93/US 60 Corridor has an effective shoulder width of four feet or greater. Sections with an effective shoulder width less than four feet make up approximately 25 percent of the corridor. The Plan identifies the need to widen the shoulders for a distance of 16 miles south of the Arizona/Nevada State Line to the Lake Mead National Recreation Area boundary. In addition, there is an opportunity for establishing south of this point a paved shoulder on US 93 (southbound) between MP 17.3 and MP 58.5. Also, identified by the Plan is a short segment that offers an opportunity on US 60 south of Wickenburg to establish paved shoulders of four feet or greater between MP 110 and MP 112.
- The segment of US 93 south of the Arizona/Nevada State Line through Kingman along I-40 and the segment of US 93/US 60 from Wickenburg to Loop 303 in Surprise are identified as having "High Traffic Volumes." The remainder of the corridor is identified as having "Medium Traffic Volumes.

The ADOT Bicycle Safety Action Plan (September 2012) identifies concern for bicyclists, including those related to the US 93 US 60 Corridor:

- The intersection of Stockton Hill Road at I-40/US 93 is identified as a Focus Area, due to the relatively high number of bicycle crashes

- The SR 66 segment identified above – I-40/US 93 to Armour Avenue – is identified as a Focus Area "Priority Location
- The presence of rumble strips in the shoulders and speeding vehicles north of Wickenburg on US 93
- US 60 from I-17 to Wickenburg, which has "worn out paving." This would include the portion of the US 60 between Wickenburg and Loop 303

The Kingman Area Transportation Study Update (February 2011) establishes bicycle and pedestrian facilities as integral part to a multimodal transportation network. Goals and recommended improvements provided with this Study support appropriate facilities and services intersecting the I-40/US 93. The Study states that new urban street design and construction actions should include improvements to accommodate bicycle and pedestrian travel.

The Town of Wickenburg, worked with ADOT to acquire and preserve on of two old US 60 bridges that crossed the Hassayampa River, when the new four-lane bridge was constructed to the north. The old bridge, which was not longer suitable for vehicle traffic, essentially has been renovated to be aesthetically pleasing and safe for bicycle and pedestrian travel. Other improvements associated with this segment of the corridor include: improving the shoulders of US 60 south to the Loop 303 with connections provided to SR 74.

Bus/Transit

There are no regular public transit services operating in the US 93/US 60 Corridor with the exception of Kingman Area Regional Transit (KART), which provides public transportation services in and around the Kingman community. There are three public transportation companies that provide, primarily for recreation, passenger transportation between the Phoenix and Las Vegas metropolitan areas through the US 93/US 60 Corridor: Tufesa, EPLA Limo Express, and Goto Bus. Trips take five to eight hours, usually with a stop in Kingman.

Aviation

The Kingman Airport supported commercial air service in the past; however, it currently does not have a passenger-carrying airline operating through the airport. In addition to the Kingman Airport, there are numerous small General Aviation (GA) airports near the US 93/US 60 Corridor, including: Triangle Airpark, a small residential airpark with paved runway adjacent to US 93 south of Willow Beach Road; Lake Mohave Ranchos Airport, a small dirt strip east of US 93 on Pierce Ferry Road in Dolan Springs; unnamed paved airstrip on US 93 at Milepost (MP) 174, north of Date Creek; Moreton Airpark, a small, residential community/airpark (dirt strips) northwest of Wickenburg above Matthie Junction; Wickenburg Municipal Airport, west of Wickenburg on the north side of US 60 (West); Rio Vista Hills Airport, a small, residential airpark (paved strip) southeast of Wickenburg on the east side of US 60; Ranta/Ad Strip, a small, private airport west of Morristown; Castle Well, a dedicated residential airpark northeast of Morristown.

Traveler Amenities

No rest areas are located along this corridor. North of Wickenburg on US 93, drivers can take advantage of several unofficial turnouts.

Land Ownership, Land Uses, and Jurisdictions

As shown in the previously referenced **Figure 2**, the US 93/US 60 Corridor traverses multiple jurisdictions in three Arizona counties: Mohave, Yavapai, and Maricopa. Land ownership is divided through the corridor between the National Park Service, Arizona State Land Department (ASLD), BLM, and private holdings. US 93 is within the Lake Mead National Recreation Area under the jurisdiction of the National Park Service for approximately 16 miles. At MP 17, the highway enters land held by the BLM, which traverses the distance to Kingman, passing in and out of parcels held variously by the BLM, ASLD under a State Trust, and private owners.

South of I-40, US 93 passes through (intersects) four one-mile square State Trust land parcels before running south for approximately nine miles through a privately-owned corridor. Three miles beyond the end of this corridor, the highway passes through land held in private ownership and continues into Yavapai County for approximately 45 miles. For the next ten miles ASLD land abuts the highway on the east side, and the highway passes through one ASLD land parcel. Beyond this point to just before the intersection with SR 89, the highway passes through ASLD land. ASLD land is not encountered again until north of Morristown. South of Morristown, the highway passes through (intersects) several ASLD parcels before reaching Wittmann.

The BLM holds ownership/control over most of the corridor south of the Lake Mead National Recreation Area boundary and Kingman. In addition to various ASLD parcels, there are square-mile parcel of privately-held land straddling the right-of-way. Sixteen miles south of the ASLD parcels south of I-40, the highway has BLM land on both sides and generally remains within BLM land into Yavapai County. In the area where ASLD land abuts the highway on the east side, BLM land abuts the highway on the west side. The highway corridor does not interfere with BLM land further south, except for a very small area between MP 116 and MP 117.

Population Centers

There are three major population centers within the US 93/US 60 Corridor: City of Kingman, Town of Wickenburg, and the community of Wittmann. North of Kingman there are two principally rural residential communities that rely on US 93 for regional travel: Dolan Springs and Golden Valley. The City of Kingman has a population of more than 29,000 (2015); it is the principal commercial and social zone for this northern portion of US 93. **Table 2** shows current (2015) population by county and city along with projected future (2040) population growth.

Table 2: Current and Future Population

Community	2010 Population	2015 Population	2040 Population	% Change 2010-2040	Total Growth
Maricopa County	3,824,100	4,063,700	6,174,800	61.5%	2,350,700
Surprise	117,700	126,700	280,500	138.3%	162,800
Wickenburg (Part)	6,400	7,000	15,700	145.3%	9,300
Unincorporated	273,700	292,100	608,500	122.3%	334,800
Yavapai County	211,033	220,774	321,924	52.5%	110,891
Wickenburg (part)	0	18	7	2.1%	7
Unincorporated	83,782	88,851	46,341	16.3%	6,498
Mohave County	160,646	169,643	255,830	59.3%	95,184
Kingman	28,068	29,693	45,042	60.5%	16,974
Unincorporated	75,230	80,944	133,587	77.6%	58,537

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

South of I-40, although an area of roughly 15 square miles has been subdivided for residential development around US 93, there are only two named communities south to Wickenburg: Wikieup with a population of approximately 300 and Nothing, AZ. The latter essentially is a truck stop or way station. SR 97 provides access the community of Hillside, approximately 28 road miles to the east and southeast of US 93. Hillside is a very small community that relies on US 93 for regional access. It was originally founded around a mining operation, and it had early interaction with the BNSF Phoenix Subdivision – the Pea Vine, which included two spurs and siding to serve the community. Although there are permanent residents there today, to many it is consider a ghost town.

US 93 terminates in Wickenburg, which has a population of more than 6,600. Wickenburg is the primary commercial and social zone for southwestern Yavapai County and northern Maricopa County. South of Wickenburg, approximately 11 miles, is the small community of Morristown (population 227 in 2010), which is located on the east side of US 60. Approximately four miles further south is the unique community of Circle City, with a population of just over 1,400, which is located on the west side of US 60. Approximately four miles south of Circle City, the community of Wittmann straddles US 60, the core of which is contained within a square-mile section of land. The Wittmann community, with a population of 6,700 in 2010, and is part of a 16-square-mile area northwest of Surprise that has a number of large-lot, rural subdivisions. Speedworld Raceway Park northwest of Surprise put on races throughout the year, which add to the traffic load on US 60 north of Loop 303.

Major Traffic Generators

Kingman and Wickenburg are the largest traffic generators within the US 93/US 60 corridor. US 60, west of Wickenburg, supports travel to the Wickenburg Municipal Airport and the communities of Aguila and Salome. The junction for US 93 and US 60 at one time was in the center of Wickenburg. This junction has since been moved east to the edge of the Hassayampa River, where a new, four-lane bridge was recently constructed. Wickenburg sponsors several annual events, which attract a large amount of traffic that puts pressure on the river crossing.

The City of Surprise, with a population exceeding 123,000 (2013) has a major influence on the level of traffic operating on US 60 north of Loop 303. Medium density housing for retired persons flanks the US 60/ Loop 303 interchange and major new planned-unit developments (PUDs) are underway along North 163rd Avenue north of the interchange.

Tribes

The Hualapai Tribe is the only federally recognized tribal community in northwestern Arizona along the US 93/US 60 corridor. Based on the 2000 census, the total population of the Hualapai Reservation is 1,620, of whom 1,353 are tribal members. The reservation covers approximately one million acres along 108 miles of the Grand Canyon and Colorado River, throughout three counties: Coconino, Yavapai, and Mohave. There is no casino gaming on the reservation, and tribal enterprise consists of big-game hunting permits, and the Grand Canyon West at the west rim of the Grand Canyon. As a sovereign Indian nation, the Tribe is governed by an executive and judicial branch.

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 actions that can be taken to alleviate those stressors. Using the Habimap™ Tool that creates an interactive database of information included in the SWAP, the following were identified in relation to the US 93/US 60 corridor:

- Wildlife waters are located along both sides of US 93 from Wickenburg to Kingman
- US 93 and US 60 travel through Arizona State Land Department allotments from Loop 303 to the Nevada State Line
- The US 93/US 60 corridor crosses through potential linkage zones and Arizona Missing Linkages from Morristown north through Wickenburg
- US 93 passes through potential linkage zones for the majority of the way to Kingman; one isolated potential linkage zone is located on US 93 north of Kingman
- Amphibian distributions along the corridor include Lowland Leopard Frog and Northern Leopard Frog, with a population of Relict Leopard Frog on US 93 near the state line
- Species and Habitat Conservation Guide indicates riparian areas along US 60 south and north of Wickenburg, and US 93 south and north of Wikieup
- Species of Greatest Conservation Need are identified continuously along the corridor between Loop 303 and the Nevada State line, ranging from low to high, with the highest concentrations near Kingman

- A high level of Species of Economic and Recreational Importance is identified southwest of the Kingman area; A low level is identified throughout the US 93 corridor north of Kingman to the Nevada State Line
- There are three wildlife overpasses on US 93 for big horn sheep crossings located at approximately MP 12.2, MP 5.1, and MP 3.3
- The Arizona Game and Fish Department monitors big horn sheep movements through the use of numerous video and still cameras along the stretch of the corridor with the three overpasses

Corridor Assets

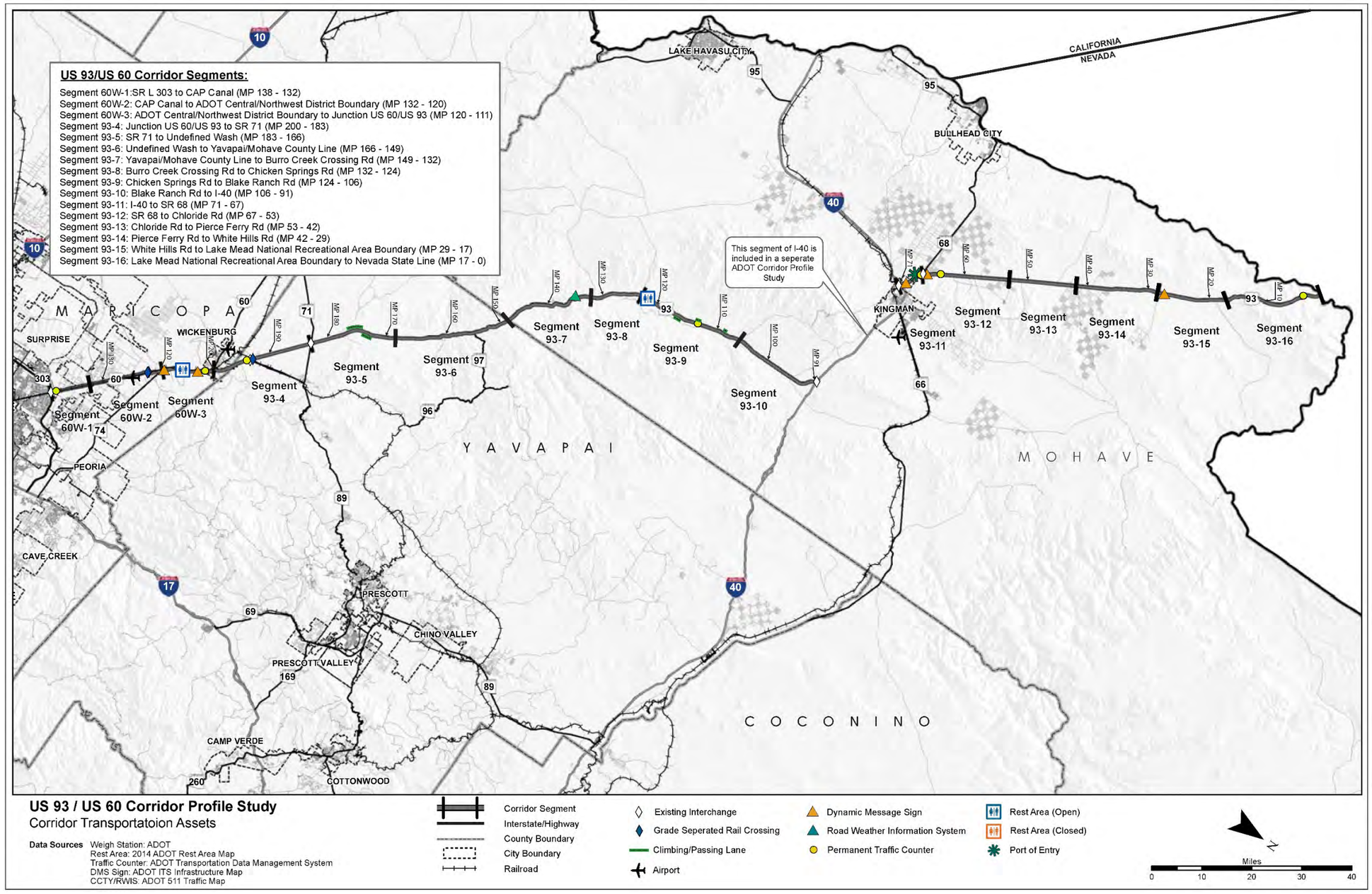
Corridor transportation assets are summarized in **Figure 3**. The corridor has six TIs located at:

- US 93/Kingman Wash Access Road, directly southeast of the Arizona/Nevada State Line
- US 93/SR 68, northwest of Kingman
- I-40/US 93, in west Kingman
- I-40/US 93, approximately 23 miles east of Kingman
- US 93/SR 71, north of Wickenburg
- US 60/Loop 303 in Surprise (the southern terminus of the corridor)

There are three roundabouts on US 93 in Wickenburg. They are located at Wickenburg Ranch Way, Tegner Street, and Junction US 60.

A freight weigh station is located just outside of Kingman near the US 93/SR 68 TI. There are three grade-separated railroad crossings on the corridor. Two are located south of Morristown, one for the eastbound and one for the westbound direction. The third grade separated road crossing is located north of Wickenburg. There are seven permanent traffic counters located along the US 93/US 60 corridor. Two counters are located on US 60, and the remaining five are located along the US 93 portion of the corridor.

Figure 3: Corridor Assets



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 conducted with key stakeholders between February 2016 and October 2016 to present the results and obtain feedback.

Key stakeholders identified for this study included:

- ADOT Northwest District
- ADOT Technical Groups
- NACOG
- WACOG
- MAG
- AGFD
- ASLD
- 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

Studies, plans, design documents, and development programs pertinent to the US 93/US 60 corridor were reviewed to understand the full context of future planning and design efforts within and around the corridor. Findings and recommendations were compiled from more than 60 previous studies, plans, and preliminary design documents. These studies are organized below into four categories: Framework and Statewide Studies; Regional Planning Studies; Planning Assistance for Rural Areas (PARAs) and Small Area Transportation Studies (SATS); and Design Concept Reports (DCRs) and Project Assessments (PAs).

Framework and Statewide Studies

- ADOT 2017-2021 Five-Year Transportation Facilities and Construction Program
- ADOT Statewide Bicycle and Pedestrian Plan Update
- ADOT Climbing and Passing Lane Prioritization Study
- Arizona Key Commerce Corridors
- Arizona State Freight Plan
- Arizona Multimodal Freight Analysis Study
- Arizona Port of Entry Study
- Arizona Roadway Departure Safety Implementation Plan
- Arizona State Airport System Plan
- Arizona State Rail Plan
- Arizona Statewide Dynamic Message Sign (DMS) Master Plan
- Arizona Statewide Rail Framework Study
- Arizona Statewide Rest Area Study
- Arizona Statewide Travel Demand Model (AZTDM)
- Arizona Wildlife Action Plan/Arizona Wildlife Linkages Assessment
- Building a Quality Arizona (BqAZ)
- Bureau of Land Management Travel Management Plan, Wickenburg Community
- MAG Freight Transportation Framework Plan; Hassayampa Valley Rail Corridors Cost Analysis Update
- What Moves You Arizona? Long-Range Transportation Plan 2010-2035

Regional Planning Studies

- ADOT and MAG CANAMEX Corridor Study
- Bellemont Access Management and Multimodal Transportation Final Study
- Bullhead Travel Management Plan
- The Collaborative Benefits of Using FHWA's INVEST – ADOT Transportation Sustainability Implementation Final Report
- An Economic Impact Study of Bicycling in Arizona – Out-of-State Bicycle Tourists & Exports
- Evaluation of Measures to Promote Desert Bighorn Sheep Highway Permeability; U.S. 93
- Hassayampa Framework Study for Wickenburg
- Havasu Travel Management Plan (TMP)
- Hualapai Indian Tribe Long-Range Transportation Final Plan
- I-11 and Intermountain West Corridor Study
- I-40 Corridor Profile Study, Working Paper 1: Literature Review
- MAG Central Phoenix Transportation Study
- MAG Commuter Rail Development Plan: Grand Avenue
- MAG FY 2014-2018 Regional Transportation Improvement Program (TIP)
- MAG 2035 Regional Transportation Plan (RTP)
- MAG Regional Transit Framework (RTF) Final Report
- MAG Strategic Transportation Safety Plan
- MCDOT Transportation System Plan (TSP)
- MCDOT Transportation Improvement Program
- Mohave County 2015 General Plan
- NACOG Human Services & Public Transit Coordinated Transportation Plan
- NACOG Regional Transportation Improvement Program
- US 60/Grand Avenue Corridor Optimization, Access Management, and System Study (COMPASS)
- WACOG Regional Transportation Improvement Program
- Yavapai County Comprehensive Plan

Planning Assistance for Rural Areas and Small Area Transportation Studies

- Kingman Stockton Hill Road Corridor Study
- North Havasu Area Transportation Study
- Town of Wickenburg Trails Connectivity and Transportation Study and the Wickenburg Community Trails Master Plan

Design Concept Reports and Project Assessments

- Interstate 40 from Bellemont to Winona
- Interstate 40 / U.S. Route 93 System Traffic Interchange Design Concept Report and Environmental Studies
- Loop 303, I-10 to US 60, Final Design Concept Report
- Loop 303 from Interstate 10 to State Route 30
- Loop 303 from State Route 30 to Hassayampa Freeway
- State Route 30 Design Concept Report
- US 60 / Grand Avenue: Loop 303 to 99th Avenue Design Concept Report
- US 60, San Domingo to Wittmann Design Concept Report
- US 93 Corridor Projects
- US 93: SR 89 to Wickenburg Interim Bypass Kingman – Wickenburg Highway Final Design Concept Report
- ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment
- US 93: Wickenburg to Santa Maria River Design Concept Report
- US 93, Right-of-Way and Access Control Addendum

Construction Projects Completed Since 2010

Information and recommended improvements relevant to the US 93/US 60 corridor obtained from reviewed studies and plans, including several DCR/PAs, has been curated in **Table 3** and **Figure 4**. They include, but are not limited to:

Important construction projects completed since 2010 to improve travel conditions in the corridor are highlighted below:

- US 93, Kabba Wash
- US 93, Pliocene Cliffs
- US 93, SB Wagon Bow Ranch
- US 93, SB Deluge Wash
- US 93, Antelope Wash
- US 93, Medlin Crossover
- US 93, South SR 71 to North SR 89
- US 60, N. Vulture Mine Road
- US 60 Grand Avenue/Loop 303 Traffic Interchange

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?)	
US 60											
1	138	111	27	Proposed US 60/Grand Ave Commuter Rail Line		√		2020 - 2040		No	- MAG Commuter Rail Development Plan: Grand Avenue - Arizona State Rail Plan - BQAZ - Arizona Statewide Rail Framework Study
2	138	111	27	Proposed High Capacity Community Transit Route		√		FY 2015 - 2030		No	- MAG Freight Transportation Framework Plan - MAG Regional Transit Framework Plan
3	138	138	0	Proposed Park-n-Ride		√		FY 2015 - 2030		No	MAG Regional Transit Framework Plan
4	138	138	0	US 60/Grand Ave and Loop 303. Proposed New System Interchange		√				No	BQAZ
5	138	138	0	Proposed North Surprise Commuter Rail Station		√		2020 - 2030		No	MAG Commuter Rail Development Plan: Grand Avenue
6	128	128	0	Proposed Park-n-Ride - US 60 and Dove Valley Rd		√				No	Arizona Statewide Rail Framework Plan
7	128	128	0	Proposed Wittmann Rail Station		√		2020 - 2030		No	MAG Commuter Rail Development Plan: Grand Avenue
8	127.50	127.50	0	BSNF Surprise Rail Classification Yard		√				No	- Arizona Statewide Rail Framework Study - Arizona State Rail Plan
9	122	122	0	Addition of westbound DMS		√				No	Arizona Statewide Dynamic Message Master Plan
10	122	122	0	Proposed Morristown / Castle Hot Springs Commuter Rail Station (Potential SAP Location)		√		2020 - 2030		No	- MAG Freight Transportation Framework Plan - MAG Commuter Rail Development Plan: Grand Avenue
11	120.80	120.80	0	System Interchange at US 60 / SR 74		√				No	Hassayampa Framework Study for Wickenburg
12	118	118	0	Addition of Eastbound DMS		√				No	Arizona Statewide Dynamic Message Master Plan
13	117	117	0	US 60 Roadway Embankment Stabilization Improvement		√			H678701C	**No**	Hassayampa River; E of Wickenburg, Wickenburg – Phoenix Highway US 60 DCR

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			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N?)	
US 60 (continued)											
14	116.30	116.30	0	US 60 Roadway Embankment Stabilization Improvement		√			H67870 1C	No	Hassayampa River; E of Wickenburg, Wickenburg – Phoenix Highway US 60 DCR
15	116	116	0	Hassayampa Rest Area Improvements		√				No	Arizona Statewide Rest Area Study
16	115.50	115.50	0	US 60 and Grand Ave Monarch Bridge scour retrofit	√			FY 2014 - 2018	33212	No	MAG FY 2014-2018 Regional Transportation Improvement Program (TIP)
17	113.75	113.75	0	Proposed Trail Head or Day Use Area	√					No	Wickenburg Community Travel Management Plan
18	112.70	111	1.70	US 60 / Grand Ave Design of Retaining Walls in Wickenburg		√		FY 2014 - 2018	21385	No	MAG FY 2014-2018 Regional Transportation Improvement Program (TIP)
19	111	111	0	Proposed Wickenburg Commuter Rail Station		√				No	- MAG Freight Transportation Framework Plan - MAG Commuter Rail Development Plan: Grand Avenue
US 93											
20	200	200	0	Construction of Pedestrian and Bicycle Bridge at US 93 Bypass and Hassayampa River			√	FY 2014 - 2018	40083	No	MAG FY 2014-2018 Regional TIP
21	-	-		Wickenburg Municipal Airport Improvements	√	√	√	FY 2016 - 2019		No	Arizona State Airport System Plan
22	198.40	197.90	0.50	Widening Existing US 93 to Include 2 Travel Lanes SB and NB with Raised Median			√		H6731 01L	No	ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment
23	198.35	193.13	5.22	Enhance Safety and Operational Traffic Characteristics		√			H6731 01L	No	US 93: SR 89 to Wickenburg Interim Bypass Kingman – Wickenburg Highway
24	197.90	197.90	0	US 93 and Rincon Rd TI: Proposed Roundabout		√			H6731 01L	No	ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment
25	197.90	194	3.90	Rincon Rd to SR 89 Junction (Pavement Preservation)	√			FY 2018	16916/C	No	ADOT 5 Year Program 2016 - 2020
26	197.90	193.10	4.8	New separate SB 2-Lane roadway			√		H6731 01L	No	ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment

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			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N?)	
US 93 (continued)											
27	197	197	0	US 93 and Cope Road TI Redesign		√			H6731 01L	No	ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment
28	196.10	196.10	0	US 93 and Vulture Mine Rd TI: Proposed Roundabout			√		H6731 01L	No	ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment
29	194.90	194.90	0	US 93 and Scenic Loop Rd TI Redesign			√		H6731 01L	No	ADOT US 93: SR 89 to Wickenburg Interim Bypass Final Environmental Assessment
30	194	194	0	Proposed West Wickenburg Commuter Rail Station		√		2030 - 2040		No	MAG Commuter Rail Development Plan: Grand Avenue
31	193.50	190.50	3	Gap – 2-Lane to 4-Lane Divided			√			No	ADOT US 93 Corridor Projects
32	193.50	190.50	3	Vista Royale – 2-Lane to 4-Lane Divided			√			No	ADOT US 93 Corridor Projects
33	193.40	193.40	0	US 93 and SR 89 TI: Proposed Roundabout			√		H6731 01L	No	- US 93: SR 89 to Wickenburg Interim Bypass Final EA - BQAZ
34	188	188	0	System Interchange at US 93 / I-11 (Planned) and SR 89 Intersection			√			No	Hassayampa Framework Study for Wickenburg
35	191	185.30	5.70	Construct Roadway Improvements		√	√	FY 2015	H85830 1C	No	ADOT 5 Year Program 2016 - 2020
36	190.50	185	5.50	SR 71 to SR 89 – 2-Lane to 4-Lane Divided			√			No	- ADOT US 93 Corridor Projects - ADOT Transportation Sustainability Implementation Rpt
37	186	186	0	Service Interchange at Proposed Twin Peaks Rd			√			No	Hassayampa Framework Study for Wickenburg
38	185	181.30	3.70	SR 71 Traffic Interchange			√			No	ADOT US 93 Corridor Projects
39	183	183	0	Parkway Interchange at US 93 and SR 71 Interchange		√				No	Hassayampa Framework Study for Wickenburg
40	184	184	0	Parkway Interchange at proposed Black Mountain Parkway Intersection			√			No	Hassayampa Framework Study for Wickenburg
41	181.30	177.80	4.50	Alamo – 2-Lane to 4-Lane Divided			√			No	ADOT US 93 Corridor Projects

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			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N?)	
US 93 (continued)											
42	177.80	173.50	4.30	Date Creek – 2-Lane to 4-Lane Divided			√			No	ADOT US 93 Corridor Projects
43	176	176	0	Service Change at US 93 and Proposed Forepaugh Peak Rd Intersection			√			No	Hassayampa Framework Study for Wickenburg
44	173.50	170.40	3.10	Tres Alamos – 2-Lane to 4-Lane Divided			√			No	ADOT US 93 Corridor Projects
45	172	165	7	Addition of Southbound Passing Lane			√	Medium Priority (Tier 2)		No	ADOT Climbing and Passing Lane Prioritization Study
46	167	165	2	Addition of Northbound Passing Lane			√	High Priority (Tier 1)		No	ADOT Climbing and Passing Lane Prioritization Study
47	166	161.70	4.30	Big Jim Wash – 2-Lane to 4-Lane divided			√			No	ADOT US 93 Corridor Projects
48	165	165	0	Bridge Scour Protection: Big Jim Wash BR, STR #548	√				25015/ 01D	No	ADOT 5 Year Program 2016 - 2020
49	163	161	2	Addition of Southbound Climbing Lane			√	High Priority (Tier 1)		No	ADOT Climbing and Passing Lane Prioritization Study
50	139	139	0	Burro Creek Bridge Rehabilitation		√		FY 2017	H85301 C	No	ADOT 5 Year Program 2016 - 2020
51	125	125	0	Medlin Crossover Design and Construction		√		FY 2015		No	ADOT 5 Year Program 2016 - 2020
52	119.70	116.30	3.40	Carrow Stephens – 2-Lane to 4-Lane Divided			√	In Design	H85950 1C	No	ADOT US 93 Corridor Projects
53	118.60	118.60	0	Cyprus Bagdad Copper Rd Proposed TI			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
54	116.60	116.60	0	Diamond Joe Rd Proposed TI			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
55	113.60	113.60	0	Hofriders Crossing Proposed TI			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR

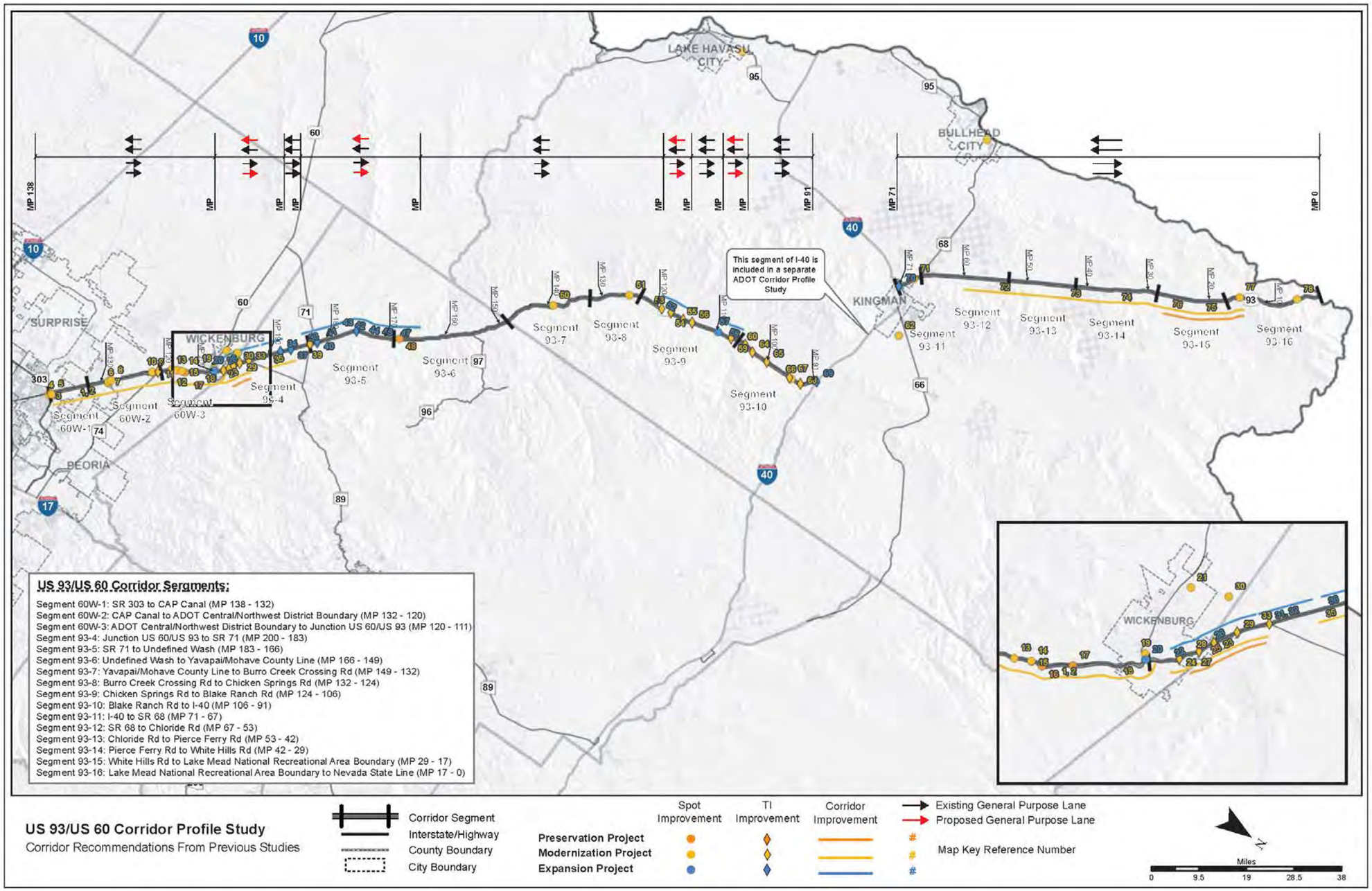
Table 3: Corridor Recommendations from Previous Studies (continued)

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization [M], Expansion [E])			Status of Recommendation			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N?)	
US 93 (continued)											
56	111.50	111.50	0	Proposed Traffic Interchange			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
57	109	109	0	Cane Springs Rural Corridor Reconstruction			√	FY 2016	10216/D	No	ADOT 5 Year Program 2016 - 2020
58	108.90	106	2.90	Cane Springs – 2-Lane to 4-Lane Divided			√	2016		No	ADOT US 93 Corridor Projects
59	107.40	107.40	0	Upper Trout Creek Proposed TI			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
60	104.40	104.40	0	Proposed Traffic Interchange			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
61	-	-	-	Lake Havasu City Airport Improvements	√	√	√			No	Arizona State Airport System Plan
62	-	-	-	Kingman Airfield Improvements	√	√	√			No	Arizona State Airport System Plan
63	-	-	-	Laughlin/Bullhead City Airport Improvements	√	√	√			No	Arizona State Airport System Plan
64	102.60	102.60	0	Proposed Traffic Interchange			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
65	99.10	99.10	0	Proposed Traffic Interchange			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
66	95.60	95.60	0	Old US 93 Proposed TI			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
67	95	95	0	Addition of northbound DMS			√			No	Arizona Statewide Dynamic Message Master Plan
68	93.10	93.10	0	Proposed Traffic Interchange			√		H44230 2L	No	US 93, Right-of-Way and Access Control Addendum DCR
69	92.50	92.50	0	US 93 and I-40 Traffic Interchange			√			No	- ADOT US 93 Corridor Projects - Arizona Key Commerce Corridors - I-40 Corridor Profile Study, WP 1: Literature Review - BQAZ

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			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N?)	
US 93 (continued)											
70	71	71	0	I-40 and US 93 Traffic Interchange Update			√	2040		No	- Arizona Key Commerce Corridors - I-40 Corridor Profile Study, WP 1: Literature Review - BQAZ - I-40 / US 93 System Traffic Interchange DCR and EA
71	68	68	0	Kingman Port of Entry Facility Improvements		√				No	Arizona Port of Entry Study
72	48	48	0	Highway Safety Improvement Program – Shoulder widening: Windy Point Rd to Mineral Park Rd		√		FY 2017	H86590 1D	No	ADOT 5 Year Program 2016 - 2020
73	38	38	0	Highway Safety Improvement Program – Design Shoulder Widening: Eleventh St to Windy Point Rd		√		FY2017	H86580 1D	No	ADOT 5 Year Program 2016 - 2020
74	28	28	0	Highway Safety Improvement Program – Design: White Hills Rd to Eleventh St.		√		FY2016	H86570 1D	No	ADOT 5 Year Program 2016 - 2020
75	17	17	0	Highway Safety Improvement Program - Construction of Shoulder & Rumble Strip: Willow Beach to White Hills Rd		√		FY 2017	H84080 1C	No	ADOT 5 Year Program 2016 - 2020
76	17	17	0	Pavement Preservation: Willow Beach to White Rd	√			FY 2017	01C	No	ADOT 5 Year Program 2016 - 2020
77	15.50	15.50	0	Proposed Wildlife Overpass		√				No	Measures to Promote Desert Bighorn Sheep Highway Permeability: U.S. Route 93
78	7.75	7.75	0	Proposed Wildlife Overpass		√				No	Measures to Promote Desert Bighorn Sheep Highway Permeability: U.S. Route 93

Figure 4: Corridor Recommendations from Previous Studies



2.0 CORRIDOR PERFORMANCE

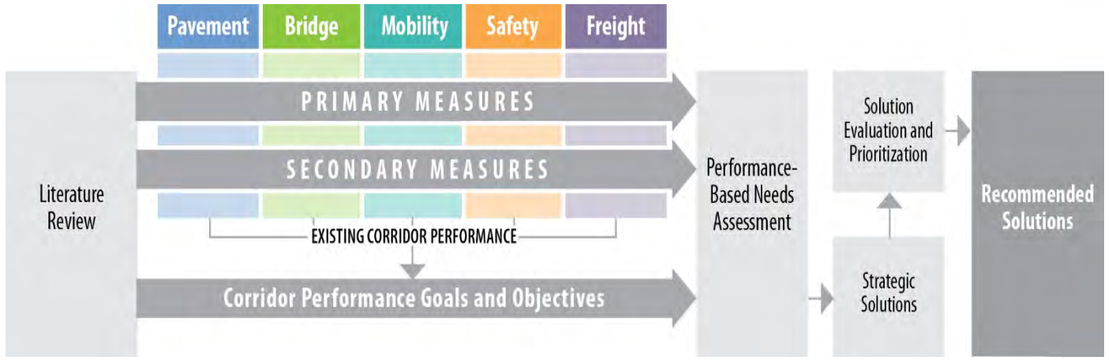
This chapter describes the evaluation of the existing performance of the US 93/US 60 corridor. A series of performance measures is used to assess the corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

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 baseline corridor performance and established performance objectives.

Figure 5: Corridor Profile Performance Framework



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

- 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. Because 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 falls 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

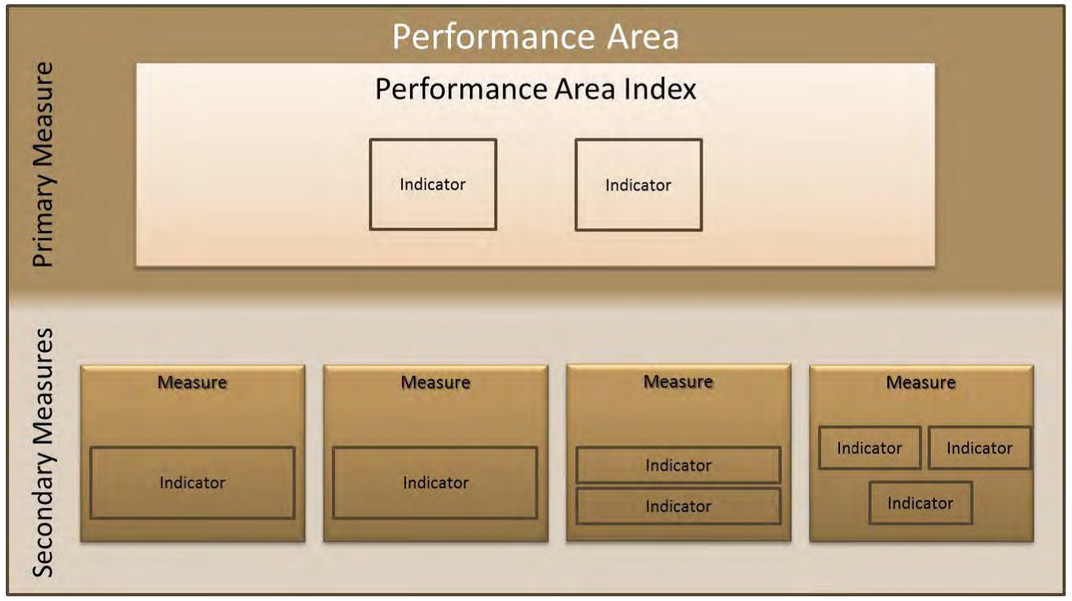
Performance Area	Primary Measure	Secondary Measures
Pavement	**Pavement Index** Based on a combination of International Roughness Index and cracking	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure 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

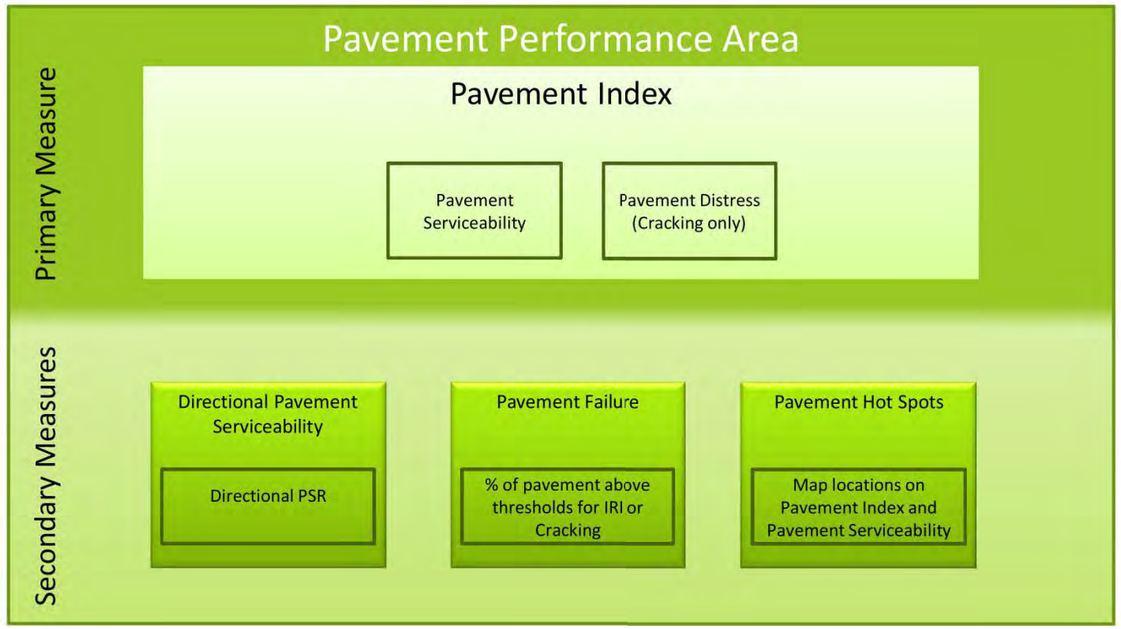
Figure 6: Performance Area Template



2.2 Pavement Performance Area

The Pavement performance area consists 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 93/US 60 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 the US 93/US 60 corridor, the following operating environment was identified:

- Non-interstate: all segments

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 this analysis, the following observations were made:

- Overall, based on the weighted average of the Pavement Index, the Pavement Performance in the corridor is "good."
- According to the Pavement Index, Pavement Performance for only one segment – Segment 93-13 – is rated as "fair"
- There are six hot spots within the corridor; one each located in Segments 93-6, 93-8, 93-11, 93-12, and two in Segment 93-14, where pavement failure is evident two of the hot spots are in Segment 14, which has a Pavement Performance rating of "fair"
- The performance of 13% of the pavement in Segments 93-6, 93-8, and 93-11 is "fair", and 8% of the pavement in Segment 93-14 is exhibiting "fair" performance
- Pavement Performance in the northbound (NB) and southbound (SB) directions is nearly equal, with the exception of southbound Segment 93-14, which has a "fair" PSR
- Segment 93-14 exhibits the lowest Pavement Performance, and the lowest PSR in the southbound direction

Table 5 summarizes the Pavement performance results for the US 93/US 60 corridor. **Figure 8** illustrates the primary Pavement Index performance and locations of Pavement hot spots along the US 93/US 60 corridor. Maps for each secondary measure can be found in **Appendix A**.

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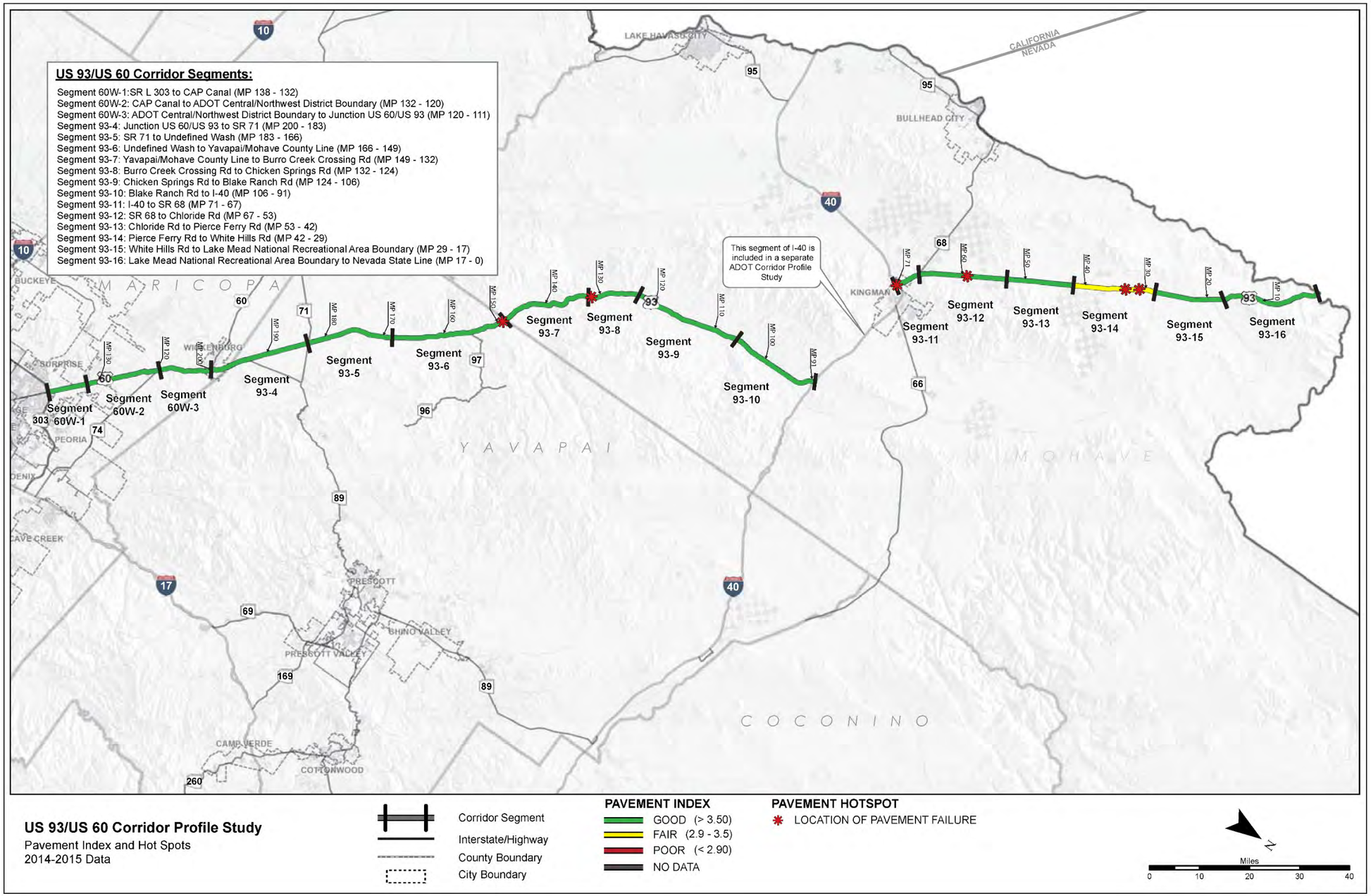
Table 5: Pavement Performance

Segment #	Segment Length (miles)	Pavement Index	Directional PSR		% Area Failure
			NB/WB	SB/EB	
60W-1	6	4.01	3.97	3.83	0%
60W-2	12	3.98	4.08	4.03	0%
60W-3	9	4.40	4.21	4.21	0%
93-4	17	3.82	3.63	3.68	0%
93-5	17	3.81	3.63	3.81	0%
93-6	17	3.71	3.58	3.84	13%
93-7	17	3.86	3.81	3.79	3%
93-8	8	3.87	4.10	3.56	13%
93-9	18	4.19	4.06	3.99	0%
93-10	15	4.19	4.03	3.95	0%
93-11	4	4.20	3.69	4.07	13%
93-12	14	4.12	4.10	4.04	4%
93-13	11	3.88	3.78	3.78	0%
93-14	13	3.43	3.59	3.49	8%
93-15	12	3.80	3.62	4.00	0%
93-16	17	4.53	4.38	4.39	0%
Weighted Corridor Average		3.98	3.98	3.89	3.90

SCALES		
Performance Level	**Non-Interstate**	
Good	> 3.50	< 5%
Fair	2.90 – 3.50	5% - 20%
Poor	< 2.90	> 20%

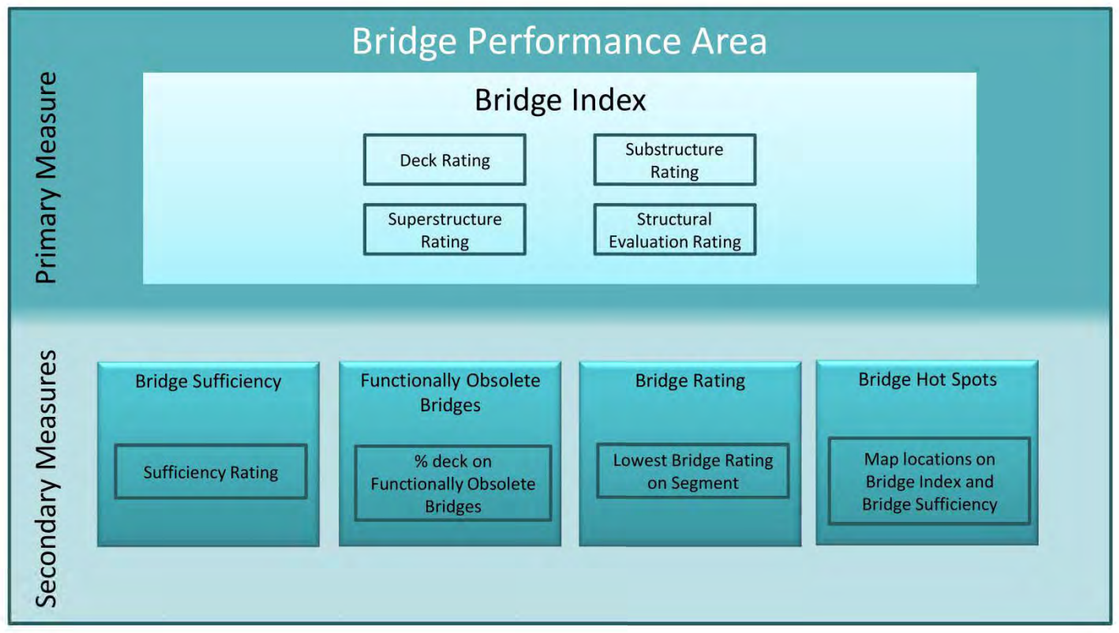
Figure 8: Pavement Performance



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 93/US 60 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 high-level assessment of the structural condition of bridges for the corridor and for each segment. The four secondary measures provide more detailed information to assess bridge performance.

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

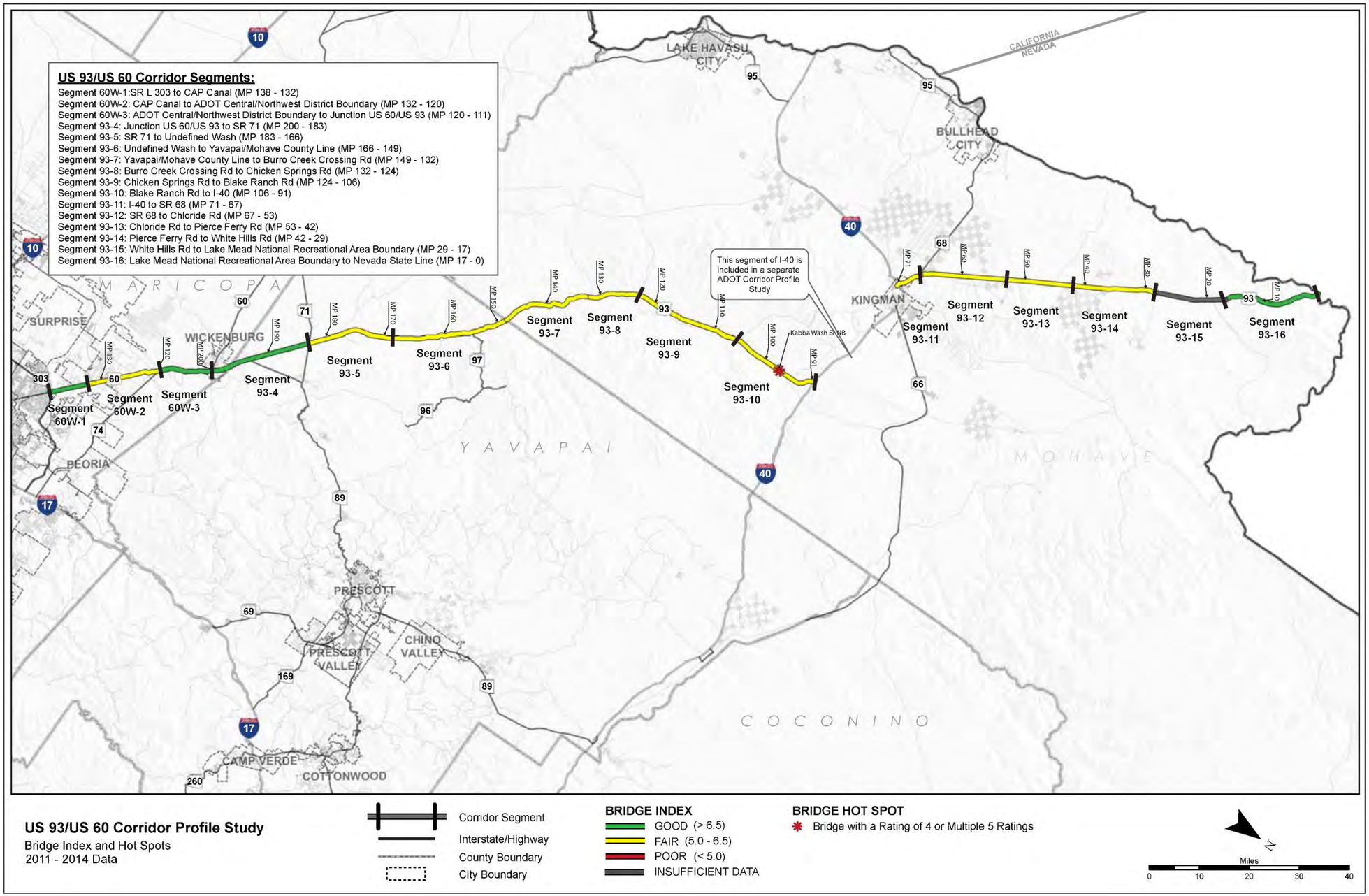
- Overall, based on the weighted average of the Bridge Index, bridge performance in the corridor would be rated as "fair"
- According to the Bridge Index, the performance of nearly all of the bridges would be rated as "fair"
- There are no structurally deficient bridges along the corridor
- For each segment of the corridor, the lowest bridge performance rating is 5 or 6
- There are no bridges in the corridor with a sufficiency rating of "poor"
- There are no functionally obsolete bridges along the corridor
- Segments 60W-1, 60W-3, 93-4, and 93-16 have the highest Bridge Index performance values
- There is one Bridge hot spot – Kabba Wash Bridge NB (#492) at MP 97.5

Table 6 summarizes the Bridge performance results for the US 93/US 60 corridor. **Figure 10** illustrates the primary Bridge Index performance and locations of Bridge hot spots along the US 93/US 60 corridor. 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	% Deck Area of Functionally Obsolete Bridges	Lowest Bridge Rating
60W-1	6	4	6.81	97.17	0.0%	5
60W-2	12	12	6.26	93.89	0.0%	5
60W-3	9	6	6.67	91.57	0.0%	6
93-4	17	2	6.76	83.15	0.0%	6
93-5	17	2	5.39	86.23	0.0%	5
93-6	17	7	6.37	96.25	0.0%	5
93-7	17	4	6.05	94.49	0.0%	5
93-8	8	11	6.32	96.75	0.0%	5
93-9	18	8	6.48	87.50	0.0%	5
93-10	15	3	6.29	93.36	0.0%	5
93-11	4	3	6.36	94.90	0.0%	6
93-12	14	6	5.90	96.11	0.0%	5
93-13	11	2	6.00	97.18	0.0%	6
93-14	13	2	6.00	97.70	0.0%	6
93-15	12	0	No Bridges			
93-16	17	7	7.31	91.03	0.0%	6
Weighted Corridor Average			6.40	93.52	0%	5.28
SCALES						
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

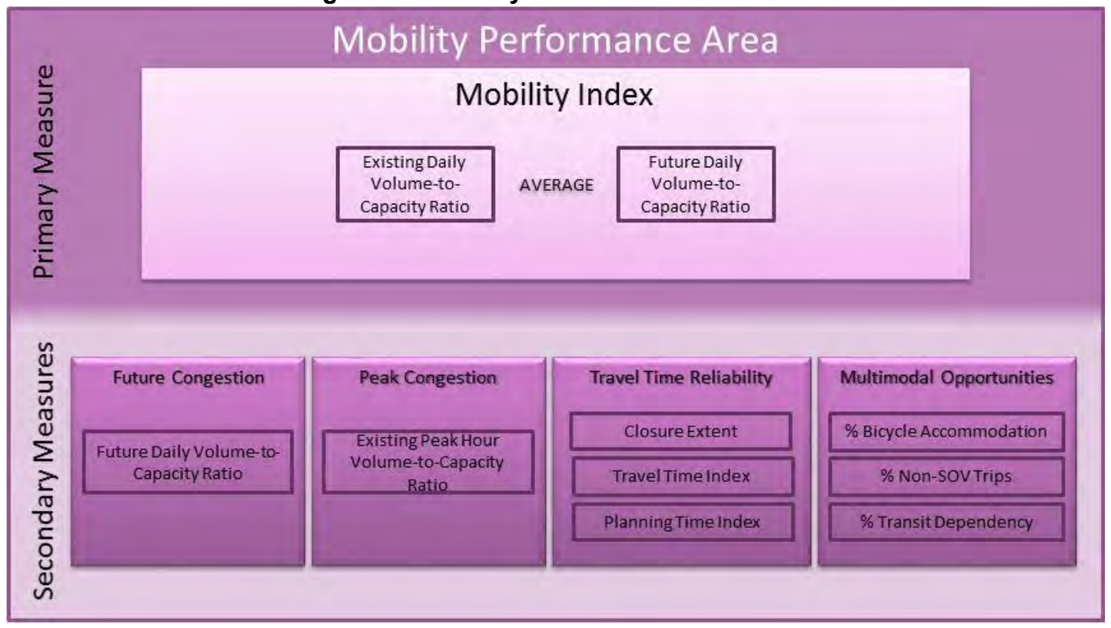
Figure 10: Bridge Index and Hot Spots



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 93/US 60 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 the US 93/US 60 corridor, the following operating environments were identified:

- Urban Interrupted Flow: Segments 60W-1, 60W-2, 93-4, and 93-11
- Rural Uninterrupted Flow: Segments 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12,
    - 93-13, 93-14, 93-15, and 93-16

Secondary Mobility Measures

Four secondary measures provide an 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.

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

- Overall, based on the weighted average of the Mobility Index, the performance of the corridor relative to traffic operations is "good"
- Existing, peak-hour traffic operations performance is "good"
- Future traffic operations performance is anticipated to be "good" throughout the corridor, except in Segments 60W-1 and 60W-2, which are anticipated to be "poor," and in Segments 93-3, 93-4 and 93-11, which are anticipated to be "fair"
- A majority of the segments show "good" performance relative to the Closure performance measure
- Segments 93-4 and 93-11 have the highest number of closures in the southbound direction, and Segment 93-9 has the highest number of closures in the northbound direction
- Performance with respect to TTI generally is "good" within the corridor with the exception of northbound Segment 93-11, which is "poor," and southbound Segment 60W-3, which also is "poor"
- The PTI measure indicates "good" performance for the majority of segments; "poor" measures are noted for both directions of Segments 60W-3 and 93-7, and "poor" measures also are noted in the northbound direction of Segments 93-4, 93-8 and 93-11 and southbound direction for Segment 93-15
- Bicycle accommodations vary along the corridor, with "good" accommodation in Segments 60W-1, 60W-2, 93-7, 93-8, and 93-11. Accommodation is "fair" in Segments 60W-3, 93-4, 93-5, 93-6, 93-12, 93-13, and 93-16. The performance of Segments 93-9, 93-10, 93-14, and 93-15 is "poor"
- A majority of the corridor, with the exception of Segments 60W-1, 93-11, and 93-12, exhibits "poor" or "fair" performance relative to non-SOV trips, meaning that many vehicles carry only a single occupant

Table 7 summarizes the Mobility performance results for the US 93/US 60 corridor. **Figure 12** illustrates the primary Mobility Index performance along the US 93/US 60 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 7: Mobility Performance

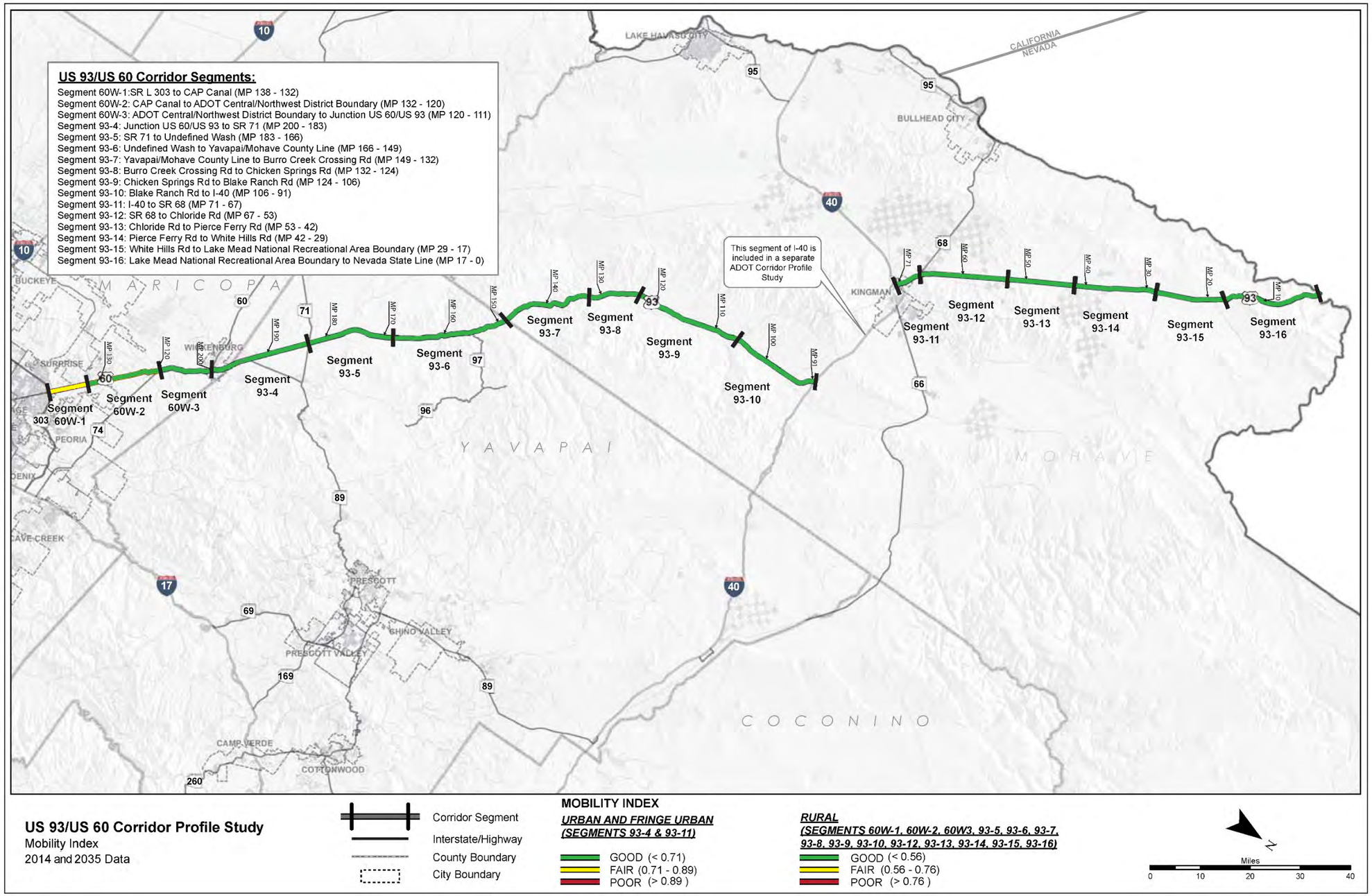
Segment #	Segment Length (miles)	Mobility Index	Future Daily V/C[a]	Existing Peak Hour V/C		Closure Extent (instances/milepost/year/ mile)		Directional TTI[b] (all vehicles)		Directional PTI[c] (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
				NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB		
60W-1[1*]	6	0.77	1.04	0.44	0.42	0.10	0.20	1.10	1.02	1.50	1.36	100%	20%
60W-2[1*]	12	0.68	1.01	0.27	0.28	0.00	0.10	1.04	1.12	1.32	1.73	99%	16%
60W-3[2^]	9	0.48	0.75	0.20	0.20	0.09	0.27	1.00	2.38	2.43	9.65	72%	10%
93-4[1*]	17	0.61	0.73	0.39	0.38	0.06	0.51	1.35	1.25	5.93	2.13	81%	15%
93-5[2^]	17	0.30	0.36	0.17	0.17	0.18	0.18	Insufficient Data				82%	10%
93-6[2^]	17	0.28	0.33	0.19	0.19	0.05	0.15	1.03	1.04	1.41	1.42	80%	8%
93-7[2^]	17	0.13	0.15	0.10	0.10	0.11	0.02	1.06	1.11	1.61	1.63	91%	11%
93-8[2^]	8	0.13	0.15	0.10	0.10	0.00	0.10	1.00	1.00	1.84	1.15	98%	11%
93-9[2^]	18	0.26	0.31	0.25	0.25	0.24	0.06	1.00	1.00	1.00	1.03	48%	6%
93-10[2^]	15	0.16	0.18	0.17	0.17	0.00	0.24	1.03	1.00	1.45	1.50	47%	6%
93-11[1*]	4	0.66	0.78	0.58	0.61	0.15	0.46	1.81	1.00	11.65	2.85	100%	19%
93-12[2^]	14	0.22	0.25	0.26	0.26	0.03	0.06	1.00	1.00	1.10	1.16	77%	21%
93-13[2^]	11	0.21	0.23	0.26	0.26	0.11	0.02	1.00	1.00	1.06	1.15	87%	8%
93-14[2^]	13	0.23	0.27	0.24	0.24	0.02	0.09	1.00	1.00	1.07	1.21	54%	10%
93-15[2^]	12	0.23	0.27	0.23	0.23	0.00	0.12	1.00	1.00	1.10	1.63	54%	7%
93-16[2^]	17	0.23	0.27	0.24	0.23	0.06	0.12	1.00	1.00	1.13	1.46	84%	0%
Weighted Corridor Average		0.32	0.40	0.24	0.23	0.08	0.16	1.06	1.11	1.96	1.87	76%	10%

SCALES

Performance Level	Urban Rural	All	Uninterrupted	Interrupted	All	
Good	< 0.71[1] < 0.56[2]	< 0.22	< 1.15^ < 1.30*	< 1.30^ < 3.00*	> 90%	> 17%
Fair	0.71 – 0.89[1] 0.56 – 0.76[2]	0.22 – 0.62	1.15 –1 .33^ 1.30 – 2.00*	1.30 – 1.50^ 3.00 – 6.00*	60% - 90%	11% - 17%
Poor	> 0.89[1] > 0.76[2]	> 0.62	> 1.33^ >2.00*	> 1.50^ > 6.00*	< 60%	< 11%

^Uninterrupted Flow Facility
*Interrupted Flow Facility
[a] V/C = Volume-to-Capacity
[1]Urban Operating Environment
[2]Rural Operating Environment
[b] TTI = Directional Travel Time Index
[C] PTI = Directional Planning Time Index

Figure 12: Mobility Index



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. Because 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 the US 93/US 60 corridor, two operating environments were identified:

- 2 or 3 or 4 Lane Divided Highway: Segments 60W-1, 60W-2, 60W-3, 93-6, 93-7,93-8,
  - 93-10, 93-11, 93-12, 93-13, 93-14, 93-15, 93-16
- 2 or 3 Lane Undivided Highway: Segments 93-4, 93-5, 93-9

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.

For US 93 and US 60, it was determined that the crash unit type performance measures for crashes involving heavy vehicle (trucks), motorcycles, and non-motorized travelers have insufficient data

(i.e., too small of a sample size) to generate reliable performance ratings so these secondary safety performance measures were removed from the performance evaluation. Therefore, these measures were not included in the performance evaluation for this corridor. Segment 93-8 also had insufficient data to generate reliable performance ratings for crashes involving behaviors associated with the SHSP Top 5 Emphasis Areas.

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

- Overall, based on the weighted average of the Safety Index, performance of the corridor rates "average"
- Nine of the segments perform either "above average" or "average," and the remaining seven are "below average" in the Safety Index
- Both directions of travel in Segments 60W-3 and 93-13 perform "below average" in the Safety Index, top five SHSP emphasis areas
- Segments 60W-2, 60W-3, 93-12, and 93-13 perform "below average" in the top 5 SHSP emphasis areas
- There are several Safety hot spots, including NB/WB in Segments 60W-1, 60W-2, 60W-3, and 93-7, and SB/EB in Segment 93-4

Table 8 summarizes the Safety performance results for the US 93/US 60 corridor. **Figure 14** illustrates the primary Safety Index performance and locations of Safety hot spots along the US 93/US 60 corridor. Maps for each secondary measure can be found in **Appendix A**.

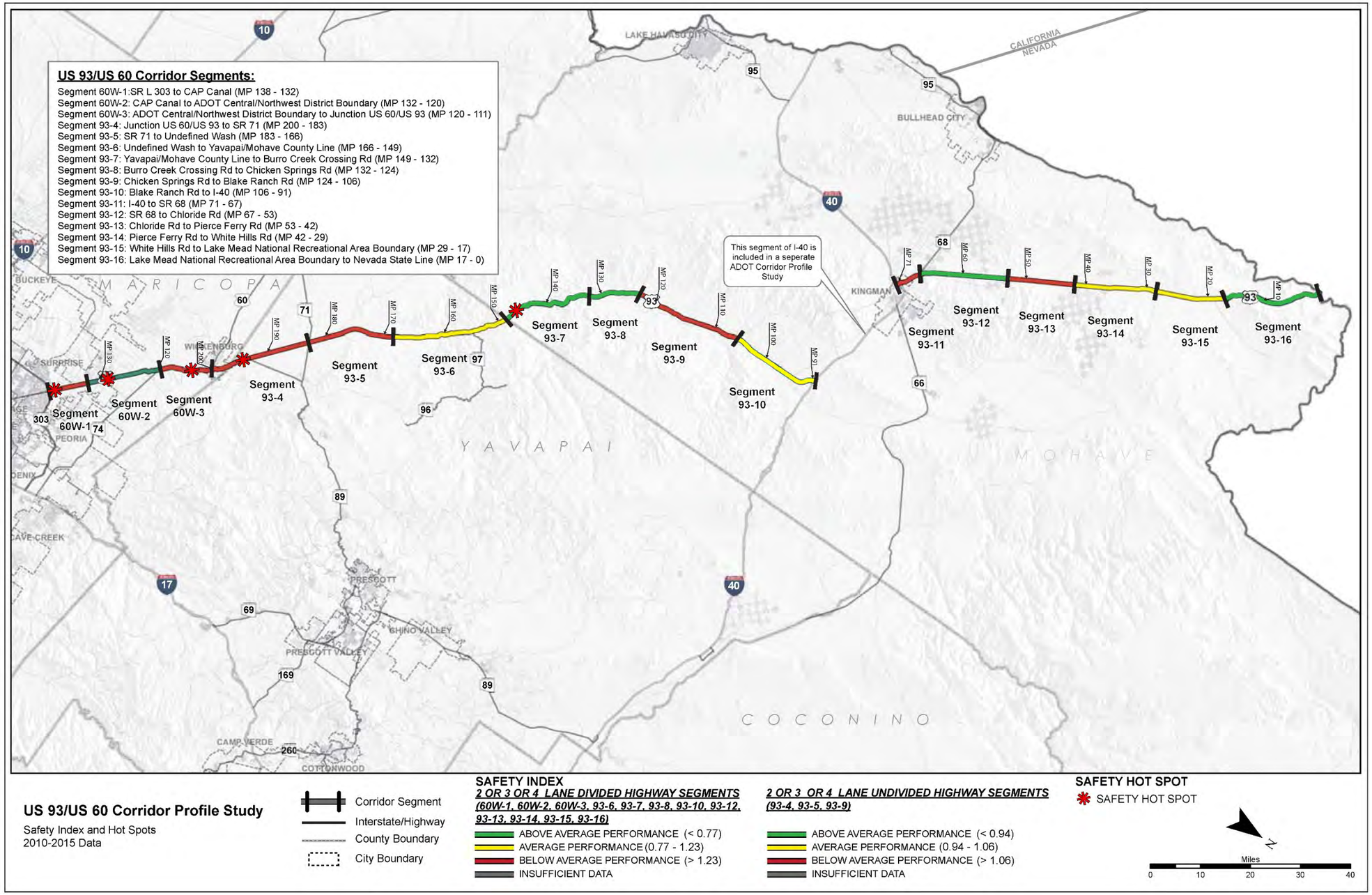
Table 8: Safety Performance

Segment #	Segment Length (miles)	Total Fatal & Incapacitating Injury Crashes (F/I)	Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors [c]	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers
				NB/WB	SB/EB				
60W-1[a]	6	4/8	1.99	1.19	2.80	50%	Insufficient Data	Insufficient Data	Insufficient Data
60W-2[a]	12	2/11	0.74	0.80	0.68	69%	Insufficient Data	Insufficient Data	Insufficient Data
60W-3[a]	9	4/10	1.44	1.52	1.35	57%	Insufficient Data	Insufficient Data	Insufficient Data
93-4[b]	17	8/6	2.58	2.51	2.66	50%	Insufficient Data	Insufficient Data	Insufficient Data
93-5[b]	17	5/9	1.73	0.82	2.64	43%	Insufficient Data	Insufficient Data	Insufficient Data
93-6[a]	17	4/10	1.07	0.61	1.53	29%	Insufficient Data	Insufficient Data	Insufficient Data
93-7[a]	17	0/12	0.19	0.29	0.10	42%	Insufficient Data	Insufficient Data	Insufficient Data
93-8[a]	8	0/1	0.03	0.00	0.07	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
93-9[b]	18	5/6	1.60	1.94	1.27	45%	Insufficient Data	Insufficient Data	Insufficient Data
93-10[a]	15	4/4	0.97	0.51	1.43	50%	Insufficient Data	Insufficient Data	Insufficient Data
93-11[a]	4	4/2	2.55	1.30	3.80	17%	Insufficient Data	Insufficient Data	Insufficient Data
93-12[a]	14	2/10	0.62	0.66	0.59	67%	Insufficient Data	Insufficient Data	Insufficient Data
93-13[a]	11	5/12	1.71	1.34	2.09	59%	Insufficient Data	Insufficient Data	Insufficient Data
93-14[a]	13	4/11	1.10	1.61	0.59	33%	Insufficient Data	Insufficient Data	Insufficient Data
93-15[a]	12	2/16	0.77	1.33	0.21	28%	Insufficient Data	Insufficient Data	Insufficient Data
93-16[a]	17	2/6	0.42	0.82	0.02	50%	Insufficient Data	Insufficient Data	Insufficient Data
Weighted Corridor Average			1.16	1.09	1.24	47%	Insufficient Data	Insufficient Data	Insufficient Data

SCALES		
Performance Level	**2 or 3 or 4 Lane Divided Highway**	
Above Average	< 0.77	< 44%
Average	0.77 – 1.23	44% – 54%
Below Average	> 1.23	> 54%
Performance Level	**2 or 3 Lane Undivided Highway**	
Above Average	< 0.94	< 51%
Average	0.94 – 1.06	51% – 58%
Below Average	> 1.06	> 58%

[a] 2 or 3 or 4 Lane Divided Highway
[b] 2 or 3 Lane Undivided Highway
Note "Insufficient Data" indicates there were 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 the US 93/US 60 corridor, the following operating environments were identified:

- Interrupted Flow: Segments 60W-1, 60W-2, 93-4, and 93-11
- Uninterrupted Flow: Segments 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12,
  - 93-13, 93-14, 93-15, and 93-16

Secondary 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 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.

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

- Overall, based on the weighted average of the Freight Index, performance of the corridor with respect to freight mobility is "fair"
- Segments 60W-3, 93-6, 93-7, 93-8, 93-11, and 93-16 show "poor" performance with respect to the Freight Index, TTTI, and TPTI
- A majority of the segments show "good" performance relative to the Closure Duration measure
- NB/EB Segments 93-4 and 93-11 and SB/WB Segment 93-9 have the longest duration of closures
- There are no vertical clearance restrictions in this corridor that cannot be bypassed by using ramps

Table 9 summarizes the Freight performance results for the US 93/US 60 corridor. **Figure 16** illustrates the primary Freight Index performance and locations of Freight hot spots along the US 93/US 60 corridor. Maps for each secondary measure can be found in **Appendix A.**

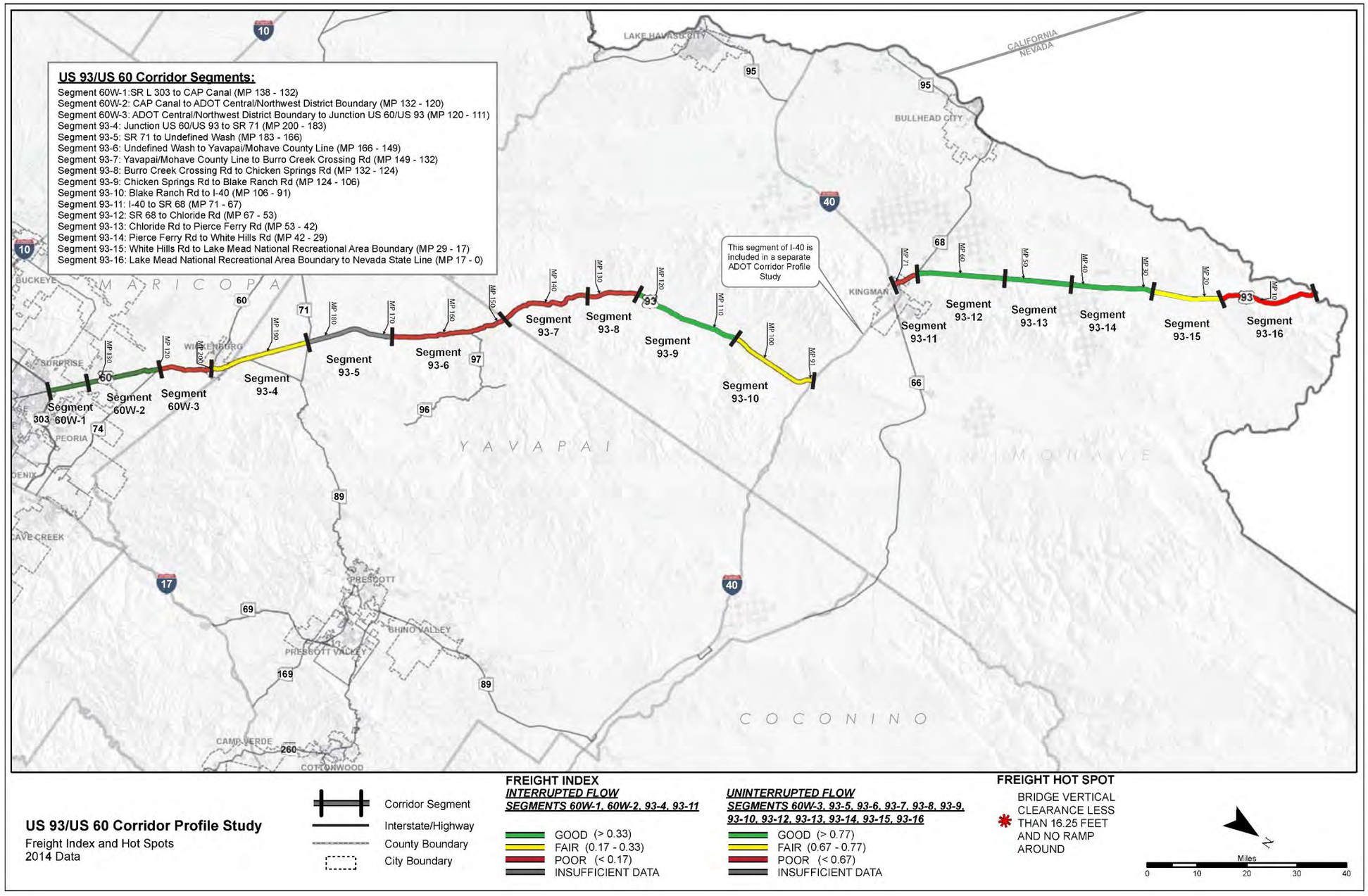
Table 9: Freight Performance

Segment #	Segment Length (miles)	Freight Index	Directional TTTI		Directional TPTI		Closure Duration (minutes/milepost/year/mile)		Bridge Vertical Clearance (feet)
			NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	
60W-1[1*]	6	0.69	1.14	1.05	1.75	1.15	16.90	34.63	No UP
60W-2[2*]	12	0.67	1.09	1.15	1.32	1.67	0.00	19.97	No UP
60W-3[2^]	9	0.14	1.00	2.90	1.91	12.05	11.22	38.69	No UP
93-4[1*]	17	0.32	1.60	1.38	3.92	2.38	18.86	179.42	No UP
93-5[2^]	17	Insufficient Data					41.69	41.69	No UP
93-6[2^]	17	0.61	1.14	1.11	1.66	1.60	15.28	33.08	No UP
93-7[2^]	17	0.53	1.20	1.15	2.03	1.71	37.55	13.75	No UP
93-8[2^]	8	0.45	1.05	1.00	3.28	1.18	0.00	6.78	No UP
93-9[2^]	18	1.00	1.00	1.00	1.01	1.01	53.24	8.74	No UP
93-10[2^]	15	0.69	1.06	1.03	1.41	1.49	0.00	34.91	No UP
93-11[1*]	4	0.21	2.00	1.09	6.85	2.85	7.50	60.45	16.85
93-12[2^]	14	0.86	1.05	1.06	1.15	1.18	6.60	8.33	No UP
93-13[2^]	11	0.87	1.04	1.06	1.12	1.18	27.33	7.04	No UP
93-14[2^]	13	0.81	1.05	1.07	1.14	1.32	4.22	20.32	No UP
93-15[2^]	12	0.72	1.05	1.16	1.14	1.63	0.00	19.72	No UP
93-16[2^]	17	0.66	1.05	1.08	1.55	1.48	7.25	27.11	17.08
Weighted Corridor Average		0.68	1.14	1.19	1.84	2.02	17.82	36.15	17.01

SCALES					
Performance Level	**Uninterrupted Interrupted Flow**			**All**	
Good	> 0.77^ > 0.33*	< 1.15^ < 1.30*	< 1.30^ < 3.00*	< 44.18	> 16.5
Fair	0.67 – 0.77^ 0.17 – 0.33*	1.15 – 1.33^ 1.30 – 2.00*	1.30 – 1.50^ 3.00 – 6.00*	44.18 – 124.86	16.0 – 16.5
Poor	< 0.67^ < 0.17*	> 1.33^ > 2.00*	> 1.50^ > 6.00*	> 124.86	< 16.0

[1]Urban Operating Environment
[2]Rural Operating Environment
^Uninterrupted Flow Facility
*Interrupted Flow Facility

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 93/US 60 corridor:

- The corridor Pavement Index generally reflects "good" performance, with the exception of a few isolated locations in Segment 93-14
- The Bridge Index generally indicates "fair" performance overall, with no functionally obsolete bridges in any segment; nine of the segments have at least one bridge with a rating of 5, and the remaining six segments have at least one bridge with a rating of 6
- All but one of the segments exhibit "good" performance relative to the Pavement Index
  - 38% of the segments have a "good" perforrmance rating relative to the Freight Index, while 38% of the segments have a "poor" performance rating, resulting in a Freight Index that has an overall performance of "fair"
- Seven segments along the corridor perform "below average" relative to the Safety Index, four segments perform "average" and five segments perform "good;" with an overall the corridor exhibits "fair" performance relative to the Safety Index
- There are very few hot spot crashes within the US 93/US 60 corridor

Figure 17 shows the percentage of the US 93/US 60 corridor that rates either "good/above average" performance, "fair/average" performance, or "poor/below average" performance relative to each primary measure. **Figure 17** shows that 88% of corridor segments exhibit "good" performance relative to the Mobility Index. Approximately 44% of corridor segments exhibit "poor" performance relative to the Safety Index, while the other 19% and 38% perform "fair" and "good," respectively. The Bridge Index bar displays 73% of corridor segments in "fair" condition, and 27% in "good" condition.

The lowest performance along the US 93 / US 60 corridor generally occurs relative to the Freight and Safety performance areas. The Pavement and Mobility performance areas reflect the highest performance.

Table 10 shows a summary of corridor performance for all primary measures and secondary measure indicators for the US 93/US 60 corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary measure. 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.

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Figure 17: Performance Summary by Primary Measure

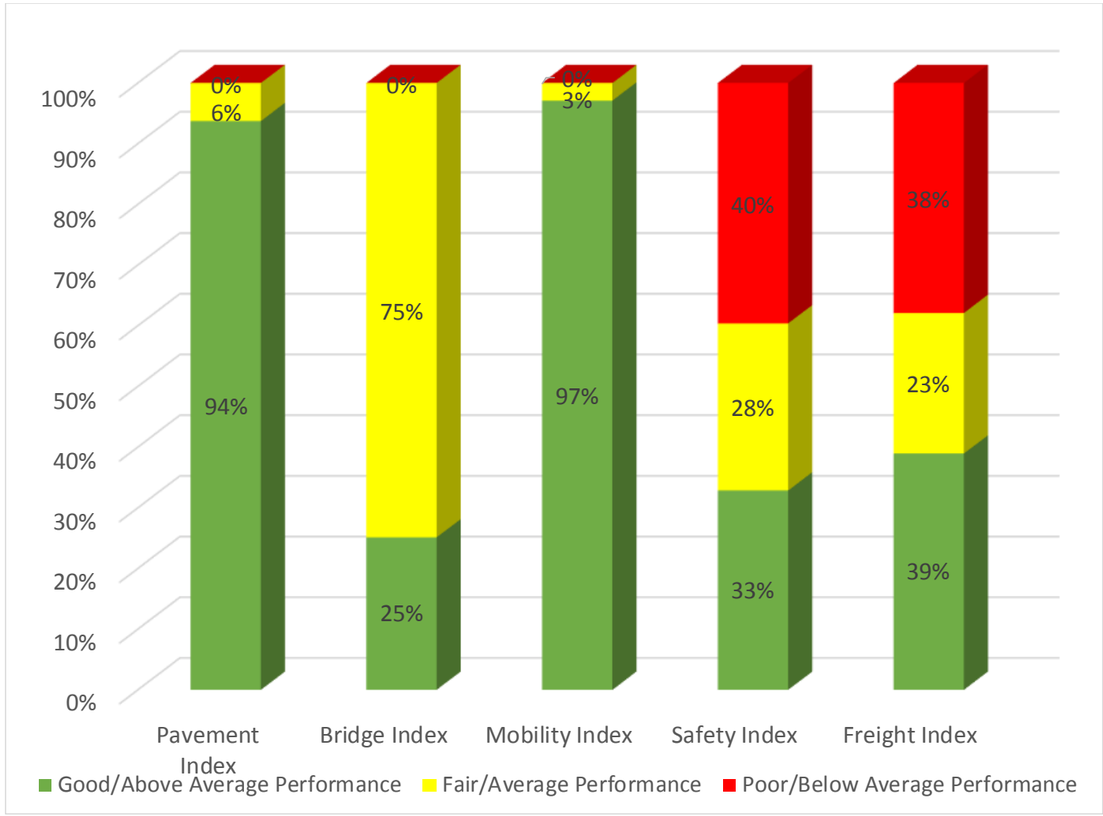


Figure 18: Corridor Performance Summary by Performance Measure

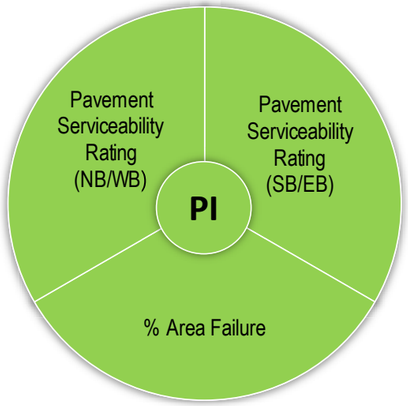
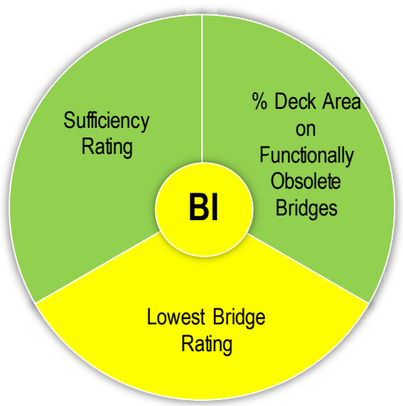
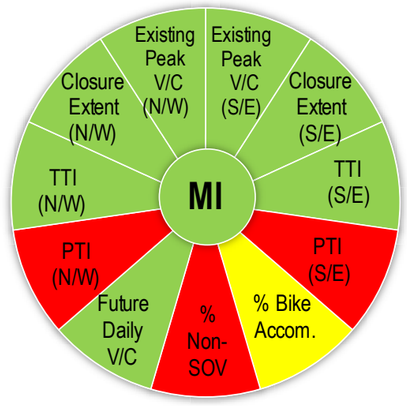
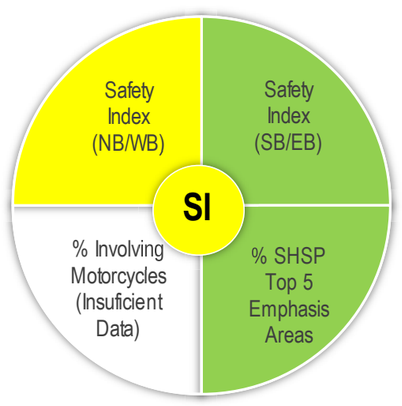
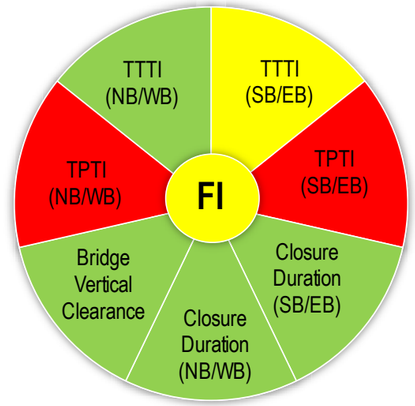
Pavement	Bridge	Mobility	Safety	Freight
				
Pavement Index (PI): based on two pavement condition ratings from the ADOT Pavement Database; the two ratings are the International Roughness Index (IRI) and the Cracking Rating.	**Bridge Index (BI):** based on four bridge condition ratings from the ADOT Bridge 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	Lowest Bridge Rating	% of Deck Area on Functionally Obsolete Bridges	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent (instances/milepost/year/mile)		Directional TII (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		
60W-11[1*a]	6	4.01	3.97	3.83	0%	6.81	97.17	5.00	0%	0.77	1.04	0.44	0.42	0.10	0.20	1.10	1.02	1.50	1.36	100%	20%
60W-21[1* a]	12	3.98	4.08	4.03	0%	6.26	93.89	5.00	0%	0.68	1.01	0.27	0.28	0.00	0.10	1.04	1.12	1.32	1.73	99%	16%
60W-32[^ a]	9	4.40	4.21	4.21	0%	6.67	91.57	6.00	0%	0.48	0.75	0.20	0.20	0.09	0.27	1.00	2.38	2.43	9.65	72%	10%
93-41[1* b]	17	3.82	3.63	3.68	0%	6.76	83.15	6.00	0%	0.61	0.73	0.39	0.38	0.06	0.51	1.35	1.25	5.93	2.13	81%	15%
93-52[^ b]	17	3.81	3.63	3.81	0%	5.39	86.23	5.00	0%	0.30	0.36	0.17	0.17	0.18	0.18	Insufficient Data				82%	10%
93-62[^ a]	17	3.71	3.58	3.84	13%	6.37	96.25	5.00	0%	0.28	0.33	0.19	0.19	0.05	0.15	1.03	1.04	1.41	1.42	80%	8%
93-72[^ a]	17	3.86	3.81	3.79	3%	6.05	94.49	5.00	0%	0.13	0.15	0.10	0.10	0.11	0.02	1.06	1.11	1.61	1.63	91%	11%
93-82[^ a]	8	3.87	4.10	3.56	13%	6.32	96.75	5.00	0%	0.13	0.15	0.10	0.10	0.00	0.10	1.00	1.00	1.84	1.15	98%	11%
93-92[^ b]	18	4.19	4.06	3.99	0%	6.48	87.50	5.00	0%	0.26	0.31	0.25	0.25	0.24	0.06	1.00	1.00	1.00	1.03	48%	6%
93-102[^ a]	15	4.19	4.03	3.95	0%	6.29	93.36	5.00	0%	0.16	0.18	0.17	0.17	0.00	0.24	1.03	1.00	1.45	1.50	47%	6%
93-111[1*a]	4	4.20	3.69	4.07	13%	6.36	94.90	6.00	0%	0.66	0.78	0.58	0.61	0.15	0.46	1.81	1.00	11.65	2.85	100%	19%
93-122[^ a]	14	4.12	4.10	4.04	4%	5.90	96.11	5.00	0%	0.22	0.25	0.26	0.26	0.03	0.06	1.00	1.00	1.10	1.16	77%	21%
93-132[^ a]	11	3.88	3.78	3.78	0%	6.00	97.18	6.00	0%	0.21	0.23	0.26	0.26	0.11	0.02	1.00	1.00	1.06	1.15	87%	8%
93-142[^ a]	13	3.43	3.59	3.49	8%	6.00	97.70	6.00	0%	0.23	0.27	0.24	0.24	0.02	0.09	1.00	1.00	1.07	1.21	54%	10%
93-152[^ a]	12	3.80	3.62	4.00	0%	No Bridges				0.23	0.27	0.23	0.23	0.00	0.12	1.00	1.00	1.10	1.63	54%	7%
93-162[^ a]	17	4.53	4.38	4.39	0%	7.31	91.03	6.00	0%	0.23	0.27	0.24	0.23	0.06	0.12	1.00	1.00	1.13	1.46	84%	0%
Weighted Average		3.98	3.89	3.90	3%	6.40	93.52	5.28	0.00	0.32	0.40	0.24	0.23	0.08	0.16	1.06	1.11	1.96	1.87	76%	10%

SCALES

Performance Level	Non-Interstate			All				Urban/Fringe Urban	All	Uninterrupted		All	
Good/Above Average	> 3.50	> 3.50	< 5%	> 6.5	> 80	> 6	< 12%	< 0.71[1/2]	≤ 0.22	< 1.15^	< 1.30^	≥ 90%	≥ 17%
Fair/Average	2.90 - 3.50	2.90 - 3.50	5% - 20%	5.0 - 6.5	50 - 80	5 - 6	12% - 40%	0.71 - 0.89[1/2]	> 0.22 - ≤ 0.62	1.15 - 1.33^	1.30 - 1.50^	60% - 90%	11 - 17%
Poor/Below Average	< 2.90	< 2.90	> 20%	< 5.0	< 50	< 5	> 40%	> 0.89[1/2]	> 0.62	>1.33^	> 1.50^	≤ 60%	< 11%

Performance Level	Rural	Interrupted	
Good/Above Average	< 0.56[2]	< 1.30*	< 3.00*
Fair/Average	0.56 - 0.76[2]	1.30 - 2.00*	3.00 - 6.00*
Poor/Below Average	> 0.76[2]	> 2.00*	> 6.00*

^Uninterrupted Flow Facility [a]2 or 3 or 4 Lane Divided Highway [1]Urban Operating Environment
*Interrupted Flow Facility [b]2 or 3 Lane Undivided Highway [2]Rural Operating Environment
Note: "Insufficient Data" indicates there were not enough data available to generate reliable performance ratings.

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

Segment #	Segmet Length (Miles)	Safety Performance Area							Freight Performance Area							
		Safety Index	Directional Safety Index		Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors [a]	Fatal + Incapacitating Injury Crashes Involving Trucks	Fatal + Incapacitating Injury Crashes Involving Motorcyles	Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Freight Index	Directional TII (trucks only))		Directional PTI (trucks only)		Closure Duration (minutes/ milepost/ year/mile)		Bridge Vertical Clearance (feet)
			NB/WB	SB/EB						NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	
60W-1[1*a]	6	1.99	1.19	2.80	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.69	1.14	1.05	1.75	1.15	16.90	34.63	No UP
60W-2[1* a]	12	0.74	0.80	0.68	69%	Insufficient Data	Insufficient Data	Insufficient Data	0.67	1.09	1.15	1.32	1.67	0.00	19.97	No UP
60W-3[2^ a]	9	1.44	1.52	1.35	57%	Insufficient Data	Insufficient Data	Insufficient Data	0.14	1.00	2.90	1.91	12.05	11.22	38.69	No UP
93-4[1* b]	17	2.58	2.51	2.66	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.32	1.60	1.38	3.92	2.38	18.86	179.42	No UP
93-5[2^ b]	17	1.73	0.82	2.64	43%	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data					41.69	41.69	No UP
93-6[2^ a]	17	1.07	0.61	1.53	29%	Insufficient Data	Insufficient Data	Insufficient Data	0.61	1.14	1.11	1.66	1.60	15.28	33.08	No UP
93-7[2^ a]	17	0.19	0.29	0.10	42%	Insufficient Data	Insufficient Data	Insufficient Data	0.53	1.20	1.15	2.03	1.71	37.55	13.75	No UP
93-8[2^ a]	8	0.03	0.00	0.07	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.45	1.05	1.00	3.28	1.18	0.00	6.78	No UP
93-9[2^ b]	18	1.60	1.94	1.27	45%	Insufficient Data	Insufficient Data	Insufficient Data	1.00	1.00	1.00	1.01	1.00	53.24	8.74	No UP
93-10[2^ a]	15	0.97	0.51	1.43	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.69	1.06	1.03	1.41	1.49	0.00	34.91	No UP
93-11[1*a]	4	2.55	1.30	3.80	17%	Insufficient Data	Insufficient Data	Insufficient Data	0.21	2.00	1.09	6.85	2.85	7.50	60.45	16.85
93-12[2^ a]	14	0.62	0.66	0.59	67%	Insufficient Data	Insufficient Data	Insufficient Data	0.86	1.05	1.06	1.15	1.18	6.60	8.33	No UP
93-13[2^ a]	11	1.71	1.34	2.09	59%	Insufficient Data	Insufficient Data	Insufficient Data	0.87	1.04	1.06	1.12	1.18	27.33	7.04	No UP
93-14[2^ a]	13	1.10	1.61	0.59	33%	Insufficient Data	Insufficient Data	Insufficient Data	0.81	1.05	1.07	1.14	1.32	4.22	20.32	No UP
93-15[2^ a]	12	0.77	1.33	0.21	28%	Insufficient Data	Insufficient Data	Insufficient Data	0.72	1.05	1.16	1.14	1.63	0.00	19.72	No UP
93-16[2^ a]	17	0.42	0.82	0.02	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.66	1.05	1.08	1.55	1.48	7.25	27.11	17.08
Weighted Average		1.16	1.09	1.24	0%	Insufficient Data	Insufficient Data	Insufficient Data	0.68	1.14	1.19	1.84	2.02	17.82	36.15	1.73

SCALES

Performance Level	2 or 3 or 4 Lane Divided Highway					Uninterrupted			All	
Good/Above Average	< 0.77[a]	< 44%[a]	< 4%[a]	< 16%[a]	< 2%[a]	> 0.77^	< 1.15^	< 1.30^	< 44.18	> 16.5
Fair/Average	0.77 - 1.23[a]	44% - 54%[a]	4% - 7%[a]	16% - 26%[a]	2% - 4%[a]	.67-.77^	1.15 - 1.33^	1.30 - 1.50^	44.18 - 124.86	16.0-16.5
Poor/Below Average	> 1.23[a]	> 54%[a]	> 7%[a]	> 26%[ab]	> 4%[a]	< 0.67^	> 1.33^	> 1.50^	> 124.86	< 16.0
Performance Level	**2 or 3 lane Undivided Highway**					**Interrupted**				
Good/Above Average	< 0.94[b]	< 51%[b]	< 6%[b]	< 19%[b]	< 5%[b]	> 0.33*	< 1.30*	< 3.00*		
Fair/Average	0.94 - 1.06[b]	51% - 57%[b]	6% - 10%[b]	19% - 27%[b]	5% - 8%[b]	.17-.33*	1.30 - 2.00*	3.00 - 6.00*		
Poor/Below Average	> 1.06[b]	> 57%[b]	> 10%[b]	> 27%[b]	> 8%[b]	< 0.17*	> 2.00*	> 6.00*		

^Uninterrupted Flow Facility
*Interrupted Flow Facility

[a]2 or 3 or 4 Lane Divided Highway
[b]2 or 3 Lane Undivided Highway

[1]Urban Operating Environment
[2]Rural Operating Environment
[1/2]Urban-Rural Operating Environment

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

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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 93/US 60 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 93/US 60 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 93/US 60 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 93/US 60 Corridor Goals	US 93/US 60 Corridor Objectives	Performance Area	Primary Measure	Performance Objective	
				Secondary Measure Indicators	Corridor Average	Segment
Improve Mobility and Accessibility **Support Economic Growth**	Improve mobility through additional capacity and improved roadway geometry Provide a safe and reliable route for recreational and tourist travel to/from Mexico, Southern California, and Southern Arizona destinations Provide safe, reliable and efficient connection to all communities along the corridor to permit efficient regional travel	Reduce current congestion and plan to facilitate future congestion that accounts for anticipated growth and land use changes Reduce delays from recurring and non-recurring events to improve reliability Improve bicycle and pedestrian accommodations	Mobility (*Emphasis Area*)	Mobility Index	Good	Fair or better
				Future Daily V/C		
				Existing Peak Hour V/C		
				Closure Extent		
				Directional Travel Time Index		
				Directional Planning Time Index		
				% Bicycle Accommodation		
				% Non-SOV Trips		
	Provide a safe, reliable and efficient freight route between Arizona, California 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	Good	Fair or better
				Directional Truck Travel Time Index		
				Directional Truck Planning Time Index		
				Closure Duration		
				Bridge Vertical Clearance		
Preserve and Maintain the State Transportation System	Preserve and modernize highway infrastructure	Maintain structural integrity of bridges	Bridge	Bridge Index	Fair or better	Fair or better
				Sufficiency Rating		
				% of Deck Area on Functionally Obsolete Bridges		
				Lowest Bridge Rating		
		Improve pavement ride quality for all corridor users Reduce long-term pavement maintenance costs	Pavement	Pavement Index	Fair or better	Fair or better
				Directional Pavement Serviceability Rating		
				% Area Failure		
Enhance Safety and Security	Provide a safe, reliable, and efficient connection for the communities along the corridor Promote safety by implementing appropriate countermeasures	Reduce fatal and incapacitating injury crashes for all roadway users	Safety *(Emphasis Area)*	Safety Index	Above Average	Average or better
				Directional Safety Index		
				% of Crashes Involving SHSP Top 5 Emphasis Areas Behaviors		
				% of Crashes Involving Crash Unit Types		

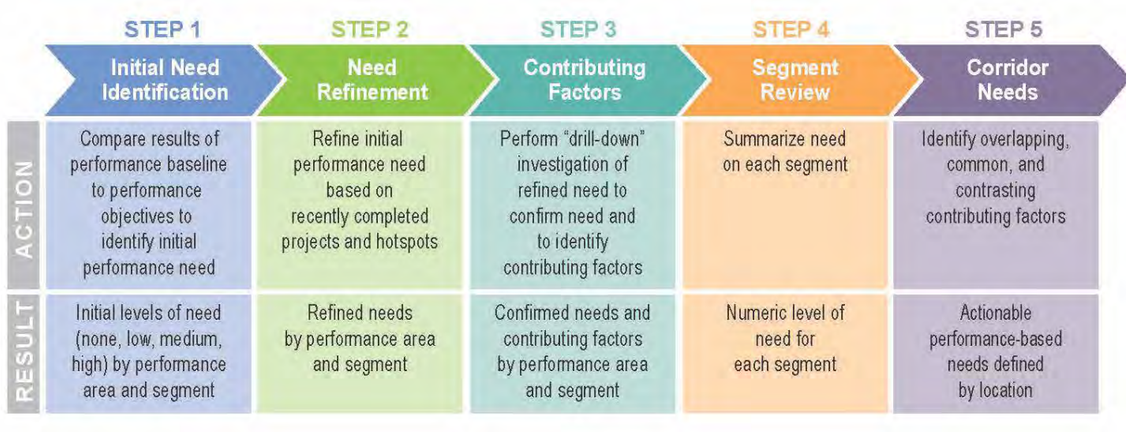
3.2 Needs Assessment Process

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

- The level of need in Segments 93-7, 93-12, and 93-14 were increased from a None to a Low due to the presence of a hotspot
- See **Appendix D** for detailed information on contributing factors

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					
60W-1	4.01	3.97	3.83	0.00%	0.0	None	None	None
60W-2	3.98	4.08	4.03	0.00%	0.0	None	None	None
60W-3	4.40	4.21	4.21	0.00%	0.0	None	None	None
93-4*	3.82	3.63	3.68	0.00%	0.0	None	Pavement Preservation Project (H8583) completed in 2015	None
93-5	3.81	3.63	3.81	0.00%	0.0	None	None	None
93-6	3.71	3.58	3.84	13.33%	0.2	NB MP153-149	None	Low
93-7	3.86	3.81	3.79	3.03%	0.0	SB MP 133-132	None	Low
93-8	3.87	4.10	3.56	13.33%	0.2	SB MP 132-130	None	Low
93-9	4.19	4.06	3.99	0.00%	0.0	None	None	None
93-10	4.19	4.03	3.95	0.00%	0.0	None	None	None
93-11	4.20	3.69	4.07	12.50%	0.2	NB MP71-70	None	Low
93-12	4.12	4.10	4.04	3.57%	0.0	SB MP 61-60	None	Low
93-13	3.88	3.78	3.78	0.00%	0.0	None	None	None
93-14	3.43	3.59	3.49	7.69%	0.0	SB MP 35-34, SB MP 33-32	None	Low
93-15	3.80	3.62	4.00	0.00%	0.0	None	None	None
93-16	4.53	4.38	4.39	0.00%	0.0	None	None	None

Level of Need (Score)	Performance Score Need Scale		Segment Level Need Scale
None* (0)	> 3.30	< 10%	0
Low (1)	3.10 – 3.30	10% - 15%	< 1.5
Medium (2)	2.70 – 3.10	15% - 25%	1.5 – 2.5
High (3)	< 2.70	> 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

- There are no bridges along the corridor with potential historical investment issues
- Segment 60W-2 is the only segment with a recently completed project but the level of need was not reduced because the segment already had None for a level of need
- Segment 93-12 has one bridge identified as a hotspot but the level of need did not increase because the segment already had a Low level of need
- See **Appendix D** for detailed information on contributing factors

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	% of Deck on Functionally Obsolete Bridges	Lowest Bridge Rating				
60W-1	6.81	97.17	0.0%	5	0.2	None	None	Low
60W-2	6.26	93.9	0.0%	5	0.2	None	None	Low
60W-3	6.67	91.6	0.0%	6	0.0	None	Scour retrofit project Monarch Wash Bridge Strs #204 & #759 (H8418) completed in 3/2015.	None
93-4*	6.76	83.1	0.0%	6	0.0	None	None	None
93-5	5.39	86.2	0.0%	5	2.2	None	None	Medium
93-6	6.37	96.3	0.0%	5	0.2	None	None	Low
93-7	6.05	94.5	0.0%	5	0.2	None	None	Low
93-8	6.32	96.7	0.0%	5	0.2	None	None	Low
93-9	6.48	87.5	0.0%	5	0.2	None	None	Low
93-10	6.29	93.4	0.0%	5	0.2	None	None	Low
93-11	6.36	94.9	0.0%	6	0.0	None	None	None
93-12	5.90	96.1	0.0%	5	1.2	Kabba Wash Bridge NB MP97.5	None	Low
93-13	6.00	97.2	0.0%	6	0.0	None	None	None
93-14	6.00	97.7	0.0%	6	0.0	None	None	None
93-15	No Bridges within Segment				N/A	None	None	N/A
93-16	7.31	91.0	0.0%	6	0.0	None	None	None

Level of Need (Score)	Performance Score Need Scale				Segment Level Need Scale
None (0)	> 6.0	> 70	< 21.0%	> 5.0	0
Low (1)	5.5 – 6.0	60 – 70	21.0% - 31.0%	5.0	< 1.5
Medium (2)	4.5 – 5.5	40 – 60	31.0% - 49.0%	4.0	1.5 – 2.5
High (3)	< 4.5	< 40	> 49.0%	< 4.0	> 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

- Segments 93-8, 93-10, and 93-16 have had projects recently completed, but only Segment 93-10 experienced a reduction in level of need from Low to None
- See **Appendix D** for detailed information on contributing factors

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				
60W-1[1*a]	0.77	1.04	0.44	0.42	0.10	0.20	1.10	1.02	1.50	1.36	100%	0.6	None	Low
60W-2[1* a]	0.68	1.01	0.27	0.28	0.00	0.10	1.04	1.12	1.32	1.73	99%	0.6	None	Low
60W-3[2^ a]	0.48	0.75	0.20	0.20	0.09	0.27	1.00	2.38	2.43	9.65	72%	1.5	None	Medium
93-4[1* b]	0.61	0.73	0.39	0.38	0.06	0.51	1.35	1.25	5.93	2.13	81%	0.4	None	Low
93-5[2^ b]	0.30	0.36	0.17	0.17	0.18	0.06	*No Data*				82%	0.0	None	None
93-6[2^ a]	0.28	0.33	0.19	0.19	0.05	0.15	1.03	1.04	1.41	1.42	80%	0.2	None	Low
93-7[2^ a]	0.13	0.15	0.10	0.10	0.11	0.02	1.06	1.11	1.61	1.63	91%	0.6	None	Low
93-8[2^ a]	0.13	0.15	0.10	0.10	0.00	0.10	1.00	1.00	1.84	1.15	98%	0.3	MP 124 Median Crossover, intersection improvements (2015)	Low
93-9[2^ b]	0.26	0.31	0.25	0.25	0.24	0.06	1.00	1.00	1.00	1.03	48%	0.6	None	Low
93-10[2^ a]	0.16	0.18	0.17	0.17	0.00	0.24	1.03	1.00	1.45	1.50	47%	1	H7388 Antelope Wash, construct 4-lane divided highway (2015)	None
93-11[1*a]	0.66	0.78	0.58	0.61	0.15	0.46	1.81	1.00	11.65	2.85	100%	0.8	None	Low
93-12[2^ a]	0.22	0.25	0.26	0.26	0.03	0.06	1.00	1.00	1.10	1.16	77%	0.2	None	Low
93-13[2^ a]	0.21	0.23	0.26	0.26	0.11	0.02	1.00	1.00	1.06	1.15	87%	0	None	None
93-14[2^ a]	0.23	0.27	0.24	0.24	0.02	0.09	1.00	1.01	1.07	1.21	54%	0.4	None	Low
93-15[2^ a]	0.23	0.27	0.23	0.23	0.00	0.12	1.00	1.09	1.10	1.63	54%	0.7	None	Low
93-16[2^ a]	0.23	0.27	0.24	0.23	0.06	0.12	1.00	1.04	1.13	1.46	84%	0.2	H8500 Kingman Wash TI Cattle Guards 2015	Low

Level of Need (Score)	Performance Score Need Scale					Segment Level Need Scale
None* (0)	≤ 0.77 (Urban) ≤ 0.63 (Rural)	< 0.35	< 1.21 (Uninterrupted) < 1.53 (Interrupted)	< 1.37 (Uninterrupted) < 4.00 (Interrupted)	> 80%	0
Low (1)	0.77 - 0.83 (Urban) 0.63 - 0.69 (Rural)	0.35 – 0.49	1.21 – 1.27 (Uninterrupted) 1.53 – 1.77 (Interrupted)	1.37 – 1.43 (Uninterrupted) 4.00 – 5.00 (Interrupted)	70% - 80%	< 1.5
Medium (2)	0.83 - 0.95 (Urban) 0.69 - 0.83 (Rural)	0.49 – 0.75	1.27 – 1.39 (Uninterrupted) 1.77 – 2.23 (Interrupted)	1.43 – 1.57 (Uninterrupted) 5.00 – 7.00 (Interrupted)	50% - 70%	1.5 - 2.5
High (3)	≥ 0.95 (Urban) ≥ 0.83 (Rural)	> 0.75	> 1.39 (Uninterrupted) > 2.23 (Interrupted)	> 1.57 (Uninterrupted) > 7.00 (Interrupted)	< 50%	> 2.5

[1]Urban Operating Environment
[2]Rural Operating Environment
^Uninterrupted Flow Facility
*Interrupted Flow Facility

**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

- Segment 93-7 includes a hot spot so the segment need was raised from None to Low
- Safety hot spots are also present in Segments 60W-1, 60W-2, 60W-3, and 93-4, which already have a High Safety segment need
- Segments 93-8, 93-10, and 93-16 have had projects recently completed, but only Segment 93-10 experienced a reduction in level of need from Medium to Low
- See **Appendix D** for detailed information on contributing factors

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		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Area Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers				
		NB/WB	SB/EB								
60W-1[1*a]	1.99	1.19	2.80	50%	Insufficient Data	Insufficient Data	Insufficient Data	3.7	WB MP 138-137	None	High
60W-2[1* a]	0.74	0.80	0.68	69%	Insufficient Data	Insufficient Data	Insufficient Data	0.6	WB 129-128	None	Low
60W-3[2^ a]	1.44	1.52	1.35	57%	Insufficient Data	Insufficient Data	Insufficient Data	4.1	WB MP 115-114	None	High
93-4[1* b]	2.58	2.51	2.66	50%	Insufficient Data	Insufficient Data	Insufficient Data	3.6	SB MP 195-193	None	High
93-5[2^ b]	1.73	0.82	2.64	43%	Insufficient Data	Insufficient Data	Insufficient Data	3.3	None	None	High
93-6[2^ a]	1.07	0.61	1.53	29%	Insufficient Data	Insufficient Data	Insufficient Data	1.3	None	None	Low
93-7[2^ a]	0.19	0.29	0.10	42%	Insufficient Data	Insufficient Data	Insufficient Data	0.0	NB MP 147-146	None	Low
93-8[2^ a]	0.03	0.00	0.07	*Insufficient Data*	Insufficient Data	Insufficient Data	Insufficient Data	0.0	None	MP 124 Median Crossover, intersection improvements (2015)	None
93-9[2^ b]	1.60	1.94	1.27	45%	Insufficient Data	Insufficient Data	Insufficient Data	3.6	None	None	High
93-10[2^ a]	0.97	0.51	1.43	50%	Insufficient Data	Insufficient Data	Insufficient Data	1.5	None	H7388 Antelope Wash construct 4-lane divided highway (2015)	Low
93-11[1*a]	2.55	1.30	3.80	17%	Insufficient Data	Insufficient Data	Insufficient Data	3.5	None	None	High
93-12[2^ a]	0.62	0.66	0.59	67%	Insufficient Data	Insufficient Data	Insufficient Data	0.6	None	None	Low
93-13[2^ a]	1.71	1.34	2.09	59%	Insufficient Data	Insufficient Data	Insufficient Data	4.1	None	None	High
93-14[2^ a]	1.10	1.61	0.59	33%	Insufficient Data	Insufficient Data	Insufficient Data	2.3	None	None	Medium
93-15[2^ a]	0.77	1.33	0.21	28%	Insufficient Data	Insufficient Data	Insufficient Data	0.2	None	None	Low
93-16[2^ a]	0.42	0.82	0.02	50%	Insufficient Data	Insufficient Data	Insufficient Data	0.2	None	H8500 Kingman Wash TI Cattle Guards 2015	Low

Level of Need (Score)		Performance Score Needs Scale					Segment Level Need Scale
None* (0)	a b	≤ 0.92 ≤ 0.98	≤ 47% ≤ 53%	≤ 5% ≤ 6%	≤ 19% < 22%	≤ 19% < 22%	0
Low (1)	a b	0.92 - 1.07 0.98 - 1.02	47% - 50% 53% - 55%	5% - 6% 6% - 7%	19% - 22% 22% - 25%	19% - 22% 22% - 25%	≤ 1.5
Medium (2)	a b	1.07 – 1.38 1.02 – 1.10	50% - 57% 55% - 59%	6% - 8% 7% - 8%	22% - 29% 25% - 30%	22% - 29% 25% - 30%	1.5 - 2.5
High (3)	a b	≥ 1.38 ≥ 1.10	≥ 57% ≥ 59%	≥ 8% ≥ 8%	≥ 29% ≥ 30%	≥ 29% ≥ 30%	≥ 2.5

[a] 2 or 3 or 4 Lane Divided Highway
[b] 2 or 3 Lane Undivided Highway

**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

- There are no vertical bridge clearance hot spots on the corridor
- Recently completed projects were identified in Segments 93-8, 93-10, and 93-16, but only 93-10 and 93-16 experienced a reduction on level of need from Medium to Low
- See **Appendix D** for detailed information on contributing factors

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					
60W-1*	0.69	1.14	1.05	1.75	1.15	16.90	34.63	No UP	0.0	None	None	None
60W-2*a	0.67	1.09	1.15	1.32	1.67	0.00	19.97	No UP	0.0	None	None	None
60W-3^	0.14	1.00	2.90	1.91	12.05	11.22	38.69	No UP	3.9	None	None	High
93-4*	0.32	1.60	1.38	3.92	2.38	18.86	179.42	No UP	0.4	None	None	Low
93-5^	*No Data*	*No Data*	*No Data*	*No Data*	*No Data*	41.69	9.08	No UP	0.0	None	None	None
93-6^	0.61	1.14	1.11	1.66	1.60	15.28	33.08	No UP	3.6	None	None	High
93-7^	0.53	1.20	1.15	2.03	1.71	37.55	13.75	No UP	3.6	None	None	High
93-8^	0.45	1.05	1.00	3.28	1.18	0.00	6.78	No UP	3.3	None	MP 124 Median Crossover, intersection improvements (2015)	High
93-9^	1.00	1.00	1.00	1.01	1.00	53.24	8.74	No UP	0.0	None	None	None
93-10^	0.69	1.06	1.03	1.41	1.49	0.00	34.91	No UP	2.3	None	H7388 Antelope Wash construct 4-lane divided highway (2015)	Low
93-11*	0.21	2.00	1.09	6.85	2.85	7.50	60.45	16.85	2.4	None	None	Medium
93-12^	0.86	1.05	1.06	1.15	1.18	6.60	8.33	No UP	0.0	None	None	None
93-13^	0.86	1.04	1.06	1.12	1.18	27.33	7.04	No UP	0.0	None	None	None
93-14^	0.87	1.05	1.07	1.14	1.32	4.22	20.32	No UP	0.0	None	None	None
93-15^	0.72	1.05	1.16	1.14	1.63	0.00	19.72	No UP	1.3	None	None	Low
93-16^	0.66	1.05	1.08	1.55	1.48	7.25	27.11	17.08	2.4	None	H8500 Kingman Wash TI Cattle Guards 2015	Low

Level of Need (Score)		Performance Score Need Scale					Segment Level Need Scale
None* (0)	^ *	≥ 0.74 ≥ 0.28	≤ 1.21 ≤ 1.53	≤ 1.37 ≤ 4.00	≤ 71.07	≥ 16.33	0
Low (1)	^ *	0.70 - 0.74 0.22 – 0.28	1.21 - 1.27 1.53 – 1.77	1.37 - 1.43 4.00 – 5.00	71.07 - 97.97	16.17 - 16.33	≤ 1.5
Medium (2)	^ *	0.64 - 0.70 0.12 – 0.22	1.27 - 1.39 1.77 – 2.23	1.43 - 1.57 5.00 – 7.00	97.97 - 151.75	15.83 - 16.17	1.5 - 2.5
High (3)	^ *	≤ 0.64 ≤ 0.12	≥ 1.39 ≥ 2.23	≥ 1.57 ≥ 7.00	≥ 151.75	≤ 15.83	≥ 2.5

^Uninterrupted Flow Facility
*Interrupted Flow Facility

**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 average need score for each segment presented in the last row of the table. A weighting factor of 1.5 is applied to the need scores of the performance areas identified as emphasis areas (Mobility, Safety, and Freight for the US 93/US 60 corridor). There are no segments with a High average need, nine segments with a Medium average need, and seven segments with a Low average need.

Table 17: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts															
	60W-1	**60W-2**	**60W-3**	**93-4**	**93-5**	**93-6**	**93-7**	**93-8**	**93-9**	**93-10**	**93-11**	**93-12**	**93-13**	**93-14**	**93-15**	**93-16**
	MP 138 - 122	**MP 132 - 120**	**MP 120 - 111**	**MP 200 - 183**	**MP 183 - 166**	**MP 166 - 149**	**MP 149 - 132**	**MP 132 - 124**	**MP 124 - 106**	**MP 106 - 91**	**MP 71 - 67**	**MP 67 - 53**	**MP 53 - 42**	**MP 42 - 29**	**MP 29 - 17**	**MP 17- 0**
Pavement	None*	None*	None*	None*	None*	Low	Low	Low	None*	None*	Low	Low	None*	Low	None*	None*
Bridge	Low	Low	None*	None*	Medium	Low	Low	Low	Low	Low	None*	Low	None*	None*	N/A#	None*
Mobility+	Low	Low	Medium	Low	None	Low	Low	Low	Low	None*	Low	Low	None*	Low	Low	None*
Safety+	High	Low	High	High	High	Low	Low	None*	High	Low	High	Low	High	Medium	Low	Low
Freight+	None*	None*	High	Low	None*	High	High	High	None*	Low	Medium	None*	None*	None*	Low	Low
Average Need	**1.08**	**0.62**	**1.85**	**1.15**	**1.00**	**1.46**	**1.46**	**1.23**	**1.08**	**0.62**	**1.54**	**0.77**	**0.69**	**0.85**	**0.82**	**0.69**

* 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.

+ Identified as an emphasis area for the US 93/US 60 corridor.

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

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

Summary Corridor Needs

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

Pavement Needs

- Six segments (93-6, 93-7, 93-8, 93-11, 93-12, and 93-14) contain Pavement hot spots, but one of these segments had recent paving projects that addressed the need
- Segments 93-6, 93-7, 93-8, 11, 12, and 14 have final needs of Low; all other segments on the corridor have a final need of None
- Pavement hot spots are present in Segments 93-7, 93-8, 93-11, 93-12, 93-14.

Bridge Needs

- Seven of 16 corridor segments (60W-1, 93-6, 93-7, 93-8, 93-9, 93-10, and 93-12) exhibit a Low level of need
- One segment (93-5) exhibits a Medium level of need

Mobility Needs

- Low Mobility or no needs were identified on 15 of the 16 segments within the corridor
- One segment (60W-3) has a Medium level of need

Safety Needs

- Seven of the corridor segments have a Low level of need
- One corridor segment has a Medium level of need
- Seven corridor segments have a High level of need

Freight Needs

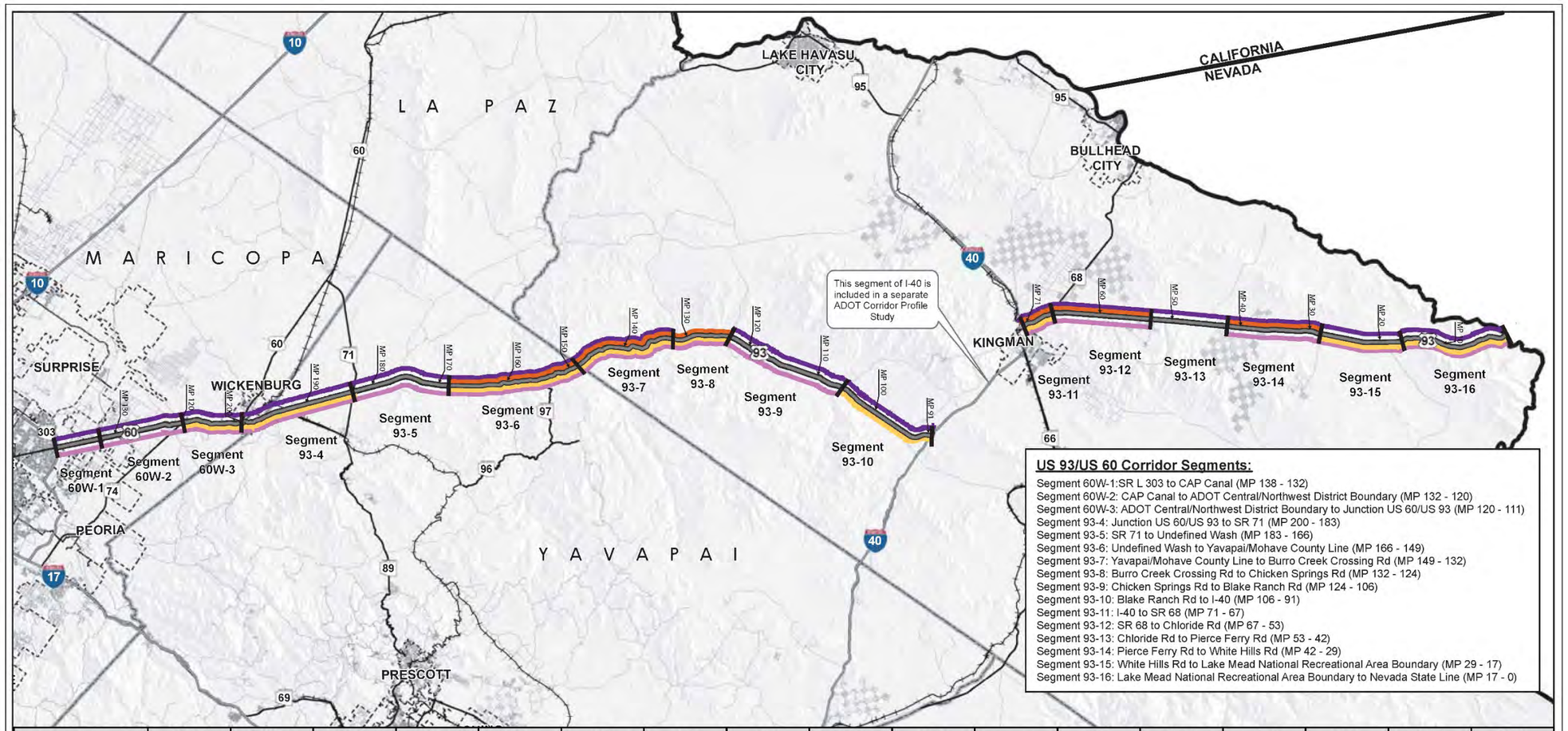
- Four corridor segments have a Low level of need
- One corridor segment has a Medium level of need
- Four corridor segments have a High level of need
- No Freight hot spots were identified along the corridor

Overlapping Needs

This section identifies overlapping performance needs on the US 93/US 60 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:

- Segments US 60W-1 and US 60W-2 has overlapping needs in relating to Bridge, Mobility, and Safety
- Segments 60W-3 and 93-4 have overlapping needs relating to Mobility, Safety, and Freight
- Segment 93-5 has overlapping needs relating to Bridge and Safety
- Segments 93-6 and 93-7 have overlapping needs in all five performance areas
- Segment 93-8 has overlapping needs in the Pavement, Bridge, Mobility, and Freight
- Segment 93-9 has overlapping needs in Bridge, Mobility, and Safety
- Segment 93-11 has overlapping needs in the Pavement, Mobility, Safety, and Freight
- Segment 93-12 has overlapping needs in the Pavement, Bridge, Mobility, and Safety
- Segment 93-14 has overlapping needs in the Pavement, Mobility, and Safety
- Segments 93-15 and 93-16 have overlapping needs in Mobility, Safety, and Freight

Figure 21: Corridor Needs Summary



Performance Area	60W-1	60W-2	60W-3	93-4	93-5	93-6	93-7	93-8	93-9	93-10	Interstate 40	93-11	93-12	93-13	93-14	93-15	93-16
	MP 138- 122	MP 132-120	MP 120-111	MP 200-183	MP 183-166	MP 166-149	MP 149-132	MP 132-124	MP 124-106	MP 106-91		MP 71-67	MP 67-53	MP 53-42	MP 42-29	MP 29-17	MP 17-0
Pavement	None^	None	None	None	None	Low	Low	Low	None	None		Low	Low	None	Low	None	None
Bridge	Low	Low	None	None	Medium	Low	Low	Low	Low	Low		None	Low	None	None	N/A#	None
Mobility*	Low	Low	Medium	Low	None	Low	Low	Low	Low	None		Low	Low	None	Low	Low	Low
Safety*	High	Low	High	High	High	Low	Low	None	High	Low		High	Low	High	Medium	Low	Low
Freight*	None	None	High	Low	None	High	High	High	None	Low		Medium	None	None	None	Low	Low
Average Need (0-3)	1.08	0.62	1.85	1.15	1.00	1.46	1.46	1.23	1.08	0.62		1.54	0.77	0.69	0.85	0.82	0.69

US 93/US 60 Corridor Profile Study
Needs Summary

* Identified as Emphasis Area for US 93/US60 Corridor
^ A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates the segment performance score exceeds the established performance thresholds and strategic solutions for the segment will not be developed as part of this study
# N/A indicates insufficient or no data available to determine level of need

Corridor Segment
Interstate/Highway
County Boundary
City Boundary

Performance Area Needs
Pavement
Mobility
Safety
Freight
Bridge

Level of Need	Average Need Range
Low	0.1 - 1.0
Medium	1.0 - 2.0
High	> 2.0

N
Miles
0 10 20 30 40

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 93/US 60 strategic investment areas (resulting from the elevated needs) are shown in **Figure 22**.

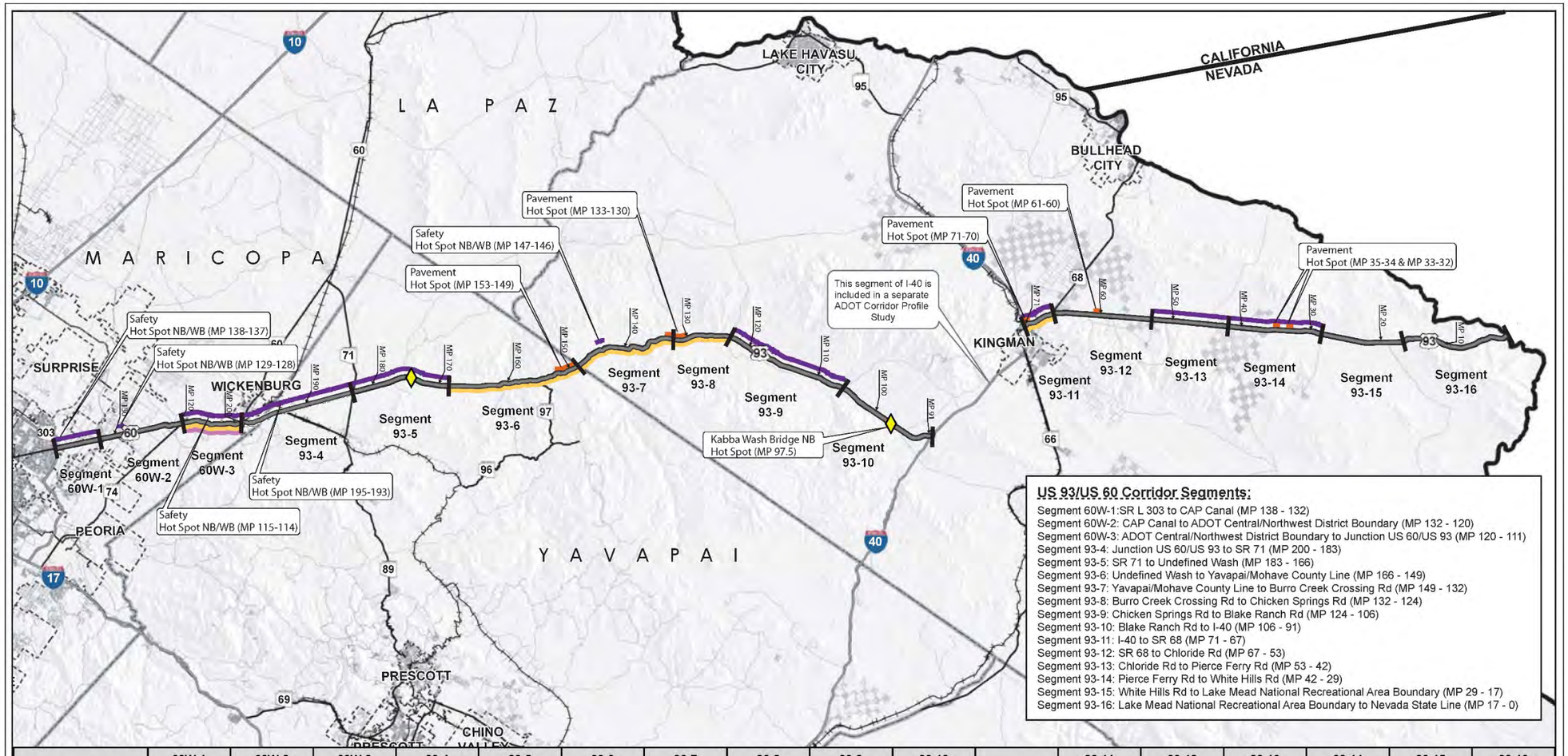
4.1 Screening Process

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	60W-1	60W-2	60W-3	93-4	93-5	93-6	93-7	93-8	93-9	93-10	Interstate 40	93-11	93-12	93-13	93-14	93-15	93-16
	MP 138- 122	MP 132-120	MP 120-111	MP 200-183	MP 183-166	MP 166-149	MP 149-132	MP 132-124	MP 124-106	MP 106-91		MP 71-67	MP 67-53	MP 53-42	MP 42-29	MP 29-17	MP 17-0
Pavement	-	-	-	-	-	Hot Spot	-	Hot Spot	-	-		Hot Spot	Hot Spot	-	Hot Spot	-	-
Bridge	-	-	-	-	Medium	-	-	-	-	Hot Spot		-	-	-	-	-	-
Mobility*	-	-	Medium	-	-	-	-	-	-	-		-	-	-	-	-	-
Safety*	High/Hot Spot	Hot Spot	High/Hot Spot	High/Hot Spot	High	-	Hot Spot	-	High	-		High	-	High	Medium	-	-
Freight*	-	-	High	-	-	High	High	High	-	-		Medium	-	-	-	-	-

US 93/US 60 Corridor Profile Study
Strategic Investment Areas

* Identified as Emphasis Area for US93/US60 Corridor
'-' symbol indicates a segment level of need of Low or None, which is not considered strategic

Note: Figures shows strategic investment areas, which are segments with Medium and High levels of need and locations of hot spots.

Corridor Segment
Interstate/Highway
County Boundary
City Boundary

Performance Area Needs
Pavement
Mobility
Safety
Freight
Bridge

Level of Need
Low
Medium
High

Miles
0 10 20 30 40

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					
60W-1 (MP 138-132)				High		L1	Safety	MP 138-132 has above average overturning, rear end, angle, and animal collisions; contributing factors include speed too fast for conditions, dark unlighted conditions, and failure to yield right of way. A hot spot also exists in the WB direction at 138-137 in proximity to the traffic signal at the intersection of 163rd Avenue.	Y	No programmed project to address Safety need.
60W-2 (MP 132-120)				Hot Spot		L2	Safety	Hot spot in the WB direction at MP 129-128 in proximity to the traffic signal at Whittman. Collision types include rear end, angle, and pedestrian. Contributing factors include driver inattention, failure to yield right of way, and improper turns.	Y	No programmed project to address Safety need.
60W-3 (MP 120-111)			Medium	High	High	L3	Mobility	Need resulting from high TTI and PTI, most likely attributable to the location of the traffic counters in the roundabout and the density of driveways and businesses just south of the roundabout, particularly fast food establishments.	N	High TTI and PTI is most likely attributable to the numerous businesses located south of the roundabouts. Therefore, the need is determined to be non-actionable.
						L4	Safety	MP 120-111 has above average fixed object and rear end collisions; contributing factors include excessive speed, driver inattention, roadside design, and narrow shoulders. A hot spot also exists in the WB direction at MP 115-114.	Y	No programmed project to address Safety need.
						L5	Freight	Need resulting from high TTI and PTI, most likely attributable to the location of the traffic counters in the roundabout and the density of driveways and businesses just south of the roundabout, particularly fast food establishments.	N	High TTI and PTI is most likely attributable to the numerous businesses located south of the roundabouts. Therefore, the need is determined to be non-actionable.
93-4 (MP 200-183)				High		L6	Safety	MP 200-183 has above average head on, rear end, and pedestrian collisions; contributing factors include crossing the centerline, driver inattention, and failure to yield right of way. A hot spot also exists in the SB direction at MP 195-193 in proximity to a no passing zone.	Y	No programmed project to address Safety need.

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					
93-5 (MP 183-166)		Medium		High		L7	Bridge	Date Creek Bridge (32366, MP 174.2) has a current deck rating of 5	N	Bridge does not have a rating of 4 or multiple ratings of 5, so it is not a hot spot and is not considered a strategic investment; not identified in historical rating review; will likely be addressed by current ADOT processes
						L8	Safety	MP 183-166 has above average head on and sideswipe (opposite direction) collisions; contributing factors include dark unlighted conditions and crossing the centerline.	Y	No programmed project to address Safety need.
93-6- (MP 166-	Hot Spot				High	L9	Pavement	Hot spot in the NB direction at MP 153-149	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes.
						L10	Freight	Need resulting from high NB and SB PTI and closures resulting from incidents/accidents.	Y	No programmed project to address Freight need.
93-7 (MP 149-132)	Hot Spot			Hot Spot	High	L11	Pavement	Hot spot in the SB direction at MP 133-132	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes.
						L12	Safety	Hot spot in the NB direction at MP 147-146 in proximity to a curve at MP 147. Above average collision types include collisions with fixed object; contributing factors include excessive speed, dark unlighted conditions, inadequate signs/delineators/guardrails, narrow shoulders, and inadequate roadside clearance.	Y	No programmed project to address Safety need.
						L13	Freight	Need resulting from high northbound and southbound PTI and closures resulting from incidents/accidents.	Y	No programmed project to address Freight need.
93-8 (MP 132-124)	Hot Spot				High	L14	Pavement	Hot spot in the SB direction at MP 132-130 with a Medium level of historical investment.	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes.
						L15	Freight	Need resulting from high northbound PTI and closures resulting from incidents/accidents. High NB PTI perhaps attributable to the NB traffic slowing down while approaching and traversing through Wikieup, AZ.	N	High northbound PTI perhaps attributable to the NB traffic slowing down while approaching and traversing through Wikieup, AZ. Therefore, the need is determined to be non-actionable.
93-9 (MP 124-				High		L16	Safety	MP 124-106 has above average overturning, fixed object, and head on collisions; contributing factors include excessive speed, failure to yield right of way, crossing the centerline, narrow shoulders, and inadequate roadside clearance.	Y	Cane Springs Design (MP 109-106), construct 4-lane divided highway; programmed in FY 21 H8232 Carrow Stephens (MP 119-116), construct 4-lane divided highway; programmed in FY 20

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					
93-10 (MP 106-)		Hot Spot				L17	Bridge	Hot spot Kabba Wash Bridge NB (#492 MP 97.5) has deck, superstructure, and structural evaluation ratings of 5, but not identified in historical review	N	While the bridge has multiple ratings of 5 and is a hot spot, it is not considered a strategic investment as it is not identified in historical rating review; will likely be addressed by current ADOT processes
93-11 (MP 71-67)	Hot Spot			High	Medium	L18	Pavement	Failure hot spot in the NB direction at MP 71-70 with a High level of historical investment.	Y	No programmed project to address hot spot; High historical investment.
						L19	Safety	MP 71-67 has above average overturning and fixed object collisions; contributing factors include narrow shoulders and inadequate roadside clearance.	Y	No programmed project to address Safety need.
						L20	Freight	Need resulting from Medium level NB PTI and closures resulting from incidents/accidents.	Y	No programmed project to address Freight need.
93-12 (MP 67-53)	Hot Spot					L21	Pavement	Failure hot spot in the NB direction at MP 61-60 with a High level of historical investment.	Y	No programmed project to address hotspot; High historical investment.
93-13 (MP 53-42)				High		L22	Safety	MP 53-42 has above average overturning, pedestrian, and angle collisions; contributing factors include excessive speed, driver inattention, failure to yield right of way, and narrow shoulders.	Y	H8659 Windy Point Road– Mineral Park Road (MP 48-58), shoulder widening (HSIP); programmed in FY18 is design only.
93-14 (MP 42-29)	Hot Spot			Medium		L23	Pavement	Failure hot spot in the SB direction at MP 35-34 and MP 33-32 with a Medium level of historical investment.	N	No High historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes.
						L24	Safety	MP 42-29 has above average overturning collisions; contributing factors include excessive speed, narrow shoulders, roadside design, and inadequate signs/delineators/guardrails.	Y	H8658 11th Street – Windy Point Road (MP 38-48), shoulder widening (HSIP); programmed in FY17 does not cover entire segment mileposts and is design only.
93-15 (MP 29-17)	No Strategic Investment Areas Identified									

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					
93-16 (MP 17-0)						No Strategic Investment Areas 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 93/US 60 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 11 candidate solutions are proposed to address the identified needs on the US 93/US 60 corridor.

Table 19 identifies each strategic location that has been assigned a candidate solution with a number (e.g., CS60W.1, CS60W.2, CS93-4, 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.

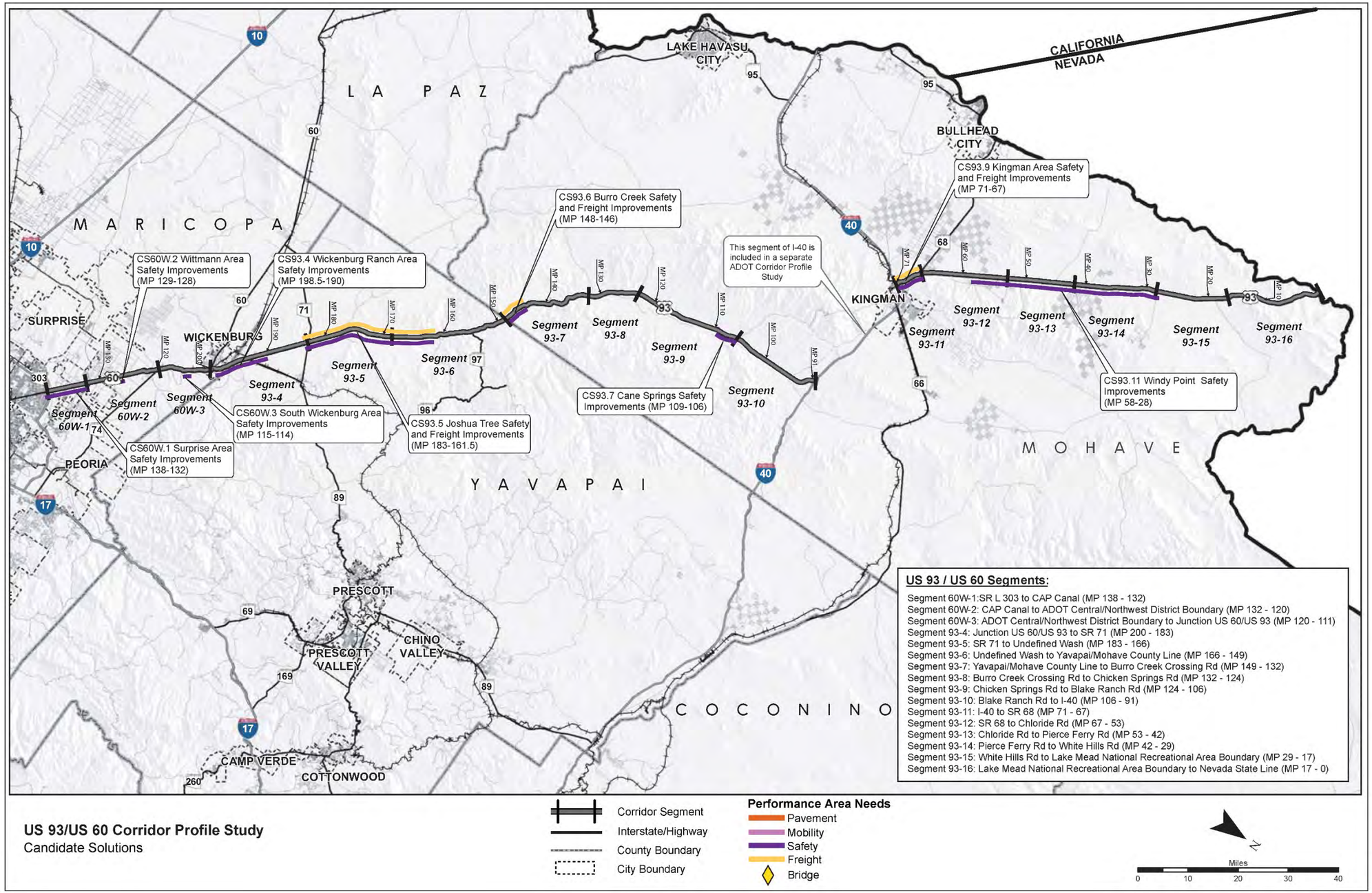
Candidate solutions that are recommended to expand or modify the scope of an already programmed project are noted and are not advanced to solution evaluation and prioritization. These solutions are directly recommended for programming.

Table 19: Candidate Solutions

Candidate Solution #	Segment #	Location #	Beginning Milepost	Ending Milepost	Candidate Solution Name	Option*	Scope	Investment Category (Preservation [P], Modernization [M], Expansion [E])
CS60W.1	60W-1	L1	138	132	Surprise Area Safety Improvements	-	-Install lighting between 163rd Avenue and Loop 303 -Rehabilitate shoulders/rumble strips and install safety edge -Improve signal visibility	M
CS60W.2	60W-2	L2	129	128	Wittmann Area Safety Improvements	-	-Install additional advanced signal warning sign with flashing beacon approximately 1000' upstream and downstream of Center Street. -Improve signal visibility	M
CS60W.3	60W-3	L4	115	114	South Wickenburg Area Safety Improvements	-	-Install left side/median guardrails between MP 114-115 -Install speed feedback sign -Install high visibility edge line striping	M
CS93.4	93-4	L6	198.5	190	Wickenburg Ranch Area Safety Improvements	A	-Construct 4-lane divided roadway MP 190-198.5 (Tegner Street roundabout)	E
						B	-Install center rumble strips -Install high visibility edge line striping -Install high visibility signage -Install Raised Pavement Markers -Add delineators	M
CS93.5	93-5 & 93-6	L8/L10	183	161.5	Joshua Tree Safety and Freight Improvements	A	-Construct 4-lane divided roadway MP 161.5-183	E
						B	-Widen shoulder -Install center and outside rumble strips -Install safety edge	M
CS93.6	93-7	L12/13	147	146	Burro Creek Safety and Freight Improvements	A	-Widen northbound shoulders -Increase northbound clear zones -Add northbound guardrails -Install northbound speed feedback sign -Re-profile northbound roadway at MP 148	M
						B	-Realign northbound MP 146-147	E
CS93.7	93-9	L16	109	106	Cane Springs Safety Improvements	A	-Construct 4-lane divided roadway MP 119.7-116.3	E
						B	-Widen shoulder -Install center and outside rumble strips -Install safety edge -Install speed feedback signs	M
CS93.8	93-11	L18	71	70	Kingman Pavement Improvements	A	-Rehabilitate pavement	P
						B	-Replace pavement	M
CS93.9	93-11	L19/L20	71	67	Kingman Area Safety and Freight Improvements	-	-Install northbound climbing lane MP 71 to SR 68 TI.	M
CS93.10	93-12	L21	61	60	Cerbat Wash Pavement Improvements	A	Rehabilitate pavement	P
						B	Replace pavement	M
CS93.11	93-12, 93-13, & 93-14	L22/24	58	29	Windy Point Safety Improvements	-	-Widen shoulders -Install rumble strips -Install safety edge	M

* ' - ' indicates only one solution is being proposed, and no options are being considered.

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.

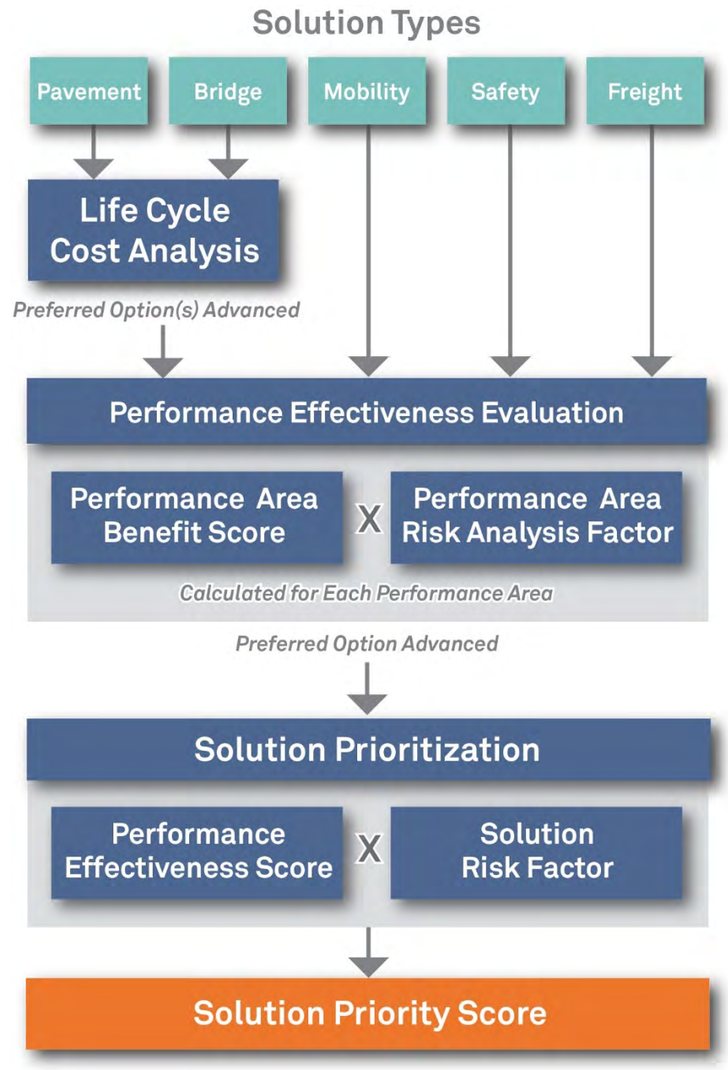
Solution Risk Analysis

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 of future costs is 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
- Because this LCCA is conducted at a planning level, and due to the variabilities in costs and improvement strategies, the LCCA net present value 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 93/US 60 corridor. A summary of this analysis is shown in **Table 20**. Additional information regarding the bridge 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 net present value of future costs is discounted at 3% and all dollar amounts are in 2015 dollars
- If the LCCA evaluation recommends rehabilitation or repair, the solution is not 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 net present value 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 two pavement project on the US 93/US 60 corridor. A summary of this analysis is shown in **Table 21**. Additional information regarding the pavement LCCA is contained in **Appendix E**.

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

- Rehabilitation or repair was determined to be the most effective approach for the candidate solutions listed below, and these locations do not have other Needs. Therefore, it is assumed that these will be addressed by normal programming processes and these candidate solutions will be dropped from further consideration:
  - Kingman Pavement Improvements (CS93.8, MP 71-70)
  - Cerbat Wash Pavement Improvements (CS93.10, MP 61-60)

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		
No Life Cycle Cost Analysis (LCCA) conducted for any bridge candidate solution on the US 93/US 60 corridor								

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		
Kingman Pavement Improvements (CS93.8, MP 71-70)	$6,943,746	$6,384,564	$5,528,475	$5,928,002	1.26	1.16	1.00	1.07	-	Reconstruction is not within 15% of lowest cost - Rehabilitation is recommended
Cerbat Wash Pavement Improvements (CS93.10, MP 61-60)	$8,795,411	$8,052,390	$6,307,010	$7,034,415	1.39	1.28	1.00	1.12	-	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 a Performance Effectiveness Score (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 (e.g., 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 net present value (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 preservation solutions such as pavement and bridge preservation; these solutions 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 generally reflective of modernization solutions that 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 expansion solutions or modernization solutions that include 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; these solutions would likely have a 75-year stream of benefits; 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 = estimated 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 can be eliminated from further consideration. If multiple options have similar PES values, or there are other factors not accounted for in the performance system that could significantly influence the ultimate selection of an option (e.g., potential environmental concerns, potential adverse economic impacts), those options should all be advanced to the prioritization process. On the US 93/US 60 corridor, the following candidate solutions have options to address Mobility, Safety, or Freight needs:

- CS93.4 (A and B) - Wickenburg Ranch Area Safety Improvements
- CS93.5 (A and B) - Joshua Tree Safety and Freight Improvements
- CS93.6 (A and B) - Burro Creek Safety and Freight Improvements
- CS93.7 (A and B) – Cane Springs Safety Improvements

Based on a review of the PES values, the candidate solution options recommended for elimination from further consideration are CS93.4A and CS93.5A.

As was previously mentioned, pavement rehabilitation (Option A) was determined to be the most effective approach for the candidate solutions listed below that were subject to LCCA:

- Kingman Pavement Improvements (CS93.8, MP 71-70)
- Cerbat Wash Pavement Improvements (CS93.10, MP 61-60)

As pavement rehabilitation will be addressed by ADOT through other existing processes, these two candidate solutions were eliminated from further consideration per the LCCA and they do not appear in **Table 22**.

Table 22: Performance Effectiveness Scores

Candidate Solution #	Segment #	Option	Candidate Solution Name	Milepost Location	Estimated Cost[1] (in millions)	Risk Factored Benefit Score					Risk Factored Emphasis Area Scores			Total Factored Benefit Score	F_{VMT}[2]	F_{NPV}[3]	Performance Effectiveness Score
						Pavement	Bridge	Mobility	Safety	Freight	Mobility	Safety	Freight				
CS60W.1	60W-1	-	Surprise Area Safety Improvements	138-132	$4.14	0.00	0.00	0.03	5.85	0.01	0.00	0.26	0.01	6.16	3.75	15.3	85.37
CS60W.2	60W-2	-	Wittmann Area Safety Improvements	132-120	$0.16	0.00	0.00	0.00	0.09	0.00	0.00	0.05	0.01	0.15	0.39	15.3	5.45
CS60W.3	60W-2	-	South Wickenburg Area Safety Improvements	115-114	$0.83	0.00	0.00	0.02	4.86	0.01	0.00	0.27	0.00	5.16	0.93	15.3	88.45
CS93.4	93-4	A	Wickenburg Ranch Area Safety Improvements	198.5-190	$63.93	0.00	0.00	1.33	7.66	1.00	0.19	0.99	0.20	11.37	3.05	20.2	10.94
CS93.4	93-4	B	Wickenburg Ranch Area Safety Improvements	198.5-190	$0.95	0.00	0.00	0.60	6.57	0.54	0.00	0.85	0.09	8.66	3.05	15.3	423.62
CS93.5	93-5 & 93-6	A	Joshua Tree Safety and Freight Improvements	183-161.5	$163.08	0.08	0.00	4.74	9.14	8.87	0.20	1.07	0.24	24.34	2.24	20.2	6.80
CS93.5	93-5 & 93-6	B	Joshua Tree Safety and Freight Improvements	183-161.5	$15.62	0.00	0.00	3.62	16.07	9.97	0.00	1.40	0.81	31.51	2.49	15.3	76.8
CS93.6	93-7	A	Burro Creek Safety and Freight Improvements	147-146	$2.37	0.00	0.00	0.62	0.02	0.29	0.00	0.02	0.08	1.03	0.49	15.3	3.27
CS93.6	93-7	B	Burro Creek Safety and Freight Improvements	147-146	$14.83	0.00	0.00	0.62	0.02	1.18	0.00	0.02	0.32	2.15	0.49	20.2	1.45
CS93.7	93-9	A	Cane Springs Safety Improvements	109-106	$25.71	0.00	0.00	2.92	0.13	0.01	0.00	0.02	0.04	3.11	1.50	20.2	3.67
CS93.7	93-9	B	Cane Springs Safety Improvements	109-106	$9.41	0.00	0.00	2.93	0.14	0.02	0.00	0.02	0.00	3.11	1.50	15.3	7.61
CS93.9	93-11	-	Kingman Area Safety and Freight Improvements	71-67	$22.62	0.00	0.00	0.78	2.07	0.04	0.01	0.06	0.00	2.96	1.96	15.3	3.93
CS93.11	93-12, 93-13, & 93-14	-	Windy Point Safety Improvements	58-28	$41.97	0.00	0.00	3.74	10.93	0.10	0.00	1.06	0.54	16.45	5.00	15.3	30.00

[1] Complete details of estimated costs and total costs may be found in the appendices.

[2] 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.

[3] 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.

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 following 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***

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. The 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 (in millions)	Performance Effectiveness Score	Weighted Risk Factor	Segment Average Need Score	Prioritization Score	Percentage by which Solution Reduces Performance Area Segment Needs				
										Pavement	Bridge	Mobility	Safety	Freight
CS60W.1	60W-1	-	Surprise Area Safety Improvements	138-132	$4.14	85.37	1.78	1.08	**164**	0%	0%	1%	37%	7%
CS60W.2	60W-2	-	Wittmann Area Safety Improvements	132-120	$0.16	5.45	1.76	0.62	**6**	0%	0%	1%	7%	0%
CS60W.3	60W-2	-	South Wickenburg Area Safety Improvements	115-114	$0.83	88.45	1.78	1.85	**291**	0%	0%	0%	67%	0%
CS93.4	93-4	A	Wickenburg Ranch Area Safety Improvements	198.5-190	$63.93	10.94	1.68	1.15	**21**	0%	0%	36%	23%	24%
CS93.4	93-4	B	Wickenburg Ranch Area Safety Improvements	198.5-190	$0.95	423.62	1.72	1.15	**838**	0%	0%	16%	19%	13%
CS93.5	93-5 & 93-6	A	Joshua Tree Safety and Freight Improvements	183-161.5	$163.08	6.80	1.54	1.28	**13**	27%	0%	38%	42%	17%
CS93.5	93-5 & 93-6	B	Joshua Tree Safety and Freight Improvements	183-161.5	$15.62	76.8	1.60	1.28	**157**	0%	0%	27%	72%	20%
CS93.6	93-7	A	Burro Creek Safety and Freight Improvements	147-146	$2.37	3.27	1.38	1.46	**7**	0%	0%	13%	20%	1%
CS93.6	93-7	B	Burro Creek Safety and Freight Improvements	147-146	$14.83	1.45	1.37	1.46	**3**	0%	0%	13%	20%	6%
CS93.7	93-9	A	Cane Springs Safety Improvements	109-106	$25.71	3.67	1.67	1.08	**5**	0%	0%	51%	1%	1%
CS93.7	93-9	B	Cane Springs Safety Improvements	109-106	$9.41	7.61	1.71	1.08	**11**	0%	0%	51%	1%	2%
CS93.9	93-11	-	Kingman Area Safety and Freight Improvements	71-67	$22.62	3.93	1.66	1.54	**10**	0%	0%	16%	9%	1%
CS93.11	93-12, 93-13, & 93-14	-	Windy Point Safety Improvements	58-28	$41.97	30.00	1.68	0.98	**49**	0%	0%	59%	36%	5%

6.0 SUMMARY OF CORRIDOR RECOMMENDATIONS

6.1 Prioritized Candidate Solution Recommendations

Table 23 and **Figure 27** show the prioritized candidate solutions recommended for the US 93/US 60 corridor. Implementation of these solutions is anticipated to improve performance of the US 93/US 60 corridor. The following observations were noted about the prioritized solutions:

- Eight of the 13 Candidate Solution recommendations focus on Safety improvements
- Five of the 13 Candidate Solution recommendations focus on Safety and Freight needs
- All Candidate Solutions would reduce needs identified relating to Safety, Mobility, and Freight

6.2 Other Corridor Recommendations

As part of the investigation of strategic investment areas and candidate solutions, other corridor recommendations were also identified. These recommendations could include modifications to the existing Statewide Construction Program, areas for further study, or other corridor specific recommendations that are not construction or policy related. The list below identifies other corridor recommendations for the US 93/US 60 corridor:

- Work with Arizona DPS and other local agencies to designate the US 93/US 60 corridor as a “Recreational Corridor” to emphasize safe driving during long or holiday weekends

6.3 Policy and Initiative Recommendations

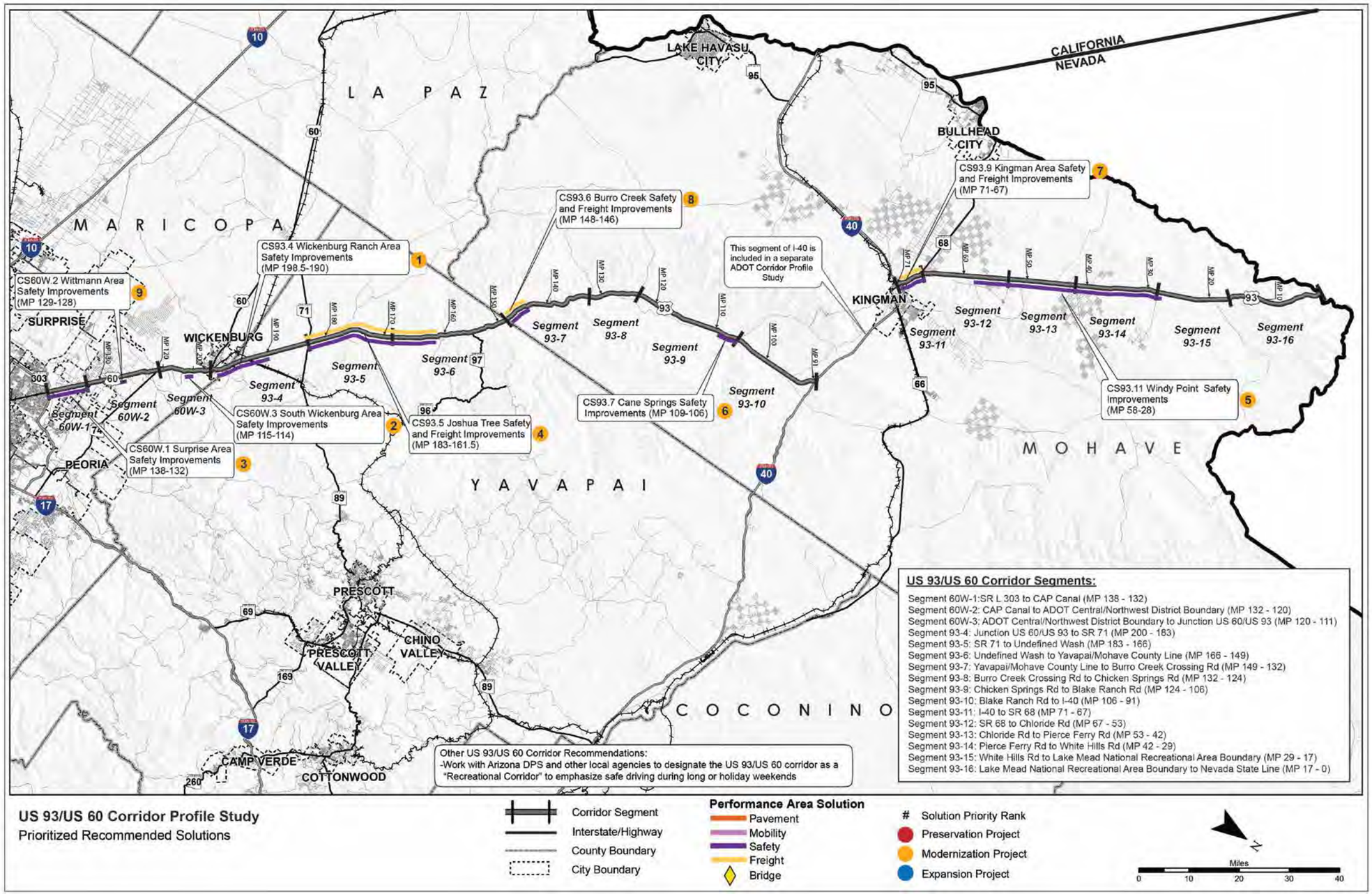
In addition to location-specific needs, general corridor and system-wide needs have also been identified through the CPS process. While these needs are more overarching and cannot be individually evaluated through this process, it is important to document them. A list of recommended policies and initiatives was developed for consideration when programming future projects not only on US 93/US 60, 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 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 feet 3 inches 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 given 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	CS93.4	B	Wickenburg Ranch Area Safety Improvements (US 93, MP 198.5-190)	-Install center rumble strips -Install high visibility edge line striping -Install high visibility signage -Install raised pavement markers -Add delineators	$0.95	M	838
		A	Wickenburg Ranch Area Safety Improvements (US 93, MP 198.5-190)	-Construct 4-lane divided roadway MP 190-198.5 (Tegner Street roundabout)	$63.93	E	21
2	CS60W.3	-	South Wickenburg Area Safety Improvements (US 60W, MP 115-114)	-Install left side/median guardrails between MP 114-115 -Install speed feedback sign -Install high visibility edge line striping	$0.83	M	291
3	CS60W.1	-	Surprise Area Safety Improvements (US 60W, MP 138-132)	-Install lighting between 163rd Avenue and Loop 303 -Rehabilitate shoulders/rumble strips and install safety edge -Improve signal visibility	$4.14	M	164
4	CS93.5	B	Joshua Tree Safety and Freight Improvements (US 93, MP 183-161.5)	-Widen shoulder -Install center and outside rumble strips -Install safety edge	$15.6	M	157
		A	Joshua Tree Safety and Freight Improvements (US 93, MP 183-161.5)	-Construct 4-lane divided roadway MP 161.5-183	$163.08	E	13
5	CS93.11	-	Windy Point Safety Improvements (US 93, MP 58-28)	-Widen shoulders -Install rumble strip -Install safety edge	$41.97	M	49
6	CS93.7	B	Cane Springs Safety Improvements (US 93 MP 106-109)	-Widen shoulder -Install center and outside rumble strips -Install safety edge -Install speed feedback signs	$9.41	M	11
		A	Cane Springs Safety Improvements (US 93 MP 106-109)	-Construct 4-lane divided roadway MP 119.7-116.3	$25.71	E	5
7	CS93.9	-	Kingman Area Safety and Freight Improvements (US 93, MP 71-67)	-Install northbound climbing lane MP 71 to SR 68 TI	$22.62	M	10
8	CS93.6	A	Burro Creek Safety and Freight Improvements (US 93, MP 147-146)	-Widen northbound shoulders -Increase northbound clear zones -Add northbound guardrails -Install northbound speed feedback sign -Re-profile northbound roadway at MP 148	$2.37	M	7
		B	Burro Creek Safety and Freight Improvements (US 93, MP 147-146)	-Realign northbound MP 146-147	$14.83	E	3
9	CS60W.2	-	Wittmann Area Safety Improvements (US 60W, MP 132-120)	-Install additional advanced signal warning sign with flashing beacon approximately 1000' upstream and downstream of Center Street -Improve signal visibility	$0.16	M	6

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 93/US 60 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 93/US 60 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:

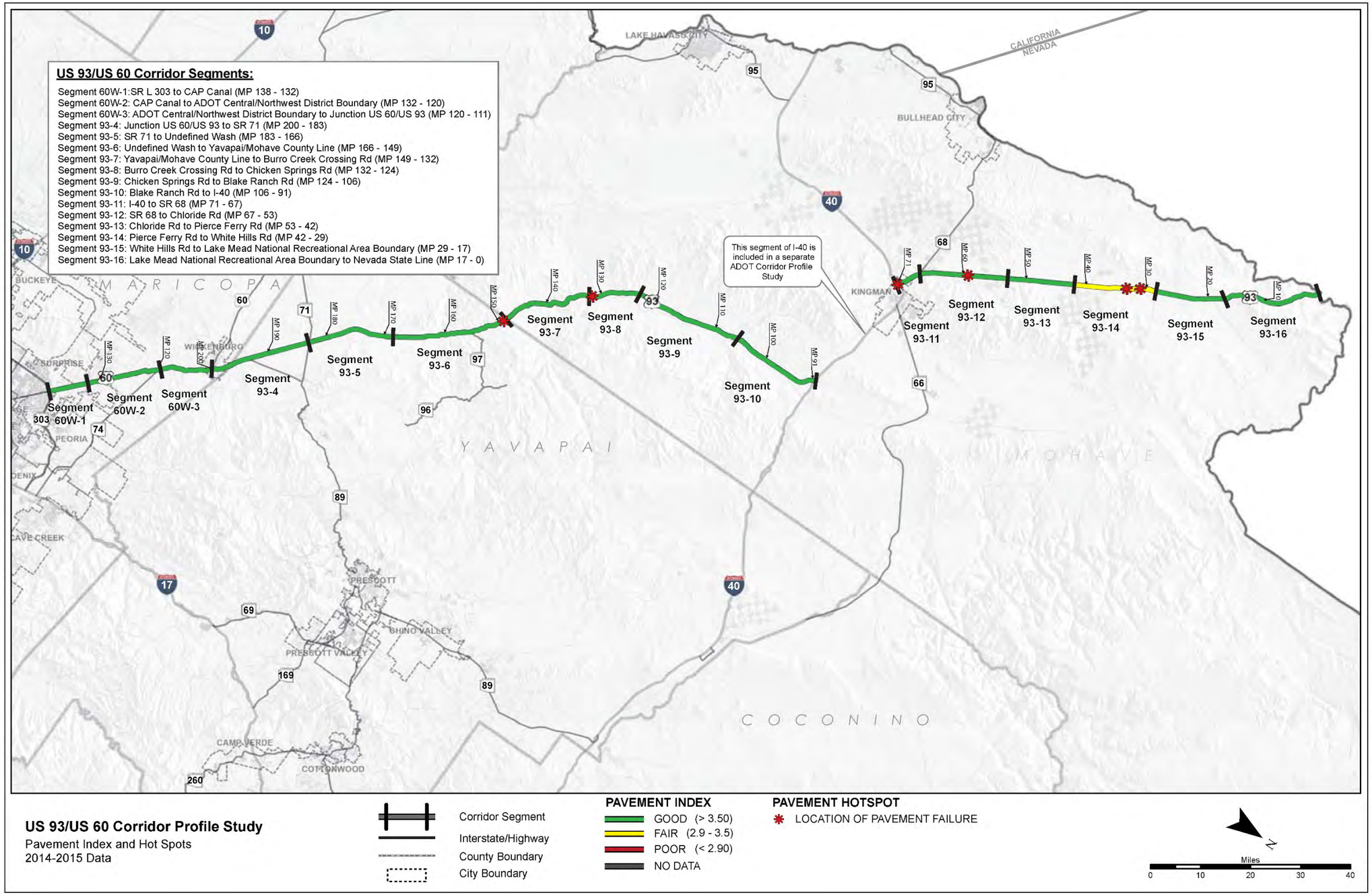
- Mobility Index
- Future Daily V/C
- Existing Peak V/C (directional)
- Average Instances Per Year a Given Milepost is Closed Per Segment Mile
- All Vehicles Travel Time Index
- All Vehicles Planning Time Index
- Multimodal Opportunities
- Percentage of Bicycle Accommodation

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
- Relative Frequency of Fatal + Incapacitating Injury Crashes Involving Motorcycles Compared to the Statewide Average for Similar Segments

Freight Performance Area:

- Freight Index and Hot Spots
- Truck Travel Time Index
- Truck Planning Time Index
- Average Minutes Per Year Given Milepost is Closed Per Segment Mile
- Bridge Vertical Clearance


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
Segment 93-7: Yavapai/Mohave County Line to Burro Creek Crossing Rd (MP 149 - 132)
Segment 93-8: Burro Creek Crossing Rd to Chicken Springs Rd (MP 132 - 124)
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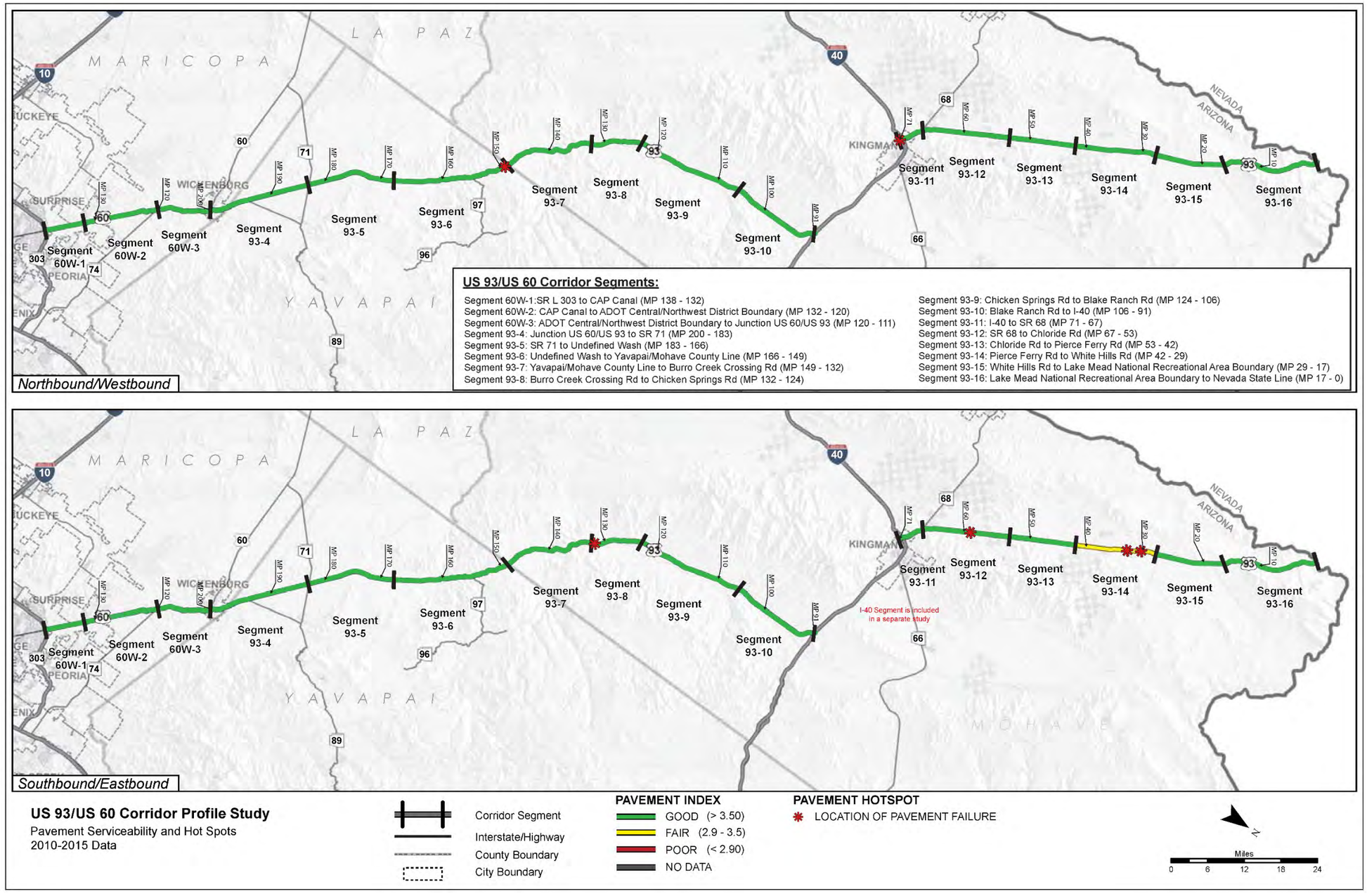
Segment 93-11: I-40 to SR 68 (MP 71 - 67)
Segment 93-12: SR 68 to Chloride Rd (MP 67 - 53)
Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
WICKENBURG
BUCKEYE
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
MOHAVE
COCONINO
US 93/US 60 Corridor Profile Study
Pavement Index and Hot Spots
2014-2015 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
PAVEMENT INDEX
GOOD (> 3.50)
FAIR (2.9 - 3.5)
POOR (< 2.90)
NO DATA
PAVEMENT HOTSPOT
LOCATION OF PAVEMENT FAILURE
N
Miles
0 10 20 30 40


MARICOPA
LA PAZ
YAVAPAI
MOHAVE
NEVADA
ARIZONA
KINGMAN
WICKENBURG
SURPRISE
PEORIA
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
Northbound/Westbound
Southbound/Eastbound
I-40 Segment is included in a separate study
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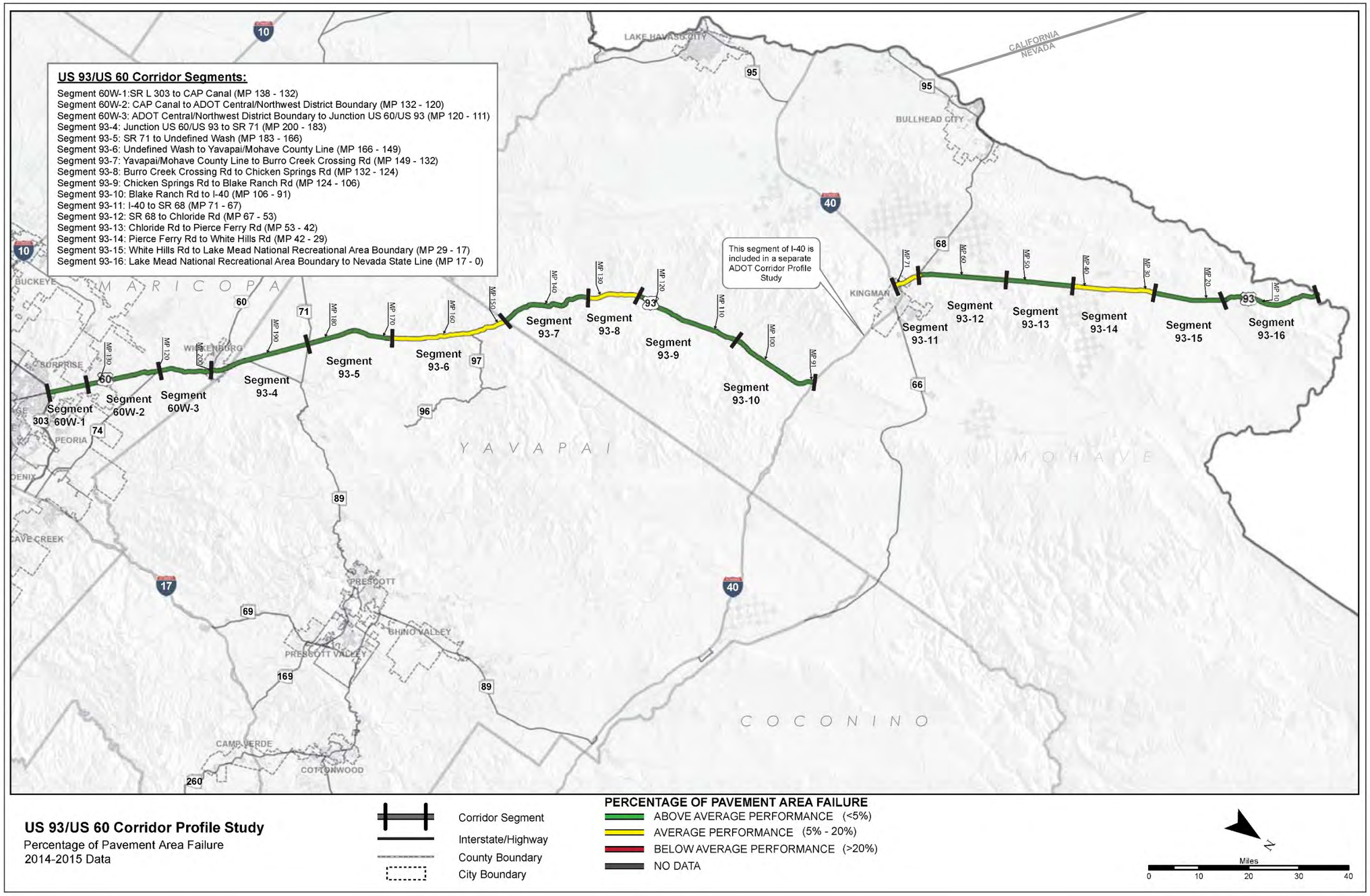
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
US 93/US 60 Corridor Profile Study
Pavement Serviceability and Hot Spots
2010-2015 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
PAVEMENT INDEX
GOOD (> 3.50)
FAIR (2.9 - 3.5)
POOR (< 2.90)
NO DATA
PAVEMENT HOTSPOT
LOCATION OF PAVEMENT FAILURE
Miles
0 6 12 18 24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Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
LAKE HAVASU CITY
CALIFORNIA
NEVADA
BULLHEAD CITY
KINGMAN
BUCKEYE
MARICOPA
WICKENBURG
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
YAVAPAI
MOHAVE
COCONINO
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
US 93/US 60 Corridor Profile Study
Percentage of Pavement Area Failure
2014-2015 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
PERCENTAGE OF PAVEMENT AREA FAILURE
ABOVE AVERAGE PERFORMANCE (<5%)
AVERAGE PERFORMANCE (5% - 20%)
BELOW AVERAGE PERFORMANCE (>20%)
NO DATA
Miles
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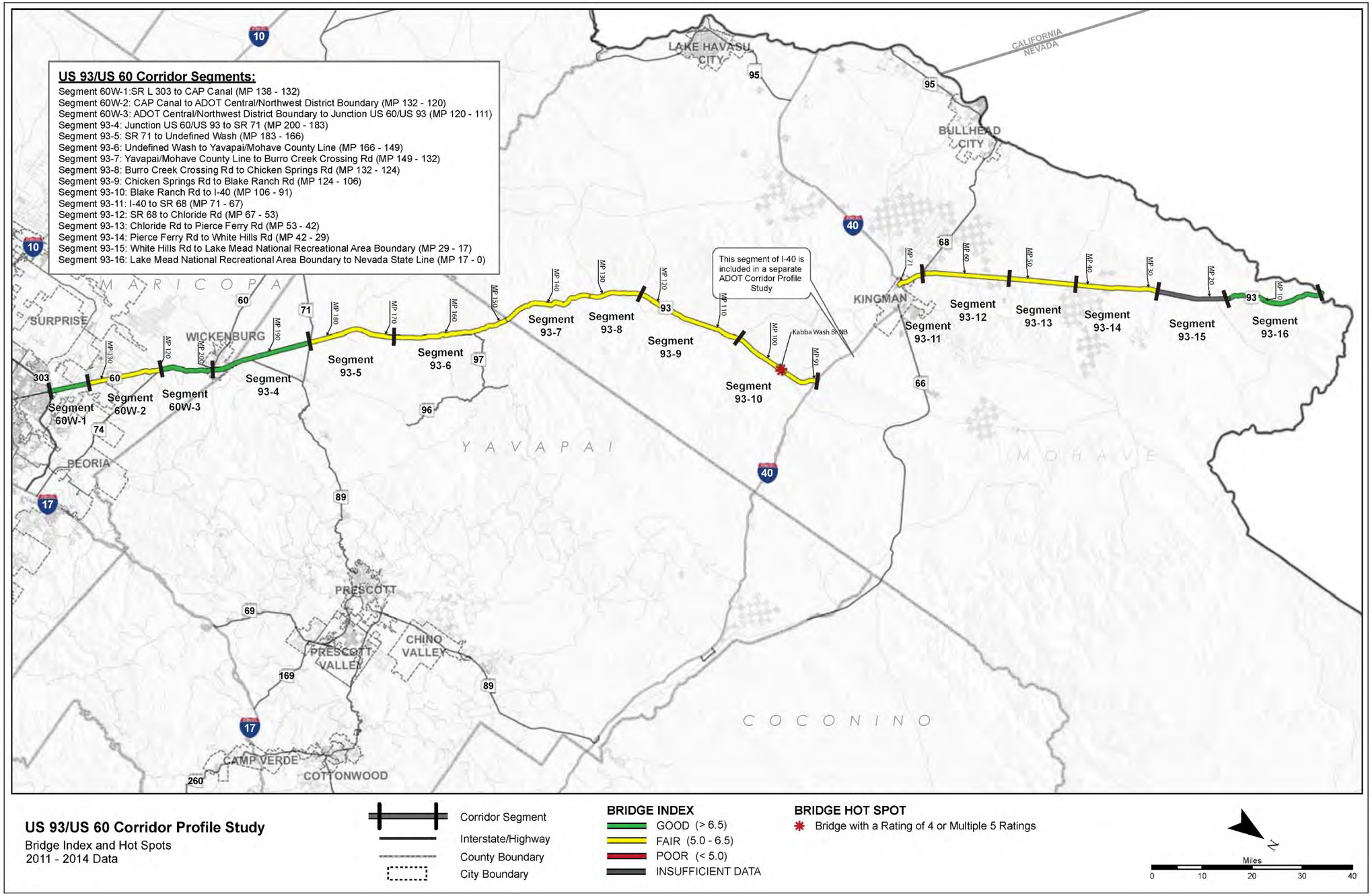
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BULLHEAD CITY
KINGMAN
SURPRISE
WICKENBURG
PEORIA
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
MOHAVE
COCONINO
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
US 93/US 60 Corridor Profile Study
Bridge Index and Hot Spots
2011 - 2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
BRIDGE INDEX
GOOD (> 6.5)
FAIR (5.0 - 6.5)
POOR (< 5.0)
INSUFFICIENT DATA
BRIDGE HOT SPOT
Bridge with a Rating of 4 or Multiple 5 Ratings
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Miles
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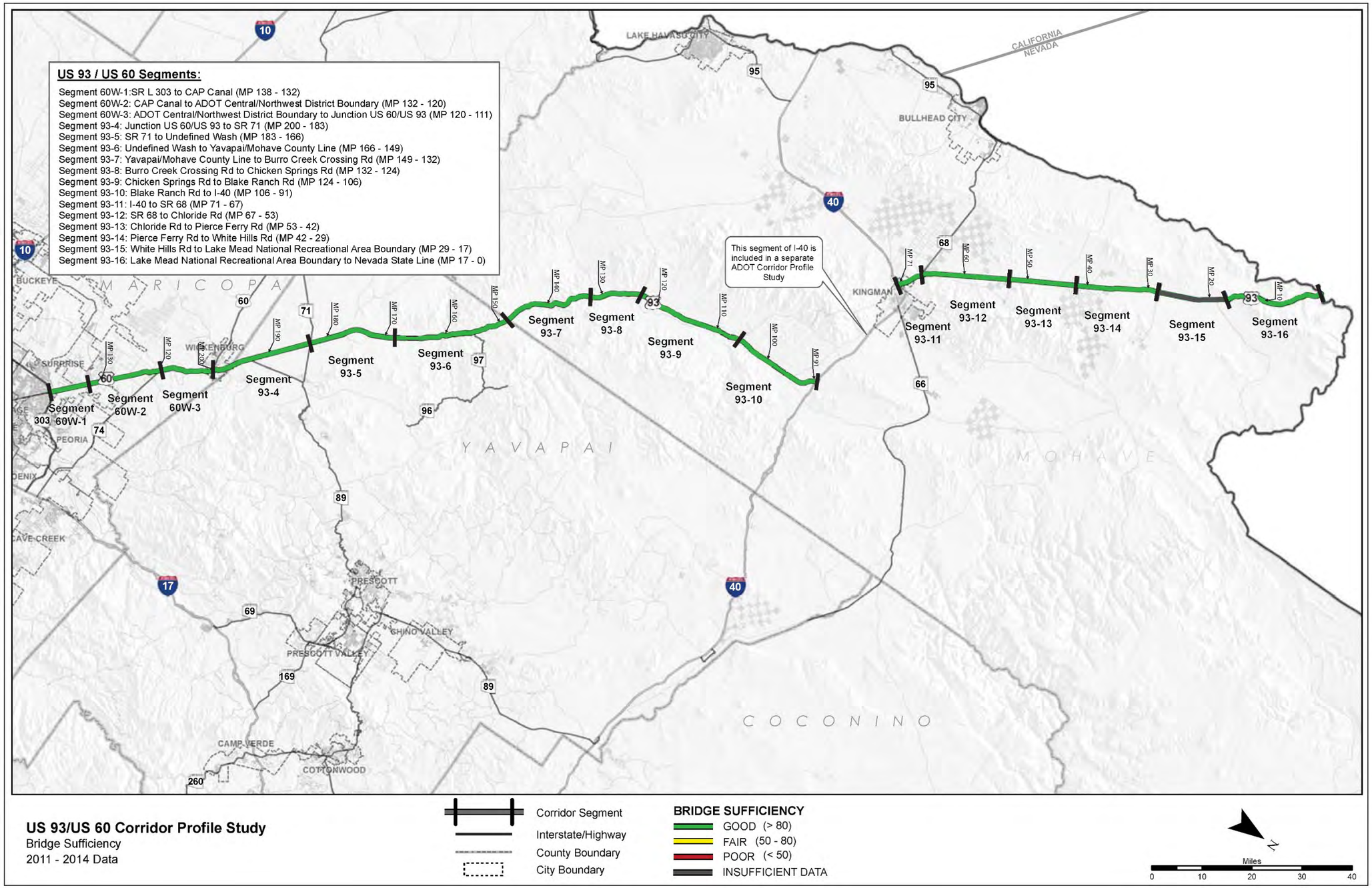
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Segment 93-11
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Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
BUCKEYE
SURPRISE
WICKENBURG
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
MOHAVE
COCONINO
US 93/US 60 Corridor Profile Study
Bridge Sufficiency
2011 - 2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
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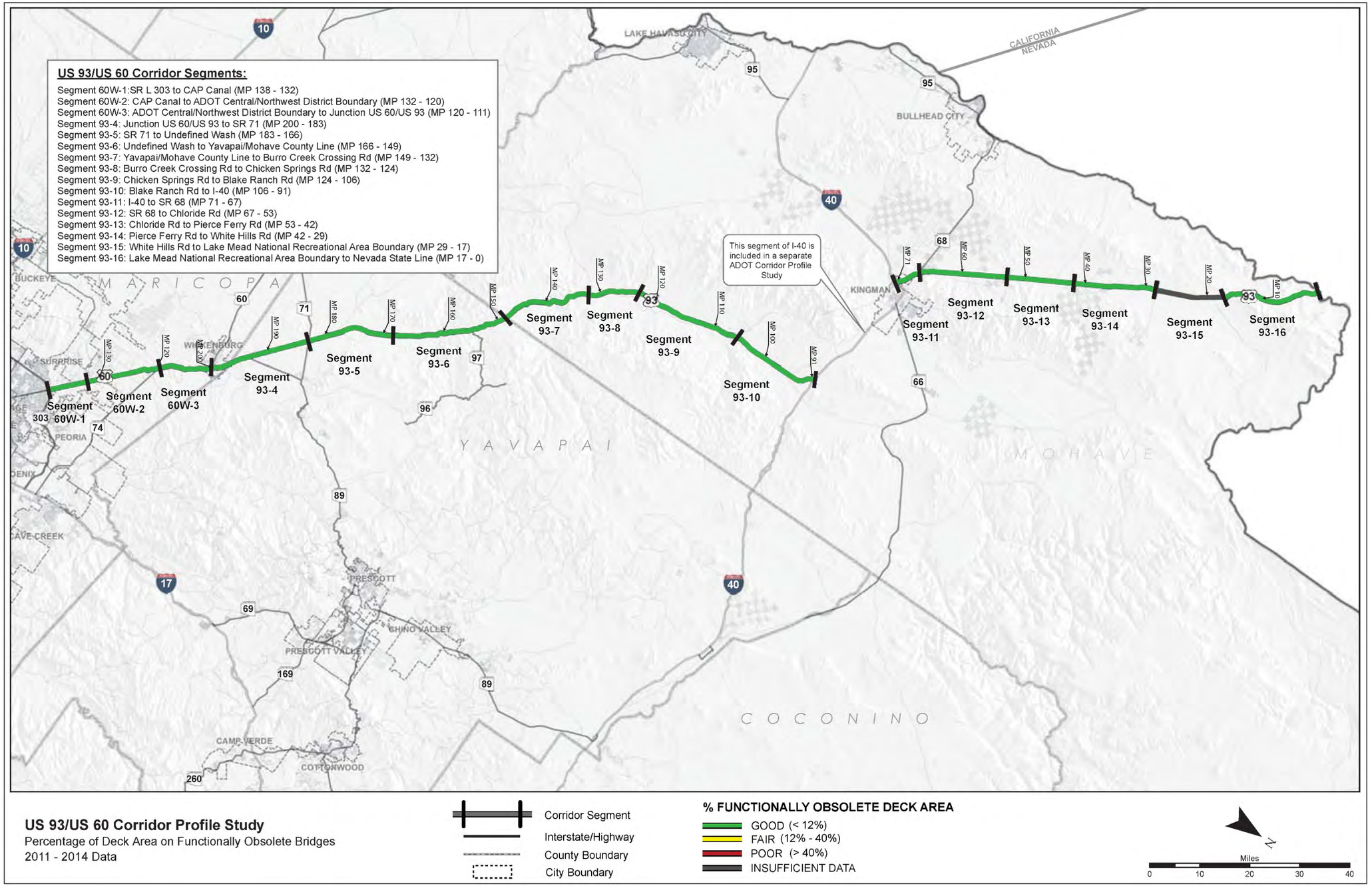
GOOD (> 80)
FAIR (50 - 80)
POOR (< 50)
INSUFFICIENT DATA
N
Miles
0 10 20 30 40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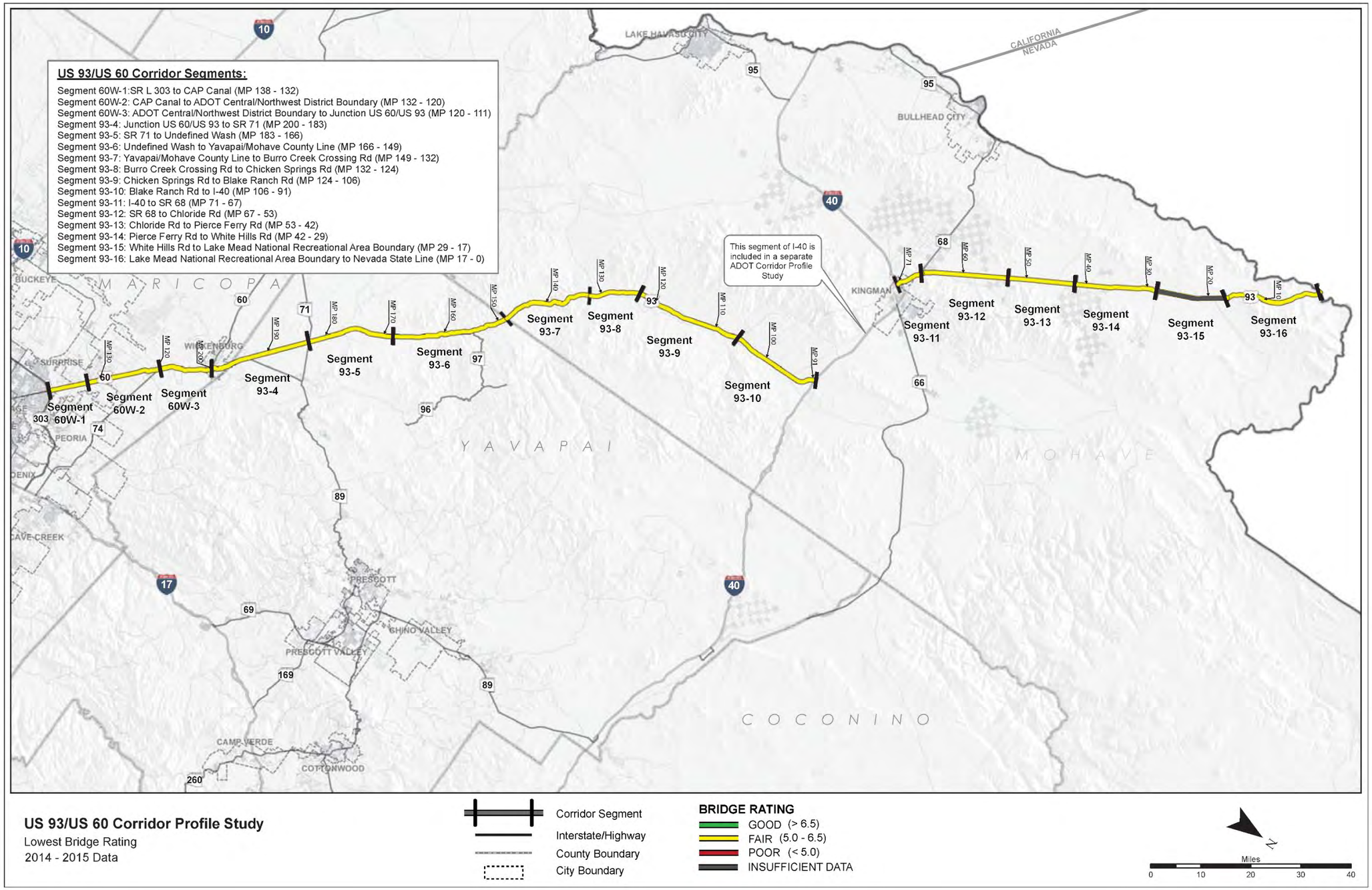
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
WICKENBURG
BUCKEYE
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
MOHAVE
COCONINO
US 93/US 60 Corridor Profile Study
Percentage of Deck Area on Functionally Obsolete Bridges
2011 - 2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
% FUNCTIONALLY OBSOLETE DECK AREA
GOOD (< 12%)
FAIR (12% - 40%)
POOR (> 40%)
INSUFFICIENT DATA
N
Miles
0 10 20 30 40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Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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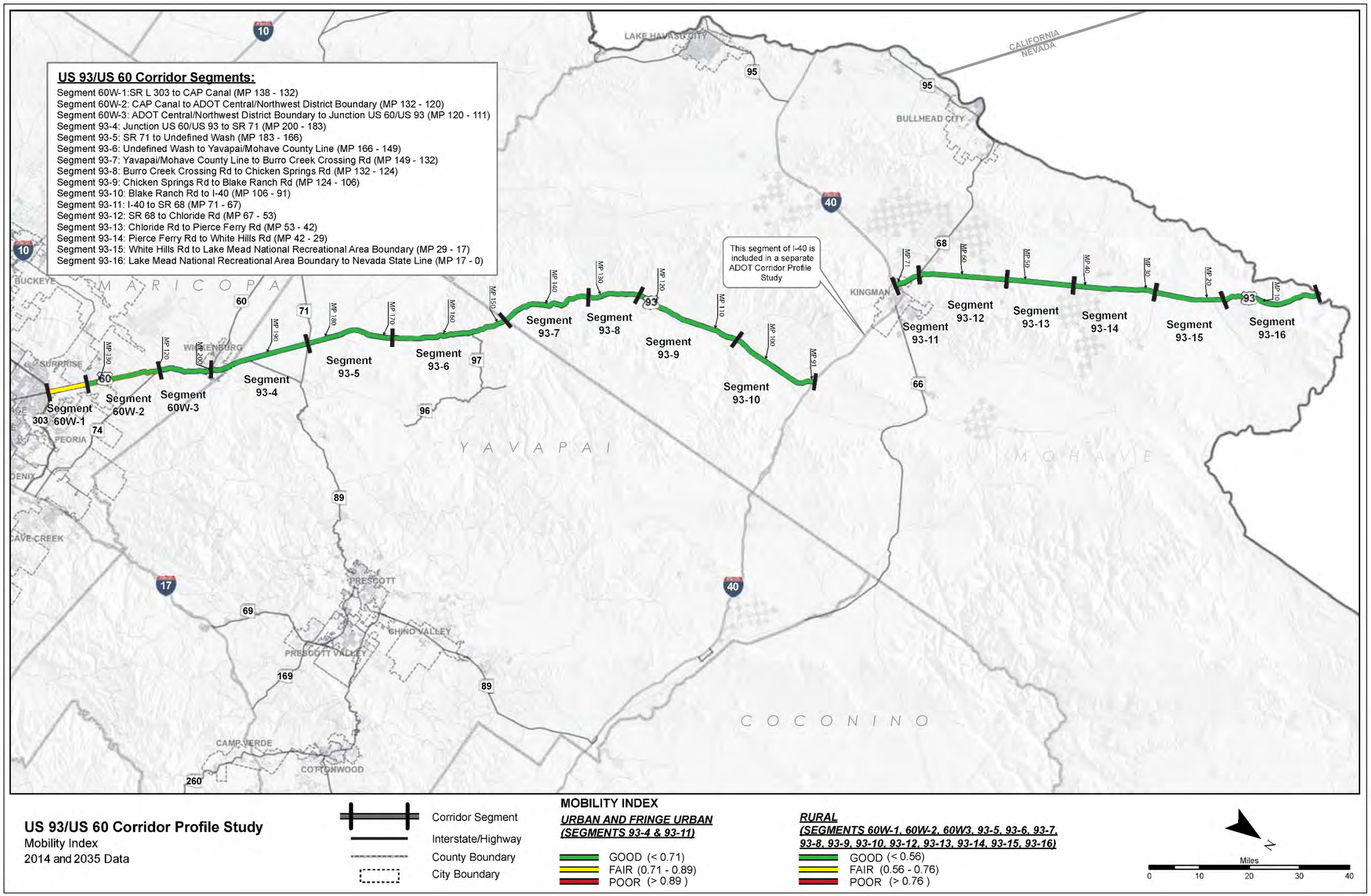
Segment 93-8: Burro Creek Crossing Rd to Chicken Springs Rd (MP 132 - 124)
Segment 93-9: Chicken Springs Rd to Blake Ranch Rd (MP 124 - 106)
Segment 93-10: Blake Ranch Rd to I-40 (MP 106 - 91)
Segment 93-11: I-40 to SR 68 (MP 71 - 67)
Segment 93-12: SR 68 to Chloride Rd (MP 67 - 53)
Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
WICKENBURG
BUCKEYE
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
CHINO VALLEY
PRESCOTT VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
MOHAVE
COCONINO
US 93/US 60 Corridor Profile Study
Lowest Bridge Rating
2014 - 2015 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
BRIDGE RATING
GOOD (> 6.5)
FAIR (5.0 - 6.5)
POOR (< 5.0)
INSUFFICIENT DATA
N
Miles
0 10 20 30 40


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
Segment 93-7: Yavapai/Mohave County Line to Burro Creek Crossing Rd (MP 149 - 132)
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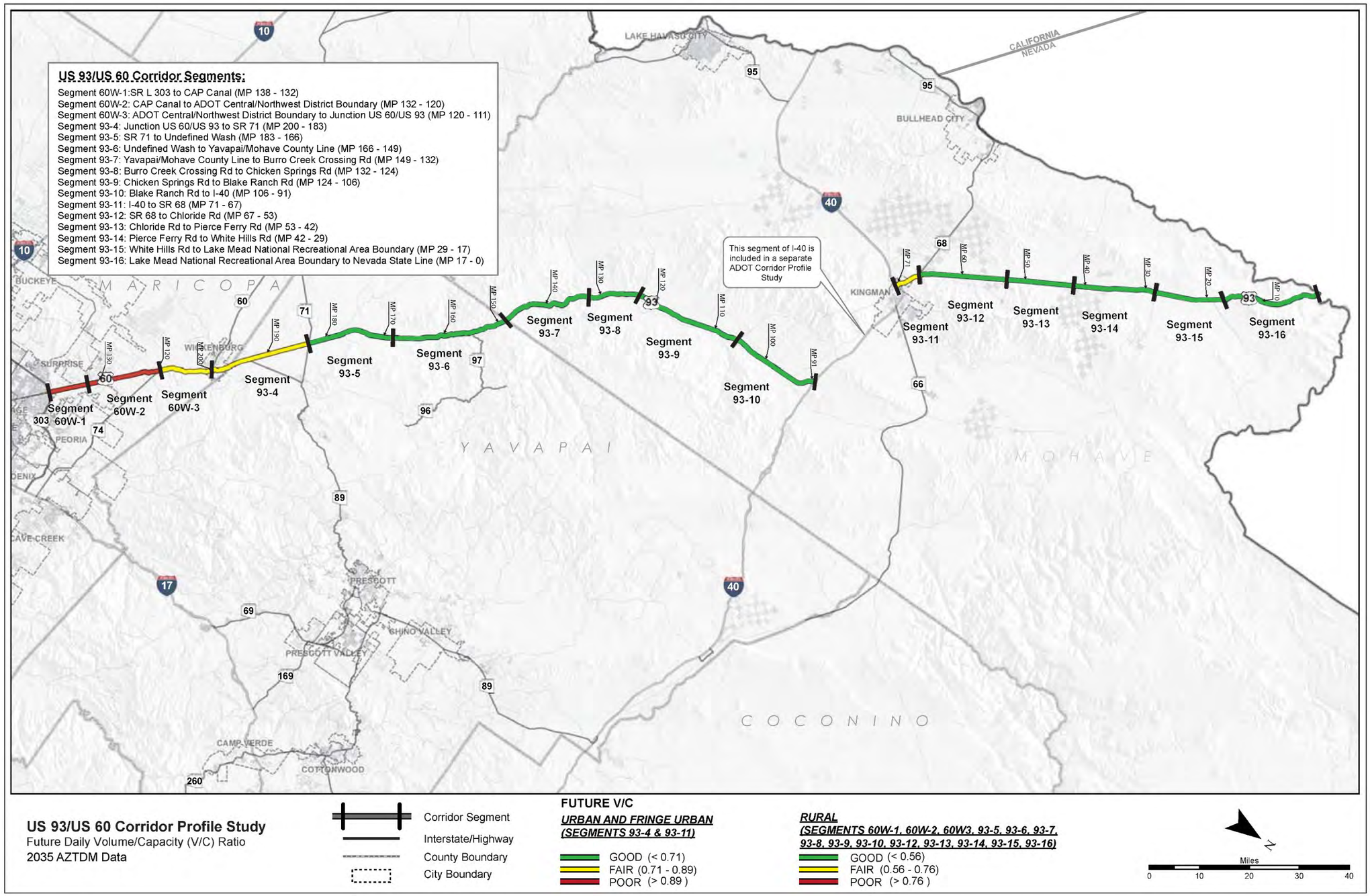
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
LAKE HAVASU CITY
CALIFORNIA
NEVADA
BULLHEAD CITY
KINGMAN
BUCKEYE
WICKENBURG
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
MARICOPA
YAVAPAI
MOHAVE
COCONINO
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
US 93/US 60 Corridor Profile Study
Mobility Index
2014 and 2035 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
MOBILITY INDEX
URBAN AND FRINGE URBAN (SEGMENTS 93-4 & 93-11)
GOOD (< 0.71)
FAIR (0.71 - 0.89)
POOR (> 0.89)
RURAL (SEGMENTS 60W-1, 60W-2, 60W3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 0.56)
FAIR (0.56 - 0.76)
POOR (> 0.76)
N
Miles
0 10 20 30 40


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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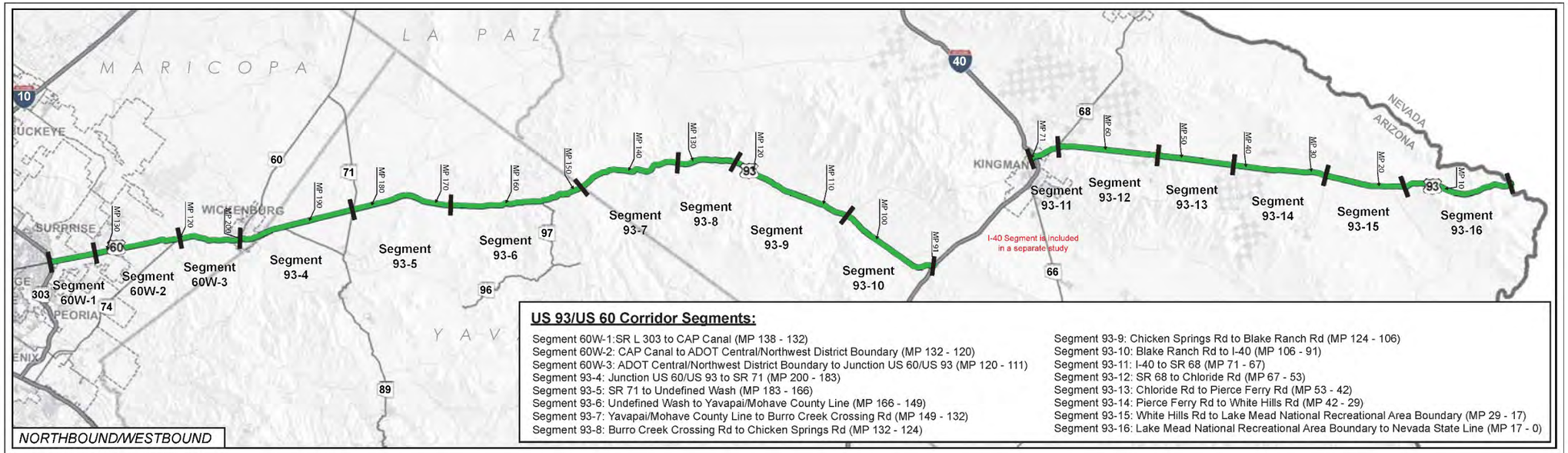
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
CALIFORNIA
NEVADA
BUCKEYE
WICKENBURG
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
MARICOPA
YAVAPAI
MOHAVE
COCONINO
US 93/US 60 Corridor Profile Study
Future Daily Volume/Capacity (V/C) Ratio
2035 AZTDM Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
FUTURE V/C
URBAN AND FRINGE URBAN (SEGMENTS 93-4 & 93-11)
GOOD (< 0.71)
FAIR (0.71 - 0.89)
POOR (> 0.89)
RURAL (SEGMENTS 60W-1, 60W-2, 60W3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 0.56)
FAIR (0.56 - 0.76)
POOR (> 0.76)
N
Miles
0 10 20 30 40



US 93/US 60 Corridor Segments:

Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
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Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)

US 93/US 60 Corridor Profile Study
Existing Peak Hour (V/C)
2013 AADT, 2035 AZTDM Data

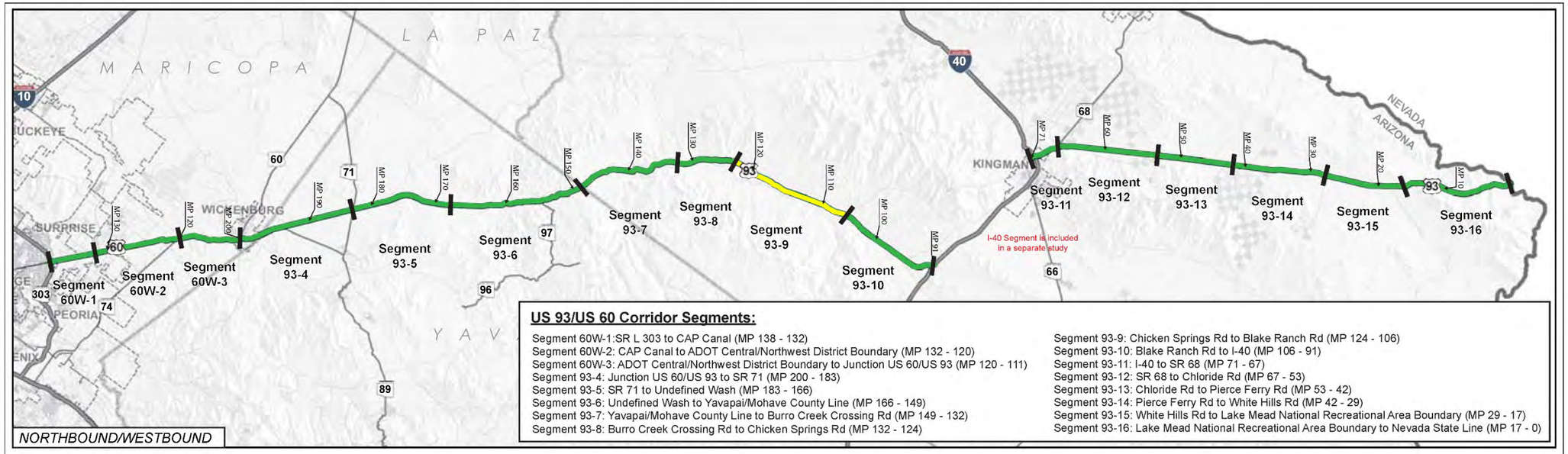
Corridor Segment
Interstate/Highway
County Boundary
City Boundary

PEAK V/C

URBAN AND FRINGE URBAN (SEGMENTS 93-4 & 93-11)
GOOD (< 0.71)
FAIR (0.71 - 0.89)
POOR (> 0.89)

RURAL (SEGMENTS 60W-1, 60W-2, 60W3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 0.56)
FAIR (0.56 - 0.76)
POOR (> 0.76)

Miles
0 6.5 13 19.5 26


MARICOPA
LA PAZ
YAVAPAI
MOHAVE
NEVADA
ARIZONA
KINGMAN
WICKENBURG
SURPRISE
PEORIA
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
I-40 Segment is included in a separate study
NORTHBOUND/WESTBOUND
US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
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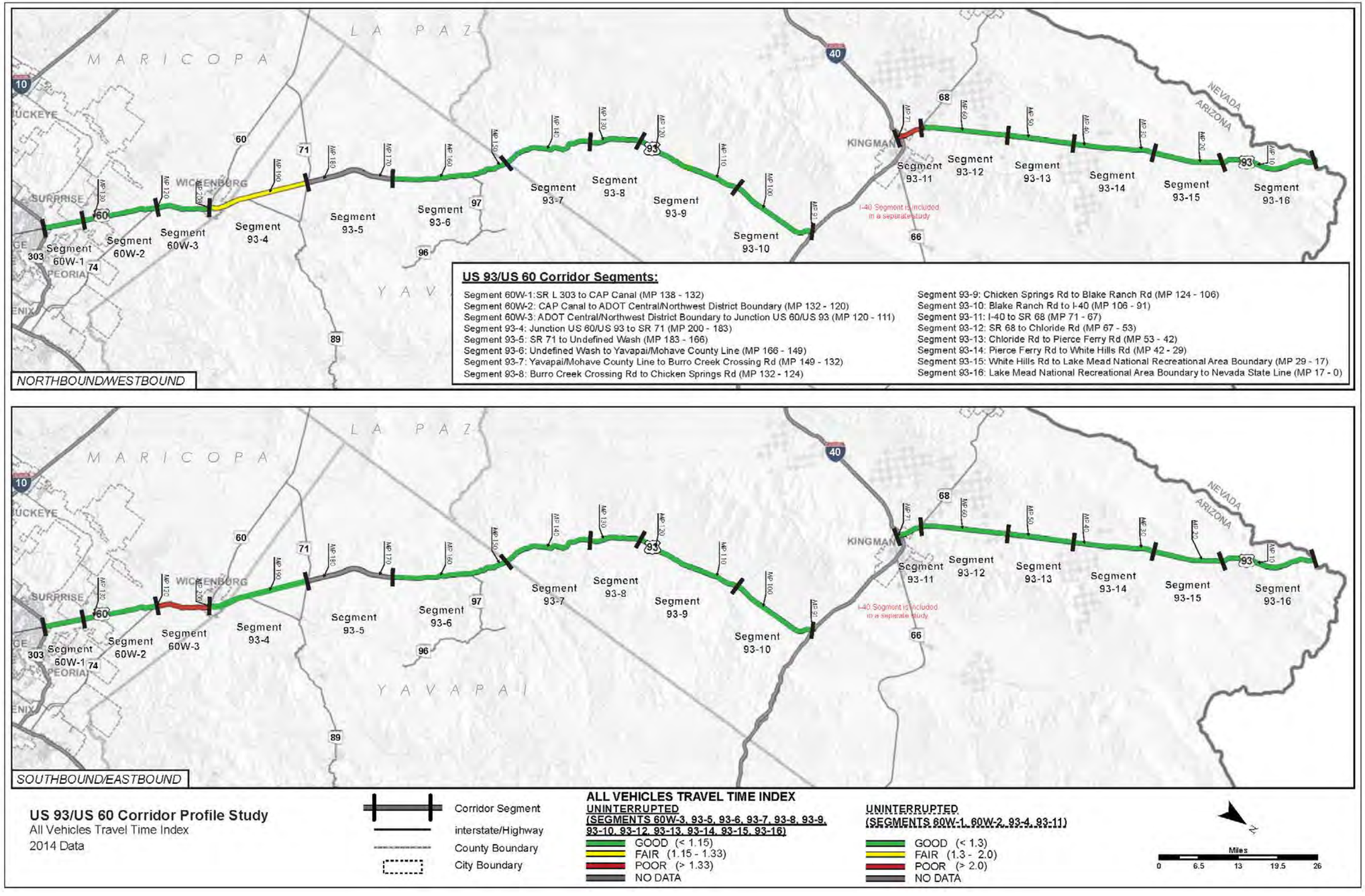
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
SOUTHBOUND/EASTBOUND
US 93/US 60 Corridor Profile Study
Average Instances Per Year a Given Milepost is Closed Per Segment Mile
2010 - 2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
CLOSURE PER MILE PER YEAR
GOOD (< 0.22)
FAIR (0.22 - 0.62)
POOR (> 0.62)
NO DATA


MARICOPA
LA PAZ
YAVAPAI
NEVADA
ARIZONA
SURPRISE
WICKENBURG
KINGMAN
PEORIA
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
I-40 Segment is included in a separate study
NORTHBOUND/WESTBOUND
SOUTHBOUND/EASTBOUND
US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
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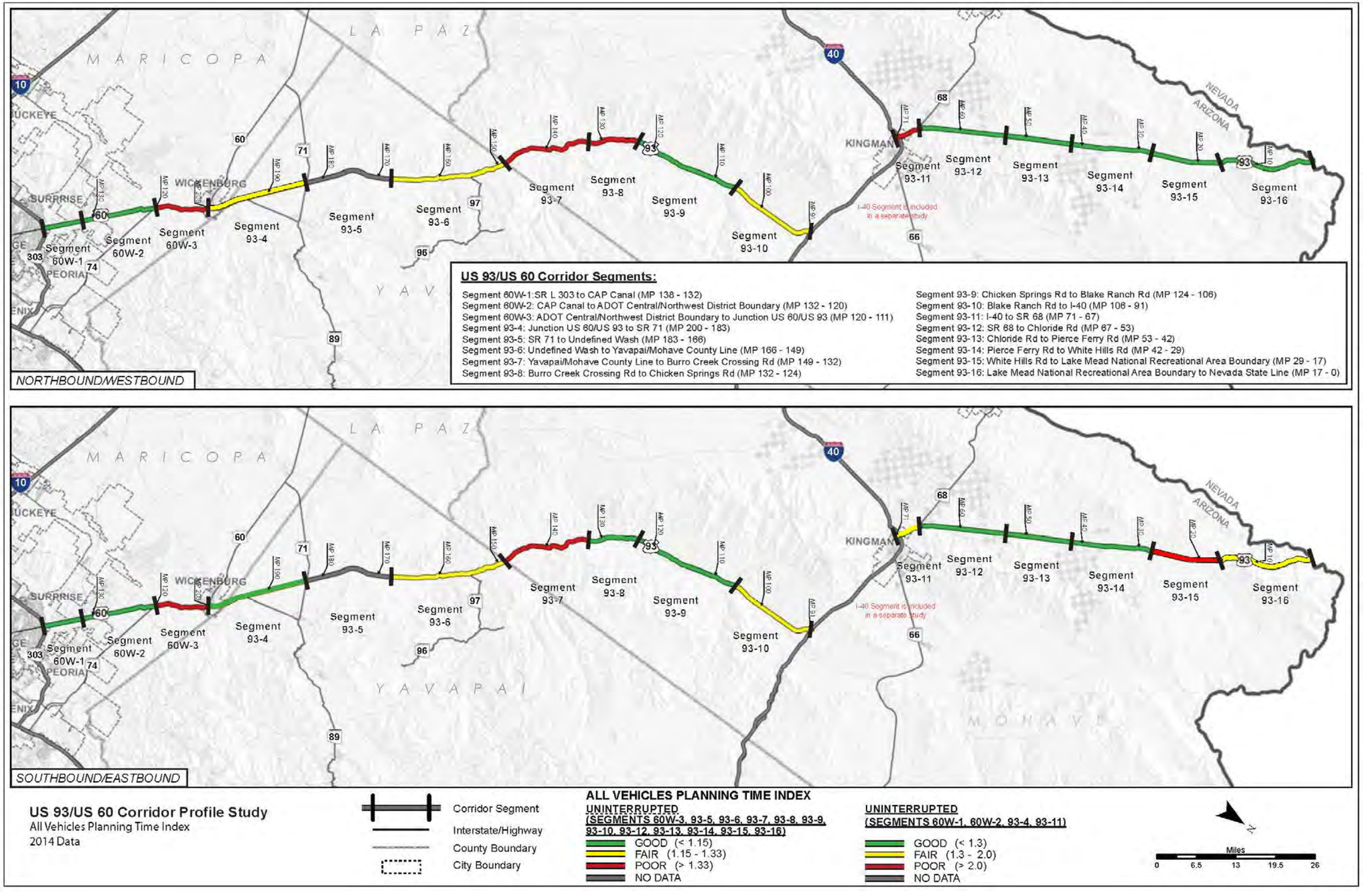
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
US 93/US 60 Corridor Profile Study
All Vehicles Travel Time Index
2014 Data
Corridor Segment
interstate/Highway
County Boundary
City Boundary
ALL VEHICLES TRAVEL TIME INDEX
UNINTERRUPTED
(SEGMENTS 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 1.15)
FAIR (1.15 - 1.33)
POOR (> 1.33)
NO DATA
UNINTERRUPTED
(SEGMENTS 60W-1, 60W-2, 93-4, 93-11)
GOOD (< 1.3)
FAIR (1.3 - 2.0)
POOR (> 2.0)
NO DATA
Miles
0
6.5
13
19.5
26



US 93/US 60 Corridor Segments:

Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
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Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)

US 93/US 60 Corridor Profile Study
All Vehicles Planning Time Index
2014 Data

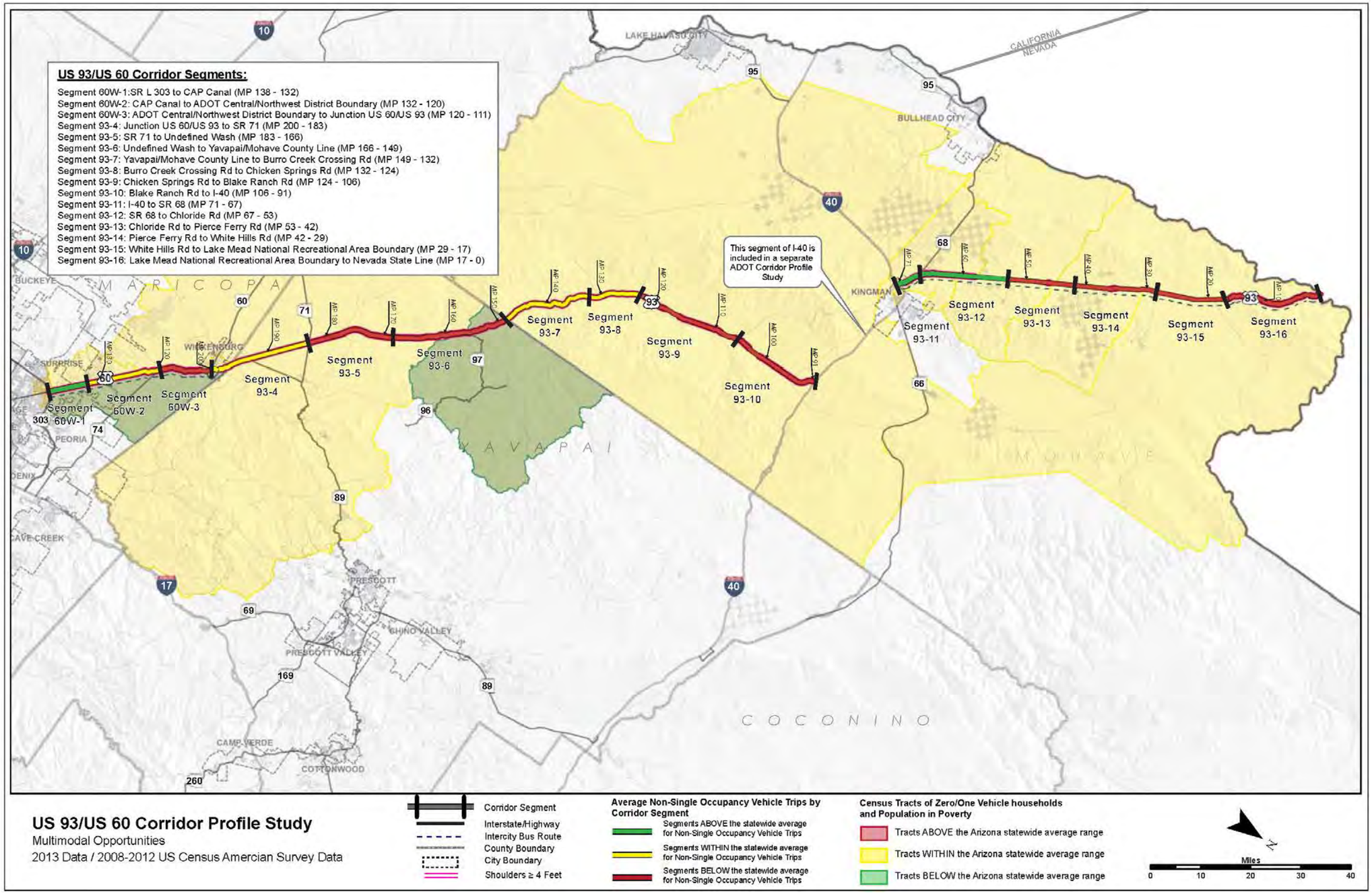
Corridor Segment
Interstate/Highway
County Boundary
City Boundary

ALL VEHICLES PLANNING TIME INDEX

UNINTERRUPTED
(SEGMENTS 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 1.15)
FAIR (1.15 - 1.33)
POOR (> 1.33)
NO DATA

UNINTERRUPTED
(SEGMENTS 60W-1, 60W-2, 93-4, 93-11)
GOOD (< 1.3)
FAIR (1.3 - 2.0)
POOR (> 2.0)
NO DATA

N
Miles
0 6.5 13 19.5 26


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
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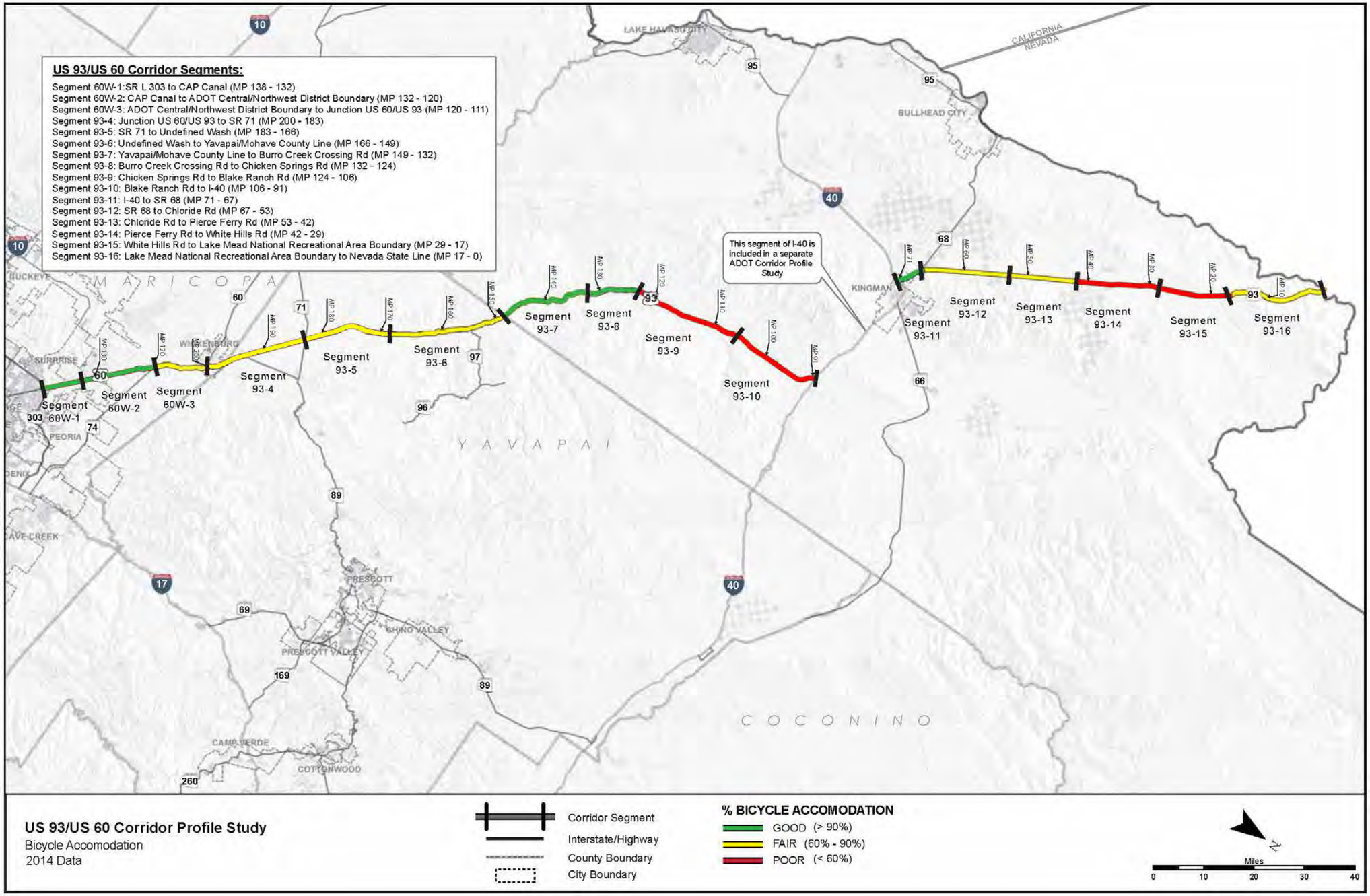
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
LAKE HAVASU CITY
CALIFORNIA
NEVADA
BULLHEAD CITY
KINGMAN
BUCKEYE
MARICOPA
WICKENBURG
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
YAVAPAI
COCONINO
MOHAVE
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
US 93/US 60 Corridor Profile Study
Multimodal Opportunities
2013 Data / 2008-2012 US Census Amercian Survey Data
Corridor Segment
Interstate/Highway
Intercity Bus Route
County Boundary
City Boundary
Shoulders ≥ 4 Feet
Average Non-Single Occupancy Vehicle Trips by Corridor Segment
Segments ABOVE the statewide average for Non-Single Occupancy Vehicle Trips
Segments WITHIN the statewide average for Non-Single Occupancy Vehicle Trips
Segments BELOW the statewide average for Non-Single Occupancy Vehicle Trips
Census Tracts of Zero/One Vehicle households and Population in Poverty
Tracts ABOVE the Arizona statewide average range
Tracts WITHIN the Arizona statewide average range
Tracts BELOW the Arizona statewide average range
N
Miles
0 10 20 30 40


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
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Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
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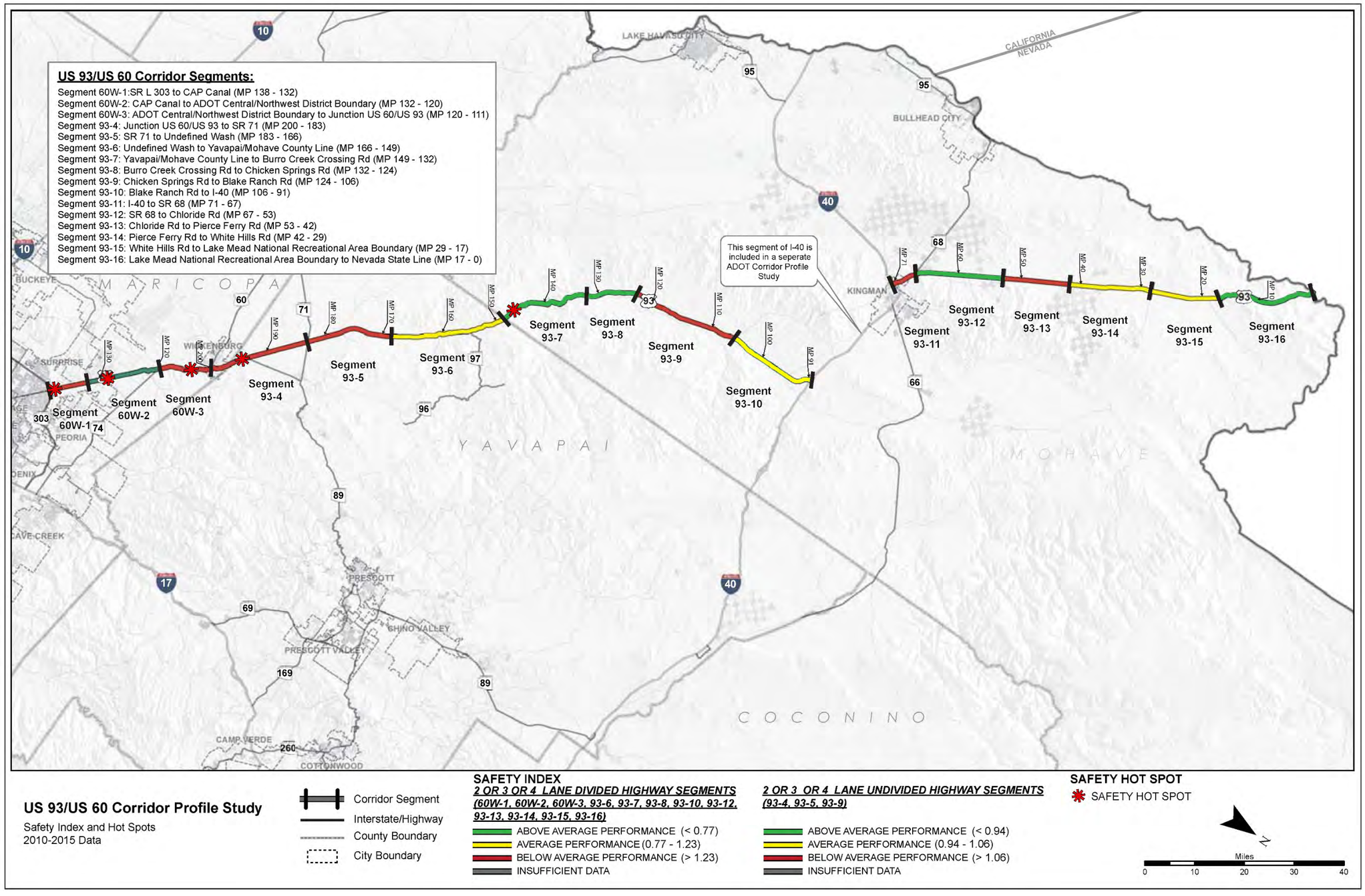
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
CALIFORNIA
NEVADA
KINGMAN
WICKENBURG
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
MARICOPA
YAVAPAI
COCONINO
US 93/US 60 Corridor Profile Study
Bicycle Accomodation
2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
% BICYCLE ACCOMODATION
GOOD (> 90%)
FAIR (60% - 90%)
POOR (< 60%)
N
Miles
0 10 20 30 40


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
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Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
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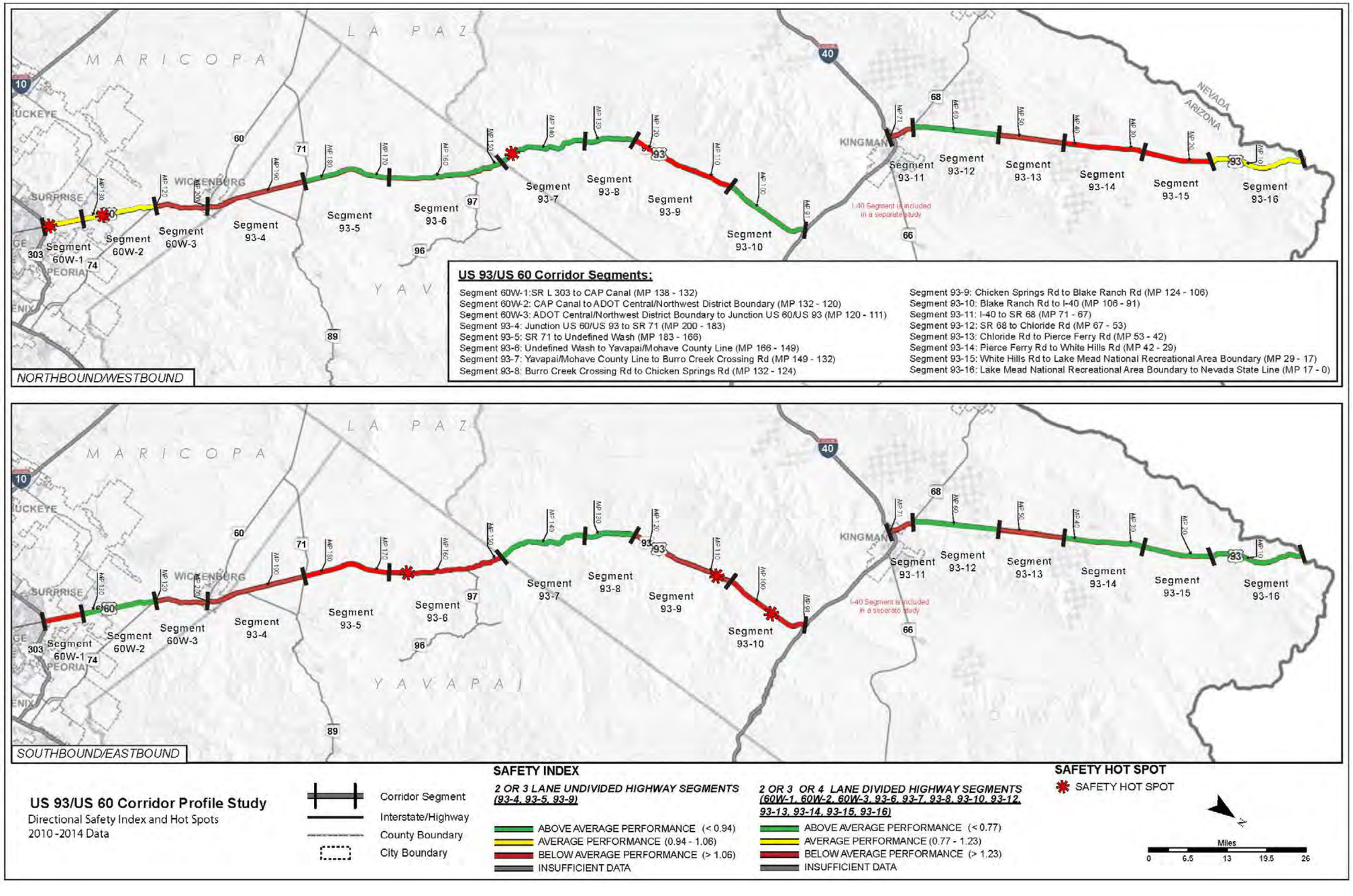
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a seperate ADOT Corridor Profile Study
LAKE HAVASU CITY
CALIFORNIA
NEVADA
BULLHEAD CITY
KINGMAN
BUCKEYE
MARICOPA
WICKENBURG
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
YAVAPAI
MOHAVE
COCONINO
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
US 93/US 60 Corridor Profile Study
Safety Index and Hot Spots
2010-2015 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
SAFETY INDEX
2 OR 3 OR 4 LANE DIVIDED HIGHWAY SEGMENTS (60W-1, 60W-2, 60W-3, 93-6, 93-7, 93-8, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
ABOVE AVERAGE PERFORMANCE (< 0.77)
AVERAGE PERFORMANCE (0.77 - 1.23)
BELOW AVERAGE PERFORMANCE (> 1.23)
INSUFFICIENT DATA
2 OR 3 OR 4 LANE UNDIVIDED HIGHWAY SEGMENTS (93-4, 93-5, 93-9)
ABOVE AVERAGE PERFORMANCE (< 0.94)
AVERAGE PERFORMANCE (0.94 - 1.06)
BELOW AVERAGE PERFORMANCE (> 1.06)
INSUFFICIENT DATA
SAFETY HOT SPOT
SAFETY HOT SPOT
N
Miles
0 10 20 30 40



US 93/US 60 Corridor Segments:

Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
Segment 93-7: Yavapai/Mohave County Line to Burro Creek Crossing Rd (MP 149 - 132)
Segment 93-8: Burro Creek Crossing Rd to Chicken Springs Rd (MP 132 - 124)
Segment 93-9: Chicken Springs Rd to Blake Ranch Rd (MP 124 - 106)
Segment 93-10: Blake Ranch Rd to I-40 (MP 106 - 91)
Segment 93-11: I-40 to SR 68 (MP 71 - 67)
Segment 93-12: SR 68 to Chloride Rd (MP 67 - 53)
Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)

US 93/US 60 Corridor Profile Study
Directional Safety Index and Hot Spots
2010 -2014 Data

Corridor Segment
Interstate/Highway
County Boundary
City Boundary

SAFETY INDEX

2 OR 3 LANE UNDIVIDED HIGHWAY SEGMENTS (93-4, 93-5, 93-9)

- ABOVE AVERAGE PERFORMANCE (< 0.94)
- AVERAGE PERFORMANCE (0.94 - 1.06)
- BELOW AVERAGE PERFORMANCE (> 1.06)
- INSUFFICIENT DATA

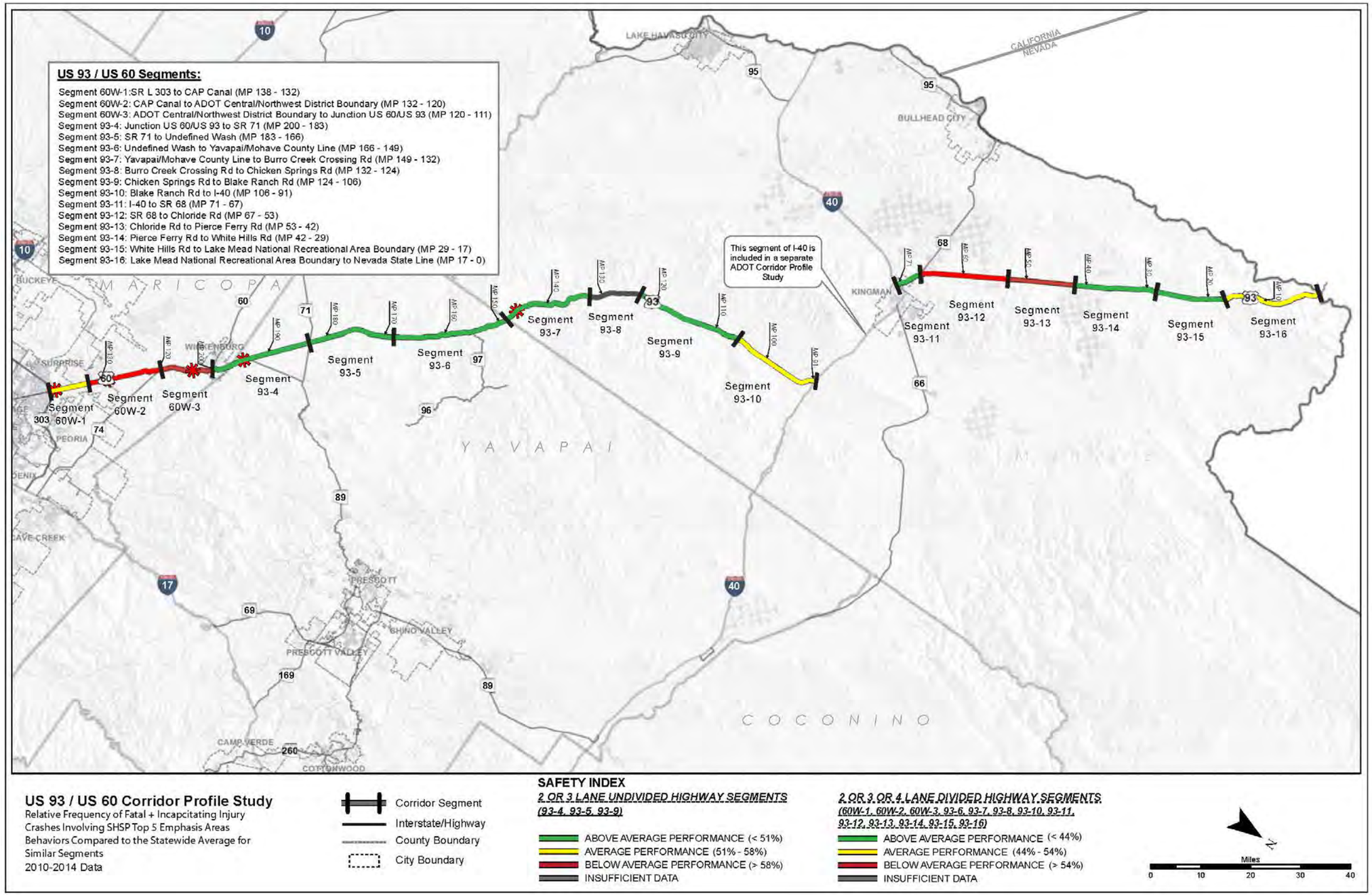
2 OR 3 OR 4 LANE DIVIDED HIGHWAY SEGMENTS (60W-1, 60W-2, 60W-3, 93-6, 93-7, 93-8, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)

- ABOVE AVERAGE PERFORMANCE (< 0.77)
- AVERAGE PERFORMANCE (0.77 - 1.23)
- BELOW AVERAGE PERFORMANCE (> 1.23)
- INSUFFICIENT DATA

SAFETY HOT SPOT

SAFETY HOT SPOT

Miles
0 6.5 13 19.5 26


US 93 / US 60 Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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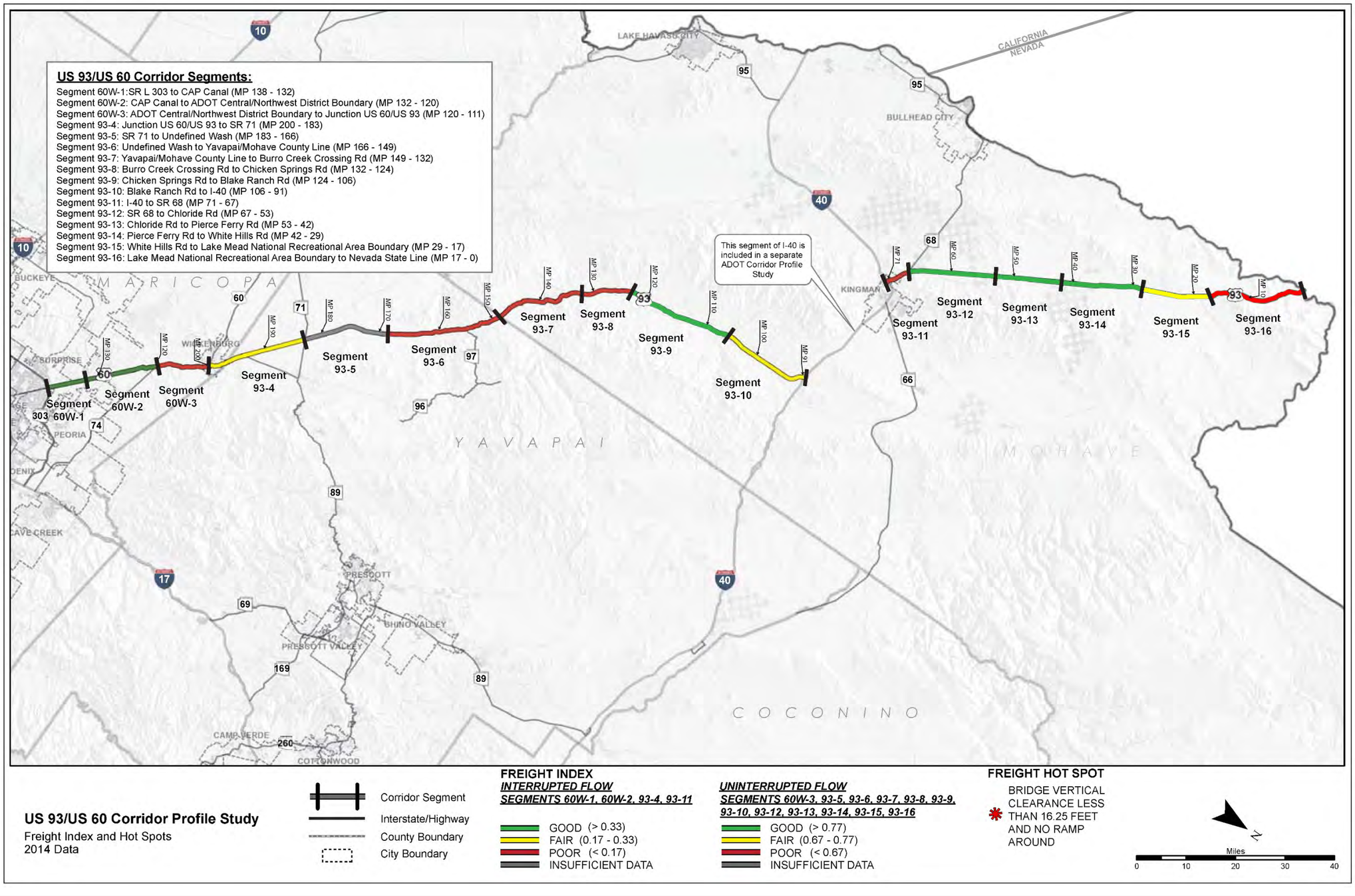
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
WICKENBURG
BUCKEYE
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
COCONINO
US 93 / US 60 Corridor Profile Study
Relative Frequency of Fatal + Incapcitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors Compared to the Statewide Average for Similar Segments
2010-2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
SAFETY INDEX
2 OR 3 LANE UNDIVIDED HIGHWAY SEGMENTS (93-4, 93-5, 93-9)
ABOVE AVERAGE PERFORMANCE (< 51%)
AVERAGE PERFORMANCE (51% - 58%)
BELOW AVERAGE PERFORMANCE (> 58%)
INSUFFICIENT DATA
2 OR 3 OR 4 LANE DIVIDED HIGHWAY SEGMENTS (60W-1, 60W-2, 60W-3, 93-6, 93-7, 93-8, 93-10, 93-11, 93-12, 93-13, 93-14, 93-15, 93-16)
ABOVE AVERAGE PERFORMANCE (< 44%)
AVERAGE PERFORMANCE (44% - 54%)
BELOW AVERAGE PERFORMANCE (> 54%)
INSUFFICIENT DATA
N
Miles
0 10 20 30 40


US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
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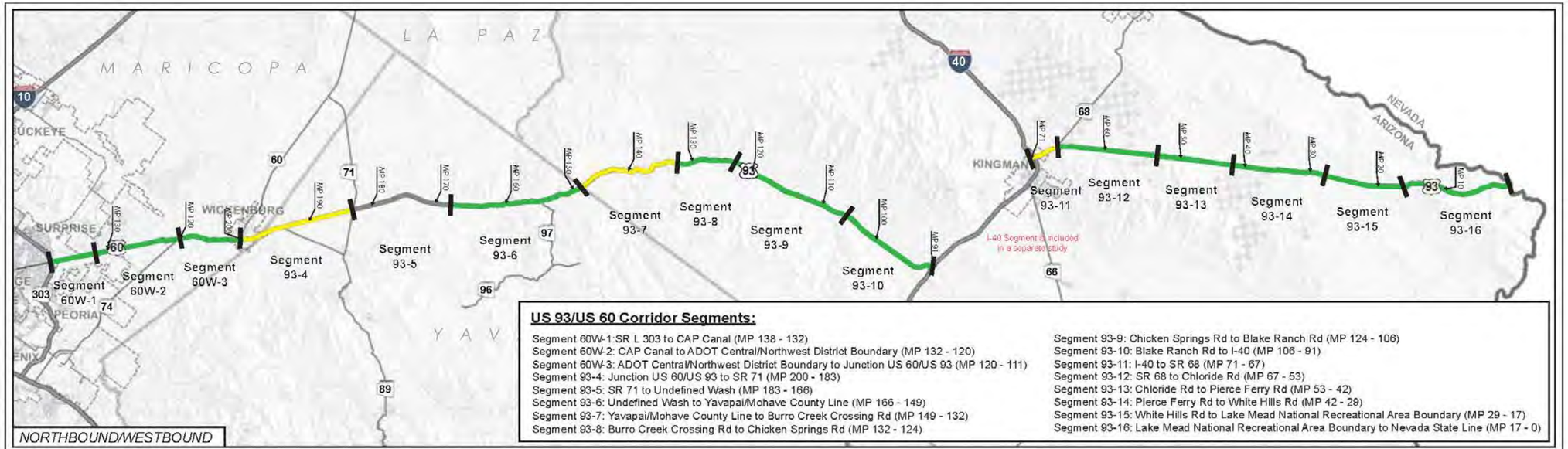
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 303 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
WICKENBURG
BUCKEYE
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
MOHAVE
COCONINO
US 93/US 60 Corridor Profile Study
Freight Index and Hot Spots
2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
FREIGHT INDEX
INTERRUPTED FLOW
SEGMENTS 60W-1, 60W-2, 93-4, 93-11
GOOD (> 0.33)
FAIR (0.17 - 0.33)
POOR (< 0.17)
INSUFFICIENT DATA
UNINTERRUPTED FLOW
SEGMENTS 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16
GOOD (> 0.77)
FAIR (0.67 - 0.77)
POOR (< 0.67)
INSUFFICIENT DATA
FREIGHT HOT SPOT
BRIDGE VERTICAL CLEARANCE LESS THAN 16.25 FEET AND NO RAMP AROUND
N
Miles
0 10 20 30 40


MARICOPA
LA PAZ
YAVAPAI
NEVADA
ARIZONA
SURPRISE
WICKENBURG
KINGMAN
PEORIA
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
I-40 Segment is included in a separate study
NORTHBOUND/WESTBOUND
US 93/US 60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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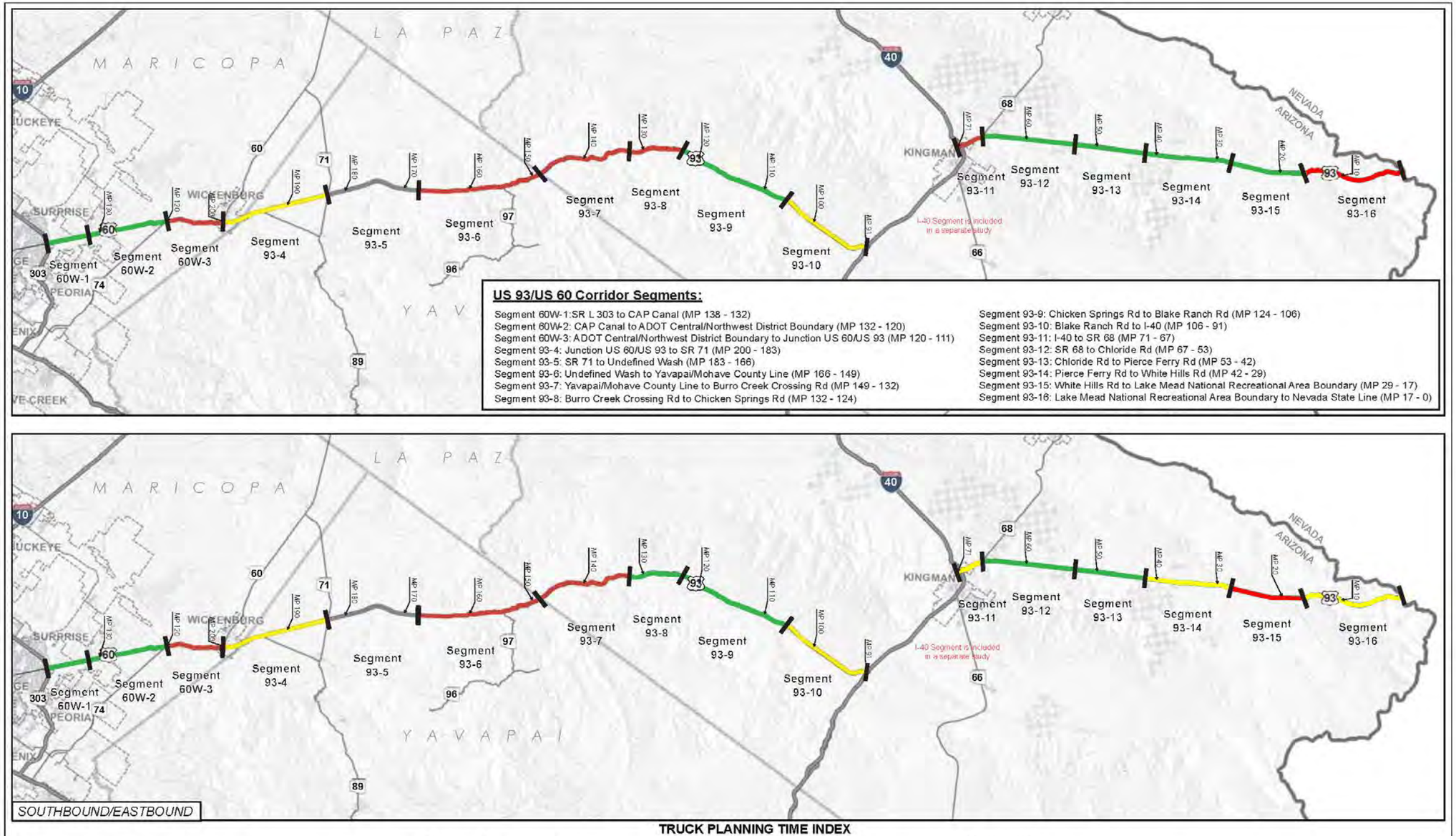
Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
SOUTHBOUND/EASTBOUND
US 93/US60 Corridor Profile Study
Truck Travel Time Index
2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
TRUCK TRAVEL TIME INDEX
UNINTERRUPTED
(SEGMENTS 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 1.15)
FAIR (1.15 - 1.33)
POOR (> 1.33)
INSUFFICIENT DATA
INTERRUPTED
(SEGMENTS 60W-1, 60W-2, 93-4, 93-11)
GOOD (< 1.30)
FAIR (1.30 - 2.00)
POOR (> 2.00)
INSUFFICIENT DATA
Miles
0 6 12 18 24



US 93/US 60 Corridor Segments:

Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
Segment 60W-3: ADOT Central/Northwest District Boundary to Junction US 60/US 93 (MP 120 - 111)
Segment 93-4: Junction US 60/US 93 to SR 71 (MP 200 - 183)
Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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Segment 93-9: Chicken Springs Rd to Blake Ranch Rd (MP 124 - 106)
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Segment 93-11: I-40 to SR 68 (MP 71 - 67)
Segment 93-12: SR 68 to Chloride Rd (MP 67 - 53)
Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
Segment 93-14: Pierce Ferry Rd to White Hills Rd (MP 42 - 29)
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)

US 93/US 60 Corridor Profile Study
Truck Planning Time Index
2014 Data

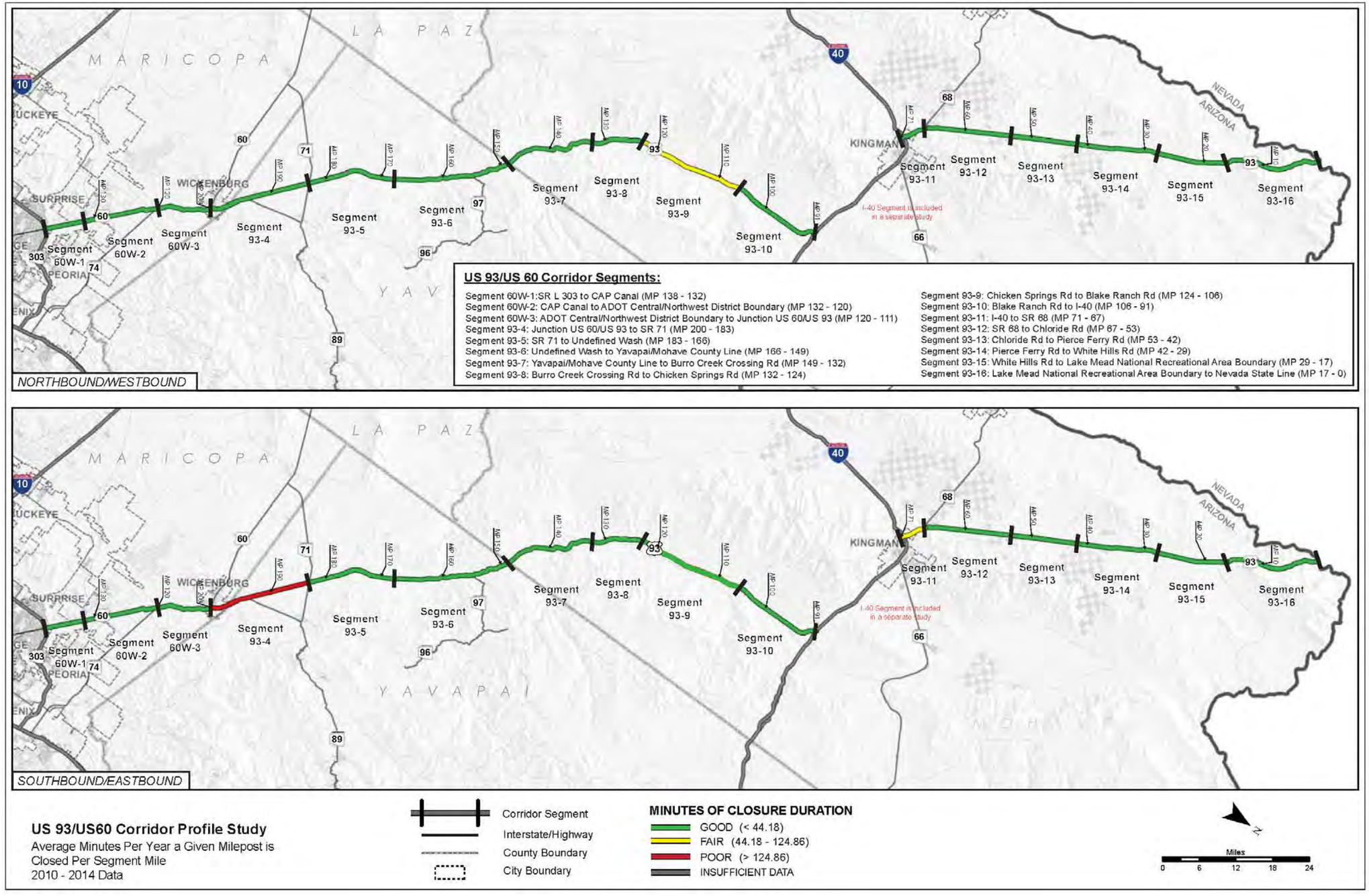
Corridor Segment
Interstate/Highway
County Boundary
City Boundary

TRUCK PLANNING TIME INDEX

UNINTERRUPTED
(SEGMENTS 60W-3, 93-5, 93-6, 93-7, 93-8, 93-9, 93-10, 93-12, 93-13, 93-14, 93-15, 93-16)
GOOD (< 1.30)
FAIR (1.30 - 1.50)
POOR (> 1.50)
INSUFFICIENT DATA

INTERRUPTED
(SEGMENTS 60W-1, 60W-2, 93-4, 93-11)
GOOD (< 3.00)
FAIR (3.00 - 6.00)
POOR (> 6.00)
INSUFFICIENT DATA

N
Miles
0 6 12 18 24



US 93/US 60 Corridor Segments:

Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
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Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
Segment 93-6: Undefined Wash to Yavapai/Mohave County Line (MP 166 - 149)
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Segment 93-12: SR 68 to Chloride Rd (MP 67 - 53)
Segment 93-13: Chloride Rd to Pierce Ferry Rd (MP 53 - 42)
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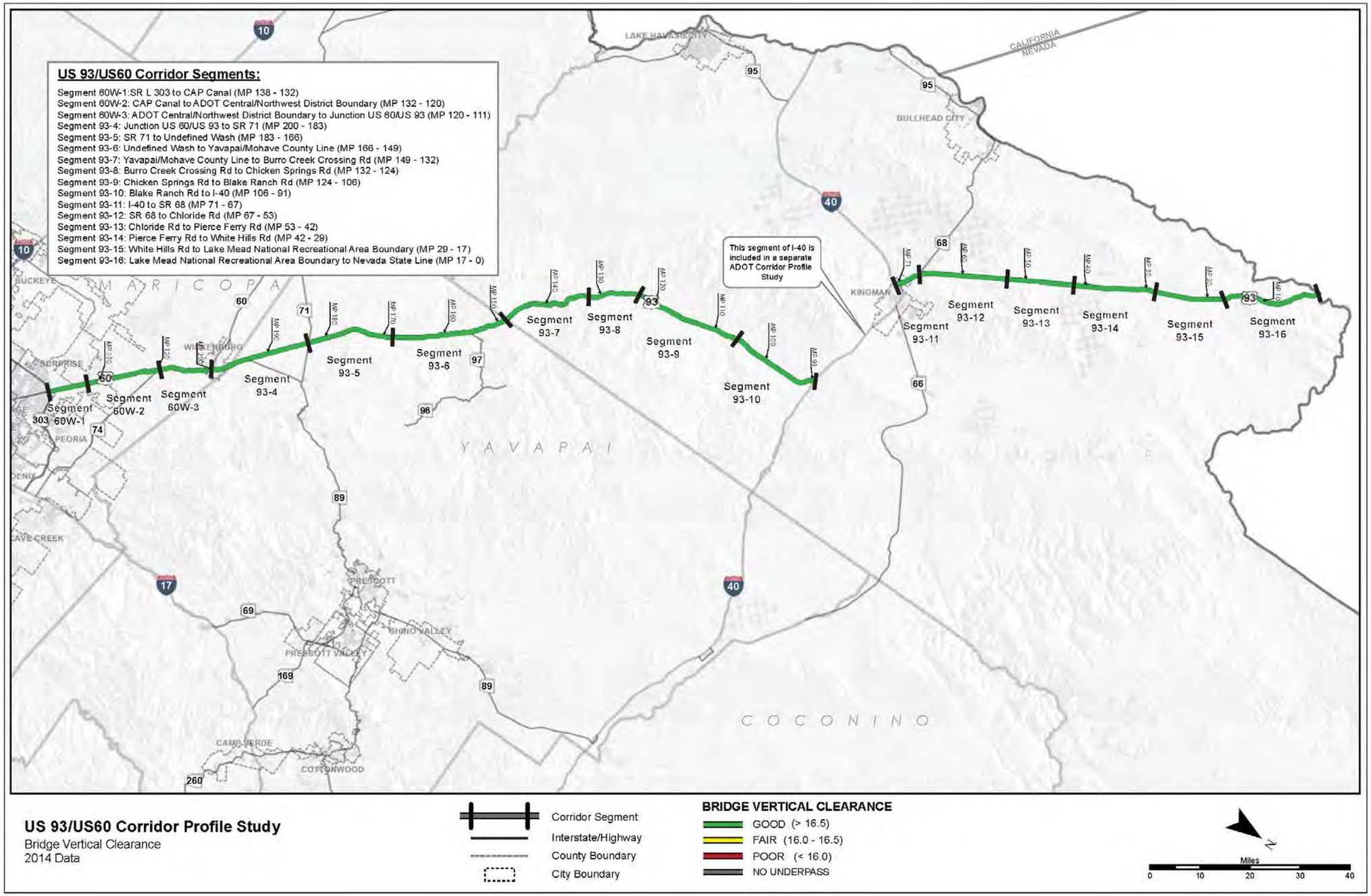
Segment 93-15: White Hills Rd to Lake Mead National Recreational Area Boundary (MP 29 - 17)
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)

US 93/US60 Corridor Profile Study
Average Minutes Per Year a Given Milepost is Closed Per Segment Mile
2010 - 2014 Data

Corridor Segment
Interstate/Highway
County Boundary
City Boundary

MINUTES OF CLOSURE DURATION
GOOD (< 44.18)
FAIR (44.18 - 124.86)
POOR (> 124.86)
INSUFFICIENT DATA

N
Miles
0 6 12 18 24


US 93/US60 Corridor Segments:
Segment 60W-1:SR L 303 to CAP Canal (MP 138 - 132)
Segment 60W-2: CAP Canal to ADOT Central/Northwest District Boundary (MP 132 - 120)
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Segment 93-5: SR 71 to Undefined Wash (MP 183 - 166)
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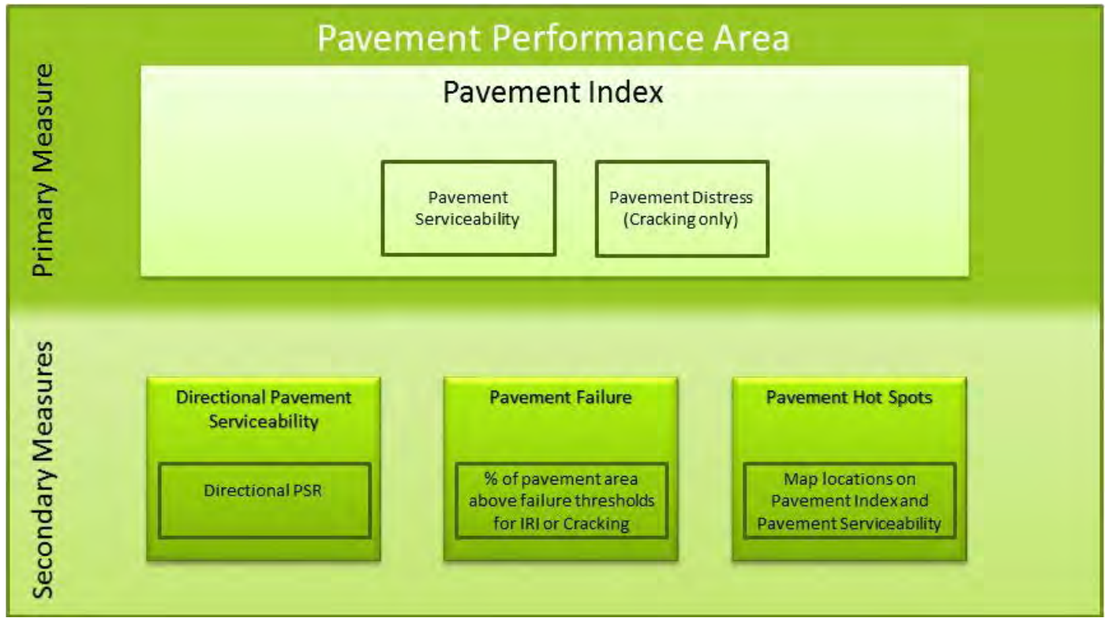
Segment 93-16: Lake Mead National Recreational Area Boundary to Nevada State Line (MP 17 - 0)
This segment of I-40 is included in a separate ADOT Corridor Profile Study
Segment 60W-1
Segment 60W-2
Segment 60W-3
Segment 93-4
Segment 93-5
Segment 93-6
Segment 93-7
Segment 93-8
Segment 93-9
Segment 93-10
Segment 93-11
Segment 93-12
Segment 93-13
Segment 93-14
Segment 93-15
Segment 93-16
LAKE HAVASU CITY
BULLHEAD CITY
KINGMAN
WICKENBURG
BUCKEYE
SURPRISE
PEORIA
CAVE CREEK
PRESCOTT
PRESCOTT VALLEY
CHINO VALLEY
CAMP VERDE
COTTONWOOD
CALIFORNIA
NEVADA
MARICOPA
YAVAPAI
COCONINO
US 93/US60 Corridor Profile Study
Bridge Vertical Clearance
2014 Data
Corridor Segment
Interstate/Highway
County Boundary
City Boundary
BRIDGE VERTICAL CLEARANCE
GOOD (> 16.5)
FAIR (16.0 - 16.5)
POOR (< 16.0)
NO UNDERPASS
Miles
0 10 20 30 40

Appendix B: Performance Area Detailed Calculation Methodologies

Pavement Performance Area 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 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

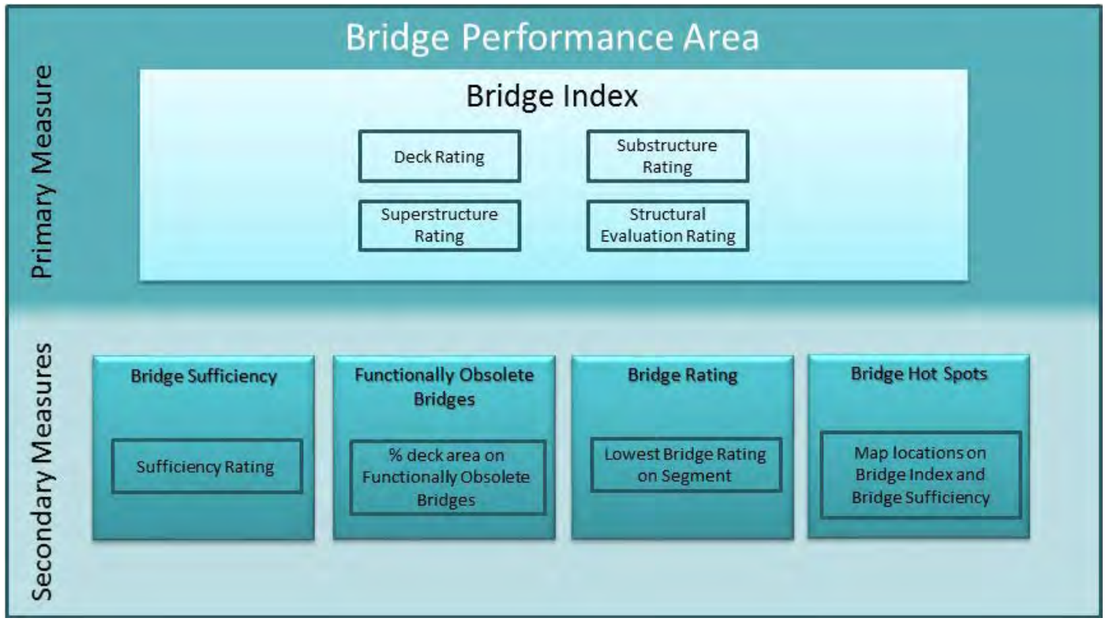
Performance Level	Pavement Index	
	Interstates	Non-Interstates
Good	>3.75	>3.5
Fair	3.2 - 3.75	2.9 - 3.5
Poor	<3.2	<2.9

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

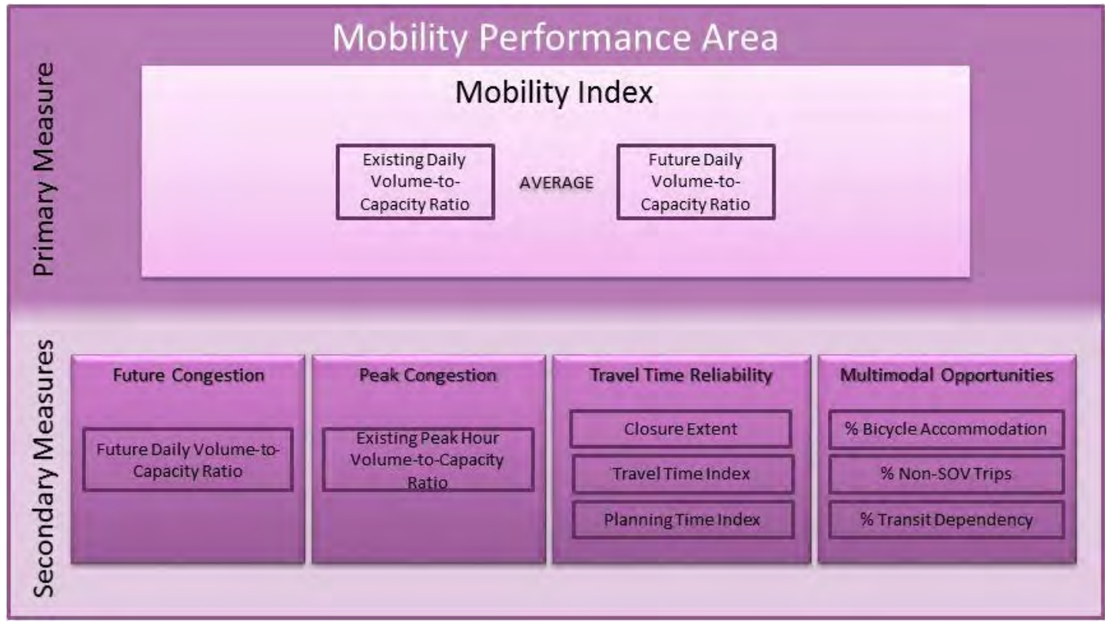
Performance Level	Sufficiency Rating
Good	>80
Fair	50-80
Poor	<50

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

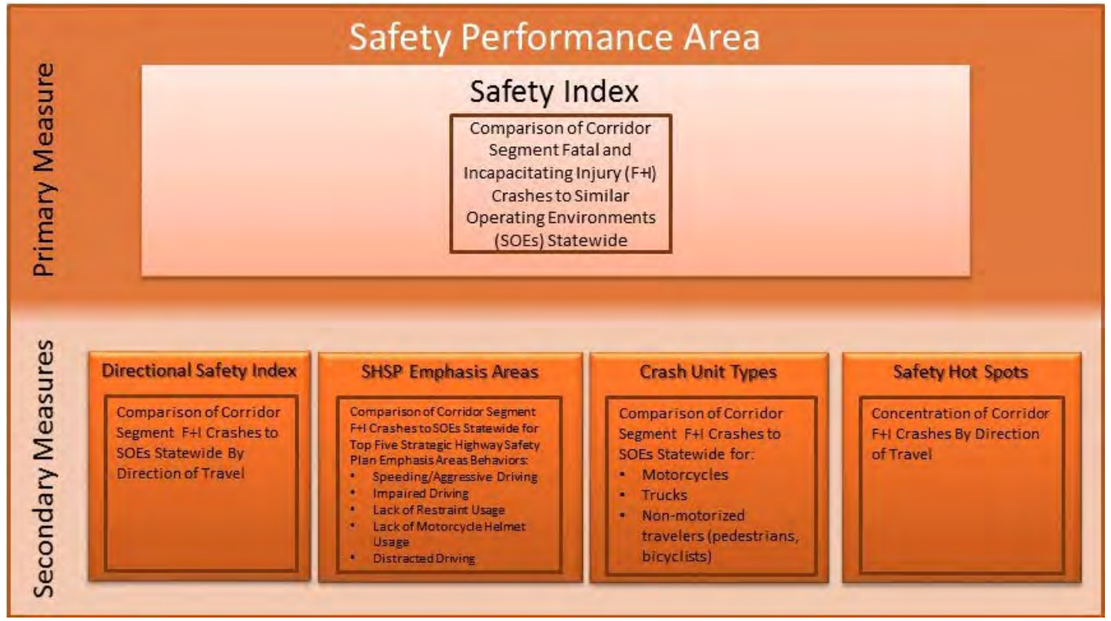
Performance Level	Percent Bicycle Accommodation
Good	≥ 90%
Fair	> 60% & ≤ 90%
Poor	< 60%

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

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Segment 60W-1		***Interstate?***	**No**															
Mile 1	138	to	137	2	78.20	2	2	81.72	3	3.71	4.5	3.67	4.3	3.94	3.85		0	0
Mile 2	137	to	136	2	59.41	4	2	84.10	1	3.99	4.1	3.63	4.7	4.03	3.94		0	0
Mile 3	136	to	135	2	59.39	5	2	57.82	5	3.99	4.0	4.01	4.0	3.99	4.01		0	0
Mile 4	135	to	134	2	58.23	7	2	60.39	1	4.01	3.8	3.97	4.7	3.83	4.18		0	0
Mile 5	134	to	133	2	54.56	1	2	76.68	5	4.06	4.7	3.74	4.0	4.24	3.82		0	0
Mile 6	133	to	132	2	54.91	1	2	62.95	4	4.06	4.7	3.94	4.1	4.24	4.00		0	0
			Total	12			12											0
			Weighted Average							3.97	4.28	3.83	4.29	4.05	3.96			
			Factor							1.00		1.00						
			Indicator Score							**3.97**		**3.83**						**0.0%**
			Pavement Index													**4.01**		
Segment 60W-2		***Interstate?***	**No**															
Mile 1	132	to	131	2	54.31	2	2	65.27	5	4.07	4.5	3.90	4.0	4.18	3.93		0	0
Mile 2	131	to	130	2	80.42	2	2	77.35	6	3.68	4.5	3.73	3.9	3.91	3.77		0	0
Mile 3	130	to	129	2	67.97	4	2	59.56	6	3.86	4.1	3.99	3.9	3.94	3.91		0	0
Mile 4	129	to	128	2	51.70	4	2	55.19	6	4.11	4.1	4.05	3.9	4.12	3.93		0	0
Mile 5	128	to	127	2	53.69	8	2	55.02	5	4.08	3.6	4.06	4.0	3.77	4.02		0	0
Mile 6	127	to	126	2	45.59	9	2	48.53	8	4.20	3.5	4.16	3.6	3.73	3.79		0	0
Mile 7	126	to	125	2	50.48	10	2	50.18	12	4.13	3.4	4.13	3.2	3.63	3.49		0	0
Mile 8	125	to	124	2	48.05	6	2	49.67	8	4.17	3.9	4.14	3.6	3.96	3.79		0	0
Mile 9	124	to	123	2	40.59	8	2	56.30	9	4.29	3.6	4.04	3.5	3.83	3.68		0	0
Mile 10	123	to	122	2	55.15	0	2	57.13	0	4.05	5.0	4.02	5.0	4.34	4.32		0	0
Mile 11	122	to	121	2	52.82	0	2	46.93	0	4.09	5.0	4.18	5.0	4.36	4.43		0	0
Mile 12	121	to	120	2	44.43	0	2	57.90	3	4.22	5.0	4.01	4.3	4.46	4.09		0	0
			Total	24			24											0
			Weighted Average							4.08	4.19	4.03	4.00	4.02	3.93			
			Factor							1.00		1.00						
			Indicator Score							**4.08**		**4.03**						**0.0%**
			Pavement Index													**3.98**		
Segment 60W-3		***Interstate?***	**No**															
Mile 1	120	to	119	2	41.70	0	2	37.24	4	4.27	5.0	4.34	4.1	4.49	4.20		0	0
Mile 2	119	to	118	2	42.86	0	2	40.47	0	4.25	5.0	4.29	5.0	4.47	4.50		0	0
Mile 3	118	to	117	2	43.20	0	2	36.33	0	4.24	5.0	4.36	5.0	4.47	4.55		0	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 4	117	to	116	2	45.42	0	2	47.09	0	4.21	5.0	4.18	5.0	4.45	4.43		0	0
Mile 5	116	to	115	2	39.09	0	2	41.34	0	4.31	5.0	4.27	5.0	4.52	4.49		0	0
Mile 6	115	to	114	2	40.43	1	2	51.24	1	4.29	4.7	4.12	4.7	4.40	4.28		0	0
Mile 7	114	to	113	2	37.38	0	2	37.86	1	4.34	5.0	4.33	4.7	4.54	4.43		0	0
Mile 8	113	to	112	2	39.04	0	2	36.90	0	4.31	5.0	4.35	5.0	4.52	4.54		0	0
Mile 9	112	to	111	2	77.95	1	2	80.65	3	3.72	4.7	3.68	4.3	4.00	3.86		0	0
			Total	18			18											0
			Weighted Average							4.21	4.92	4.21	4.75	4.43	4.36			
			Factor							1.00		1.00						
			Indicator Score							**4.21**		**4.21**						**0.0%**
			Pavement Index													**4.40**		
Segment 93-4			***Interstate?***	**No**														
Mile 1	200	to	199				2	53.235	0	5.00	5.0	4.08	5.0	5.00	4.36		0	0
Mile 2	199	to	198				2	81.165	3	5.00	5.0	3.67	4.3	5.00	3.86		0	0
Mile 3	198	to	197				1	88.16	6	5.00	5.0	3.58	3.9	5.00	3.67		0	0
Mile 4	197	to	196				1	92.425	2	5.00	5.0	3.52	4.5	5.00	3.80		0	0
Mile 5	196	to	195				1	102.4745	4	5.00	5.0	3.39	4.1	5.00	3.61		0	0
Mile 6	195	to	194				1	137.3295	2	5.00	5.0	2.97	4.5	5.00	3.41		0	0
Mile 7	194	to	193				1	75.2485	2	5.00	5.0	3.76	4.5	5.00	3.97		0	0
Mile 8	193	to	192				1	75.5305	6	5.00	5.0	3.75	3.9	5.00	3.79		0	0
Mile 9	192	to	191				1	83.2035	11	5.00	5.0	3.64	3.3	5.00	3.42		0	0
Mile 10	191	to	190				1	81.1075	14	5.00	5.0	3.67	3.0	5.00	3.22		0	0
Mile 11	190	to	189				2	83.321	8	5.00	5.0	3.64	3.6	5.00	3.64		0	0
Mile 12	189	to	188				2	81.6585	3	5.00	5.0	3.67	4.3	5.00	3.85		0	0
Mile 13	188	to	187				2	80.7455	3	5.00	5.0	3.68	4.3	5.00	3.86		0	0
Mile 14	187	to	186				2	74.0265	3	5.00	5.0	3.77	4.3	5.00	3.93		0	0
Mile 15	186	to	185				2	87.8905	3	5.00	5.0	3.58	4.3	5.00	3.79		0	0
Mile 16	185	to	184				2	67.624	3	5.00	5.0	3.87	4.3	5.00	3.99		0	0
Mile 17	184	to	183	2	83.9485	5	2	72.521	2	3.63	4.0	3.80	4.5	3.74	3.99		0	0
			Total	2			26											0
			Weighted Average							3.63	4.00	3.68	4.20	3.74	3.82			
			Factor							1.00		1.00						
			Indicator Score							**3.63**		**3.68**						**0.0%**
			Pavement Index													**3.82**		
Segment 93-5			***Interstate?***	**No**														
Mile 1	183	to	182	2	84.5285	10	2	88.355	2	3.63	3.4	3.57	4.5	3.48	3.84		0	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 2	182	to	181				2	91.2835	5	5.00	5.0	3.53	4.0	5.00	3.67		0	0
Mile 3	181	to	180				2	83.7905	6	5.00	5.0	3.64	3.9	5.00	3.71		0	0
Mile 4	180	to	179				2	79.4205	7	5.00	5.0	3.70	3.8	5.00	3.71		0	0
Mile 5	179	to	178				2	61.0625	6	5.00	5.0	3.96	3.9	5.00	3.90		0	0
Mile 6	178	to	177				2	59.542	8	5.00	5.0	3.99	3.6	5.00	3.74		0	0
Mile 7	177	to	176				2	65.823	10	5.00	5.0	3.89	3.4	5.00	3.56		0	0
Mile 8	176	to	175				2	90.863181	7	5.00	5.0	3.54	3.8	5.00	3.60		0	0
Mile 9	175	to	174				2	91.373	12	5.00	5.0	3.53	3.2	5.00	3.31		0	0
Mile 10	174	to	173				2	71.475	5	5.00	5.0	3.81	4.0	5.00	3.87		0	0
Mile 11	173	to	172				2	71.2745	7	5.00	5.0	3.81	3.8	5.00	3.77		0	0
Mile 12	172	to	171				2	59.8995	4	5.00	5.0	3.98	4.1	5.00	4.03		0	0
Mile 13	171	to	170				2	51.592727	3	5.00	5.0	4.11	4.3	5.00	4.16		0	0
Mile 14	170	to	169				2	59.182	2	5.00	5.0	3.99	4.5	5.00	4.13		0	0
Mile 15	169	to	168				2	67.682	6	5.00	5.0	3.87	3.9	5.00	3.87		0	0
Mile 16	168	to	167				2	65.6555	3	5.00	5.0	3.90	4.3	5.00	4.01		0	0
Mile 17	167	to	166				2	61.044	2	5.00	5.0	3.96	4.5	5.00	4.11		0	0
			Total	2			34											0
			Weighted Average							3.63	3.42	3.81	3.96	3.48	3.82			
			Factor							1.00		1.00						
			Indicator Score							**3.63**		**3.81**						**0.0%**
			Pavement Index													**3.81**		
Segment 93-6		***Interstate?***		**No**														
Mile 1	166	to	165				2	82.381	2	5.00	5.0	3.66	4.5	5.00	3.90		0	0
Mile 2	165	to	164				2	63.51	2	5.00	5.0	3.93	4.5	5.00	4.09		0	0
Mile 3	164	to	163				2	56.4695	10	5.00	5.0	4.03	3.4	5.00	3.61		0	0
Mile 4	163	to	162				2	61.6365	4	5.00	5.0	3.96	4.1	5.00	4.01		0	0
Mile 5	162	to	161	2	82.47	11	2	67.067272	3	3.65	3.3	3.88	4.3	3.42	4.00		0	0
Mile 6	161	to	160	2	65.626	3	2	76.658	0	3.90	4.3	3.74	5.0	4.01	4.12		0	0
Mile 7	160	to	159	2	57.1675	4	2	75.835	4	4.02	4.1	3.75	4.1	4.06	3.87		0	0
Mile 8	159	to	158	2	52.42	3	2	39.6855	1	4.10	4.3	4.30	4.7	4.15	4.41		0	0
Mile 9	158	to	157	2	49.1575	0	2	55.776	2	4.15	5.0	4.05	4.5	4.40	4.17		0	0
Mile 10	157	to	156	2	44.603333	12	2	48.4365	3	4.22	3.2	4.16	4.3	3.52	4.20		0	0
Mile 11	156	to	155	2	88.6315	12	2	66.085833	1	3.57	3.2	3.89	4.7	3.33	4.12		0	0
Mile 12	155	to	154	2	66.2915	6	2	61.603	0	3.89	3.9	3.96	5.0	3.88	4.27		0	0
Mile 13	154	to	153	2	65.4805	13	2	53.735	1	3.90	3.1	4.08	4.7	3.36	4.25		0	0
Mile 14	153	to	152	2	152.6005	9	2	84.1335	4	2.80	3.5	3.63	4.1	2.80	3.78		2	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 15	152	to	151	2	150.5765	17	2	94.041	2	2.82	2.8	3.50	4.5	2.76	3.78		2	0
Mile 16	151	to	150	2	148.532	16	2	92.441	8	2.84	2.8	3.52	3.6	2.84	3.55		2	0
Mile 17	150	to	149	2	162.994	40	2	110.42091	4	2.69	1.1	3.29	4.1	1.06	3.54		2	0
			Total	26			34											8
			Weighted Average							3.58	3.44	3.84	4.35	3.35	3.98			
			Factor							1.00		1.00						
			Indicator Score							**3.58**		**3.84**						**13.3%**
			Pavement Index													**3.71**		
Segment 93-7			***Interstate?***	**No**														
Mile 1	149	to	148	2	128.9135	2	2	122.4115	7	3.06	4.5	3.14	3.8	3.48	3.32		0	0
Mile 2	148	to	147	2	65.7715	4	2	104.4295	6	3.89	4.1	3.36	3.9	3.97	3.52		0	0
Mile 3	147	to	146	2	90.125	2	2	106.7715	6	3.55	4.5	3.33	3.9	3.82	3.50		0	0
Mile 4	146	to	145	2	89.2725	0	2	103.63091	0	3.56	5.0	3.37	5.0	3.99	3.86		0	0
Mile 5	145	to	144	2	79.6775	0	2	84.8615	0	3.69	5.0	3.62	5.0	4.09	4.04		0	0
Mile 6	144	to	143	2	73.096	0	2	65.408	0	3.79	5.0	3.90	5.0	4.15	4.23		0	0
Mile 7	143	to	142	2	57.718	1	2	75.389545	7	4.02	4.7	3.75	3.8	4.21	3.75		0	0
Mile 8	142	to	141			0.01	2		0.01	5.00	5.0	5.00	5.0	4.99	4.99		0	0
Mile 9	141	to	140	2		5	2	52.85	0	5.00	4.0	4.09	5.0	4.30	4.36		0	0
Mile 10	140	to	139	2	60.9845	3	2	65.1565	1	3.97	4.3	3.90	4.7	4.06	4.13		0	0
Mile 11	139	to	138	2	69.6095	9	2	64.5215	6	3.84	3.5	3.91	3.9	3.62	3.89		0	0
Mile 12	138	to	137	2	74.767272	6	2	67.126	8	3.76	3.9	3.87	3.6	3.80	3.71		0	0
Mile 13	137	to	136	2	89.4385	6	2	68.78	7	3.56	3.9	3.85	3.8	3.65	3.78		0	0
Mile 14	136	to	135	2	81.9565	5	2	78.93909	2	3.66	4.0	3.70	4.5	3.76	3.93		0	0
Mile 15	135	to	134	2	80.5715	9	2	69.4275	7	3.68	3.5	3.84	3.8	3.57	3.78		0	0
Mile 16	134	to	133	2	69.4235	6	2	56.41	14	3.84	3.9	4.04	3.0	3.85	3.33		0	0
Mile 17	133	to	132	2	48.711	5	2	81.9105	16	4.16	4.0	3.66	2.8	4.05	2.85		0	2
			Total	32			34											2
			Weighted Average							3.81	4.23	3.79	4.13	3.90	3.82			
			Factor							1.00		1.00						
			Indicator Score							**3.81**		**3.79**						**3.0%**
			Pavement Index													**3.86**		
Segment 93-8			***Interstate?***	**No**														
Mile 1	132	to	131	2	53.377	4	2	115.592	20	4.08	4.1	3.22	2.5	4.10	2.51		0	2
Mile 2	131	to	130	2	41.2375	5	2	109.023	17	4.27	4.0	3.30	2.8	4.08	2.76		0	2
Mile 3	130	to	129	2	46.433	0	2	141.6895	2	4.19	5.0	2.92	4.5	4.43	3.38		0	0
Mile 4	129	to	128	2	58.503	2	2	59.633	1	4.00	4.5	3.99	4.7	4.14	4.19		0	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 5	128	to	127	2	61.505909	2	2	58.2265	2	3.96	4.5	4.01	4.5	4.11	4.14		0	0
Mile 6	127	to	126	2	36.245555	1	2	69.742272	8	4.36	4.7	3.84	3.6	4.45	3.70		0	0
Mile 7	126	to	125	2	58.700909	2	2	84.6705	2	4.00	4.5	3.62	4.5	4.14	3.87		0	0
Mile 8	125	to	124	1	74.4385	2	1	81.7625	0	3.77	4.5	3.66	5.0	3.97	4.07		0	0
			Total	15			15											4
			Weighted Average							4.10	4.45	3.56	3.92	4.19	3.54			
			Factor							1.00		1.00						
			Indicator Score							**4.10**		**3.56**						**13.3%**
			Pavement Index													**3.87**		
Segment 93-9		***Interstate?***		**No**														
Mile 1	124	to	123	1			2	86.047777	8	5.00	5.0	3.61	3.6	5.00	3.62		0	0
Mile 2	123	to	122	1			1	101.091	5	5.00	5.0	3.41	4.0	5.00	3.58		0	0
Mile 3	122	to	121	1	103.01455	13	1	109.17182	6	3.38	3.1	3.30	3.9	3.20	3.47		0	0
Mile 4	121	to	120	2	65.4395	1	2	82.877222	6	3.90	4.7	3.65	3.9	4.13	3.72		0	0
Mile 5	120	to	119	2	87.705	3	2	105.8485	3	3.58	4.3	3.34	4.3	3.79	3.63		0	0
Mile 6	119	to	118				1	58.7755	1	5.00	5.0	4.00	4.7	5.00	4.20		0	0
Mile 7	118	to	117				1	58.0175	0	5.00	5.0	4.01	5.0	5.00	4.31		0	0
Mile 8	117	to	116	2	55.9485	0	1	51.5105	0	4.04	5.0	4.11	5.0	4.33	4.38		0	0
Mile 9	116	to	115	2	42.644	0	1	50.68	0	4.25	5.0	4.12	5.0	4.48	4.39		0	0
Mile 10	115	to	114	2	53.911	0	2	35.75	0	4.07	5.0	4.36	5.0	4.35	4.56		0	0
Mile 11	114	to	113	2	56.4985	0	2	32.298	0	4.03	5.0	4.42	5.0	4.32	4.60		0	0
Mile 12	113	to	112	2	43.7005	0	2	36.66	0	4.23	5.0	4.35	5.0	4.46	4.54		0	0
Mile 13	112	to	111	2	43.366	0	2	33.472	0	4.24	5.0	4.40	5.0	4.47	4.58		0	0
Mile 14	111	to	110	2	37.1355	4	2	41.537	0	4.34	4.1	4.27	5.0	4.20	4.49		0	0
Mile 15	110	to	109	2	45.356818	1	2	33.987727	4	4.21	4.7	4.39	4.1	4.34	4.22		0	0
Mile 16	109	to	108				1	77.1245	3	5.00	5.0	3.73	4.3	5.00	3.90		0	0
Mile 17	108	to	107				1	69.1185	0	5.00	5.0	3.85	5.0	5.00	4.19		0	0
Mile 18	107	to	106	2	49.991	3	1	82.7025	4	4.13	4.3	3.65	4.1	4.18	3.80		0	0
			Total	25			27											0
			Weighted Average							4.14	4.69	3.99	4.55	4.29	4.15			
			Factor							1.00		1.00						
			Indicator Score							**4.14**		**3.99**						**0.0%**
			Pavement Index													**4.22**		
Segment 93-10		***Interstate?***		**No**														
Mile 1	106	to	105	2	35.7215	0	2	45.3395	4	4.37	5.0	4.21	4.1	4.56	4.16		0	0
Mile 2	105	to	104	2	39.553636	1	2	49.755454	4	4.30	4.7	4.14	4.1	4.41	4.14		0	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 3	104	to	103	2	67.033	1	2	82.9475	2	3.88	4.7	3.65	4.5	4.11	3.89		0	0
Mile 4	103	to	102				1	80.195	0	5.00	5.0	3.69	5.0	5.00	4.08		0	0
Mile 5	102	to	101	1	76.077	0	1	99.538	0	3.74	5.0	3.43	5.0	4.12	3.90		0	0
Mile 6	101	to	100	2	50.7085	2	2	68.1725	0	4.12	4.5	3.86	5.0	4.22	4.20		0	0
Mile 7	100	to	99	2	39.7005	3	2	62.4705	0	4.30	4.3	3.94	5.0	4.29	4.26		0	0
Mile 8	99	to	98	2	44.481363	1	2	69.802	0	4.22	4.7	3.84	5.0	4.35	4.18		0	0
Mile 9	98	to	97	2	77.6555	0	2	71.738	0	3.72	5.0	3.81	5.0	4.11	4.16		0	0
Mile 10	97	to	96	2	55.3055	0	2	64.735	1	4.05	5.0	3.91	4.7	4.34	4.13		0	0
Mile 11	96	to	95	2	57.5475	0	2	56.2545	4	4.02	5.0	4.04	4.1	4.31	4.07		0	0
Mile 12	95	to	94	2	74.3835	3	2	44.315	4	3.77	4.3	4.23	4.1	3.92	4.16		0	0
Mile 13	94	to	93	2	64.503636	1	2	46.6135	3	3.91	4.7	4.19	4.3	4.14	4.22		0	0
Mile 14	93	to	92	2	66.244	1	2	45.67	0	3.89	4.7	4.20	5.0	4.12	4.44		0	0
Mile 15	92	to	91				2	76.822777	0	5.00	5.0	3.73	5.0	5.00	4.11		0	0
			Total	25			28											0
			Weighted Average							4.03	4.70	3.95	4.64	4.23	4.15			
			Factor							1.00		1.00						
			Indicator Score							**4.03**		**3.95**						**0.0%**
			Pavement Index													**4.19**		
Segment 93-11		***Interstate?***		**No**														
Mile 1	71	to	70	2	142.995	1	2	88.934	0	2.90	4.7	3.57	5.0	3.43	4.00		2	0
Mile 2	70	to	69	2	95.131	0	2	46.5985	0	3.48	5.0	4.19	5.0	3.94	4.43		0	0
Mile 3	69	to	68	2	50.5395	0	2	44.2265	0	4.13	5.0	4.23	5.0	4.39	4.46		0	0
Mile 4	68	to	67	2	44.204	0	2	40.8945	0	4.23	5.0	4.28	5.0	4.46	4.50		0	0
			Total	8			8											2
			Weighted Average							3.69	4.91	4.07	5.00	4.05	4.35			
			Factor							1.00		1.00						
			Indicator Score							**3.69**		**4.07**						**12.5%**
			Pavement Index													**4.20**		
Segment 93-12		***Interstate?***		**No**														
Mile 1	67	to	66	2	60.4755	0	2	52.218	0	3.97	5.0	4.10	5.0	4.28	4.37		0	0
Mile 2	66	to	65	2	36.2815	0	2	45.427	0	4.36	5.0	4.21	5.0	4.55	4.45		0	0
Mile 3	65	to	64	2	40.198	4	2	40.6375	0	4.29	4.1	4.28	5.0	4.18	4.50		0	0
Mile 4	64	to	63	2	63.457	2	2	49.205	0	3.93	4.5	4.15	5.0	4.09	4.40		0	0
Mile 5	63	to	62	2	58.3355	9	2	47.695909	1	4.01	3.5	4.17	4.7	3.67	4.32		0	0
Mile 6	62	to	61	2	53.507272	3	2	55.637	1	4.08	4.3	4.05	4.7	4.14	4.23		0	0
Mile 7	61	to	60	2	58.312	3	2	60.152	20	4.01	4.3	3.98	2.5	4.09	2.51		0	2

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 8	60	to	59	2	56.2535	0	2	65.9875	2	4.04	5.0	3.89	4.5	4.33	4.06		0	0
Mile 9	59	to	58	2	65.328	1	2	56.3855	9	3.90	4.7	4.04	3.5	4.13	3.68		0	0
Mile 10	58	to	57	2	56.076	0	2	56.550454	5	4.04	5.0	4.03	4.0	4.33	4.01		0	0
Mile 11	57	to	56	2	51.143636	0	2	53.696111	5	4.12	5.0	4.08	4.0	4.38	4.02		0	0
Mile 12	56	to	55	2	44.3755	1	2	63.437083	6	4.22	4.7	3.93	3.9	4.35	3.89		0	0
Mile 13	55	to	54	2	46.028	0	2	63.093	6	4.20	5.0	3.93	3.9	4.44	3.89		0	0
Mile 14	54	to	53	2	43.9	1	2	78.7335	7	4.23	4.7	3.71	3.8	4.36	3.72		0	0
			Total	28			28											2
			Weighted Average							4.10	4.62	4.04	4.24	4.24	4.00			
			Factor							1.00		1.00						
			Indicator Score							**4.10**		**4.04**						**3.6%**
			Pavement Index													**4.12**		
Segment 93-13			***Interstate?***	**No**														
Mile 1	53	to	52	2	40.781	0	2	78.95	7	4.28	5.0	3.70	3.8	4.50	3.72		0	0
Mile 2	52	to	51	2	56.5295	0	2	69.020454	1	4.03	5.0	3.85	4.7	4.32	4.09		0	0
Mile 3	51	to	50	2	46.563	1	2	52.0335	4	4.19	4.7	4.10	4.1	4.33	4.11		0	0
Mile 4	50	to	49	2	44.286	6	2	55.851	3	4.23	3.9	4.04	4.3	3.98	4.12		0	0
Mile 5	49	to	48	2	51.284	1	2	57.786	7	4.11	4.7	4.01	3.8	4.28	3.83		0	0
Mile 6	48	to	47	2	62.345	0	2	51.5915	6	3.95	5.0	4.11	3.9	4.26	3.95		0	0
Mile 7	47	to	46	2	72.4015	2	2	83.4455	6	3.80	4.5	3.64	3.9	3.99	3.71		0	0
Mile 8	46	to	45	2	109.7755	6	2	84.059	9	3.29	3.9	3.63	3.5	3.47	3.56		0	0
Mile 9	45	to	44	2	114.40909	7	2	91.907272	9	3.24	3.8	3.53	3.5	3.39	3.53		0	0
Mile 10	44	to	43	2	117.75	3	2	120.1515	5	3.20	4.3	3.17	4.0	3.52	3.42		0	0
Mile 11	43	to	42	2	109.558	7	2	70.6125	6	3.30	3.8	3.82	3.9	3.43	3.84		0	0
			Total	22			22											0
			Weighted Average							3.78	4.39	3.78	3.93	3.95	3.81			
			Factor							1.00		1.00						
			Indicator Score							**3.78**		**3.78**						**0.0%**
			Pavement Index													**3.88**		
Segment 93-14			***Interstate?***	**No**														
Mile 1	42	to	41	2	94.0245	6	2	99.3415	15	3.50	3.9	3.43	2.9	3.61	3.09		0	0
Mile 2	41	to	40	2	110.4075	8	2	94.8235	15	3.29	3.6	3.49	2.9	3.39	3.10		0	0
Mile 3	40	to	39	2	95.545	8	2	86.429	6	3.48	3.6	3.60	3.9	3.53	3.68		0	0
Mile 4	39	to	38	2	112.143	8	2	74.2865	9	3.27	3.6	3.77	3.5	3.38	3.60		0	0
Mile 5	38	to	37	2	121.071	7	2	78.981	3	3.16	3.8	3.70	4.3	3.34	3.88		0	0
Mile 6	37	to	36	2	101.752	6	2	89.007	10	3.40	3.9	3.57	3.4	3.54	3.47		0	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 7	36	to	35	2	73.7995	7	2	117.4285	12	3.78	3.8	3.20	3.2	3.76	3.21		0	0
Mile 8	35	to	34	2	72.972727	7	2	104.19682	25	3.79	3.8	3.37	2.1	3.76	2.11		0	2
Mile 9	34	to	33	2	75.7625	7	2	110.3375	15	3.75	3.8	3.29	2.9	3.75	3.04		0	0
Mile 10	33	to	32	2	69.437	4	2	74.9685	25	3.84	4.1	3.76	2.1	3.93	2.11		0	2
Mile 11	32	to	31	2	69.4875	3	2	106.2555	10	3.84	4.3	3.34	3.4	3.97	3.36		0	0
Mile 12	31	to	30	2	66.771	4	2	94.5485	6	3.88	4.1	3.49	3.9	3.96	3.61		0	0
Mile 13	30	to	29	2	74.015909	10	2	107.30136	8	3.77	3.4	3.33	3.6	3.53	3.42		0	0
			Total	26			26											4
			Weighted Average							3.59	3.82	3.49	3.26	3.65	3.21			
			Factor							1.00		1.00						
			Indicator Score							**3.59**		**3.49**						**7.7%**
			Pavement Index													**3.43**		
Segment 93-15		***Interstate?***		**No**														
Mile 1	29	to	28	2	83.583	8	2	75.065	8	3.64	3.6	3.76	3.6	3.64	3.68		0	0
Mile 2	28	to	27	2	84.4045	5	2	63.5715	6	3.63	4.0	3.93	3.9	3.74	3.89		0	0
Mile 3	27	to	26	2	76.078	8	2	56.8645	8	3.74	3.6	4.03	3.6	3.67	3.76		0	0
Mile 4	26	to	25	2	75.9545	10	2	47.145909	9	3.75	3.4	4.18	3.5	3.52	3.72		0	0
Mile 5	25	to	24	2	82.318	8	2	61.235	9	3.66	3.6	3.96	3.5	3.64	3.66		0	0
Mile 6	24	to	23	2	79.5005	6	2	62.2425	7	3.70	3.9	3.95	3.8	3.75	3.81		0	0
Mile 7	23	to	22	2	105.24	3	2	52.9885	7	3.35	4.3	4.09	3.8	3.63	3.85		0	0
Mile 8	22	to	21	2	128.5905	4	2	52.034	5	3.07	4.1	4.10	4.0	3.39	4.03		0	0
Mile 9	21	to	20	2	84.2025	5	2	54.7035	5	3.63	4.0	4.06	4.0	3.74	4.02		0	0
Mile 10	20	to	19	2	91.24	4	2	64.9135	3	3.54	4.1	3.91	4.3	3.72	4.02		0	0
Mile 11	19	to	18	2	79.3125	5	2	52.803	5	3.70	4.0	4.09	4.0	3.79	4.03		0	0
Mile 12	18	to	17	2	52.5825	1	2	60.6835	0	4.09	4.7	3.97	5.0	4.26	4.28		0	0
			Total	24			24											0
			Weighted Average							3.62	3.95	4.00	3.92	3.71	3.90			
			Factor							1.00		1.00						
			Indicator Score							**3.62**		**4.00**						**0.0%**
			Pavement Index													**3.80**		
Segment 93-16		***Interstate?***		**No**														
Mile 1	17	to	16	2	30.79375	1	2	28.50125	0	4.45	4.7	4.49	5.0	4.51	4.64		0	0
Mile 2	16	to	15	2	28.0725	1	2	32.2955	0	4.49	4.7	4.42	5.0	4.54	4.60		0	0
Mile 3	15	to	14	2	28.9165	0	2	27.275	0	4.48	5.0	4.51	5.0	4.64	4.66		0	0
Mile 4	14	to	13	2	24.370909	0	2	24.492727	0	4.56	5.0	4.56	5.0	4.69	4.69		0	0
Mile 5	13	to	12	2	25.841	0	2	26.781	0	4.53	5.0	4.52	5.0	4.67	4.66		0	0

				US60 Westbound/US93 Northbound			US60 Eastbound/US93 Southbound			US60 WB/US93 NB		US 60 EB/US 93 SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 6	12	to	11	2	25.7195	0	2	23.765	0	4.53	5.0	4.57	5.0	4.67	4.70		0	0
Mile 7	11	to	10	2	28.0545	0	2	27.658	0	4.49	5.0	4.50	5.0	4.65	4.65		0	0
Mile 8	10	to	9	2	29.1485	0	2	27.176	0	4.48	5.0	4.51	5.0	4.63	4.66		0	0
Mile 9	9	to	8	2	24.523	0	2	26.4415	1	4.56	5.0	4.52	4.7	4.69	4.56		0	0
Mile 10	8	to	7	2	36.4215	4	2	42.461	0	4.35	4.1	4.25	5.0	4.20	4.48		0	0
Mile 11	7	to	6	2	29.658	2	2	27.6615	0	4.47	4.5	4.50	5.0	4.46	4.65		0	0
Mile 12	6	to	5	2	28.973	1	2	32.2215	0	4.48	4.7	4.42	5.0	4.53	4.60		0	0
Mile 13	5	to	4	2	47.719	0	2	41.322	0	4.17	5.0	4.27	5.0	4.42	4.49		0	0
Mile 14	4	to	3	2	35.826	4	2	30.161818	0	4.36	4.1	4.46	5.0	4.21	4.62		0	0
Mile 15	3	to	2	2	44.983181	0	2	35.910909	0	4.21	5.0	4.36	5.0	4.45	4.55		0	0
Mile 16	2	to	1	2	68.1125	0	2	71.162727	0	3.86	5.0	3.82	5.0	4.20	4.17		0	0
Mile 17	1	to	0	2	61.5375	0	2	62.2225	0	3.96	5.0	3.95	5.0	4.27	4.26		0	0
			Total	34			34											0
			Weighted Average							4.38	4.81	4.39	4.98	4.50	4.57			
			Factor							1.00		1.00						
			Indicator Score							**4.38**		**4.39**						**0.0%**
			Pavement Index													**4.53**		

Bridge Performance Area Data

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map	to identify hot spots	
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete			Functionally Obsolete	# <=4	# = 5
Segment 60W-1															
Beardsley Canal BR EB	2563	138.02	235.1375942	97	7	7	7	7	7.0	0			N	0	0
McMicken Dam Fldwy Br WB	472	138.09	468.2313216	84.6	7	7	7	5	5.0	0			N	0	0
McMicken Dam Outlet BR EB	2561	138.09	516.0763872	97	7	7	7	7	7.0	0			N	0	0
Estrella Underpass at Grand Ave	2320	138.6	3674.965553	98.8	7	7	7	7	7.0	0			N	0	0
Total			4,894												
Weighted Average				97.17					6.81	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**97.17**						**0.00%**	**5**				
Bridge Index									**6.81**						
Segment 60W-2															
Morristown RR OP EB	271	121.91	500.0041613	94	6	6	6	6	6.0	0			N	0	0
Morristown RR OP WB	894	121.91	850.2486221	76.6	5	7	6	6	5.0	0			N	0	1
Wash Bridge EB	259	123.1	319.3077485	86.8	6	6	6	6	6.0	0			N	0	0
Wash Bridge WB	862	123.1	446.1203981	95.6	7	7	7	7	7.0	0			N	0	0
Trilby Wash Bridge WB	255	125.2	775.9261901	97.1	7	7	7	7	7.0	0			N	0	0
Trilby Wash Bridge EB	2560	125.2	732.5404704	97.7	6	6	7	6	6.0	0			N	0	0
Wittmann Wash Bridge WB	272	128.98	477.6145286	94.8	7	6	6	6	6.0	0			N	0	0
Wittmann Wash Bridge EB	2459	128.98	539.6737594	97.7	6	6	7	6	6.0	0			N	0	0
Wash Bridge EB	1452	131.73	715.9108262	97.7	7	7	7	7	7.0	0			N	0	0
Wash Bridge WB	1453	131.73	715.9108262	97.7	7	7	7	7	7.0	0			N	0	0
CAP Canal Br Wittman WB	1404	131.9	373.5631238	97.7	6	8	7	7	6.0	0					
Cap Canal Bridge EB	2562	131.9	395.6740474	97.7	6	8	8	8	6.0	0					
Total			6,842												
Weighted Average				93.89					6.26	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**93.89**						**0.00%**	**5**				
Bridge Index									**6.26**						
Segment 60W-3															
Hassayampa River Bridge	2818	110.53	3869.22581	96.8	7	7	8	7	7.0	0			N	0	0
Calamity Bridge	516	111.55	995.1773645	75.1	6	6	7	6	6.0	0			N	0	0
Bridge WB	177	113.07	173.7286848	97.5	7	7	7	7	7.0	0			N	0	0

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map	to identify hot spots		
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete			Functionally Obsolete	# <=4	# = 5
Monarch Wash Br WB	204	115.5	461.8210118	85.4	6	6	6	6	6.0	0			N	0	0
Monarch Wash Br EB	759	115.5	556.4892096	96.2	7	7	7	7	7.0	0			N	0	0
San Domingo Wash Br	893	117.8	793.9493798	85.8	7	7	7	6	6.0	0			N	0	0
Total			6,850												
Weighted Average				91.57					6.67	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**91.57**						**0.00%**	**6**				
Bridge Index									**6.67**						
Segment 93-4															
Matthie RR OP	780	192.88	559.2763008	93.3	6	7	7	7	6.0	0			N	0	0
Sols Wash Bridge	2819	199.5	1802.318976	80	7	7	7	7	7.0	0			N	0	0
Total			2,362												
Weighted Average				83.15					6.76	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**83.15**						**0.00%**	**6**				
Bridge Index									**6.76**						
Segment 93-5															
Date Creek Bridge	2366	174.2	947.1464928	81.2	5	8	8	8	5.0	0			N	0	1
Hwy 71 TI OP	842	182.88	605.1704026	94.1	6	6	7	6	6.0	0			N	0	0
Total			1,552												
Weighted Average				86.23					5.39	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**86.23**						**0.00%**	**5**				
Bridge Index									**5.39**						
Segment 93-6															
Placeritas Creek Bridge SB	2610	155.68	994.7128493	97.8	7	8	7	7	7.0	0			N	0	0
Placeritas Creek Bridge NB	2609	155.69	994.7128493	97.8	7	8	7	7	7.0	0			N	0	0
Cottonwood Canyon Br NB	2655	157.6	1612.518065	97.8	7	8	7	7	7.0	0			N	0	0
Cottonwood Canyon Br SB	2817	157.6	1612.518065	97.8	7	8	7	7	7.0	0			N	0	0
Santa Maria River Bridge NB	2520	160.67	3263.962504	97.8	6	7	7	7	6.0	0			N	0	0
Santa Maria River Bridge SB	2521	160.67	3263.962504	97.8	6	8	7	7	6.0	0			N	0	0
Big Jim Wash Bridge	548	165.54	656.8244928	68.6	5	6	6	5	5.0	0			N	0	1
Total			12,399												

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map	to identify hot spots		
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete			Functionally Obsolete	# <=4	# = 5
Weighted Average				96.25					6.37	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**96.25**						**0.00%**	**5**				
Bridge Index									**6.37**						
Segment 93-7															
Kaiser Springs Bridge SB	2549	135	6697.844669	97.8	6	6	7	6	6.0	0			N	0	0
Kaiser Springs Bridge NB	2550	135.21	5363.106693	97.8	6	7	7	7	6.0	0			N	0	0
Burro Creek Bridge SB	846	139.07	3173.660749	77.6	5	6	7	6	5.0	0			N	0	1
Burro Creek Bridge NB	2662	139.07	4122.107885	97.8	7	7	7	7	7.0	0			N	0	0
Total			19,357												
Weighted Average				94.49					6.05	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**94.49**						**0.00%**	**5**				
Bridge Index									**6.05**						
Segment 93-8															
Bronco Wash Br SB	666	125.95	604.7987904	95.7	6	8	7	7	6.0	0			N	0	0
Bronco Wash Bridge NB	2624	125.95	1265.246502	97.8	7	8	7	7	7.0	0			N	0	0
Big Sandy River Bridge SB	2621	126.8	3654.248175	97.8	7	8	7	7	7.0	0			N	0	0
Big Sandy River Br NB	2355	127	3863.187112	96.7	5	8	7	7	5.0	0			N	0	1
Sycamore Creek Br NB	640	127.63	559.2763008	83.5	6	6	7	6	6.0	0			N	0	0
Sycamore Creek Bridge SB	2622	127.63	1265.246502	97.8	7	8	7	7	7.0	0			N	0	0
Gray Wash Br NB	641	128.63	405.8004787	89.5	6	6	6	6	6.0	0			N	0	0
Gray Wash Bridge SB	2623	128.63	1015.52313	97.8	7	8	7	7	7.0	0					
Wash Bridge SB	2649	130.12	270.5336525	97.8	7	8	8	8	7.0	0					
Box Canyon Wash Bridge SB	2581	131.8	1573.220079	97.8	7	7	7	7	7.0	0					
Box Canyon Wash Bridge NB	2606	131.81	1573.220079	97.8	7	8	6	6	6.0	0					
Total			16,050												
Weighted Average				96.75					6.32	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**96.75**						**0.00%**	**5**				
Bridge Index									**6.32**						
Segment 93-9															
Cane Springs Bridge	637	108.63	764.127504	56	6	6	5	5	5.0	0			N	0	1

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map	Functionally Obsolete	to identify hot spots	
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete				# <=4	# = 5
Wash Bridge SB	2947	112.55	541.067305	97.8	7	8	8	8	7.0	0			N	0	0
Wash Bridge NB	2946	112.57	541.067305	97.8	7	8	8	8	7.0	0			N	0	0
Deluge Wash Bridge SB	2929	115.69	1044.694685	97.8	7	8	8	8	7.0	0			N	0	0
Deluge Wash Bridge NB	2948	115.69	1044.694685	97.8	7	8	8	8	7.0	0			N	0	0
Tompkins Canyon Br NB	2633	120.3	307.9735776	97.8	7	7	8	7	7.0	0			N	0	0
Tompkins Canyon Br SB	2861	120.3	307.9735776	97.8	7	7	7	7	7.0	0			N	0	0
Natural Corral Br	639	121.48	559.2763008	60.8	6	6	7	5	5.0	0			N	0	0
Total			5,111												
Weighted Average				87.50					6.48	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**87.50**						**0.00%**	**5**				
Bridge Index									**6.48**						
Segment 93-10															
Kabba Wash Br NB	492	97.5	432.2778451	68.8	5	5	7	5	5.0	0			N	0	2
Kabba Wash Bridge SB	2788	97.55	1136.204179	97.8	6	8	8	8	6.0	0			N	0	0
Wheeler Wash Bridge SB	2787	100.34	1256.978131	97.8	7	8	8	8	7.0	0			N	0	0
Total			2,825												
Weighted Average				93.36					6.29	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**93.36**						**0.00%**	**5**				
Bridge Index									**6.29**						
Segment 93-11															
SR 68 TI OP SB	2499	67.05	884.7156499	97.7	7	7	7	7	7.0	0			N	0	0
SR 68 TI OP NB	2498	67.06	1119.295826	97.7	6	7	7	7	6.0	0			N	0	0
Wildlife Crossing Bridge	2523	69.36	482.9100019	83.3	6	7	7	7	6.0	0			N	0	0
Total			2,487												
Weighted Average				94.90					6.36	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**94.90**						**0.00%**	**6**				
Bridge Index									**6.36**						
Segment 93-12															
Bismark Canyon Br SB	1578	59.15	709.9650317	96.7	6	6	6	6	6.0	0			N	0	0
Bismark Canyon Br NB	2363	59.15	701.2321459	97.7	6	6	7	6	6.0	0			N	0	0

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map	to identify hot spots		
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete			Functionally Obsolete	# <=4	# = 5
Cerbat Wash Br SB	1576	60.24	480.5874259	96	6	6	6	6	6.0	0			N	0	0
Cerbat Wash Br NB	2364	60.24	554.2595366	97.7	6	6	7	6	6.0	0			N	0	0
Wash Bridge SB	636	64.63	340.1180294	86.6	7	7	7	5	5.0	0			N	0	0
Wash Bridge NB	2365	64.63	554.2595366	97.7	6	6	7	6	6.0	0			N	0	0
Total			3,340												
Weighted Average				96.11					5.90	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**96.11**						**0.00%**	**5**				
Bridge Index									**5.90**						
Segment 93-13															
Big Wash Br SB	1579	51.5	709.9650317	96.7	6	6	6	6	6.0	0			N	0	0
Big Wash Bridge NB	2373	51.5	666.2076998	97.7	6	6	7	6	6.0	0			N	0	0
Total			1,376												
Weighted Average				97.18					6.00	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**97.18**						**0.00%**	**6**				
Bridge Index									**6.00**						
Segment 93-14															
Detrital Wash Br NB	1916	35.8	1604.063889	97.7	6	6	7	6	6.0	0			N	0	0
Detrital Wash Br SB	1928	35.8	1730.040411	97.7	6	6	6	6	6.0	0			N	0	0
Total			3,334												
Weighted Average				97.70					6.00	0.00%					
Factor				1.00					1.00	1.00					
Indicator Score				**97.70**						**0.00%**	**6**				
Bridge Index									**6.00**						
Segment 93-16															
Colorado River Bridge	2685	0	15567.66951	94	7	7	7	7	7.0	0			N	0	0
Sugarloaf Mtn Bridge	2686	0.5	7483.154066	82.7	8	8	8	8	8.0	0			N	0	0
Sugarloaf Mtn TI OP	2687	1.2	1160.173164	84.7	8	8	8	8	8.0	0			N	0	0
White Rock Canyon Br NB	888	4.26	890.6614445	97.7	7	8	7	7	7.0	0			N	0	0
White Rock Canyon Br SB	2900	4.26	903.2033549	97.3	8	8	8	8	8.0	0			N	0	0
Devils Wash Bridge SB	947	7.96	703.3689158	97.7	7	7	7	7	7.0	0			N	0	0
Devils Wash Bridge NB	2902	7.96	1065.504966	97.7	6	7	8	7	6.0	0			N	0	0

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete		
Total			27,774									
Weighted Average				91.03					7.31	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**91.03**						**0.00%**	**6**	
Bridge Index									**7.31**			

to identify hot spots

Functionally Obsolete	# <=4	# = 5

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
60W-1	132	138	6	Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	63	Divided	2	0%	N/A
60W-2	120	132	12	Fringe Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	63	Divided	3	0%	N/A
60W-3	111	120	9	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	57	Divided	13	0%	N/A
93-4	183	200	17	Fringe Urban	Interrupted	Level	2	Urban/Rural Single or Multilane Signalized	12.00	61	Undivided	2	65%	Street Parking Prohibited
93-5	166	183	17	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	56%	Street Parking Prohibited
93-6	149	166	17	Rural	Uninterrupted	Level	4	Rural Two-Lane, Non-Signalized	12.00	65	Divided	1	0%	N/A
93-7	132	166	34	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	2	0%	N/A
93-8	124	132	8	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	5	0%	N/A
93-9	106	124	18	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	3	14%	Street Parking Prohibited
93-10	91	106	15	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	1	0%	N/A
93-11	67	71	4	Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	56	Divided	9	0%	N/A
93-12	53	67	14	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	2	0%	N/A
93-13	42	53	11	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	2	0%	N/A
93-14	29	42	13	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	2	0%	N/A
93-15	17	29	12	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	65	Divided	2	0%	N/A
93-16	0	17	17	Rural	Uninterrupted	Level	4	Multilane Highway	12.00	61	Divided	1	0%	N/A

Car TTI and PTI/Truck TTTI and TPTI – Northbound/Westbound

Segment	TMC	Time Period	Week Type	ROAD NUMBER	Road Direction	Cars Mean	trucks mean	Cars P05	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	115P05201	1 AM Peak	Weekday	US-60	Westbound	51.1	49.2	31.0	22.4	65	65	65	1.27	1.32	2.09	2.90	1.29	1.32	2.14	2.90
1	115P05201	2 Mid Day	Weekday	US-60	Westbound	50.4	50.5	30.7	27.3	65	65	65	1.29	1.29	2.12	2.38				
1	115P05201	3 PM Peak	Weekday	US-60	Westbound	54.4	50.0	30.4	27.0	65	65	65	1.20	1.30	2.14	2.40				
1	115P05201	4 Evening	Weekday	US-60	Westbound	54.6	52.1	30.4	25.5	65	65	65	1.19	1.25	2.14	2.55				
1	115P05202	1 AM Peak	Weekday	US-60	Westbound	64.7	61.8	55.8	56.5	65	65	65	1.01	1.05	1.16	1.15	1.01	1.05	1.18	1.18
1	115P05202	2 Mid Day	Weekday	US-60	Westbound	65.6	61.9	56.5	57.2	65	65	65	1.00	1.05	1.15	1.14				
1	115P05202	3 PM Peak	Weekday	US-60	Westbound	66.9	61.7	58.7	56.5	65	65	65	1.00	1.05	1.11	1.15				
1	115P05202	4 Evening	Weekday	US-60	Westbound	65.0	61.9	55.2	55.2	65	65	65	1.00	1.05	1.18	1.18				
1	115P05203	1 AM Peak	Weekday	US-60	Westbound	64.3	62.0	54.7	57.1	65	65	65	1.01	1.05	1.19	1.14	1.01	1.05	1.19	1.16
1	115P05203	2 Mid Day	Weekday	US-60	Westbound	65.3	62.0	55.9	57.1	65	65	65	1.00	1.05	1.16	1.14				
1	115P05203	3 PM Peak	Weekday	US-60	Westbound	66.6	61.7	58.4	57.1	65	65	65	1.00	1.05	1.11	1.14				
1	115P05203	4 Evening	Weekday	US-60	Westbound	64.8	62.0	54.7	55.9	65	65	65	1.00	1.05	1.19	1.16				
2	115P05204	1 AM Peak	Weekday	US-60	Westbound	64.1	62.1	53.9	57.2	65	65	65	1.01	1.05	1.21	1.14	1.01	1.05	1.21	1.16
2	115P05204	2 Mid Day	Weekday	US-60	Westbound	64.7	62.1	53.9	57.2	65	65	65	1.00	1.05	1.21	1.14				
2	115P05204	3 PM Peak	Weekday	US-60	Westbound	66.6	61.8	57.8	57.2	65	65	65	1.00	1.05	1.12	1.14				
2	115P05204	4 Evening	Weekday	US-60	Westbound	65.1	62.1	56.1	56.1	65	65	65	1.00	1.05	1.16	1.16				
2	115P05205	1 AM Peak	Weekday	US-60	Westbound	60.7	57.0	43.9	35.4	45	45	45	1.00	1.00	1.02	1.27	1.06	1.14	1.47	1.63
2	115P05205	2 Mid Day	Weekday	US-60	Westbound	61.8	57.7	44.2	40.8	65	65	65	1.05	1.13	1.47	1.59				
2	115P05205	3 PM Peak	Weekday	US-60	Westbound	62.5	57.2	44.6	39.9	65	65	65	1.04	1.14	1.46	1.63				
2	115P05205	4 Evening	Weekday	US-60	Westbound	61.1	58.1	44.6	44.6	65	65	65	1.06	1.12	1.46	1.46				
2	115P05206	1 AM Peak	Weekday	US-60	Westbound	63.3	60.8	51.6	51.6	65	65	65	1.03	1.07	1.26	1.26	1.03	1.08	1.26	1.26
2	115P05206	2 Mid Day	Weekday	US-60	Westbound	63.9	60.7	51.6	53.1	65	65	65	1.02	1.07	1.26	1.22				
2	115P05206	3 PM Peak	Weekday	US-60	Westbound	64.5	60.3	53.3	52.2	65	65	65	1.01	1.08	1.22	1.25				
2	115P05206	4 Evening	Weekday	US-60	Westbound	63.6	61.1	51.6	52.2	65	65	65	1.02	1.06	1.26	1.25				
2	115P05939	1 AM Peak	Weekday	US-60	Westbound	60.7	59.4	48.2	52.3	65	65	65	1.07	1.09	1.35	1.24	1.07	1.09	1.35	1.24
2	115P05939	2 Mid Day	Weekday	US-60	Westbound	62.0	59.9	51.4	53.2	65	65	65	1.05	1.08	1.26	1.22				
2	115P05939	3 PM Peak	Weekday	US-60	Westbound	62.4	59.7	52.3	53.2	65	65	65	1.04	1.09	1.24	1.22				
2	115P05939	4 Evening	Weekday	US-60	Westbound	61.1	59.6	50.6	52.3	65	65	65	1.06	1.09	1.29	1.24				
3	115P11090	1 AM Peak	Weekday	US-60	Westbound	51.9	49.3	29.5	23.6	45	45	45	1.00	1.00	1.52	1.91	1.00	1.00	2.43	1.91
3	115P11090	2 Mid Day	Weekday	US-60	Westbound	51.2	51.0	25.7	32.3	45	45	45	1.00	1.00	1.75	1.39				
3	115P11090	3 PM Peak	Weekday	US-60	Westbound	50.2	50.9	20.5	32.8	45	45	45	1.00	1.00	2.19	1.37				
3	115P11090	4 Evening	Weekday	US-60	Westbound	50.4	50.2	18.5	27.3	45	45	45	1.00	1.00	2.43	1.65				
4	115P05949	1 AM Peak	Weekday	US-93	Northbound	15.5	14.6	8.0	10.4	25	25	25	1.62	1.71	3.13	2.41	1.62	1.76	4.10	2.89
4	115P05949	2 Mid Day	Weekday	US-93	Northbound	15.6	14.7	7.4	8.6	25	25	25	1.60	1.70	3.37	2.89				
4	115P05949	3 PM Peak	Weekday	US-93	Northbound	16.6	14.2	10.4	10.4	25	25	25	1.50	1.76	2.41	2.41				
4	115P05949	4 Evening	Weekday	US-93	Northbound	15.9	14.3	6.1	10.4	25	25	25	1.57	1.74	4.10	2.41				

Segment	TMC	Time Period	Week Type	ROAD NUMBER	Road Direction	Cars Mean	trucks mean	Cars P05	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	115P11118	1 AM Peak	Weekday	US-93	Northbound	41.7	36.8	19.9	16.8	45	45	45	1.08	1.22	2.26	2.69	1.13	1.26	2.42	2.69
4	115P11118	2 Mid Day	Weekday	US-93	Northbound	41.9	37.0	18.7	19.9	45	45	45	1.08	1.22	2.41	2.26				
4	115P11118	3 PM Peak	Weekday	US-93	Northbound	41.7	36.6	18.7	19.6	45	45	45	1.08	1.23	2.41	2.29				
4	115P11118	4 Evening	Weekday	US-93	Northbound	39.7	35.6	18.6	16.8	45	45	45	1.13	1.26	2.42	2.68				
4	115P11210	1 AM Peak	Weekday	US-93	Northbound	22.9	16.5	5.0	8.7	45	45	45	1.96	2.73	9.05	5.17	2.08	3.18	24.13	12.07
4	115P11210	2 Mid Day	Weekday	US-93	Northbound	21.6	15.5	3.7	6.8	45	45	45	2.08	2.89	12.07	6.58				
4	115P11210	3 PM Peak	Weekday	US-93	Northbound	21.7	15.7	3.7	7.5	45	45	45	2.08	2.88	12.07	6.04				
4	115P11210	4 Evening	Weekday	US-93	Northbound	22.3	14.1	1.9	3.7	45	45	45	2.02	3.18	24.13	12.07				
4	115P06151	1 AM Peak	Weekday	US-93	Northbound	47.5	43.4	30.4	21.7	55	55	55	1.16	1.27	1.81	2.53	1.19	1.27	2.11	2.68
4	115P06151	2 Mid Day	Weekday	US-93	Northbound	46.2	43.9	26.1	24.8	55	55	55	1.19	1.25	2.11	2.21				
4	115P06151	3 PM Peak	Weekday	US-93	Northbound	46.4	43.4	27.4	22.4	55	55	55	1.19	1.27	2.00	2.46				
4	115P06151	4 Evening	Weekday	US-93	Northbound	47.2	43.2	29.9	20.5	55	55	55	1.16	1.27	1.84	2.68				
4	115P05950	1 AM Peak	Weekday	US-93	Northbound	54.3	52.5	38.0	31.7	55	55	55	1.01	1.05	1.45	1.74	1.04	1.06	1.67	2.03
4	115P05950	2 Mid Day	Weekday	US-93	Northbound	52.7	52.1	33.0	34.6	55	55	55	1.04	1.06	1.67	1.59				
4	115P05950	3 PM Peak	Weekday	US-93	Northbound	53.2	52.0	35.1	34.0	55	55	55	1.03	1.06	1.57	1.62				
4	115P05950	4 Evening	Weekday	US-93	Northbound	54.0	52.1	33.8	27.1	55	55	55	1.02	1.06	1.63	2.03				
4	115P05951	1 AM Peak	Weekday	US-93	Northbound	65.5	62.3	58.1	57.2	65	65	65	1.00	1.04	1.12	1.14	1.01	1.05	1.14	1.15
4	115P05951	2 Mid Day	Weekday	US-93	Northbound	64.6	61.9	57.2	57.7	65	65	65	1.01	1.05	1.14	1.13				
4	115P05951	3 PM Peak	Weekday	US-93	Northbound	64.6	61.6	57.8	57.6	65	65	65	1.01	1.05	1.12	1.13				
4	115P05951	4 Evening	Weekday	US-93	Northbound	64.8	62.1	56.9	56.5	65	65	65	1.00	1.05	1.14	1.15				
5	*No Data*																			
6	115P06152	1 AM Peak	Weekday	US-93	Northbound	66.7	61.6	58.4	51.0	65	65	65	1.00	1.06	1.11	1.28	1.00	1.06	1.12	1.28
6	115P06152	2 Mid Day	Weekday	US-93	Northbound	66.4	61.3	57.8	53.5	65	65	65	1.00	1.06	1.12	1.22				
6	115P06152	3 PM Peak	Weekday	US-93	Northbound	66.1	61.3	58.6	55.6	65	65	65	1.00	1.06	1.11	1.17				
6	115P06152	4 Evening	Weekday	US-93	Northbound	66.3	62.0	58.6	55.3	65	65	65	1.00	1.05	1.11	1.18				
6	115P05952	1 AM Peak	Weekday	US-93	Northbound	63.7	54.3	44.1	31.7	65	65	65	1.02	1.20	1.47	2.05	1.06	1.22	1.69	2.05
6	115P05952	2 Mid Day	Weekday	US-93	Northbound	64.9	54.5	43.5	36.7	65	65	65	1.00	1.19	1.49	1.77				
6	115P05952	3 PM Peak	Weekday	US-93	Northbound	62.3	53.1	39.8	36.0	65	65	65	1.04	1.22	1.63	1.80				
6	115P05952	4 Evening	Weekday	US-93	Northbound	61.0	54.4	38.5	34.7	65	65	65	1.06	1.20	1.69	1.88				
7	115P06153	1 AM Peak	Weekday	US-93	Northbound	63.7	54.1	43.2	32.0	65	65	65	1.02	1.20	1.50	2.03	1.06	1.20	1.61	2.03
7	115P06153	2 Mid Day	Weekday	US-93	Northbound	65.0	56.2	46.4	42.5	65	65	65	1.00	1.16	1.40	1.53				
7	115P06153	3 PM Peak	Weekday	US-93	Northbound	63.8	54.8	45.1	43.0	65	65	65	1.02	1.19	1.44	1.51				
7	115P06153	4 Evening	Weekday	US-93	Northbound	61.6	55.2	40.4	37.9	65	65	65	1.06	1.18	1.61	1.71				
8	115P06154	1 AM Peak	Weekday	US-93	Northbound	59.5	52.6	32.9	16.8	55	55	55	1.00	1.05	1.67	3.28	1.00	1.05	1.84	3.28
8	115P06154	2 Mid Day	Weekday	US-93	Northbound	60.0	55.9	34.2	34.5	55	55	55	1.00	1.00	1.61	1.60				
8	115P06154	3 PM Peak	Weekday	US-93	Northbound	60.6	56.0	38.8	38.8	55	55	55	1.00	1.00	1.42	1.42				
8	115P06154	4 Evening	Weekday	US-93	Northbound	58.8	55.4	29.8	25.5	55	55	55	1.00	1.00	1.84	2.16				

Segment	TMC	Time Period	Week Type	ROAD NUMBER	Road Direction	Cars Mean	trucks mean	Cars P05	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
9	115P06155	1 AM Peak	Weekday	US-93	Northbound	62.1	57.0	47.9	44.8	45	45	45	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.01
9	115P06155	2 Mid Day	Weekday	US-93	Northbound	63.2	58.2	48.4	48.5	45	45	45	1.00	1.00	1.00	1.00				
9	115P06155	3 PM Peak	Weekday	US-93	Northbound	63.1	57.5	49.3	49.7	45	45	45	1.00	1.00	1.00	1.00				
9	115P06155	4 Evening	Weekday	US-93	Northbound	61.2	57.2	46.6	46.0	45	45	45	1.00	1.00	1.00	1.00				
10	115P06156	1 AM Peak	Weekday	US-93	Northbound	61.2	58.1	42.5	44.3	65	65	65	1.06	1.12	1.53	1.47	1.06	1.12	1.53	1.47
10	115P06156	2 Mid Day	Weekday	US-93	Northbound	62.7	58.7	44.6	47.6	65	65	65	1.04	1.11	1.46	1.36				
10	115P06156	3 PM Peak	Weekday	US-93	Northbound	64.3	59.1	53.4	52.4	65	65	65	1.01	1.10	1.22	1.24				
10	115P06156	4 Evening	Weekday	US-93	Northbound	62.9	59.3	51.8	51.6	65	65	65	1.03	1.10	1.26	1.26				
10	115P05953	1 AM Peak	Weekday	US-93	Northbound	59.5	55.5	32.6	33.2	45	45	45	1.00	1.00	1.38	1.35	1.00	1.00	1.38	1.35
10	115P05953	2 Mid Day	Weekday	US-93	Northbound	62.1	57.1	45.2	44.8	45	45	45	1.00	1.00	1.00	1.01				
10	115P05953	3 PM Peak	Weekday	US-93	Northbound	61.6	56.7	44.3	45.4	45	45	45	1.00	1.00	1.02	1.00				
10	115P05953	4 Evening	Weekday	US-93	Northbound	59.1	55.5	39.7	39.7	45	45	45	1.00	1.00	1.13	1.13				
11	115P10852	1 AM Peak	Weekday	US-93	Northbound	16.2	15.1	3.7	3.7	35	35	35	2.16	2.32	9.38	9.38	2.40	2.56	18.77	9.38
11	115P10852	2 Mid Day	Weekday	US-93	Northbound	16.2	15.2	2.5	3.7	35	35	35	2.16	2.30	14.08	9.38				
11	115P10852	3 PM Peak	Weekday	US-93	Northbound	15.7	14.7	1.9	3.7	35	35	35	2.22	2.38	18.77	9.38				
11	115P10852	4 Evening	Weekday	US-93	Northbound	14.6	13.7	2.5	3.7	35	35	35	2.40	2.56	14.08	9.38				
11	115P10853	1 AM Peak	Weekday	US-93	Northbound	47.0	39.5	19.3	14.9	55	55	55	1.17	1.39	2.86	3.69	1.22	1.44	4.54	4.32
11	115P10853	2 Mid Day	Weekday	US-93	Northbound	45.8	40.5	12.1	12.7	55	55	55	1.20	1.36	4.54	4.32				
11	115P10853	3 PM Peak	Weekday	US-93	Northbound	47.2	40.1	14.9	16.2	55	55	55	1.17	1.37	3.69	3.40				
11	115P10853	4 Evening	Weekday	US-93	Northbound	44.9	38.3	12.4	13.7	55	55	55	1.22	1.44	4.42	4.02				
12	115P10854	1 AM Peak	Weekday	US-93	Northbound	66.0	62.4	57.8	57.2	65	65	65	1.00	1.04	1.12	1.14	1.00	1.05	1.12	1.17
12	115P10854	2 Mid Day	Weekday	US-93	Northbound	68.2	62.5	59.7	58.3	65	65	65	1.00	1.04	1.09	1.12				
12	115P10854	3 PM Peak	Weekday	US-93	Northbound	69.0	61.9	61.2	58.2	65	65	65	1.00	1.05	1.06	1.12				
12	115P10854	4 Evening	Weekday	US-93	Northbound	66.7	61.7	58.4	55.6	65	65	65	1.00	1.05	1.11	1.17				
12	115P07214	1 AM Peak	Weekday	US-93	Northbound	67.1	62.6	61.4	58.4	65	65	65	1.00	1.04	1.06	1.11	1.00	1.05	1.07	1.14
12	115P07214	2 Mid Day	Weekday	US-93	Northbound	69.2	62.8	61.4	58.8	65	65	65	1.00	1.04	1.06	1.11				
12	115P07214	3 PM Peak	Weekday	US-93	Northbound	70.0	62.1	61.4	58.4	65	65	65	1.00	1.05	1.06	1.11				
12	115P07214	4 Evening	Weekday	US-93	Northbound	68.0	62.1	61.0	57.0	65	65	65	1.00	1.05	1.07	1.14				
13	115P07234	1 AM Peak	Weekday	US-93	Northbound	67.8	63.7	61.5	59.2	65	65	65	1.00	1.02	1.06	1.10	1.00	1.03	1.06	1.11
13	115P07234	2 Mid Day	Weekday	US-93	Northbound	69.6	63.5	61.5	59.6	65	65	65	1.00	1.02	1.06	1.09				
13	115P07234	3 PM Peak	Weekday	US-93	Northbound	70.4	62.9	62.6	59.6	65	65	65	1.00	1.03	1.04	1.09				
13	115P07234	4 Evening	Weekday	US-93	Northbound	68.6	62.9	61.5	58.5	65	65	65	1.00	1.03	1.06	1.11				
13	115P07215	1 AM Peak	Weekday	US-93	Northbound	67.2	62.9	61.0	58.8	65	65	65	1.00	1.03	1.07	1.11	1.00	1.04	1.07	1.12
13	115P07215	2 Mid Day	Weekday	US-93	Northbound	69.2	62.9	61.2	59.0	65	65	65	1.00	1.03	1.06	1.10				
13	115P07215	3 PM Peak	Weekday	US-93	Northbound	70.2	62.3	62.7	59.0	65	65	65	1.00	1.04	1.04	1.10				
13	115P07215	4 Evening	Weekday	US-93	Northbound	68.6	62.3	61.7	57.9	65	65	65	1.00	1.04	1.05	1.12				
14	115P07216	1 AM Peak	Weekday	US-93	Northbound	67.2	62.7	60.9	58.4	65	65	65	1.00	1.04	1.07	1.11	1.00	1.05	1.07	1.14

Segment	TMC	Time Period	Week Type	ROAD NUMBER	Road Direction	Cars Mean	trucks mean	Cars P05	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	115P07216	2 Mid Day	Weekday	US-93	Northbound	68.9	62.7	60.8	58.9	65	65	65	1.00	1.04	1.07	1.10				
14	115P07216	3 PM Peak	Weekday	US-93	Northbound	69.6	62.3	60.9	59.0	65	65	65	1.00	1.04	1.07	1.10				
14	115P07216	4 Evening	Weekday	US-93	Northbound	68.3	62.2	61.5	57.2	65	65	65	1.00	1.05	1.06	1.14				
15	115P07217	1 AM Peak	Weekday	US-93	Northbound	66.7	62.8	59.1	58.5	65	65	65	1.00	1.03	1.10	1.11	1.00	1.05	1.10	1.14
15	115P07217	2 Mid Day	Weekday	US-93	Northbound	68.7	62.9	59.9	58.9	65	65	65	1.00	1.03	1.08	1.10				
15	115P07217	3 PM Peak	Weekday	US-93	Northbound	70.3	62.4	62.8	59.2	65	65	65	1.00	1.04	1.03	1.10				
15	115P07217	4 Evening	Weekday	US-93	Northbound	68.6	62.1	61.6	57.1	65	65	65	1.00	1.05	1.06	1.14				
16	115P07235	1 AM Peak	Weekday	US-93	Northbound	65.4	59.5	54.8	33.6	65	65	65	1.00	1.09	1.19	1.94	1.00	1.10	1.19	1.94
16	115P07235	2 Mid Day	Weekday	US-93	Northbound	67.7	60.6	57.9	46.0	65	65	65	1.00	1.07	1.12	1.41				
16	115P07235	3 PM Peak	Weekday	US-93	Northbound	69.1	60.0	59.7	46.6	65	65	65	1.00	1.08	1.09	1.39				
16	115P07235	4 Evening	Weekday	US-93	Northbound	66.5	59.3	54.8	39.9	65	65	65	1.00	1.10	1.19	1.63				
16	115P07218	1 AM Peak	Weekday	US-93	Northbound	64.5	59.8	53.4	48.5	55	55	55	1.00	1.00	1.03	1.13	1.00	1.00	1.07	1.16
16	115P07218	2 Mid Day	Weekday	US-93	Northbound	66.3	60.0	54.4	50.4	55	55	55	1.00	1.00	1.01	1.09				
16	115P07218	3 PM Peak	Weekday	US-93	Northbound	67.4	59.0	55.9	50.4	55	55	55	1.00	1.00	1.00	1.09				
16	115P07218	4 Evening	Weekday	US-93	Northbound	65.1	58.5	51.6	47.2	55	55	55	1.00	1.00	1.07	1.16				

Car TTI and PTI/Truck TTTI and TPTI – Southbound/Westbound

Segment	TMC	timeperiod	week type	ROAD NUMBER	road direction	Cars mean	trucks mean	Cars P05	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	115N05201	1 AM Peak	Weekday	US-60	Eastbound	64.6	62.4	54.5	57.2	65	65	65	1.01	1.04	1.19	1.14	1.01	1.05	1.19	1.15
1	115N05201	2 Mid Day	Weekday	US-60	Eastbound	65.1	62.3	55.8	57.2	65	65	65	1.00	1.04	1.16	1.14				
1	115N05201	3 PM Peak	Weekday	US-60	Eastbound	66.5	62.1	57.9	57.2	65	65	65	1.00	1.05	1.12	1.14				
1	115N05201	4 Evening	Weekday	US-60	Eastbound	66.4	62.4	57.2	56.5	65	65	65	1.00	1.04	1.14	1.15				
1	115N05202	1 AM Peak	Weekday	US-60	Eastbound	63.7	62.0	48.8	56.5	65	65	65	1.02	1.05	1.33	1.15	1.02	1.05	1.39	1.15
1	115N05202	2 Mid Day	Weekday	US-60	Eastbound	63.4	62.3	46.8	57.2	65	65	65	1.02	1.04	1.39	1.14				
1	115N05202	3 PM Peak	Weekday	US-60	Eastbound	65.5	62.2	53.0	57.2	65	65	65	1.00	1.04	1.23	1.14				
1	115N05202	4 Evening	Weekday	US-60	Eastbound	65.3	62.3	53.6	56.5	65	65	65	1.00	1.04	1.21	1.15				
1	115N05203	1 AM Peak	Weekday	US-60	Eastbound	62.8	62.4	43.5	56.7	65	65	65	1.04	1.04	1.49	1.15	1.04	1.04	1.49	1.15
1	115N05203	2 Mid Day	Weekday	US-60	Eastbound	64.1	62.4	50.1	58.4	65	65	65	1.01	1.04	1.30	1.11				
1	115N05203	3 PM Peak	Weekday	US-60	Eastbound	66.3	62.3	56.7	57.3	65	65	65	1.00	1.04	1.15	1.14				
1	115N05203	4 Evening	Weekday	US-60	Eastbound	66.2	62.4	56.7	56.7	65	65	65	1.00	1.04	1.15	1.15				
2	115N05204	1 AM Peak	Weekday	US-60	Eastbound	58.1	57.8	36.6	36.1	65	65	65	1.12	1.13	1.78	1.80	1.12	1.13	1.78	1.80
2	115N05204	2 Mid Day	Weekday	US-60	Eastbound	60.2	58.3	41.7	40.4	65	65	65	1.08	1.11	1.56	1.61				
2	115N05204	3 PM Peak	Weekday	US-60	Eastbound	62.2	58.1	45.6	41.7	65	65	65	1.05	1.12	1.42	1.56				
2	115N05204	4 Evening	Weekday	US-60	Eastbound	61.9	58.4	46.7	43.4	65	65	65	1.05	1.11	1.39	1.50				
2	115N05205	1 AM Peak	Weekday	US-60	Eastbound	60.8	60.0	43.2	46.1	45	45	45	1.00	1.00	1.04	1.00	1.05	1.09	1.47	1.44
2	115N05205	2 Mid Day	Weekday	US-60	Eastbound	61.9	59.9	46.0	45.6	65	65	65	1.05	1.09	1.41	1.42				
2	115N05205	3 PM Peak	Weekday	US-60	Eastbound	64.3	60.0	50.9	47.8	65	65	65	1.01	1.08	1.28	1.36				
2	115N05205	4 Evening	Weekday	US-60	Eastbound	62.3	59.8	44.2	45.2	65	65	65	1.04	1.09	1.47	1.44				
2	115N05206	1 AM Peak	Weekday	US-60	Eastbound	59.8	58.5	49.7	51.4	65	65	65	1.09	1.11	1.31	1.27	1.09	1.11	1.39	1.27
2	115N05206	2 Mid Day	Weekday	US-60	Eastbound	60.0	59.3	46.7	52.2	65	65	65	1.08	1.10	1.39	1.24				
2	115N05206	3 PM Peak	Weekday	US-60	Eastbound	61.8	59.3	49.7	52.2	65	65	65	1.05	1.10	1.31	1.24				
2	115N05206	4 Evening	Weekday	US-60	Eastbound	61.0	59.5	48.1	51.4	65	65	65	1.07	1.09	1.35	1.27				
2	115N05939	1 AM Peak	Weekday	US-60	Eastbound	52.9	52.4	30.5	31.5	65	65	65	1.23	1.24	2.13	2.06	1.23	1.26	2.27	2.18
2	115N05939	2 Mid Day	Weekday	US-60	Eastbound	53.2	52.4	31.4	32.3	65	65	65	1.22	1.24	2.07	2.01				
2	115N05939	3 PM Peak	Weekday	US-60	Eastbound	54.8	52.4	33.3	32.6	65	65	65	1.19	1.24	1.95	1.99				
2	115N05939	4 Evening	Weekday	US-60	Eastbound	52.7	51.6	28.6	29.8	65	65	65	1.23	1.26	2.27	2.18				
3	115N11090	1 AM Peak	Weekday	US-60	Eastbound	20.0	17.0	5.6	10.5	45	45	45	2.25	2.65	8.07	4.27	2.38	2.90	9.65	12.05
3	115N11090	2 Mid Day	Weekday	US-60	Eastbound	19.3	16.7	6.8	7.5	45	45	45	2.33	2.70	6.61	6.03				
3	115N11090	3 PM Peak	Weekday	US-60	Eastbound	20.1	16.4	5.6	5.6	45	45	45	2.24	2.75	8.07	8.07				
3	115N11090	4 Evening	Weekday	US-60	Eastbound	18.9	15.5	4.7	3.7	45	45	45	2.38	2.90	9.65	12.05				
4	115N05949	1 AM Peak	Weekday	US-93	Southbound	35.7	34.5	12.4	12.4	25	25	25	1.00	1.00	2.01	2.01	1.00	1.00	2.01	2.03
4	115N05949	2 Mid Day	Weekday	US-93	Southbound	38.0	34.9	13.7	12.3	25	25	25	1.00	1.00	1.83	2.03				
4	115N05949	3 PM Peak	Weekday	US-93	Southbound	39.5	35.2	13.7	12.5	25	25	25	1.00	1.00	1.83	2.00				
4	115N05949	4 Evening	Weekday	US-93	Southbound	37.9	34.7	14.9	13.7	25	25	25	1.00	1.00	1.68	1.83				

Segment	TMC	timeperiod	week type	ROAD NUMBER	road direction	Cars mean	trucks mean	Cars P05	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	115N11118	1 AM Peak	Weekday	US-93	Southbound	46.2	42.8	18.7	16.8	45	45	45	1.00	1.05	2.41	2.68	1.00	1.09	2.41	3.29
4	115N11118	2 Mid Day	Weekday	US-93	Southbound	46.3	41.6	20.5	14.9	45	45	45	1.00	1.08	2.19	3.02				
4	115N11118	3 PM Peak	Weekday	US-93	Southbound	47.1	42.1	23.0	16.8	45	45	45	1.00	1.07	1.96	2.68				
4	115N11118	4 Evening	Weekday	US-93	Southbound	47.2	41.3	19.9	13.7	45	45	45	1.00	1.09	2.26	3.29				
4	115N11210	1 AM Peak	Weekday	US-93	Southbound	19.0	15.2	11.7	9.7	45	45	45	2.37	2.97	3.86	4.63	2.42	3.00	4.37	4.63
4	115N11210	2 Mid Day	Weekday	US-93	Southbound	18.6	15.1	11.7	9.7	45	45	45	2.42	2.98	3.86	4.63				
4	115N11210	3 PM Peak	Weekday	US-93	Southbound	19.2	15.0	10.9	9.7	45	45	45	2.35	3.00	4.12	4.63				
4	115N11210	4 Evening	Weekday	US-93	Southbound	18.7	15.0	10.3	9.7	45	45	45	2.41	3.00	4.37	4.63				
4	115N06151	1 AM Peak	Weekday	US-93	Southbound	54.4	53.2	38.5	37.2	55	55	55	1.01	1.03	1.43	1.48	1.04	1.05	1.65	1.92
4	115N06151	2 Mid Day	Weekday	US-93	Southbound	52.7	52.4	33.3	34.8	55	55	55	1.04	1.05	1.65	1.58				
4	115N06151	3 PM Peak	Weekday	US-93	Southbound	54.0	52.6	35.5	34.5	55	55	55	1.02	1.05	1.55	1.59				
4	115N06151	4 Evening	Weekday	US-93	Southbound	54.1	52.2	33.5	28.6	55	55	55	1.02	1.05	1.64	1.92				
4	115N05950	1 AM Peak	Weekday	US-93	Southbound	64.6	62.7	55.6	57.8	55	55	55	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	115N05950	2 Mid Day	Weekday	US-93	Southbound	64.9	62.2	56.1	57.4	55	55	55	1.00	1.00	1.00	1.00				
4	115N05950	3 PM Peak	Weekday	US-93	Southbound	65.5	62.3	57.0	57.8	55	55	55	1.00	1.00	1.00	1.00				
4	115N05950	4 Evening	Weekday	US-93	Southbound	65.2	62.3	56.6	56.6	55	55	55	1.00	1.00	1.00	1.00				
4	115N05951	1 AM Peak	Weekday	US-93	Southbound	62.2	58.0	49.7	46.6	65	65	65	1.04	1.12	1.31	1.39	1.04	1.12	1.31	1.39
4	115N05951	2 Mid Day	Weekday	US-93	Southbound	64.0	58.9	51.0	48.0	65	65	65	1.02	1.10	1.28	1.36				
4	115N05951	3 PM Peak	Weekday	US-93	Southbound	64.9	59.0	52.4	49.7	65	65	65	1.00	1.10	1.24	1.31				
4	115N05951	4 Evening	Weekday	US-93	Southbound	63.2	58.4	49.9	46.8	65	65	65	1.03	1.11	1.30	1.39				
5																				
6	115N06152	1 AM Peak	Weekday	US-93	Southbound	66.7	63.2	59.2	57.2	65	65	65	1.00	1.03	1.10	1.14	1.00	1.03	1.12	1.15
6	115N06152	2 Mid Day	Weekday	US-93	Southbound	68.0	63.0	59.0	57.6	65	65	65	1.00	1.03	1.10	1.13				
6	115N06152	3 PM Peak	Weekday	US-93	Southbound	68.4	63.1	59.7	57.7	65	65	65	1.00	1.03	1.09	1.13				
6	115N06152	4 Evening	Weekday	US-93	Southbound	67.6	63.0	57.9	56.5	65	65	65	1.00	1.03	1.12	1.15				
6	115N05952	1 AM Peak	Weekday	US-93	Southbound	60.4	55.4	37.7	34.6	65	65	65	1.08	1.17	1.72	1.88	1.08	1.18	1.72	2.05
6	115N05952	2 Mid Day	Weekday	US-93	Southbound	63.2	56.4	41.6	39.8	65	65	65	1.03	1.15	1.56	1.63				
6	115N05952	3 PM Peak	Weekday	US-93	Southbound	63.8	55.5	42.9	37.7	65	65	65	1.02	1.17	1.52	1.73				
6	115N05952	4 Evening	Weekday	US-93	Southbound	61.0	55.1	38.1	31.7	65	65	65	1.07	1.18	1.71	2.05				
7	115N06153	1 AM Peak	Weekday	US-93	Southbound	58.7	56.5	40.4	37.9	65	65	65	1.11	1.15	1.61	1.71	1.11	1.15	1.63	1.71
7	115N06153	2 Mid Day	Weekday	US-93	Southbound	60.6	56.9	41.6	42.3	65	65	65	1.07	1.14	1.56	1.54				
7	115N06153	3 PM Peak	Weekday	US-93	Southbound	61.5	56.8	44.7	42.0	65	65	65	1.06	1.14	1.45	1.55				
7	115N06153	4 Evening	Weekday	US-93	Southbound	59.0	56.6	39.8	39.1	65	65	65	1.10	1.15	1.63	1.66				
8	115N06154	1 AM Peak	Weekday	US-93	Southbound	63.8	60.1	48.5	46.6	55	55	55	1.00	1.00	1.13	1.18	1.00	1.00	1.15	1.18
8	115N06154	2 Mid Day	Weekday	US-93	Southbound	64.3	60.0	48.7	48.5	55	55	55	1.00	1.00	1.13	1.13				
8	115N06154	3 PM Peak	Weekday	US-93	Southbound	64.7	60.4	51.0	50.0	55	55	55	1.00	1.00	1.08	1.10				
8	115N06154	4 Evening	Weekday	US-93	Southbound	63.7	60.1	47.9	47.2	55	55	55	1.00	1.00	1.15	1.16				
9	115N06155	1 AM Peak	Weekday	US-93	Southbound	62.3	60.0	43.6	48.5	45	45	45	1.00	1.00	1.03	1.00	1.00	1.00	1.03	1.00

Segment	TMC	timeperiod	week type	ROAD NUMBER	road direction	Cars mean	trucks mean	Cars P05	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
9	115N06155	2 Mid Day	Weekday	US-93	Southbound	64.0	59.8	48.5	49.4	45	45	45	1.00	1.00	1.00	1.00				
9	115N06155	3 PM Peak	Weekday	US-93	Southbound	65.5	61.0	55.0	54.1	45	45	45	1.00	1.00	1.00	1.00				
9	115N06155	4 Evening	Weekday	US-93	Southbound	64.1	60.8	53.0	53.1	45	45	45	1.00	1.00	1.00	1.00				
10	115N06156	1 AM Peak	Weekday	US-93	Southbound	66.3	62.0	56.6	54.0	65	65	65	1.00	1.05	1.15	1.20	1.00	1.05	1.19	1.22
10	115N06156	2 Mid Day	Weekday	US-93	Southbound	67.5	61.8	57.4	55.4	65	65	65	1.00	1.05	1.13	1.17				
10	115N06156	3 PM Peak	Weekday	US-93	Southbound	67.6	62.2	57.9	56.4	65	65	65	1.00	1.05	1.12	1.15				
10	115N06156	4 Evening	Weekday	US-93	Southbound	66.1	61.9	54.4	53.5	65	65	65	1.00	1.05	1.19	1.22				
10	115N05953	1 AM Peak	Weekday	US-93	Southbound	56.4	53.0	34.7	31.7	45	45	45	1.00	1.00	1.30	1.42	1.00	1.00	1.81	1.77
10	115N05953	2 Mid Day	Weekday	US-93	Southbound	58.9	53.5	41.8	38.5	45	45	45	1.00	1.00	1.08	1.17				
10	115N05953	3 PM Peak	Weekday	US-93	Southbound	58.4	54.0	39.7	36.7	45	45	45	1.00	1.00	1.13	1.23				
10	115N05953	4 Evening	Weekday	US-93	Southbound	54.1	50.9	24.8	25.5	45	45	45	1.00	1.00	1.81	1.77				
11	115N10852	1 AM Peak	Weekday	US-93	Southbound	41.7	29.9	9.3	7.5	35	35	35	1.00	1.17	3.75	4.69	1.00	1.17	4.69	4.69
11	115N10852	2 Mid Day	Weekday	US-93	Southbound	41.0	30.5	10.7	8.5	35	35	35	1.00	1.15	3.28	4.10				
11	115N10852	3 PM Peak	Weekday	US-93	Southbound	41.9	32.4	11.3	9.9	35	35	35	1.00	1.08	3.09	3.52				
11	115N10852	4 Evening	Weekday	US-93	Southbound	39.7	31.1	7.5	8.7	35	35	35	1.00	1.12	4.69	4.02				
11	115N10853	1 AM Peak	Weekday	US-93	Southbound	66.3	61.2	55.3	53.6	45	45	45	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
11	115N10853	2 Mid Day	Weekday	US-93	Southbound	67.2	61.1	56.2	55.2	45	45	45	1.00	1.00	1.00	1.00				
11	115N10853	3 PM Peak	Weekday	US-93	Southbound	66.9	61.2	56.5	53.9	45	45	45	1.00	1.00	1.00	1.00				
11	115N10853	4 Evening	Weekday	US-93	Southbound	65.5	60.9	55.0	52.2	45	45	45	1.00	1.00	1.00	1.00				
12	115N10854	1 AM Peak	Weekday	US-93	Southbound	68.5	62.1	59.5	57.8	65	65	65	1.00	1.05	1.09	1.13	1.00	1.05	1.12	1.15
12	115N10854	2 Mid Day	Weekday	US-93	Southbound	68.6	62.1	58.1	58.1	65	65	65	1.00	1.05	1.12	1.12				
12	115N10854	3 PM Peak	Weekday	US-93	Southbound	68.3	62.6	59.2	58.5	65	65	65	1.00	1.04	1.10	1.11				
12	115N10854	4 Evening	Weekday	US-93	Southbound	67.1	62.3	59.2	56.4	65	65	65	1.00	1.04	1.10	1.15				
12	115N07214	1 AM Peak	Weekday	US-93	Southbound	66.7	60.8	55.5	54.6	65	65	65	1.00	1.07	1.17	1.19	1.00	1.07	1.20	1.21
12	115N07214	2 Mid Day	Weekday	US-93	Southbound	67.4	60.9	55.7	55.4	65	65	65	1.00	1.07	1.17	1.17				
12	115N07214	3 PM Peak	Weekday	US-93	Southbound	66.2	61.4	54.1	55.7	65	65	65	1.00	1.06	1.20	1.17				
12	115N07214	4 Evening	Weekday	US-93	Southbound	65.1	60.9	54.3	53.7	65	65	65	1.00	1.07	1.20	1.21				
13	115N07234	1 AM Peak	Weekday	US-93	Southbound	66.9	61.3	56.3	55.0	65	65	65	1.00	1.06	1.16	1.18	1.00	1.06	1.17	1.18
13	115N07234	2 Mid Day	Weekday	US-93	Southbound	67.2	61.4	55.6	56.7	65	65	65	1.00	1.06	1.17	1.15				
13	115N07234	3 PM Peak	Weekday	US-93	Southbound	67.0	62.2	56.7	57.2	65	65	65	1.00	1.04	1.15	1.14				
13	115N07234	4 Evening	Weekday	US-93	Southbound	65.7	61.5	56.6	55.3	65	65	65	1.00	1.06	1.15	1.18				
13	115N07215	1 AM Peak	Weekday	US-93	Southbound	67.0	61.8	57.9	56.6	65	65	65	1.00	1.05	1.12	1.15	1.00	1.05	1.14	1.17
13	115N07215	2 Mid Day	Weekday	US-93	Southbound	67.7	61.7	58.7	57.2	65	65	65	1.00	1.05	1.11	1.14				
13	115N07215	3 PM Peak	Weekday	US-93	Southbound	67.2	62.3	59.1	57.6	65	65	65	1.00	1.04	1.10	1.13				
13	115N07215	4 Evening	Weekday	US-93	Southbound	65.5	61.8	57.2	55.3	65	65	65	1.00	1.05	1.14	1.17				
14	115N07216	1 AM Peak	Weekday	US-93	Southbound	66.6	60.6	57.3	49.1	65	65	65	1.00	1.07	1.13	1.32	1.01	1.07	1.21	1.32
14	115N07216	2 Mid Day	Weekday	US-93	Southbound	66.7	61.1	56.7	54.7	65	65	65	1.00	1.06	1.15	1.19				

Segment	TMC	timeperiod	week type	ROAD NUMBER	road direction	Cars mean	trucks mean	Cars P05	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	115N07216	3 PM Peak	Weekday	US-93	Southbound	66.1	61.6	56.6	54.7	65	65	65	1.00	1.06	1.15	1.19				
14	115N07216	4 Evening	Weekday	US-93	Southbound	64.6	60.6	53.8	50.5	65	65	65	1.01	1.07	1.21	1.29				
15	115N07217	1 AM Peak	Weekday	US-93	Southbound	62.8	56.2	46.0	40.1	65	65	65	1.04	1.16	1.41	1.62	1.09	1.16	1.63	1.63
15	115N07217	2 Mid Day	Weekday	US-93	Southbound	63.5	56.2	45.4	41.6	65	65	65	1.02	1.16	1.43	1.56				
15	115N07217	3 PM Peak	Weekday	US-93	Southbound	62.1	56.9	42.9	42.5	65	65	65	1.05	1.14	1.52	1.53				
15	115N07217	4 Evening	Weekday	US-93	Southbound	59.4	56.4	39.8	39.8	65	65	65	1.09	1.15	1.63	1.63				
16	115N07235	1 AM Peak	Weekday	US-93	Southbound	62.7	56.2	46.6	39.4	65	65	65	1.04	1.16	1.39	1.65	1.09	1.16	1.61	1.74
16	115N07235	2 Mid Day	Weekday	US-93	Southbound	62.9	56.3	46.0	41.5	65	65	65	1.03	1.15	1.41	1.56				
16	115N07235	3 PM Peak	Weekday	US-93	Southbound	61.9	57.3	43.0	42.3	65	65	65	1.05	1.13	1.51	1.54				
16	115N07235	4 Evening	Weekday	US-93	Southbound	59.9	56.1	40.4	37.3	65	65	65	1.09	1.16	1.61	1.74				
16	115N07218	1 AM Peak	Weekday	US-93	Southbound	56.8	55.4	42.0	45.0	55	55	55	1.00	1.00	1.31	1.22	1.00	1.00	1.31	1.22
16	115N07218	2 Mid Day	Weekday	US-93	Southbound	56.6	55.2	45.0	45.0	55	55	55	1.00	1.00	1.22	1.22				
16	115N07218	3 PM Peak	Weekday	US-93	Southbound	58.0	56.1	48.5	45.0	55	55	55	1.00	1.00	1.13	1.22				
16	115N07218	4 Evening	Weekday	US-93	Southbound	58.3	56.2	45.0	45.0	55	55	55	1.00	1.00	1.22	1.22				

Closure Data

				Total miles of closures		Avg Occurrences/Mile/Year	
Segment	**Length (miles)**	**# of closures**		**NB (or WB)**	**SB (or EB)**	**NB (or WB)**	**SB (or EB)**
60W-1	6	9		3.0	6.0	0.10	0.20
60W-2	12	6		0.0	6.0	0.00	0.10
60W-3	9	16		4.0	12.0	0.09	0.27
93-4	17	14		5.0	43.6	0.06	0.51
93-5	17	20		15.0	5.0	0.18	0.06
93-6	15	15		4.0	11.0	0.05	0.15
93-7	17	11		9.0	2.0	0.11	0.02
93-8	8	4		0.0	4.0	0.00	0.10
93-9	18	27		22.0	5.0	0.24	0.06
93-10	15	16		0.0	18.0	0.00	0.24
93-11	4	12		3.0	9.1	0.15	0.46
93-12	14	6		2.0	4.0	0.03	0.06
93-13	11	7		6.0	1.0	0.11	0.02
93-14	13	7		1.0	6.0	0.02	0.09
93-15	12	7		0.0	7.0	0.00	0.12
93-16	17	15		5.0	10.0	0.06	0.12

	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)
60W-1	0	0	3	6	0	0	0	0	0	0	0	0
60W-2	0	0	0	6	0	0	0	0	0	0	0	0
60W-3	0	0	4	12	0	0	0	0	0	0	0	0
93-4	0	0	5	9	0	0	0	0	0	0	0	0
93-5	0	0	15	5	0	0	0	0	0	0	0	0
93-6	0	0	4	11	0	0	0	0	0	0	0	0
93-7	0	0	9	2	0	0	0	0	0	0	0	0
93-8	0	0	0	4	0	0	0	0	0	0	0	0
93-9	0	0	22	5	0	0	0	0	0	0	0	0
93-10	0	0	0	15	0	0	0	1	0	0	0	0
93-11	0	0	3	9	0	0	0	0	0	0	0	0
93-12	0	0	2	4	0	0	0	0	0	0	0	0
93-13	0	0	6	1	0	0	0	0	0	0	0	0
93-14	0	0	1	6	0	0	0	0	0	0	0	0
93-15	0	0	0	7	0	0	0	0	0	0	0	0
93-16	0	0	5	10	0	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/EB AADT	SB/WB AADT	2014 AADT	K Factor	D-Factor	T-Factor
60W-1	138	132	7828	7614	15442	8553	8075	16628	9	52	8
60W-2	132	120	5139	5006	10145	5840	5936	11776	8	50	8
60W-3	120	111	6941	6899	13840	7330	7450	14780	9	51	7
93-4	200	183	3855	3753	7608	3978	3970	7948	8	50	11
93-5	183	166	3709	3815	7524	4072	4072	8144	7	50	10
93-6	166	149	3614	3708	7322	3974	4003	7977	9	50	9
93-7	149	132	3460	3513	6972	3716	3771	7487	10	50	8
93-8	132	124	3460	3513	6972	3716	3771	7487	10	50	8
93-9	124	106	3495	3517	7012	3775	3787	7562	12	50	6
93-10	106	91	4531	4656	9187	4683	4755	9439	14	50	4
93-11	71	67	8953	9487	18440	8745	9185	17931	12	51	9
93-12	67	53	4983	4964	9947	6519	6550	13069	15	50	9
93-13	53	42	5009	4999	10008	6567	6567	13134	15	50	8
93-14	42	29	5712	5755	11467	6718	6637	13357	13	50	8
93-15	29	17	5862	5917	11780	6744	6640	13387	13	50	8
93-16	17	0	5798	5871	11671	6753	6652	13408	13	50	8

SEGMENT	Loc ID	BMP	EMP	Length	Pos Dir AADT	Neg Dir AADT	Corrected Pos Dir AADT	Corrected Neg Dir AADT	2014 AADT	K Factor	D-Factor	D-Factor Adjusted	T-Factor
	100974	177.04	177.98	0.94	10581	9830	10581	9830	20410	8	65	52	5
	100976	177.98	179.00	1.02	7813	8110	7813	8110	15923	5	56	51	5
	100977	179.00	179.80	0.80	5141	7396	5141	7396	12537	9	58	59	5
	100978	179.80	182.10	2.30	7033	6458	7033	6458	13491	9	61	52	5
	100979	182.10	188.83	6.73	11510	12030	11510	12030	23540	10	51	51	5
	100980	188.83	190.84	2.01	7570	7094	7570	7094	14664	10	60	52	5
	100981	190.84	199.14	8.30	4648	4432	4648	4432	9080	11	70	51	6
	100982	199.14	217.92	18.78	4981	4846	4981	4846	9827	10	75	51	10
	100983	217.92	235.69	17.77	5342	5436	5342	5436	10778	11	80	50	10
	100984	235.69	239.45	3.76	4810	4191	4810	4191	9001	10	65	53	11
	100985	239.45	251.28	11.83	0	0	6290	6290	12580	9	59	50	10
	100986	251.28	251.85	0.57	8334	7931	8334	7931	16265	9	59	51	8
	100988	251.85	252.58	0.73	12363	11010	12363	11010	23372	10	52	53	7
	100990	252.58	254.58	2.00	9982	8507	9982	8507	18489	10	53	54	9
	101501	252.29	252.88	0.59	8107	7105	8107	7105	15212	10	64	53	2
	101503	252.88	255.86	2.98	6599	7836	6599	7836	14435	12	69	54	2
	101505	255.86	258.58	2.72	0	0	6900	6900	13800	14	80	50	2
	101506	258.58	263.19	4.61	6793	7001	6793	7001	13796	19	80	51	2
	101507	263.19	266.87	3.68	0	0	5498	5498	10996	16	72	50	2
	101508	266.87	282.24	15.37	2843	2295	2843	2295	5138	14	66	55	4
	101510	282.24	290.00	7.76	2598	0	2600	2600	5200	11	65	50	5
	101511	290.00	303.72	13.72	0	0	2982	2982	5964	11	68	50	11
	101512	303.72	305.75	2.03	4383	0	4383	4383	8766	11	68	50	11
	101512	303.72	305.75	2.03	4383	0	4383	4383	8766	11	68	50	11
	101514	305.75	307.98	2.23	3070	3371	3296	3296	6591	12	70	50	12
	101563	312.62	321.21	8.59	558	523	558	523	1082	9	54	52	10
	101637	0.00	33.83	33.83	1032	1058	1032	1058	2091	18	51	51	10
	100826	386.21	387.80	1.59	0	0	3300	3300	6600	11	53	50	13
	100827	387.80	388.67	0.87	4411	5283	4411	5283	9694	10	52	54	13
	101796	287.04	287.41	0.37	0	0	6210	6210	12420	10	53	50	8
	101798	287.41	288.37	0.96	4541	5705	5224	5224	10447	10	53	50	10

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
60W-1	132	138	Divided	11.5	10.3	7.8		6.0	6.0	100%
60W-2	120	132	Divided	10.9	11.2	8.0		12.0	11.8	99%
60W-3	111	120	Divided	9.4	9.0			7.3	7.3	72%
93-4	183	200	Undivided	8.7		N/A	N/A	15.3	12.5	81%
93-5	166	183	Undivided	5.7		N/A	N/A	10.3	7.8	82%
93-6	149	166	Divided	9.1	8.8			12.5	12.8	80%
93-7	132	166	Divided	9.9	11.0			14.3	16.8	91%
93-8	124	132	Divided	9.0	11.0			7.8	8.0	98%
93-9	106	124	Undivided	1.0		N/A	N/A	0.0	3.0	48%
93-10	91	106	Divided	8.0	10.0			15.0	15.0	47%
93-11	67	71	Divided	0.0	0.0			0.0	0.0	100%
93-12	53	67	Divided	8.0	5.3			14.0	8.5	77%
93-13	42	53	Divided	10.00	0.4			11.0	0.5	87%
93-14	29	42	Divided	8.00	0.7			13.0	1.0	54%
93-15	17	29	Divided	8.00	0.3			12.0	0.5	54%
93-16	0	17	Divided	8.00	8.0			17.0	17.0	84%

AZTDM Data

SEGMENT	Growth Rate	% Non-SOV
60W-1	3.56%	20.1%
60W-2	5.10%	16.2%
60W-3	6.05%	10.3%
93-4	1.88%	15.3%
93-5	1.78%	9.6%
93-6	1.65%	7.9%
93-7	1.65%	11.3%
93-8	1.66%	11.1%
93-9	1.66%	5.7%
93-10	1.66%	5.7%
93-11	1.79%	19.4%
93-12	1.47%	20.9%
93-13	1.12%	7%
93-14	1.71%	10%
93-15	1.75%	7%
93-16	1.75%	0%

HERS Capacity Calculation Data

Segment	Capacity Environment Type	Facility Type	Terrain	Lane Width	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	PHF	E_T	f_{HV}	f_M	f_A	g/C	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
60W-1	3	Urban	Level	12.00	11.50	10.33	1.0	N/A	N/A	N/A	0.9	2	0.926	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1742.19	33,185
60W-2	3	Fringe Urban	Level	12.00	10.88	11.22	1.0	N/A	N/A	N/A	0.9	2	0.929	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1748.04	33,296
60W-3	2	Rural	Level	12.00	9.38	9.00	0.0	0	0	N/A	0.88	1.5	0.967	0	3.25	N/A	N/A	N/A	N/A	N/A	53.75	53.75	3530	3530	N/A	67,239
93-4	3	Fringe Urban	Level	12.00	8.70		1.0	N/A	N/A	N/A	0.9	2	0.904	N/A	N/A	0.55	N/A	N/A	1.00	N/A	N/A	N/A	N/A	N/A	849.79	16,186
93-5	4	Rural	Level	12.00	5.74		0.0	N/A	N/A	N/A	0.88	1.4	0.962	N/A	0.25	N/A	1	3.30	1.00	N/A	74.75	74.75	N/A	N/A	1715.58	32,678
93-6	4	Rural	Level	12.00	9.12	8.75	0.0	N/A	N/A	N/A	0.88	1.4	0.967	N/A	0.25	N/A	1	1.90	N/A	N/A	74.75	74.75	N/A	N/A	1800.41	34,294
93-7	2	Rural	Level	12.00	9.94	11.00	0.0	0	0	N/A	0.88	1.5	0.962	0	0.5	N/A	N/A	N/A	N/A	N/A	64.50	64.50	3725	3725	N/A	70,957
93-8	2	Rural	Level	12.00	9.00	11.00	0.0	0	0	N/A	0.88	1.5	0.962	0	1.25	N/A	N/A	N/A	N/A	N/A	63.75	63.75	3725	3725	N/A	70,957
93-9	4	Rural	Level	12.00	1.00		4.2	N/A	N/A	N/A	0.88	1.2	0.989	N/A	0.75	N/A	1	1.50	1.00	N/A	70.05	70.05	N/A	N/A	1600.67	30,489
93-10	2	Rural	Level	12.00	8.00	10.00	0.0	0	0	N/A	0.88	1.5	0.980	0	0.25	N/A	N/A	N/A	N/A	N/A	64.75	64.75	3796	3796	N/A	72,311
93-11	3	Urban	Level	12.00	0.00	0.00	1.0	N/A	N/A	N/A	0.92	2	0.915	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1759.74	33,519
93-12	2	Rural	Level	12.00	8.00	5.25	0.0	0	0	N/A	0.88	1.5	0.958	0	0.5	N/A	N/A	N/A	N/A	N/A	64.50	64.50	3710	3710	N/A	70,676
93-13	2	Rural	Level	12.00	10.00	0.36	0.0	1.3	1.3	N/A	0.88	1.5	0.962	0	0.5	N/A	N/A	N/A	N/A	N/A	63.20	63.20	3726	3726	N/A	70,971
93-14	2	Rural	Level	12.00	8.00	0.69	0.0	1.3	1.3	N/A	0.88	1.5	0.963	0	0.5	N/A	N/A	N/A	N/A	N/A	63.20	63.20	3730	3730	N/A	71,049
93-15	2	Rural	Level	12.00	8.00	0.33	0.0	1.3	1.3	N/A	0.88	1.5	0.964	0	0.5	N/A	N/A	N/A	N/A	N/A	63.20	63.20	3732	3732	N/A	71,076
93-16	2	Rural	Level	12.00	8.00	8.00	0.0	0	0	N/A	0.88	1.5	0.964	0	0.25	N/A	N/A	N/A	N/A	N/A	60.75	60.75	3732	3732	N/A	71,076

Safety Performance Area Data

Segment	Operating Environment	Segment Length (miles)	SB/EB Fatal Crashes 2010-2014	NB/WB Fatal Crashes 2010-2014	SB/EB Incapacitating Injury Crashes	NB/WB Incapacitating Injury Crashes	Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors
60W-1	2 or 3 or 4 Lane Divided Highway	6	3	1	3	5	6
60W-2	2 or 3 or 4 Lane Divided Highway	12	1	1	4	7	9
60W-3	2 or 3 or 4 Lane Divided Highway	9	2	2	3	7	8
93-4	2 or 3 Lane Undivided Highway	17	4	4	5	1	7
93-5	2 or 3 Lane Undivided Highway	17	4	1	4	5	6
93-6	2 or 3 or 4 Lane Divided Highway	17	3	1	5	5	4
93-7	2 or 3 or 4 Lane Divided Highway	17	0	0	3	9	5
93-8	2 or 3 or 4 Lane Divided Highway	8	0	0	1	0	0
93-9	2 or 3 Lane Undivided Highway	18	2	3	2	4	5
93-10	2 or 3 or 4 Lane Divided Highway	15	3	1	2	2	4
93-11	2 or 3 or 4 Lane Divided Highway	4	3	1	1	1	1
93-12	2 or 3 or 4 Lane Divided Highway	14	1	1	4	6	8
93-13	2 or 3 or 4 Lane Divided Highway	11	3	2	8	4	10
93-14	2 or 3 or 4 Lane Divided Highway	13	1	3	4	7	5
93-15	2 or 3 or 4 Lane Divided Highway	12	0	2	6	10	5
93-16	2 or 3 or 4 Lane Divided Highway	17	0	2	1	5	4

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
60W-1	2 or 3 or 4 Lane Divided Highway	2	2	0	7828	7614	15442
60W-2	2 or 3 or 4 Lane Divided Highway	1	3	0	5139	5006	10145
60W-3	2 or 3 or 4 Lane Divided Highway	0	3	0	6941	6899	13840
93-4	2 or 3 Lane Undivided Highway	0	1	0	3855	3753	7608
93-5	2 or 3 Lane Undivided Highway	3	0	0	3709	3815	7524
93-6	2 or 3 or 4 Lane Divided Highway	3	5	0	3614	3708	7322
93-7	2 or 3 or 4 Lane Divided Highway	1	1	0	3460	3513	6972
93-8	2 or 3 or 4 Lane Divided Highway	0	0	0	3460	3513	6972
93-9	2 or 3 Lane Undivided Highway	1	2	0	3495	3517	7012
93-10	2 or 3 or 4 Lane Divided Highway	0	0	0	4531	4656	9187
93-11	2 or 3 or 4 Lane Divided Highway	0	1	0	8953	9487	18440
93-12	2 or 3 or 4 Lane Divided Highway	2	1	0	4983	4964	9947
93-13	2 or 3 or 4 Lane Divided Highway	0	0	0	5009	4999	10008
93-14	2 or 3 or 4 Lane Divided Highway	0	3	0	5712	5755	11467
93-15	2 or 3 or 4 Lane Divided Highway	2	3	0	5862	5917	11780
93-16	2 or 3 or 4 Lane Divided Highway	0	2	0	5798	5871	11671

HPMS Data

2010-2014 Weighted Average						2014			2013			2012			2011			2010		
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	NB/WB AADT	SB/EB AADT	2014 AADT	NB/WB AADT	SB/EB AADT	2014 AADT	NB/WB AADT	SB/EB AADT	2014 AADT	NB/WB AADT	SB/EB AADT	2014 AADT
60W-1	138	132	7828	7614	15442	8553	8075	16628	7679	7808	15487	7673	6895	14567	7371	7429	14800	7863	7863	15727
60W-2	132	120	5139	5006	10145	5840	5936	11776	5360	4839	10200	5624	5488	11111	4728	4625	9354	4142	4142	8283
60W-3	120	111	6941	6899	13840	7330	7450	14780	7315	7311	14626	6636	6600	13236	7090	6800	13891	6334	6334	12668
93-4	200	183	3855	3753	7608	3978	3970	7948	4402	3893	8295	3382	3339	6721	3649	3574	7223	3865	3990	7855
93-5	183	166	3709	3815	7524	4072	4072	8144	5046	5497	10543	3621	3621	7242	2933	2933	5867	2874	2949	5823
93-6	166	149	3614	3708	7322	3974	4003	7977	4296	4614	8911	3512	3588	7098	3226	3226	6451	3063	3110	6174
93-7	149	132	3460	3513	6972	3716	3771	7487	3507	3573	7080	3224	3368	6590	3553	3553	7105	3300	3300	6600
93-8	132	124	3460	3513	6972	3716	3771	7487	3507	3573	7080	3224	3368	6590	3553	3553	7105	3300	3300	6600
93-9	124	106	3495	3517	7012	3775	3787	7562	3503	3594	7098	3575	3646	7221	3828	3764	7591	2794	2794	5588
93-10	106	91	4531	4656	9187	4683	4755	9439	4322	4487	8810	4886	4886	9772	5212	5100	10312	3549	4051	7601
93-11	71	67	8953	9487	18440	8745	9185	17931	8933	9220	18153	9867	9799	19666	8707	8707	17413	8514	10522	19036
93-12	67	53	4983	4964	9947	6519	6550	13069	4466	4444	8910	4337	4299	8636	5158	5158	10317	4435	4370	8805
93-13	53	42	5009	4999	10008	6567	6567	13134	4804	4804	9607	4637	4637	9273	4851	4851	9703	4184	4138	8322
93-14	42	29	5712	5755	11467	6718	6637	13357	6022	6113	12136	6057	6057	12114	5447	5577	11024	4314	4392	8706
93-15	29	17	5862	5917	11780	6744	6640	13387	6141	6257	12399	6242	6242	12484	5782	5948	11730	4400	4500	8900
93-16	17	0	5798	5871	11671	6753	6652	13408	5938	6050	11989	6036	6036	12072	5791	6039	11830	4474	4580	9054

Freight Performance Area Data

			Total minutes of closures		Avg Mins/Mile/Year	
Segment	Length (miles)	# of closures	NB (or WB)	SB (or EB)	NB (or WB)	SB (or EB)
60W-1	6	9	507.0	1039.0	16.90	34.63
60W-2	12	6	0.0	1198.0	0.00	19.97
60W-3	9	16	505.0	1741.0	11.22	38.69
93-4	17	14	1603.0	15250.3	18.86	179.42
93-5	17	20	3544.0	772.0	41.69	9.08
93-6	17	15	1146.0	2481.0	15.28	33.08
93-7	17	11	3192.0	1169.0	37.55	13.75
93-8	8	4	0.0	271.0	0.00	6.78
93-9	18	27	4792.0	787.0	53.24	8.74
93-10	15	16	0.0	2618.0	0.00	34.91
93-11	4	12	150.0	1209.1	7.50	60.45
93-12	14	6	462.0	583.0	6.60	8.33
93-13	11	7	1503.0	387.0	27.33	7.04
93-14	13	7	274.0	1321.0	4.22	20.32
93-15	12	7	0.0	1183.0	0.00	19.72
93-16	17	15	616.0	2304.0	7.25	27.11

	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 EB)	SB (or EB)	NB (or WB)	SB (or EB)
60W-1	0	0	6	6	0	0	0	0	0	0	0	0
60W-2	0	0	15	1	0	0	0	1	0	0	0	0
60W-3	0	0	13	8	0	0	5	1	0	0	0	0
93-4	0	0	17	14	0	0	4	1	0	0	0	0
93-5	0	0	6	2	0	0	1	0	0	0	0	0
93-6	0	0	8	9	0	0	0	0	0	0	0	1
93-7	0	0	1	0	0	0	0	0	0	0	0	1
93-8	0	0	1	0	0	0	0	0	0	0	0	0
93-9	0	0	4	7	0	0	0	0	0	0	1	1
93-10	0	0	11	3	0	0	0	2	0	0	1	2
93-11	0	0	1	6	0	0	0	0	0	0	1	3
93-12	0	0	13	8	0	0	0	0	0	0	2	4
93-13	0	0	0	2	0	0	0	0	0	0	0	1
93-14	0	0	3	0	0	0	1	0	0	0	0	0
93-15	0	0	7	7	0	0	0	0	0	0	0	0
93-16	0	0	0	0	0	0	0	0	0	0	0	0

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

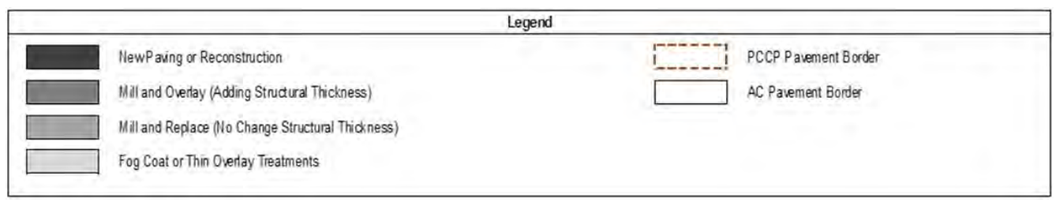
Appendix D: Needs Analysis Contributing Factors and Scores

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
1	6	138-132	None	High	Medium	High	
2	12	132-120	None	High	Medium	High	
3	9	120-111	None	Low	Low	Low	
4	17	200-183	None	Low	Low	Low	
5	17	183-166	None	Medium	Medium	Medium	
6	17	166-149	Low	Low	Low	Low	MP 153-149 Northbound
7	17	149-132	Low	Low	Medium	Low	MP 133-132 Southbound
8	8	132-124	Low	Medium	Low	Medium	MP 132-130 Southbound
9	18	124-106	None	High	Medium	High	
10	15	106-91	None	Medium	High	High	
11	4	71-67	Low	High	Low	High	MP 71-70 Northbound
12	14	67-53	Low	High	Low	High	MP 61-60 Southbound
13	11	53-42	None	Medium	Medium	Medium	
14	13	42-29	Low	Medium	Low	Medium	MP 35-34 Southbound, MP 33-32 Southbound
15	12	29-17	None	High	Low	High	
16	17	17-0	None	High	Low	High	

Pavement History

Pavement Treatment Reference numbers are provided in the legend on the following page.



Pavement History (continued)

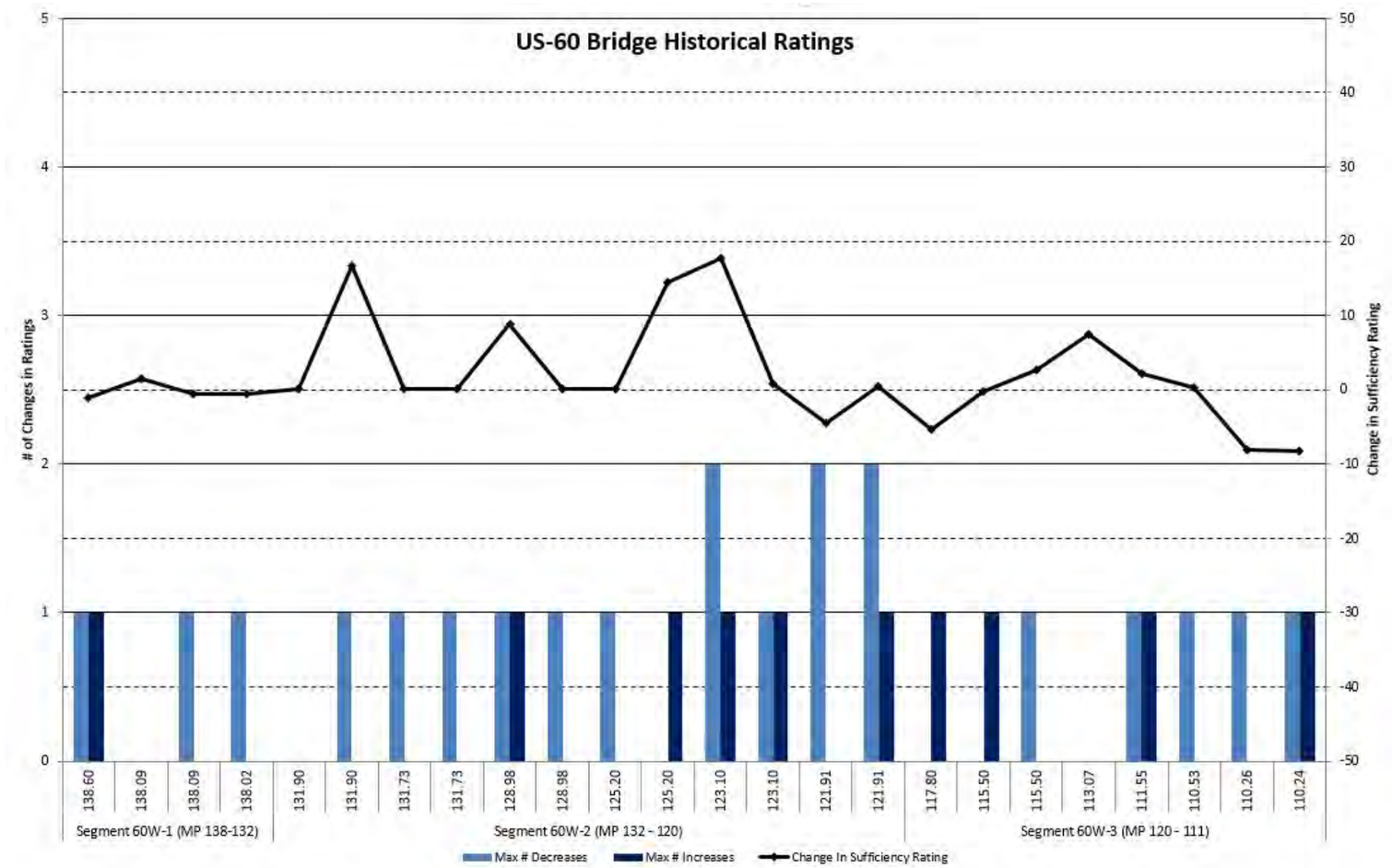
Pavement Treatment Reference Numbers		
1 **2011 (WB)** : 6- Aggregate Base, 8-AC, 0.50- ACFC With Asphaltic Rubber	38 **2003 (NB)** : 6- Aggregate Base, 5-AC, 0.50- ACFC With Asphaltic Rubber	75 **2006 (SB)** : 0.50-Remove Existing Material, 2- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber
2 **2003 (EB)** : 6- Aggregate Base, 8-AC, 0.50- ACFC With Asphaltic Rubber	39 **2000 (NB)** : 6- Aggregate Base, 5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	76 **1996 (NB/SB)** : 1.50- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber
3 **2011 (WB)** : 2- Remove Existing Material, 2- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber	40 **2008 (SB)** : 7.5- Aggregate Base, 6-AC, 0.50- ACFC With Asphaltic Rubber	77 **1998 (NB)** : 8-Aggregate Base, 4-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber
4 **2003 (WB/EB)** : 1- Remove Existing Material, 4- AC, 0.50- ACFC With Asphaltic Rubber	41 **2003 (SB)** : 6- Aggregate Base, 5-AC, 0.50- ACFC With Asphaltic Rubber	78 **1998 (SB)** : 8-Aggregate Base, 4-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber
5 **2003 (EB)** : 6- Aggregate Base, 8-AC, 0.50- ACFC With Asphaltic Rubber	42 **2003 (SB)** : 2- Removal of Existing Material, 5-AC, 0.50- ACFC With Asphaltic Rubber	79 **1996 (NB/SB)** : 1.50- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber
6 **1998 (WB/SB)** : 0.30- Seal Coat - Cover Material With Emulsified Asphalt, 0- Flush Coat Or Fog Seal Or Fog Coat	43 **2000 (SB)** : 6- Aggregate Base, 5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	80 **2012 (NB)** : 0.50- Remove Existing Material, 0.50- ACFC With Asphaltic Rubber
7 **2011 (WB/EB)** : 0.75- Remove Existing Material, 0.50-ACFC With Asphaltic Rubber	44 **2003 (SB)** : 4- Aggregate Base, 7-AC, 0.50- ACFC With Asphaltic Rubber	81 **2010 (SB)** : 8-Aggregate Base, 6-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber
8 **2011 (WB/EB)** : 4- Remove Existing Material, 3.5- AC, 0.50- ACFC With Asphaltic Rubber	45 **2003 (NB)** : 4- Aggregate Base, 7-AC, 0.50- ACFC With Asphaltic Rubber	82 **2007 (NB)** : 3.50- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
9 **2003 (WB)** : 1- Remove Existing Material, 4-AC, 0.50-ACFC With Asphaltic Rubber	46 **2003 (NB)** : 2- AC, 0.50- ACFC With Asphaltic Rubber	83 **2008 (SB)** : 9-Aggregate Base, 6-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber
10 **2003 (EB)** : 10- Aggregate Base, 8-AC, 0.50- ACFC With Asphaltic Rubber	47 **2004 (NB/SB)** : 6- Aggregate Base, 5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	84 **2007 (SB)** : 6- Aggregate Base, 6-AC, 0.50-ACFC with Asphaltic Rubber
11 **1998 (WB/EB)** : 2- AC, 0.30- Seal Coat - Cover Material With Emulsified Asphalt	48 **2003 (SB)** : 6- Aggregate Base, 5-AC, 0.50- ACFC With Asphaltic Rubber	85 **2007 (NB/SB)** : 3.50- Removalof Existing Material, 3-AC, 0.50-ACFC Asphaltic Concrete Friction Course
12 **1998 (EB)** : 2.5- Remove Existing Material, 2.5- AC, 0.30- Seal Coat - Cover Material With Emulsified Asphalt	49 **1999 (SB)** : 8- Aggregate Base, 5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	86 **1996 (NB/SB)** : 0-Geogrid Base Reinforcement, 1.50- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber
13 **1999 (WB)** : 4- Remove Existing Material, 4- AC, 0.30- Seal Coat - Cover Material With Emulsified Asphalt	50 **2006 (NB)** : 6.5- Aggregate Base, 6-AC, 0.50- ACFC With Asphaltic Rubber	87 **2012 (NB/SB)** : 3.5- Removal of Existing Material, 3- AC, 0.50- ACFC With Asphaltic Rubber
14 **1997 (WB/EB)** : 4- Remove Existing Material, 4- AC, 0.50- ACFC With Asphaltic Rubber	51 **1999 (NB)** : 8- Aggregate Base, 5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	88 **2012 (NB/SB)** : 4.5- Removal of Existing Material, 4- AC, 0.50- ACFC With Asphaltic Rubber
15 **2011 (WB/EB)** : 3- Remove Existing Material, 2.5- AC, 0.50- ACFC Asphaltic Concrete Friction Course	52 **2006 (SB)** : 6.5- Aggregate Base, 6-AC, 0.50- ACFC With Asphaltic Rubber	89 **1999 (SB)** : 7-Aggregate Base, 5.5-Asphaltic Concrete, 0.50-ACFC Asphaltic Concrete Friction Course
16 **2010 (WB/EB)** : 3- Remove Existing Material, 3- AC, 0.50- ACFC With Asphaltic Rubber	53 **1995 (SB)** : 4- Aggregate Base, 5.5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	90 **1999 (NB)** : 7-Aggregate Base, 5.5-Asphaltic Concrete, 0.50-ACFC Asphaltic Concrete Friction Course
17 **2010 (NB/SB)** : 8- Aggregate Base, 7-AC, 0.50- ACFC With Asphaltic Rubber	54 **1995 (NB)** : 4- Aggregate Base, 5.5-AC, 0.50- ACFC Asphaltic Concrete Friction Course	91 **1998 (NB/SB)** : 6.89- Aggregate Base, 5.5- AC, 0.60- ACFC Asphaltic Concrete Friction Course
18 **2009 (NB/SB)** : 3- Removal of Existing Material, 3- AC, 0.50- ACFC With Asphaltic Rubber	55 **1995 (NB)** : 10- Aggregate Base, 7-AC, 0.50- ACFC With Asphaltic Rubber	92 **1999 (NB/SB)** : 7- Aggregate Base, 5.5- AC, 0.50- ACFC Asphaltic Concrete Friction Course
19 **2014 (NB)** : 0.50- Removal of Existing Material, 0.50- ACFC With Asphaltic Rubber	56 **2004 (NB)** : 3.5- Removal of Existing Material, 3- AC, 0.50- ACFC With Asphaltic Rubber	93 **2006 (SB)** : 0.50- Removal of Existing Material, 0.50 ACFC With Asphaltic Rubber
20 **2004 (NB/SB)** : 0.50- Removal of Existing Material, 0.50- ACFC With Asphaltic Rubber	57 **2004 (NB)** : 6- Aggregate Base, 6-AC, 0.50- ACFC With Asphaltic Rubber	94 **2006 (SB)** : 3.50- Removal of Existing Material, 3- AC, 0.50 ACFC With Asphaltic Rubber
21 **2014 (SB)** : 11- Aggregate Base, 4-AC, 0.50- ACFC With Asphaltic Rubber	58 **2004 (SB)** : 6- Aggregate Base, 6-AC, 0.30- ACFC With Asphaltic Rubber	95 **2006 (SB)** : 3.50- Removal of Existing Material, 3- AC, 0.50 ACFC With Asphaltic Rubber
22 **2003 (NB/SB)** : 3.50- Removal of Existing Material, 5- AC, 0.50- ACFC With Asphaltic Rubber	59 **2004 (SB)** : 3.5- Removal of Material , 3-AC, 0.50- ACFC With Asphaltic Rubber	96 **2001 (NB/SB)** : 0.50- ACFC Asphaltic Concrete Friction Course
23 **2008 (NB)** : 0- Flush Coat Or Fog Seal Or Fog Coat	60 **1995 (NB/SB)** : 0.30- Seal Coat - Cover Material With Emulsified Asphalt	97 **1999 (SB)** : 2.5- AC, 0.50-ACFC With Asphaltic Rubber
24 **2000 (SB)** : 12- Aggregate Base, 3- AC, 0- Flush Coat Or Fog Seal Or Fog Coat	61 **2002 (NB)** : 2.5- AC, 0.50- ACFC With Asphaltic Rubber	98 **1999 (NB)** : 2- Removal of Existing Material, 4.50- AC, 0.50 ACFC With Asphaltic Rubber
25 **2000 (NB)** : 12- Aggregate Base, 3- AC, 0- Flush Coat Or Fog Seal Or Fog Coat	62 **2005 (NB/SB)** : 2.5- Removal of Existing Material, 2-AC, 0.50- ACFC With Asphaltic Rubber	99 **1999 (NB)** : 2- Removal of Existing Material, 4.50- AC, 0.50 ACFC With Asphaltic Rubber
26 **2000 (NB/SB)** : 0.5- Removal of Existing Material, 3.5- AC, 0.50- ACFC With Asphaltic Rubber	63 **2012 (NB/SB)** : 0.50-Remove Existing Material, 0.50- ACFC With Asphaltic Rubber	100 **1999 (SB)** : 36- Mix And Compacted Existing Materials, 5- AC, 0.50- ACFC With Asphaltic Rubber
27 **2003 (SB)** : 3.50- Removal of Existing Material, 5- AC, 0.50- ACFC With Asphaltic Rubber	64 **2012 (NB/SB)** : 8-Aggregate Base, 7-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber	101 **1999 (SB)** : 2.50- Removal of Existing Material, 5- AC, 0.50 AC with Asphaltic Rubber
28 **1999 (NB/SB)** : 2- Removal of Material , 2-AC, 0.50- ACFC With Asphaltic Rubber	65 **2012 (NB/SB)** : 8-Aggregate Base, 6-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber	102 **2000 (NB)** : 0.50 Removal of Existing Material, 0.50 ACFC With Asphaltic Rubber
29 **2003 (NB)** : 2- AC, 0.50- ACFC With Asphaltic Rubber	66 **2005 (NB/SB)** : 10- Aggregate Base, 8-AC, 0.50- ACFC With Asphaltic Rubber	103 **2010 (NB)** : 1- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
30 **2000 (NB/SB)** : 0.50- Removal of Existing Material, 3.5- AC, 0.50- ACFC With Asphaltic Rubber	67 **2012 (NB)** : 0.50-Remove Existing Material, 0.50- ACFC With Asphaltic Rubber	104 **2010 (SB)** : 1- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
31 **1999 (SB)** : 2- Removal of Material , 2-AC, 0.50- ACFC With Asphaltic Rubber	68 **2012 (SB)** : 8-Aggregate Base, 7-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber	105 **2010 (SB)** : 10 Aggregate Base, 5- AC, 0.50- ACFC With Asphaltic Rubber
32 **1999 (NB)** : 2- Removal of Material , 2-AC, 0.50- ACFC With Asphaltic Rubber	69 **2008 (NB/SB)** : 8-Aggregate Base, 6-Asphaltic Concrete, 0.50-ACFC With Asphaltic Rubber	106 **2010 (NB)** : 2.5- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
33 **2000 (NB/SB)** : 3-AC, 0.50- ACFC With Asphaltic Rubber	70 **2006 (NB/SB)** : 1.50- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber	107 **2010 (SB)** : 2.5- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
34 **1998 (NB/SB)** : 0.30- Seal Coat - Cover Material With Emulsified Asphalt	71 **2006 (NB/SB)** : 0.50-Remove Existing Material, 2- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber	108 **2010 (NB)** : 1- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
35 **1998 (NB/SB)** : 6- Aggregate Base, 3-AC, 0.30- Seal Coat - Cover Material With Emulsified Asphalt	72 **2006 (NB/SB)** : 0.50- Remove Existing Material, 2- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber	109 **2010 (NB)** : 10 Aggregate Base, 5- AC, 0.5- ACFC with Asphaltic Rubber
36 **2011 (NB/SB)** : 0.50- Removal of Existing Material, 0.50- ACFC With Asphaltic Rubber	73 **2006 (NB)** : 0.50-Remove Existing Material, 2- AC with Asphaltic Rubber, 0.50- ACFC With Asphaltic Rubber	110 **2010 (NB)** : 2.50- Removal of Existing Material, 3-AC, 0.50-ACFC with Asphaltic Rubber
37 **2008 (NB)** : 7.5- Aggregate Base, 6-AC, 0.50- ACFC With Asphaltic Rubber	74 **1999 (SB)** : 8- Aggregate Base, 4- AC, 0.50 - ASFC Asphaltic Concrete Friction Course	

Value	Level	Segment Number 1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16	
		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	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			75%	15%	54%				55%	9%	35%				18%		38%				50%						64%		100%		33%		
1	L1			15%	38%						24%				6%		13%										64%		46%				
1																																	
1																																	
3					42%		22%	31%	25%				12%	6%		100%		6%	6%	13%	27%		80%	86%	14%	36%				50%		3%	
3					27%		56%									25%			17%	40%			80%	46%	14%	36%							
3	L2															25%								86%		36%							
3																								46%									
3																								79%									
3																								46%									
4		17%	67%	12%	8%		17%		8%	12%	29%	12%	26%	21%		38%		14%	11%		13%			79%	7%	36%		50%		33%		31%	
4			92%		85%		22%		55%	6%	18%			12%		31%		14%	31%		57%			39%		100%		4%		50%		25%	
4					15%					6%	32%			6%					25%									50%		100%		31%	
4	L3									6%	9%								25%									4%		100%		25%	
4											3%																	50%				13%	
4																												50%				6%	
4											9%																	46%				13%	
6		17%		23%				28%	6%	9%	9%	21%		21%	29%	31%		11%	17%	17%		50%	20%		7%					4%		25%	100%
6		50%		8%						6%		24%		18%		44%		8%	22%	23%		40%	70%		14%							44%	
6		42%										9%		26%				6%	6%	40%												34%	
6	L4											21%		18%				8%	11%														
6												12%		26%					39%														
6												9%		9%					39%														
6												18%		6%																			
6												21%		6%																			
Sub-Total		7.2	7.1	2.6	7.3	0.0	3.9	2.6	4.2	2.1	5.2	8.4	1.4	9.5	2.0	11.8	0.5	3.3	12.3	6.4	4.1	5.4	10.2	16.4	2.4	8.7	1.3	10.2	1.5	13.1	0.3	12.0	6.0
Total		**10.7**		**8.6**		**3.9**		**5.5**		**6.3**		**5.6**		**6.7**		**6.4**		**14.0**		**7.3**		**12.9**		**10.6**		**5.6**		**6.5**		**6.9**		**12.0**	

Bridge Performance Needs Analysis

Segment	Segment Length (Miles)	Segment Mileposts (MP)	Number of Bridges in Segment	# Functionally Obsolete Bridges	Final Need	Contributing Factors			Comments
						Bridge	Current Ratings	Historical Review	
1	6	138-132	4	0	Low	McMicken Dam Fldwy Bridge WB (#472) (MP138.09)	Current Structural Evaluation Rating of 5	Not identified in historical review	
2	12	132-120	12	0	Low	Morristown RR OP WB (#894) (MP 121.91)	Current Deck Rating of 5	Not identified in historical review	
3	9	120-111	6	0	None	No bridges with current ratings less than 6.			
4	17	200-183	2	0	None	No bridges with current ratings less than 6.			
5	17	183-166	2	0	Medium	Date Creek Bridge (#2366) (MP 174.2)	Current Deck Rating of 5	Not identified in historical review	
6	17	166-149	7	0	Low	Big Jim Wash Bridge (#548) (MP 165.54)	Current Deck & Structual Evaluation Rating of 5	Not identified in historical review	
7	17	149-132	4	0	Low	Burro Creek Bridge SB (#846) (MP 139.07)	Current Deck Rating of 5	Not identified in historical review	
8	8	132-124	11	0	Low	Big Sandy River Bridge NB(#2355) (MP 127)	Current Deck Rating of 5	Not identified in historical review	
9	18	124-106	8	0	Low	Cane Springs Bridge (#637) (MP 108.63)	Current Superstructure and Structual Evaluation Rating of 5	Not identified in historical review	
						Natural Corral Bridge (#639) (MP 121.48)	Current Structural Evaluation Rating of 5	Not identified in historical review	
10	15	106-91	3	0	Low	Kabba Wash Bridge NB (#492) (MP 97.5)	2014 Deck, Superstructure and Structural Evaluation Ratings of 5	Not identified in historical review	
11	4	71-67	3	0	None	SR 68 TI Overpass NB (#2498) (MP 67.06)	No bridges with current ratings less than 6.	Identified in historical review	
12	14	67-53	6	0	Low	Wash Bridge NB (#2365) (MP 64.63)	Current Structural Evaluation Rating of 5	Identified in historical review	
						Cerbat Wash Bridge SB (#1576) (MP 60.24)	No bridges with current ratings less than 6.	Identified in historical review	
13	11	53-42	2	0	None	No bridges with current ratings less than 6.			
14	13	42-29	2	0	None	Detrital Wash Bridge NB (#1916) (MP 35.8)	No bridges with current ratings less than 6.	Identified in historical review	
15	0	29-17	0	0	N/A	No bridges within segment			
16	17	17-0	10	0	None	No bridges with current ratings less than 6.			

Bridge Ratings History

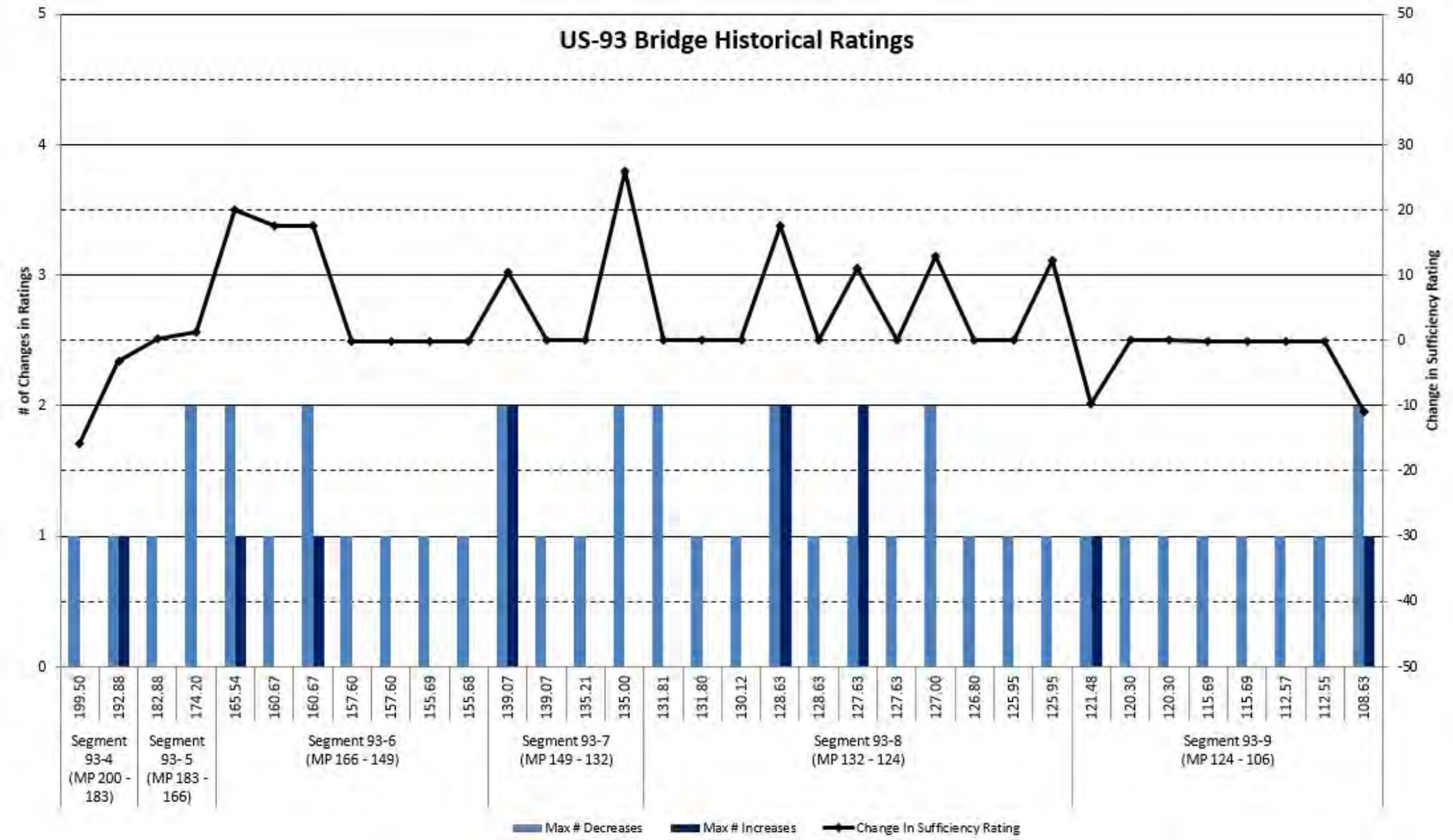


O identifies the bridge indicated is of concern from a historical ratings perspective

Maximum # of 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 # of 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)

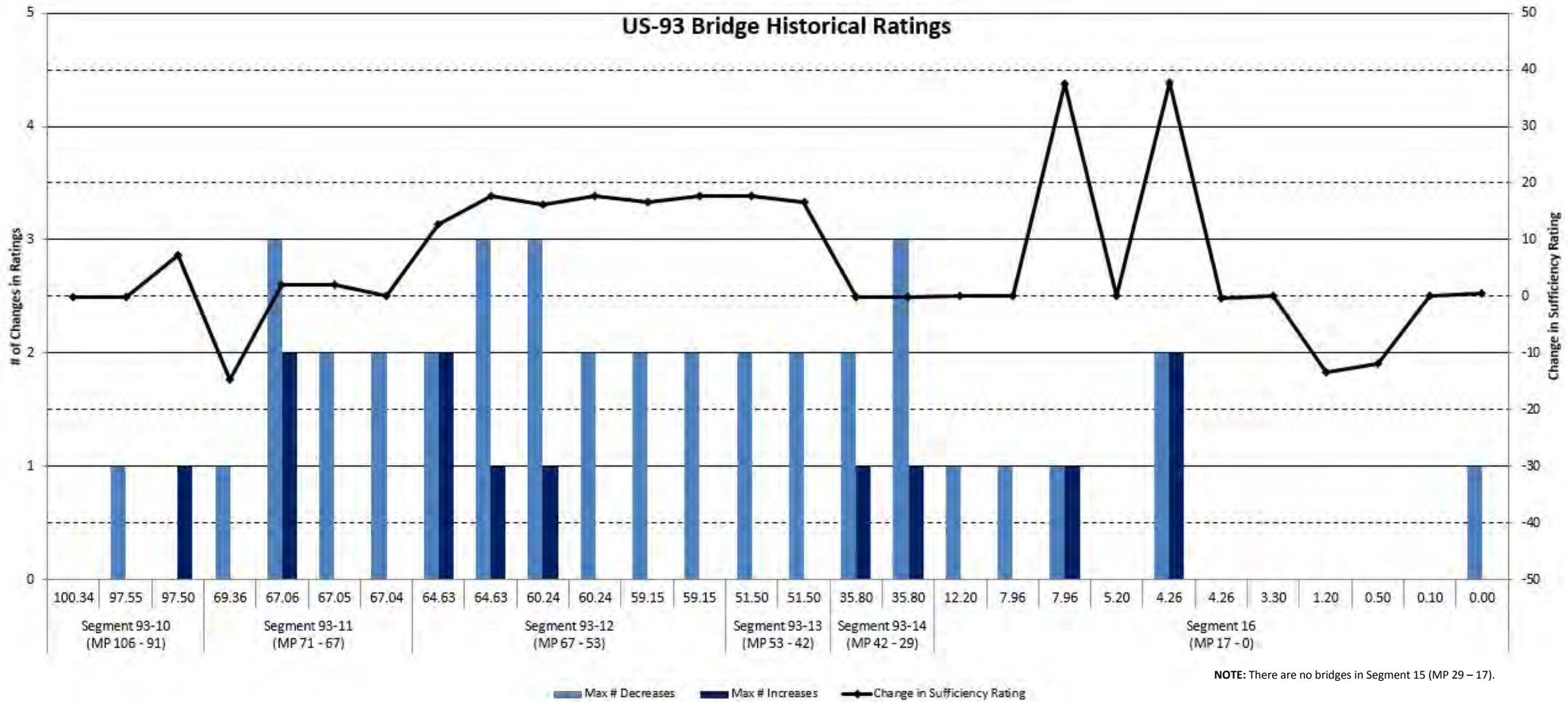


O identifies the bridge indicated is of concern from a historical ratings perspective

Maximum # of 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 # of 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)



NOTE: There are no bridges in Segment 15 (MP 29 – 17).

O identifies the bridge indicated is of concern from a historical ratings perspective

Maximum # of 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 # of 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)	Final Need	Roadway Variables								Traffic Variables					Relevant Mobility Related Existing Infrastructure
				Functional Classification	Environmental Type (Urban/Rural)	Terrain	# of Lanes/ Direction	Speed Limit	Auxiliary Lanes	Divided/ Non-Divided	% No Passing	Existing Level of Service (LOS)	Future 2035 LOS	% Trucks	NB Buffer Index (PTI-TTI)*	SB Buffer Index (PTI-TTI)	
60W-1	138-132	6	Low	State Highway	Urban	Level	2	63	No	Divided	0%	A-C	E/F	7.97	0.40	0.34	
60W-2	132-120	12	Low	State Highway	Fringe Urban	Level	2	63	No	Divided	0%	A-C	E/F	7.61	0.28	0.61	
60W-3	120-111	9	Medium	State Highway	Rural	Level	2	57	No	Divided	0%	A-C	C	6.91	1.43	7.27	DMS MP119 (EB) 113.5 (EB), Rest Area MP116 (EB)
93-4	200-183	17	Low	State Highway	Fringe Urban	Level	1	61	No	Non-Divided	65%	A-C	C	10.67	4.58	0.87	
93-5	183-166	17	Low	State Highway	Rural	Level	1	65	No	Non-Divided	56%	A-C	A/B	9.86	No Data	No Data	
93-6	166-149	17	Low	State Highway	Rural	Level	2	65	No	Divided	0%	A-C	A/B	8.64	0.37	0.39	Passing Lane MP176-175.5 (SB) MP173.5-172.5 (NB)
93-7	149-132	17	Low	State Highway	Rural	Level	2	65	No	Divided	0%	A-C	A/B	7.88	0.55	0.53	
93-8	132-124	8	Low	State Highway	Rural	Level	2	65	No	Both	0%	A-C	A/B	7.88	0.84	0.15	
93-9	124-106	18	Low	State Highway	Rural	Level	1	65	No	Both	14%	A-C	A/B	5.67	0.00	0.03	Rest Area MP122.5 (NB), Passing Lane MP117-116 (NB)
93-10	106-91	15	None	State Highway	Rural	Level	2	65	No	Both	0%	A-C	A/B	3.99	0.42	0.50	
93-11	71-67	4	Low	State Highway	Urban	Level	2	56	No	Divided	0%	A-C	D	9.27	9.84	1.85	DMS MP70 (NB)
93-12	67-53	14	Low	State Highway	Rural	Level	2	65	No	Divided	0%	A-C	A/B	8.71	0.10	0.16	DMS MP66 (SB)
93-13	53-42	11	None	State Highway	Rural	Level	2	65	No	Divided	0%	A-C	A/B	7.84	0.06	0.18	
93-14	42-29	13	Low	State Highway	Rural	Level	2	65	No	Divided	0%	A-C	A/B	7.61	0.06	0.18	
93-15	29-17	12	Low	State Highway	Rural	Level	2	65	No	Divided	0%	A-C	A/B	7.53	0.06	0.18	DMS MP27 (NB)
93-16	17-0	17	None	State Highway	Rural	Level	2	61	No	Divided	0%	A-C	A/B	7.53	0.06	0.18	

* PTI-TTI: Planning Time Index minus Travel Time Index.

Mobility Performance Needs Analysis (continued)

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Type							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents*	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
60W-1	138-132	6	Low	9	9	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Anticipated future growth proximate to Phoenix urban area results in over capacity conditions. 4' shoulder widths minimize bicycle accommodation.
60W-2	132-120	12	Low	6	6	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Anticipated future growth proximate to Phoenix urban area results in over capacity conditions. 4' shoulder widths minimize bicycle accommodation.
60W-3	120-111	9	Medium	16	16	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Anticipated future growth in Wickenburg results in near capacity conditions. High SB TTI and NB/SB PTI, perhaps attributable to counter location within the roundabout and/or density of driveways just south of the roundabouts.
93-4	200-183	17	Low	15	15	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. SB closures dominate. Limited bicycle accommodation on shoulders. Shoulders range from 4-8 feet, except from MP 200-199 where there are no shoulders.
93-5	183-166	17	Low	20	20	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Limited bicycle accommodation on shoulders.
93-6	166-149	17	Low	15	15	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from Low level NB/SB direction PTI.
93-7	149-132	17	Low	11	11	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from High level NB/SB direction PTI. Limited bicycle accommodation on shoulders.
93-8	132-124	8	Low	4	4	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from High level NB direction PTI, potentially attributable to a NB pullout near Nothing , AZ. Limited bicycle accommodation on shoulders.

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 Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
93-9	124-106	18	Low	27	27	100%	0	0%	0	0%	None	Cane Springs Design (MP 109), construct 4-lane divided highway; programmed in FY 21 H8232 Carrow to Stephens (MP 116), construct 4-lane divided highway; programmed in FY 20	Percent of closures due to incidents/accidents above statewide average. Limited bicycle accommodation on shoulders.
93-10	106-91	15	None	16	15	94%	1	6%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from Medium level NB/SB direction PTI. Limited bicycle accommodation on shoulders.
93-11	71-67	4	Low	12	12	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Anticipated future growth in Kingman results in near capacity conditions. Low SB closure extent. NB PTI/TTI Medium/High.
93-12	67-53	14	Low	6	6	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Limited bicycle accommodation on shoulders.
93-13	53-42	11	None	7	7	100%	0	0%	0	0%	None	H8659 Windy Point Road - Mineral Park Road (MP 48), shoulder widening (HSIP); programmed in FY18	Percent of closures due to incidents/accidents above statewide average.
93-14	42-29	13	Low	7	7	100%	0	0%	0	0%	None	H8658 11th Street - Windy Point Road (MP 38), shoulder widening (HSIP); programmed in FY17	Percent of closures due to incidents/accidents above statewide average. Limited bicycle accommodation on shoulders.
93-15	29-17	12	Low	7	7	100%	0	0%	0	0%	None	H8657 White Hills Road - 11th Street (MP 28), shoulder widening; programmed in FY18	Percent of closures due to incidents/accidents above statewide average. Limited bicycle accommodation on shoulders.
93-16	17-0	17	None	16	16	100%	0	0%	0	0%	None	H8408 Willow Beach - White Road (MP 17), construct shoulder widening (HSIP); programmed in FY17	Percent of closures due to incidents/accidents above statewide average.
Statewide HCRS Database Closure Type Average %:						96%		2.8%		1.3%			

* Red text indicates segment % exceeds statewide average %.

HSIP: Highway Safety Improvement Program.

Safety Performance Needs Analysis

		5		6		7		8		Corridor-Wide Crash Characteristics	
Segment Number											
Segment Length (miles)		17		17		17		8			
Segment Milepost (MP)		183-166		166-149		149-132		132-124			
Final Need		High		Low		Low		None			
Segment Crash Summaries (Fatal and Serious Injury Crashes)	**Segment Crash Overview**	**5**	Crashes were fatal	**4**	Crashes were fatal	**0**	Crashes were fatal	**0**	Crashes were fatal	56	Crashes were fatal
		9	Crashes had incapacitating injuries	**10**	Crashes had incapacitating injuries	**12**	Crashes had incapacitating injuries	**1**	Crashes had incapacitating injuries	138	Crashes had incapacitating injuries
		3	Crashes involve trucks	**3**	Crashes involve trucks	**1**	Crashes involve trucks	**0**	Crashes involve trucks	15	Crashes involve trucks
	First Harmful Event Type	86%	Involve Collision with Motor Vehicle	40%	Involve Overturning	25%	Involve Overturning	N/A - Sample size too small		37%	Involve Collision with Motor Vehicle
		7%	Involve Overturning	40%	Involve Other Non-Collision	25%	Involve Collision with Fixed Object			36%	Involve Overturning
		7%	Involve Other Non-Collision	10%	Involve Collision with Motor Vehicle	25%	Involve Other Non-Collision			11%	Involve Collision with Fixed Object
	Collision Type	36%	Involve Head On	90%	Involve Single Vehicle	83%	Involve Single Vehicle	N/A - Sample size too small		57%	Involve Single Vehicle
		21%	Involve Sideswipe (opposite)	10%	Involve Head On	8%	Involve Rear End			11%	Involve Rear End
		14%	Involve Single Vehicle			8%	Involve Other			8%	Involve Head On
	Violation or Behavior	50%	Involve Drove in Opposing Lane	40%	Involve Speed too Fast for Conditions	42%	Involve Speed too Fast for Conditions	N/A - Sample size too small		32%	Involve Speed too Fast for Conditions
		21%	Involve Speed too Fast for Conditions	20%	Involve No Improper Action	33%	Involve Unknown			14%	Involve Inattention/Distraction
		7%	Involve No Improper Action	20%	Involve Inattention/Distraction	8%	Involve No Improper Action			10%	Involve No Improper Action
	Lighting Conditions	57%	Occur in Daylight Conditions	60%	Occur in Daylight Conditions	50%	Occur in Daylight Conditions	N/A - Sample size too small		63%	Occur in Daylight Conditions
		43%	Occur in Dark-Unlighted Conditions	40%	Occur in Dark-Unlighted Conditions	50%	Occur in Dark-Unlighted Conditions			30%	Occur in Dark-Unlighted Conditions
										4%	Occur in Dark-Lighted Conditions
	Surface Conditions	86%	Involve Dry Conditions	90%	Involve Dry Conditions	83%	Involve Dry Conditions	N/A - Sample size too small		92%	Involve Dry Conditions
		7%	Involve Wet Conditions	10%	Involve Wet Conditions	8%	Involve Ice/Frost Conditions			4%	Involve Wet Conditions
		7%	Involve Ice/Frost Conditions			8%	Involve Water (standing or moving)Conditions			2%	Involve Water (standing or moving) Conditions
	First Unit Event	57%	Involve a first unit event of Crossed Centerline	50%	Involve a first unit event of Ran Off the Road (Left)	50%	Involve a first unit event of Ran Off the Road (Right)	N/A - Sample size too small		28%	Involve a first unit event of Motor Vehicle in Transport
		29%	Involve a first unit event of Motor Vehicle in Transport	30%	Involve a first unit event of Ran Off the Road (Right)	17%	Involve a first unit event of Ran Off the Road (Left)			22%	Involve a first unit event of Ran Off the Road (Right)
		7%	Involve a first unit event of Ran Off the Road (Right)	10%	Involve a first unit event of Crossed Centerline	17%	Motor Vehicle in Transport			21%	Involve a first unit event of Ran Off the Road (Left)
	Driver Physical Condition	43%	No Apparent Influence	50%	Unknown	50%	No Apparent Influence	N/A - Sample size too small		47%	No Apparent Influence
		29%	Unknown	40%	No Apparent Influence	33%	Unknown			28%	Unknown
		14%	Under the Influence of Drugs or Alcohol	10%	Other	8%	Fatigued/Fell Asleep			11%	Under the Influence of Drugs or Alcohol
	Safety Device Usage	50%	Air Bag Deployed/Shoulder-Lap Belt	40%	Shoulder And Lap Belt Used	42%	Shoulder And Lap Belt Used	N/A - Sample size too small		46%	Shoulder And Lap Belt Used
		36%	Shoulder And Lap Belt Used	40%	Helmet Used	25%	None Used			21%	None Used
		7%	None Used	10%	None Used	17%	Air Bag Deployed/Shoulder-Lap Belt			13%	Air Bag Deployed/Shoulder-Lap Belt
Hot Spot Crash Summaries		None		None		147-146 (NB)		None			
Previously Completed Safety-Related Projects								MP 124 Median Crossover, intersection improvements (2015)			
District Interviews/Discussions											
Contributing Factors		- Misjudges speed of oncoming traffic - Poor nighttime visibility or lighting - Narrow shoulders		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders - Inadequate roadside clearance					

		9		10		11		12		Corridor-Wide Crash Characteristics	
Segment Number											
Segment Length (miles)		**18**		**15**		**4**		**14**			
Segment Milepost (MP)		**124-106**		**106-91**		**71-67**		**67-53**			
Final Need		High		None		High		Low			
Segment Crash Summaries (Fatal and Serious Injury Crashes)	**Segment Crash Overview**	**5**	Crashes were fatal	**4**	Crashes were fatal	**2**	Crashes were fatal	**3**	Crashes were fatal	56	Crashes were fatal
		9	Crashes had incapacitating injuries	**3**	Crashes had incapacitating injuries	**1**	Crashes had incapacitating injuries	**10**	Crashes had incapacitating injuries	138	Crashes had incapacitating injuries
		1	Crashes involve trucks	**0**	Crashes involve trucks	**0**	Crashes involve trucks	**2**	Crashes involve trucks	15	Crashes involve trucks
	First Harmful Event Type	50%	Involve Overturning	80%	Involve Overturning	N/A - Sample size too small		38%	Involve Overturning	37%	Involve Collision with Motor Vehicle
		25%	Involve Collision with Fixed Object	20%	Involve Collision with Fixed Object			31%	Involve Collision with Motor Vehicle	36%	Involve Overturning
		13%	Involve Collision with Motor Vehicle	0%	Involve Collision with Motor Vehicle			15%	Involve Other Non-Collision	11%	Involve Collision with Fixed Object
	Collision Type	88%	Involve Single Vehicle	100%	Involve Single Vehicle	N/A - Sample size too small		62%	Involve Single Vehicle	57%	Involve Single Vehicle
		13%	Involve Head On					31%	Involve Angle	11%	Involve Rear End
								8%	Involve Rear End	8%	Involve Head On
	Violation or Behavior	38%	Involve Speed too Fast for Conditions	40%	Involve Speed too Fast for Conditions	N/A - Sample size too small		38%	Involve Speed too Fast for Conditions	32%	Involve Speed too Fast for Conditions
		25%	Involve No Improper Action	40%	Involve Failure to Keep in Proper Lane Conditions			15%	Involve No Improper Action	14%	Involve Inattention/Distraction
		13%	Involve Failure to Yield Right-of-Way	20%	Involve Unsafe Lane Change			15%	Involve Failure to Yield Right-of-Way	10%	Involve No Improper Action
	Lighting Conditions	88%	Occur in Daylight Conditions	60%	Occur in Daylight Conditions	N/A - Sample size too small		77%	Occur in Daylight Conditions	63%	Occur in Daylight Conditions
		13%	Occur in Dark-Lighted Conditions	40%	Occur in Dark-Unlighted Conditions			23%	Occur in Dark-Unlighted Conditions	30%	Occur in Dark-Unlighted Conditions
										4%	Occur in Dark-Lighted Conditions
	Surface Conditions	88%	Involve Dry Conditions	100%	Involve Dry Conditions	N/A - Sample size too small		85%	Involve Dry Conditions	92%	Involve Dry Conditions
		13%	Involve Wet Conditions					8%	Involve Slush Conditions	4%	Involve Wet Conditions
								8%	Involve Water (standing or moving) Conditions	2%	Involve Water (standing or moving) Conditions
	First Unit Event	38%	Involve a first unit event of Crossed Centerline	40%	Involve a first unit event of Ran Off the Road (Left)	N/A - Sample size too small		31%	Involve a first unit event of Ran Off the Road (Left)	28%	Involve a first unit event of Motor Vehicle in Transport
		13%	Involve a first unit event of Ran Off the Road (Left)	40%	Involve a first unit event of Ran Off the Road (Right)			31%	Involve a first unit event of Ran Off the Road (Right)	22%	Involve a first unit event of Ran Off the Road (Right)
		13%	Equipment Failure	20%	Involve a first unit event of Other Non-Collision			31%	Involve a first unit event of Motor Vehicle in Transport	21%	Involve a first unit event of Ran Off the Road (Left)
	Driver Physical Condition	50%	No Apparent Influence	40%	Unknown	N/A - Sample size too small		54%	No Apparent Influence	47%	No Apparent Influence
		25%	Under the Influence of Drugs or Alcohol	20%	Under the Influence of Drugs or Alcohol			23%	Fatigued/Fell Asleep	28%	Unknown
		25%	Unknown	20%	Fatigued/Fell Asleep			8%	Under the Influence of Drugs or Alcohol	11%	Under the Influence of Drugs or Alcohol
	Safety Device Usage	50%	Shoulder And Lap Belt Used	40%	Shoulder And Lap Belt Used	N/A - Sample size too small		62%	Shoulder And Lap Belt Used	46%	Shoulder And Lap Belt Used
		25%	Unknown	20%	None Used			31%	None Used	21%	None Used
		13%	None Used	20%	Air Bag Deployed/Shoulder-Lap Belt			8%	Air Bag Deployed/Shoulder-Lap Belt	13%	Air Bag Deployed/Shoulder-Lap Belt
Hot Spot Crash Summaries		None		None		None		None			
Previously Completed Safety-Related Projects				H7388 Antelope Wash construct 4-lane divided highway (2015)							
District Interviews/Discussions											
Contributing Factors		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders - Inadequate roadside clearance		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes)				- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders			

		13		14		15		16		Corridor-Wide Crash Characteristics	
Segment Number											
Segment Length (miles)		**11**		**13**		**12**		**17**			
Segment Milepost (MP)		**53-42**		**42-29**		**29-17**		**17-0**			
Final Need		High		Medium		Low		Low			
Segment Crash Summaries (Fatal and Serious Injury Crashes)	**Segment Crash Overview**	5	Crashes were fatal	4	Crashes were fatal	2	Crashes were fatal	2	Crashes were fatal	56	Crashes were fatal
		12	Crashes had incapacitating injuries	11	Crashes had incapacitating injuries	14	Crashes had incapacitating injuries	6	Crashes had incapacitating injuries	138	Crashes had incapacitating injuries
		0	Crashes involve trucks	0	Crashes involve trucks	2	Crashes involve trucks	0	Crashes involve trucks	15	Crashes involve trucks
	First Harmful Event Type	59%	Involve Overturning	80%	Involve Overturning	50%	Involve Overturning	38%	Involve Overturning	37%	Involve Collision with Motor Vehicle
		24%	Involve Collision with Motor Vehicle	13%	Involve Collision with Motor Vehicle	38%	Involve Collision with Motor Vehicle	25%	Involve Collision with Fixed Object	36%	Involve Overturning
		6%	Involve Collision with Pedestrian	7%	Involve Other Non-Collision	6%	Involve Collision with Fixed Object	25%	Involve Other Non-Collision	11%	Involve Collision with Fixed Object
	Collision Type	65%	Involve Single Vehicle	87%	Involve Single Vehicle	63%	Involve Single Vehicle	75%	Involve Single Vehicle	57%	Involve Single Vehicle
		18%	Involve Angle	7%	Involve Rear End	13%	Involve Rear End	25%	Involve Other	11%	Involve Rear End
		12%	Involve Rear End	7%	Involve Sideswipe (same)	6%	Involve Angle			8%	Involve Head On
	Violation or Behavior	47%	Involve Speed too Fast for Conditions	60%	Involve Speed too Fast for Conditions	31%	Involve Speed too Fast for Conditions	50%	Involve Speed too Fast for Conditions	32%	Involve Speed too Fast for Conditions
		18%	Involve Inattention/Distraction	20%	Involve No Improper Action	13%	Involve No Improper Action	13%	Involve No Improper Action	14%	Involve Inattention/Distraction
		12%	Involve Failure to Yield Right-of-Way	7%	Involve Exceeded Lawful Speed	13%	Involve Failure to Yield Right-of-Way	13%	Exceeded Lawful Speed	10%	Involve No Improper Action
	Lighting Conditions	71%	Occur in Daylight Conditions	73%	Occur in Daylight Conditions	69%	Occur in Daylight Conditions	63%	Occur in Daylight Conditions	63%	Occur in Daylight Conditions
		18%	Occur in Dark-Unlighted Conditions	27%	Occur in Dark-Unlighted Conditions	25%	Occur in Dark-Unlighted Conditions	38%	Occur in Dark-Unlighted Conditions	30%	Occur in Dark-Unlighted Conditions
		12%	Occur in Dawn Conditions			6%	Occur in Dark-Lighted Conditions			4%	Occur in Dark-Lighted Conditions
	Surface Conditions	94%	Involve Dry Conditions	93%	Involve Dry Conditions	100%	Involve Dry Conditions	88%	Involve Dry Conditions	92%	Involve Dry Conditions
		6%	Involve Snow Conditions	7%	Involve Wet Conditions			13%	Involve Wet Conditions	4%	Involve Wet Conditions
										2%	Involve Water (standing or moving) Conditions
	First Unit Event	47%	Involve a first unit event of Ran Off the Road (Right)	40%	Involve a first unit event of Ran Off the Road (Left)	38%	Involve a first unit event of Ran Off the Road (Right)	38%	Involve a first unit event of Ran Off the Road (Right)	28%	Involve a first unit event of Motor Vehicle in Transport
		29%	Involve a first unit event of Motor Vehicle in Transport	20%	Involve a first unit event of Equipment Failure	31%	Involve a first unit event of Motor Vehicle in Transport	25%	Involve a first unit event of Ran Off the Road (Left)	22%	Involve a first unit event of Ran Off the Road (Right)
		18%	Involve a first unit event of Ran Off the Road (Left)	13%	Involve a first unit event of Ran Off the Road (Right)	25%	Involve a first unit event of Ran Off the Road (Left)	13%	Involve a first unit event of Crossed Centerline	21%	Involve a first unit event of Ran Off the Road (Left)
	Driver Physical Condition	35%	No Apparent Influence	73%	No Apparent Influence	63%	No Apparent Influence	38%	No Apparent Influence	47%	No Apparent Influence
		24%	Under the Influence of Drugs or Alcohol	13%	Fatigued/Fell Asleep	31%	Unknown	25%	Illness	28%	Unknown
		24%	Unknown	7%	Under the Influence of Drugs or Alcohol	6%	Under the Influence of Drugs or Alcohol	13%	Under the Influence of Drugs or Alcohol	11%	Under the Influence of Drugs or Alcohol
	Safety Device Usage	59%	Shoulder And Lap Belt Used	53%	Shoulder And Lap Belt Used	63%	Shoulder And Lap Belt Used	25%	Shoulder And Lap Belt Used	46%	Shoulder And Lap Belt Used
		24%	None Used	20%	None Used	19%	None Used	25%	None Used	21%	None Used
		6%	Air Bag Deployed/Shoulder-Lap Belt	20%	Helmet Used	6%	Helmet Used	25%	Helmet Used	13%	Air Bag Deployed/Shoulder-Lap Belt
Hot Spot Crash Summaries		None		None		None		None			
Previously Completed Safety-Related Projects								H8500 Kingman Wash TI Cattle Guards 2015			
District Interviews/Discussions											
Contributing Factors		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes) - Narrow shoulders		- Excessive Speed - Inadequate signs, delineators, guardrails - Roadside design (non-traversable side slopes)			

Freight Performance Needs Analysis

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Roadway Variables								Traffic Variables					Relevant Freight Related Existing Infrastructure*
				Functional Classification	Environmental Type (Urban/Rural)	Terrain	# of Lanes/ Direction	Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing LOS	Future 2035 LOS	% Trucks	NB/WB Buffer Index (TPTI-TTTI)	SB/EB Buffer Index (TPTI-TTTI)	
60W-1	138-132	6	None	Interstate	Urban	Level	2	63	No	Divided	0%	A-C	E/F	7.97	0.61	0.10	
60W-2	132-120	12	None	Interstate	Fringe Urban	Level	2	63	No	Divided	0%	A-C	E/F	7.61	0.23	0.52	
60W-3	120-111	9	High	Interstate	Rural	Level	2	57	No	Divided	0%	A-C	D	6.91	0.91	9.15	DMS MP119 (EB) MP 113.5 (EB), Rest Area MP116 (EB)
93-4	200-183	17	Low	Interstate	Fringe Urban	Level	1	61	No	Non-Divided	65%	A-C	D	10.67	2.32	1.00	
93-5	183-166	17	None	Interstate	Rural	Level	1	65	No	Non-Divided	56%	A-C	A-C	9.86	No Data	No Data	
93-6	166-149	17	High	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	8.64	0.52	0.49	Climbing Lane 176-175.5 (SB) 173.5-172.5 (NB)
93-7	149-132	17	High	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	7.88	0.83	0.56	
93-8	132-124	8	High	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	7.88	2.23	0.18	
93-9	124-106	18	None	Interstate	Rural	Level	1	65	No	Both	14%	A-C	A-C	5.67	0.01	0.00	Rest Area MP122.5 (NB), Climbing Lane MP 117-116 (NB)
93-10	106-91	15	None	Interstate	Rural	Level	2	65	No	Both	0%	A-C	A-C	3.99	0.35	0.46	
93-11	71-67	4	Medium	Interstate	Urban	Level	2	56	No	Divided	0%	A-C	D	9.27	4.85	1.76	DMS MP70 (NB), POE MP68 (SB)
93-12	67-53	14	None	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	8.71	0.10	0.12	DMS MP66 (SB)
93-13	53-42	11	None	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	7.84	0.08	0.13	
93-14	42-29	13	None	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	7.61	0.08	0.13	
93-15	29-17	12	None	Interstate	Rural	Level	2	65	No	Divided	0%	A-C	A-C	7.53	0.08	0.13	DMS MP27 (NB)
93-16	17-0	17	None	Interstate	Rural	Level	2	61	No	Divided	0%	A-C	A-C	7.53	0.08	0.13	

* Note: For freight, relevant existing infrastructure includes DMS, Weigh Stations, POE, Rest Areas, Parking Areas, and Climbing Lanes

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 Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents*	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
60W-1	138-132	6	None	9	9	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average.
60W-2	132-120	12	None	6	6	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average.
60W-3	120-111	9	High	16	16	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. High SB Travel Time Index (TTI) and NB/SB Planning Time Index (PTI), perhaps attributable to counter location within the roundabout and/or density of driveways just south of the roundabouts.
93-4	200-183	17	Low	15	15	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. SB closure duration is extremely high.
93-5	183-166	17	None	20	20	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average.
93-6	166-149	17	High	15	15	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from High level NB/SB direction PTI.
93-7	149-132	17	High	11	11	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from High level NB/SB direction Planning Time Index.
93-8	132-124	8	High	4	4	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from High level NB direction PTI, potentially attributable to a NB pullout near Nothing , AZ.
93-9	124-106	18	None	27	27	100%	0	0%	0	0%	None	Cane Springs Design (MP 109), construct 4-lane divided highway; programmed in FY 21 H8232 Carrow to Stephens (MP 116), construct 4-lane divided highway; programmed in FY 20	Percent of closures due to incidents/accidents above statewide average. Need stems from Low/Medium level NB/SB PTI.

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 Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
93-10	106-91	15	None	16	15	94%	1	6%	0	0%	None		Percent of closures due to incidents/accidents above statewide average.
93-11	71-67	4	Medium	12	12	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average. Need stems from Medium level NB PTI/TTI.
93-12	67-53	14	None	6	6	100%	0	0%	0	0%	None		Percent of closures due to incidents/accidents above statewide average.
93-13	53-42	11	None	7	7	100%	0	0%	0	0%	None	H8659 Windy Point Road - Mineral Park Road (MP 48), shoulder widening (HSIP); programmed in FY18	Percent of closures due to incidents/accidents above statewide average.
93-14	42-29	13	None	7	7	100%	0	0%	0	0%	None	H8658 11th Street - Windy Point Road (MP 38), shoulder widening (HSIP); programmed in FY17	Percent of closures due to incidents/accidents above statewide average.
93-15	29-17	12	None	7	7	100%	0	0%	0	0%	None	H8657 White Hills Road - 11th Street (MP 28), shoulder widening; programmed in FY18	Percent of closures due to incidents/accidents above statewide average.
93-16	17-0	17	None	16	16	100%	0	0%	0	0%	None	H8408 Willow Beach - White Road (MP 17), construct shoulder widening (HSIP); programmed in FY17	Percent of closures due to incidents/accidents above statewide average.
Statewide HCRS Database Closure Type Average %:						96%		3%		1%			

* Red text indicates segment % exceeds statewide average %.
HSIP: Highway Safety Improvement Program.

NOTES:
- Includes border patrol check points and other closures/restrictions not controlled by ADOT.
- Existing and Planned Infrastructure – Source: 2012 Highway Log, Climbing and Passing Lane Prioritization Study, ADOT 5-year Construction Program.
- Statewide averages determined from Highway Condition Reporting System (HCRS) data for 2009-2013 for ADOT's nine designated strategic corridors.
- Roadway vertical grade, number of lanes, and presence/lack of a climbing lane should be a consideration, if deficiencies are due to Planning Time Index (PTI) or Travel Time Index (TTI)

Needs Summary Table

Performance Area	Segment Number and Mileposts															
	60W-1	60W-2	60W-3	93-4	93-5	93-6	93-7	93-8	93-9	93-10	93-11	93-12	93-13	93-14	93-15	93-16
	MP 138 - 122	MP 132 - 120	MP 120 - 111	MP 200 - 183	MP 183 - 166	MP 166 - 149	MP 149 - 132	MP 132 - 124	MP 124 - 106	MP 106 - 91	MP 71 - 67	MP 67 - 53	MP 53 - 42	MP 42 - 29	MP 29 - 17	MP 17- 0
Pavement	None*	None*	None*	None*	None*	Low	Low	Low	None*	None*	Low	Low	None*	Low	None*	None*
Bridge	Low	Low	None*	None*	Medium	Low	Low	Low	Low	Low	None*	Low	None*	None*	N/A#	None*
Mobility+	Low	Low	Medium	Low	None	Low	Low	Low	Low	None*	Low	Low	None*	Low	Low	None*
Safety+	High	Low	High	High	High	Low	Low	None*	High	Low	High	Low	High	Medium	Low	Low
Freight+	None*	None*	High	Low	None*	High	High	High	None*	Low	Medium	None*	None*	None*	Low	Low
Average Need	**1.08**	**0.62**	**1.85**	**1.15**	**1.00**	**1.46**	**1.46**	**1.23**	**1.08**	**0.62**	**1.54**	**0.77**	**0.69**	**0.85**	**0.82**	**0.69**

* 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.

+ Identified as an emphasis area for the US 93/US 60 corridor.

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

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

Appendix E: Life-Cycle Cost Analysis

Pavement Life-Cycle Cost Analysis Worksheet

Project Details		
Project title	US60/93 Corridor Profile Study	
Route	US 93	
Milepost begin	60	
Milepost end	61	

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)	=	2	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	4	
Right shoulder width (ft)	=	10	
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]	=	38	
Total lane-miles [total traffic direction lanes & shoulders]	=	6.3	
Total square feet [total traffic direction lanes & shoulders]	=	401,280	
Total square yards [total traffic direction lanes & shoulders]	=	44,587	

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"	30-34	$350,000	$5.5	$50
Asphalt Reconstruction	8"-12"	26-30	$280,000	$4.4	$40
Concrete Medium Rehab	1"-3"	24-28	$75,000	$1.2	$11
Concrete Light Rehab	<1"	18-22	$50,000	$0.8	$7
Asphalt Medium Rehab	3"-8"	20-24	$105,000	$1.7	$15
Asphalt Light Rehab	<3"	14-18	$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 ($) [includes material costs and indirect costs]			Total Bi-Directional Cost ($)
Treatment Type	Pavement Thickness	Typical Service Life (years)	Lane-miles	Square Feet	Square Yards	Total Cost
Concrete Reconstruction	8"-12"	30-34	$1,366,400	$21.6	$194	$8,653,867
Asphalt Reconstruction	8"-12"	26-30	$1,093,120	$17.3	$155	$6,923,093
Concrete Medium Rehab	1"-3"	24-28	$219,600	$3.5	$31	$1,390,800
Concrete Light Rehab	<1"	18-22	$146,400	$2.3	$21	$927,200
Asphalt Medium Rehab	3"-8"	20-24	$307,440	$4.9	$44	$1,947,120
Asphalt Light Rehab	<3"	14-18	$204,960	$3.2	$29	$1,298,080

Pavement Service Life, Intervals, and Sequence of Improvements

US 93 MP 60 - MP 61

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	32	30-34	0	-	16
Asphalt Reconstruction	28	26-30	17	-	14
Concrete Medium Rehab	26	24-28	0	13	13
Concrete Light Rehab	20	18-22	0	10	10
Asphalt Medium Rehab	22	20-24	11	11	11
Asphalt Light Rehab	16	14-18	11	8	8
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 93 MP 60 - MP 61

Year	Project Number	Tracs No.	Direction of Improvement	Treatment Type	Improvement Description	Thickness (inches)	Beg. MP	End MP	Length (miles)
1938	FA123- - B		NB/SB	Asphalt Reconstruction	BM	9	57.93	64.39	6.46
					BS	1.5	57.93	64.39	6.46
1961	NF039- 1-61A		SB	Asphalt Medium Rehab	Asphalt Concrete	3	35.89	64.59	28.7
1975	F039- 1-906		SB	Asphalt Light Rehab	SC	0.3	35.89	64.59	28.7
1986	F039- 1-917		NB/SB	Asphalt Medium Rehab	Remove Existing Material	2	56.7	64.5	7.8
					Asphalt Concrete	3.5	56.7	64.5	7.8
					FC	0.5	56.7	64.5	7.8
1994	STP-039-1(31)		NB/SB	Asphalt Reconstruction	Aggregate Base	10	58.31	65.03	6.72
					Asphalt Concrete	5	58.31	65.03	6.72
					FC	0.5	58.31	65.03	6.72
2006	NH -093-A(003)A		SB	Asphalt Medium Rehab	Remove Existing Material	3.5	58.4	64.5	6.1
					Asphalt Concrete	3	58.4	64.5	6.1
					FC	0.5	58.4	64.5	6.1

Interval between Improvements in Years	
After Asphalt Reconstuction	23
After Medium Rehab	14
After Light Rehab	11
After Medium Rehab	8
After Asphalt Reconstuction	12

Treatment Type Options	Estimated Historical Interval Value between Improvements in Years
Concrete Reconstruction	
Asphalt Reconstruction	17
Concrete Medium Rehab	
Concrete Light Rehab	
Asphalt Medium Rehab	11
Asphalt Light Rehab	11

Design Alternative # 1 - Concrete Reconstruction

US 93 MP 60 - MP 61

Enter Name of Design Alternative

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	$8,653,867	$7,688,848	$6,601,993
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	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	Concrete Light Rehab	$927,200	$513,368	$239,606
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	Concrete Medium Rehab	$1,390,800	$572,991	$182,705
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	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	Concrete Light Rehab	$927,200	$260,119	$50,544
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Concrete Light Rehab	$880,840	$239,916	$44,876
Enter Year of Last Used DA Improvement ››		2060	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$8,795,411	$7,029,973
AGENCY COST	$11,018,227	

Design Alternative # 2 - Asphalt Reconstruction

US 93 MP 60 - MP 61

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	$6,923,093	$6,151,079	$5,281,595
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	Asphalt Light Rehab	$1,298,080	$762,485	$384,055
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	Asphalt Medium Rehab	$1,947,120	$902,869	$335,285
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	Asphalt Light Rehab	$1,298,080	$434,835	$106,194
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 Light Rehab	$730,170	$198,878	$37,200
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$8,052,390	$6,069,930
AGENCY COST	$10,736,203	

Design Alternative # 3 - Asphalt Medium Rehab

US 93 MP 60 - MP 61

Enter Name of Design Alternative

Number of Years	Year	Asphalt Medium Rehab Focus	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	$1,947,120	$1,729,991	$1,485,449
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	Asphalt Light Rehab	$1,298,080	$833,188	$470,484
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	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	Asphalt Reconstruction	$6,923,093	$3,210,202	$1,192,125
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	Asphalt Light Rehab	$1,298,080	$461,316	$121,582
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	Asphalt Light Rehab	$1,298,080	$397,935	$86,686
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 Light Rehab	$973,560	$265,170	$49,599
Enter Year of Last Used DA Improvement ››		2057	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$6,367,462	$3,306,727
AGENCY COST	$11,790,893	

Design Alternative # 4 - Asphalt Light Rehab

US 93 MP 60 - MP 61

Enter Name of Design Alternative

Number of Years	Year	Asphalt Light Rehab Focus	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	$1,298,080	$1,153,327	$990,299
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	Asphalt Reconstruction	$6,923,093	$4,855,718	$3,073,936
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	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	Asphalt Light Rehab	$1,298,080	$601,913	$223,524
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	Asphalt Medium Rehab	$1,947,120	$712,733	$195,139
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
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	$1,062,065	$289,277	$54,108
Enter Year of Last Used DA Improvement ››		2051	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$7,034,415	$4,428,789
AGENCY COST	$10,404,308	

Summary of LCCA Results

US 93 MP 60 - MP 61

	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehab Focus	Asphalt Light Rehab Focus
Net Present Value - 3%	$8,795,411	$8,052,390	$6,307,010	$7,034,415
Net Present Value - 7%	$7,029,973	$6,069,930	$3,485,332	$4,428,789
Agency Cost	$11,018,227	$10,736,203	$10,736,203	$10,404,308

Cost Ratio at 3% Discount Rate

1.39 Ratio of Concrete Reconstruction to Lowest Cost Rehab

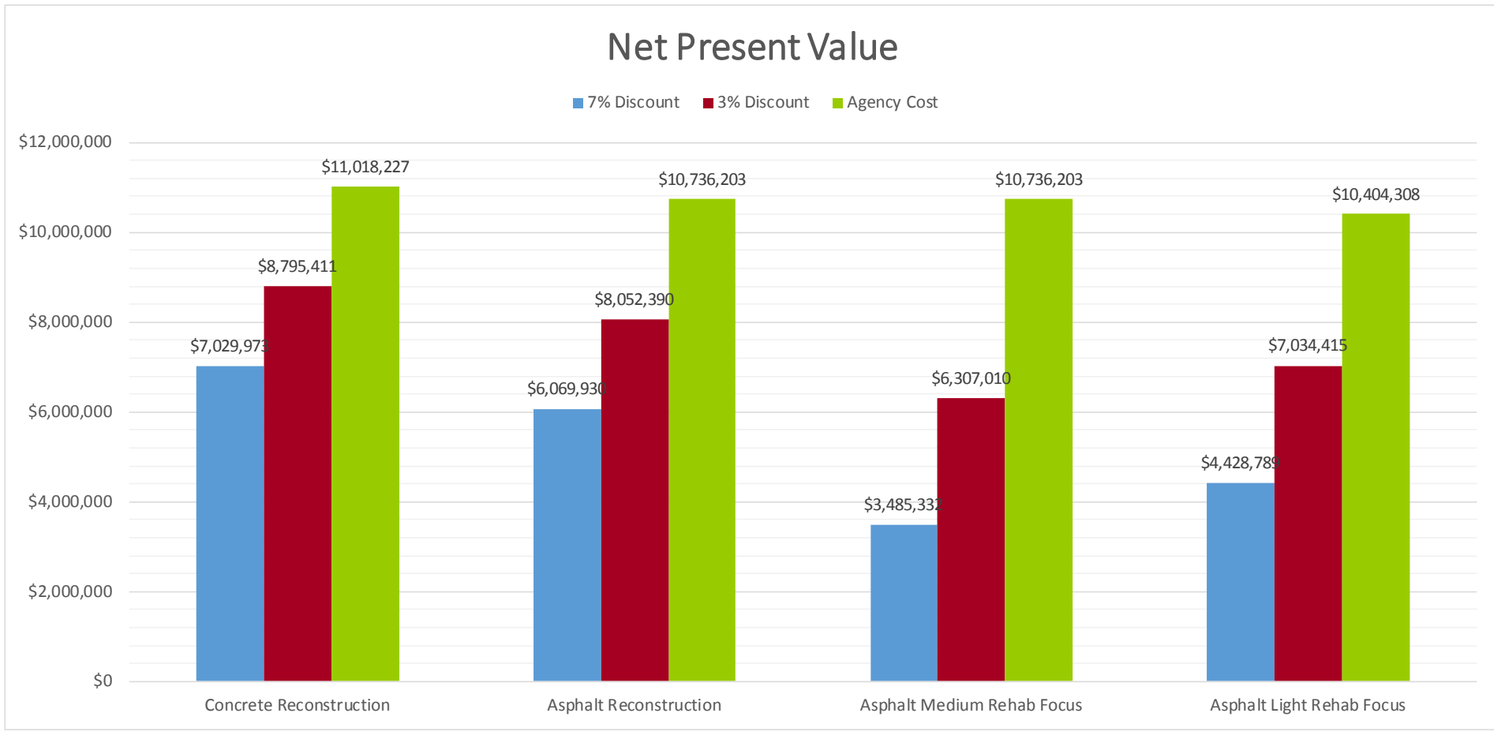
1.28 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Cost Ratio at 7% Discount Rate

2.02 Ratio of Concrete Reconstruction to Lowest Cost Rehab

1.74 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.



Pavement Life-Cycle Cost Analysis Worksheet

Project Details		
Project title	US60/93 Corridor Profile Study	
Route	US 93	
Milepost begin	70	
Milepost end	71	

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)	=	2	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	6	
Right shoulder width (ft)	=	0	
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]	=	30	
Total lane-miles [total traffic direction lanes & shoulders]	=	5.0	
Total square feet [total traffic direction lanes & shoulders]	=	316,800	
Total square yards [total traffic direction lanes & shoulders]	=	35,200	

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"	30-34	$350,000	$5.5	$50
Asphalt Reconstruction	8"-12"	26-30	$280,000	$4.4	$40
Concrete Medium Rehab	1"-3"	24-28	$75,000	$1.2	$11
Concrete Light Rehab	<1"	18-22	$50,000	$0.8	$7
Asphalt Medium Rehab	3"-8"	20-24	$105,000	$1.7	$15
Asphalt Light Rehab	<3"	14-18	$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 ($) [includes material costs and indirect costs]			Total Bi-Directional Cost ($)
Treatment Type	Pavement Thickness	Typical Service Life (years)	Lane-miles	Square Feet	Square Yards	Total Cost
Concrete Reconstruction	8"-12"	30-34	$1,366,400	$21.6	$194	$6,832,000
Asphalt Reconstruction	8"-12"	26-30	$1,093,120	$17.3	$155	$5,465,600
Concrete Medium Rehab	1"-3"	24-28	$219,600	$3.5	$31	$1,098,000
Concrete Light Rehab	<1"	18-22	$146,400	$2.3	$21	$732,000
Asphalt Medium Rehab	3"-8"	20-24	$307,440	$4.9	$44	$1,537,200
Asphalt Light Rehab	<3"	14-18	$204,960	$3.2	$29	$1,024,800

Pavement Service Life, Intervals, and Sequence of Improvements

US 93 MP 70 - MP 71

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	32	30-34	0	-	16
Asphalt Reconstruction	28	26-30	12	-	14
Concrete Medium Rehab	26	24-28	0	13	13
Concrete Light Rehab	20	18-22	0	10	10
Asphalt Medium Rehab	22	20-24	5	5	11
Asphalt Light Rehab	16	14-18	7	7	8
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 93 MP 70 - MP 71

Year	Project Number	Tracs No.	Direction of Improvement	Treatment Type	Improvement Description	Thickness (inches)	Beg. MP	End MP	Length (miles)
1959	F039- 1- 1		NB/SB	Asphalt Reconstruction	Select Material	18	68.8	71.27	2.47
					Aggregate Base	4	68.8	71.27	2.47
					Asphalt Concrete	3	68.8	71.27	2.47
					Seal Coat	0.3	68.8	71.27	2.47
1974	F039- 1-904		NB/SB	Asphalt Light Rehab	Seal Coat	0.3	64.59	71.36	6.77
1981	F039- 1-912		NB/SB	Asphalt Light Rehab	FR	0.5	67.08	71.4	4.32
1993	F-039-1(25)		NB/SB	Asphalt Medium Rehab	Remove Existing Material	8.5	70.31	70.63	0.32
					Asphalt Concrete	8.5	70.31	70.63	0.32
					Remove Existing Material	1.5	70.63	71.09	0.46
					Asphalt Concrete	1	70.63	71.09	0.46
1998	STP-039-1(29)		NB/SB	Asphalt Reconstruction	Aggregate Base	6.8	64.7	70.3	5.6
					Asphalt Concrete	5.5	64.7	70.3	5.6
					FC	0.6	64.7	70.3	5.6
1999	STP*-039-1(35)		NB/SB	Asphalt Reconstruction	Aggregate Base	7	67.93	70.93	3
					Asphalt Concrete	5.5	67.93	70.93	3
					FC	0.5	67.93	70.93	3
2008	NONE		NB/SB	Asphalt Light Rehab	MS	0	70.3	70.7	0.4
2012	NH -093-A(202)A		NB/SB	Asphalt Medium Rehab	Remove Existing Material	3.5	64.89	71.04	6.15
					Asphalt Concrete	3	64.89	71.04	6.15
					FR	0.5	64.89	71.04	6.15

Interval between Improvements in Years	
After Asphalt Reconstuction	15
After Light Rehab	7
Agfter Light Rehab	12
After Medium Rehab	5
After Asphalt Reconstuction	9
After Light Rehab	4

Treatment Type Options	Estimated Historical Interval Value between Improvements in Years
Concrete Reconstruction	
Asphalt Reconstruction	12
Concrete Medium Rehab	
Concrete Light Rehab	
Asphalt Medium Rehab	5
Asphalt Light Rehab	7

Design Alternative # 1 - Concrete Reconstruction

US 93 MP 70 - MP 71

Enter Name of Design Alternative

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	$6,832,000	$6,070,144	$5,212,100
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	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	Concrete Light Rehab	$732,000	$405,291	$189,163
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	Concrete Medium Rehab	$1,098,000	$452,361	$144,241
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	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	Concrete Light Rehab	$732,000	$205,357	$39,903
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Concrete Light Rehab	$695,400	$189,407	$35,428
Enter Year of Last Used DA Improvement ››		2060	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$6,943,746	$5,549,979
AGENCY COST	$8,698,600	

Design Alternative # 2 - Asphalt Reconstruction

US 93 MP 70 - MP 71

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	$5,465,600	$4,856,115	$4,169,680
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	Asphalt Light Rehab	$1,024,800	$601,962	$303,201
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	Asphalt Medium Rehab	$1,537,200	$712,792	$264,699
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	Asphalt Light Rehab	$1,024,800	$343,291	$83,838
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	$475,800	$129,594	$24,240
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$6,384,564	$4,797,178
AGENCY COST	$8,576,600	

Design Alternative # 3 - Asphalt Medium Rehab

US 93 MP 70 - MP 71

Enter Name of Design Alternative

Number of Years	Year	Asphalt Medium Rehab Focus	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	$1,537,200	$1,365,782	$1,172,723
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	$1,024,800	$697,839	$425,256
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	Asphalt Reconstruction	$5,465,600	$3,026,170	$1,412,415
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	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	Asphalt Light Rehab	$1,024,800	$375,123	$102,705
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
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 Medium Rehab	$1,537,200	$444,188	$89,663
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	$1,397,455	$380,627	$71,195
Enter Year of Last Used DA Improvement ››		2059	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$5,528,475	$3,131,565
AGENCY COST	$9,192,145	

Design Alternative # 4 - Asphalt Light Rehab

US 93 MP 70 - MP 71

Enter Name of Design Alternative

Number of Years	Year	Asphalt Light Rehab Focus	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	$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	Asphalt Reconstruction	$5,465,600	$3,948,466	$2,596,667
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	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	Asphalt Light Rehab	$1,024,800	$489,450	$188,819
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	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	Asphalt Medium Rehab	$1,537,200	$579,565	$164,841
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
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	Asphalt Light Rehab	$1,024,800	$279,127	$52,210
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$1,024,800	$279,127	$52,210
Enter Year of Last Used DA Improvement ››		2061	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$5,928,002	$3,732,142
AGENCY COST	$9,052,400	

Summary of LCCA Results

US 93 MP 70 - MP 71

	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehab Focus	Asphalt Light Rehab Focus
Net Present Value - 3%	$6,943,746	$6,384,564	$5,528,475	$5,928,002
Net Present Value - 7%	$5,549,979	$4,797,178	$3,131,565	$3,732,142
Agency Cost	$8,698,600	$8,576,600	$9,192,145	$9,052,400

Cost Ratio at 3% Discount Rate

1.26 Ratio of Concrete Reconstruction to Lowest Cost Rehab

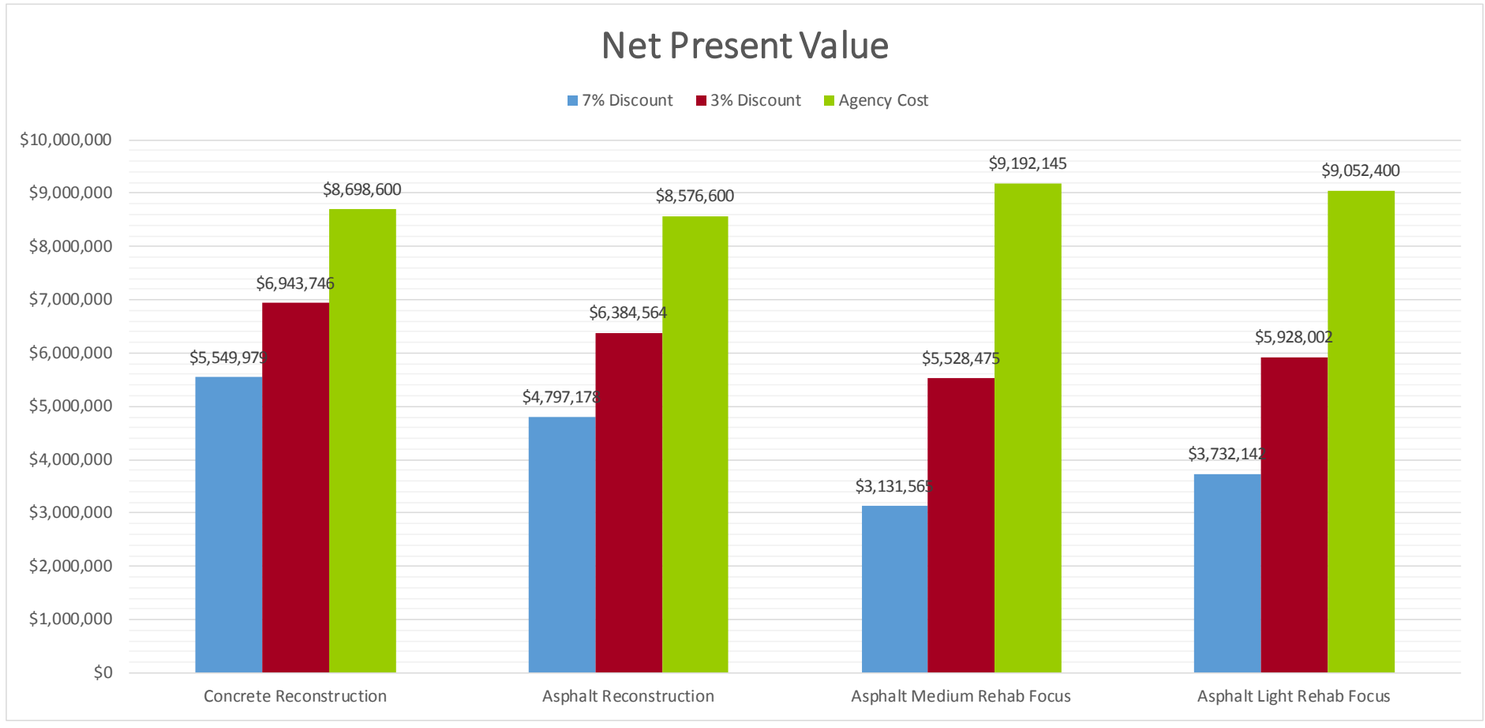
1.155 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Cost Ratio at 7% Discount Rate

1.77 Ratio of Concrete Reconstruction to Lowest Cost Rehab

1.53 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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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~~cabinet, detectors, 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
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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.)
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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
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

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
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

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
1	16,628	6		1,000				1,325	N	0.35	0.37	2	Y	10.00	N
2	11,776	0.5		1,000				896	N	0.38	0.44	1.2	Y	10.00	N
3	14,780	1		1,000				1,021	N	0.38	0.44	2	N	7.31	N
4a	7,948	8.5		1,000				848	Y	1.66	2.73	1.3	Y	7.05	Y
4b	7,948	8.5		1,000				848	Y	1.66	2.73	1.3	Y	7.05	Y
5a.2	7,977	4.5		1,000				689	Y	0.51	0.38	2.5	N	5.24	Y
5b.2	7,977	4.5		1,000				689	Y	0.51	0.38	2.5	N	5.24	Y
6a	3,716	2		1,000				293	Y	0.70	0.54	4	N	9.93	N
6b	3,716	2		1,000				293	Y	0.70	0.54	4	N	9.93	N
7a	7,562	3		1,000				429	Y	0.01	0.02	3	N	3.43	Y
7b	7,562	3		1,000				429	Y	0.01	0.02	3	N	3.43	Y
8a	17,931	1		1,000				1,662	Y	3.31	5.84	2	Y	10.00	N
8b	17,931	1		1,000				1,662	N	3.31	5.84	2	Y	10.00	N
9	8,745	4		1,000				810	N	3.31	5.84	4	Y	10.00	N
10a	13,069	1		1,000				1,138	N	0.11	0.13	2	N	6.28	N
10b	13,069	1		1,000				1,138	N	0.11	0.13	2	N	6.28	N
11.1	13,069	5		1,000				1,138	Y	0.11	0.13	1.3	N	6.28	N
11.2	13,134	11		1,000				1,006	Y	0.11	0.12	1.9	N	2.05	N
11.3	13,357	14		1,000				1,008	Y	0.11	0.12	2	N	2.03	N
5a.1	8,144	17		1,000				803	Y	1.02	0.76	4	N	5.24	Y
5b.1	8,144	17		1,000				803	Y	1.02	0.76	4	N	5.24	Y

Solution Number	Bridge	Pavement	Mobility	Safety	Freight	Risk Score (0 to 10)				
						Bridge	Pavement	Mobility	Safety	Freight
1	0	0	y	y	y	0.00	0.00	2.02	2.95	0.84
2	0	0	y	y	y	0.00	0.00	0.37	2.73	0.65
3	0	0	y	y	y	0.00	0.00	2.66	1.95	2.47
4a	0	y	y	y	y	0.00	1.52	6.55	3.71	5.09
4b	0	0	y	y	y	0.00	0.00	6.55	3.71	5.09
5a.2	0	y	y	y	y	0.00	1.41	7.76	2.43	7.78
5b.2	0	0	y	y	y	0.00	0.00	7.76	2.43	7.78
6a	0	0	y	y	y	0.00	0.00	5.25	0.89	5.18
6b	0	y	y	y	y	0.00	0.68	5.25	0.89	5.18
7a	0	y	y	y	y	0.00	1.18	5.75	2.51	5.31
7b	0	0	y	y	y	0.00	0.00	5.75	2.51	5.31
8a	0	0	y	y	y	0.00	0.00	5.30	3.00	4.63
8b	0	0	y	y	y	0.00	0.00	2.80	3.00	2.13
9	0	0	y	y	y	0.00	0.00	3.21	3.17	1.73
10a	0	0	y	y	y	0.00	0.00	1.05	2.28	1.17
10b	0	0	y	y	y	0.00	0.00	1.05	2.28	1.17
11.1	0	0	y	y	y	0.00	0.00	4.63	2.28	3.69
11.2	0	0	y	y	y	0.00	0.00	5.28	2.80	3.60
11.3	0	0	y	y	y	0.00	0.00	5.43	2.81	3.60
5a.1	0	y	y	y	y	0.00	1.51	9.51	3.04	7.84
5b.1	0	0	y	y	y	0.00	0.00	9.51	3.04	7.84

Appendix H: Candidate Solution Cost Estimates

Candidate #	Name	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost	Quantity Notes
CS60W.1	Surprise Area Safety Improvements	Install lighting between 163rd Avenue and SR303L	138	137.5	mi	1	$ 594,000	$20,000	$60,000	$0	$594,000	$674,000	.5 miles length x2 directions
		Rehabilitate shoulders/rumble strips and install safety edge	-	-	mi	12	$ 249,000	$90,000	$300,000	$0	$2,988,000	$3,378,000	6 mile length x2 directions
		Improve signal visibility	-	-	each	1	$ 77,000	$2,000	$10,000	$0	$77,000	$89,000	cost for signalized 4-legged intersection
							Solution Total	**$112,000**	**$370,000**	**$0**	**$3,659,000**	**$4,141,000**	
CS60W.2	Wittmann Area Safety Improvements	Install additional advanced signal warning sign with flashing beacon approximately 1000' upstream of Center Street.	128	128.5	each	2	$ 33,000	$2,000	$7,000	$0	$66,000	$75,000	cost includes both directions
		Improve signal visibility.	-	-	each	1	$ 77,000	$2,000	$10,000	$0	$77,000	$89,000	cost for signalized 4-legged intersection
							Solution Total	**$4,000**	**$17,000**	**$0**	**$143,000**	**$164,000**	
CS60W.3	South Wickenburg Area Safety Improvements	Install left side/median guardrails between MP 114-115	115	114	mi	2	$ 286,000	$20,000	$60,000	$0	$572,000	$652,000	1 mile length x2 directions
		Install speed feedback sign	-	-	each	2	$ 55,000	$3,000	$10,000	$0	$110,000	$123,000	includes one per direction
		Install high visibility edge line striping	-	-	mi	2	$ 23,800	$1,000	$5,000	$0	$47,600	$53,600	divided highway, 1 mile length x4 edges (left and right)
							Solution Total	**$24,000**	**$75,000**	**$0**	**$729,600**	**$828,600**	
CS93.4	Wickenburg Ranch Area Safety Improvements	Construct 4 lane divided roadway MP 190-198.5 (Tenger Street roundabout)	199	190	mi	8.5	$ 6,600,000	$1,680,000	$5,610,000	$538,560	$56,100,000	$63,928,560	
							Option A Solution Total	**$1,680,000**	**$5,610,000**	**$538,560**	**$56,100,000**	**$63,928,560**	
		Install center rumble strips	-	-	mi	8.5	$ 6,000	$2,000	$5,000	$0	$51,000	$58,000	
		Install safety edge	-	-	mi	0	$ 176,000	$0	$0	$0	$0	$0	Deleted - not a viable separate project
		Install high visibility edge line striping	-	-	mi	17	$ 23,800	$10,000	$40,000	$0	$404,600	$454,600	8.5 mile length x2 directions
		Install high visibility signage	-	-	each	20	$ 5,500	$3,000	$11,000	$0	$110,000	$124,000	approximates a total of 20 signs
		Install Raised Pavement Markers	-	-	mi	8.5	$ 4,400	$1,000	$4,000	$0	$37,400	$42,400	
		Add delineators	-	-	mi	17	$ 14,300	$10,000	$20,000	$0	$243,100	$273,100	8.5 mile length x2 directions
							Option B Solution Total	**$26,000**	**$80,000**	**$0**	**$846,100**	**$952,100**	

Candidate #	Name	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost	Quantity Notes
CS93.5	Joshua Tree Safety and Freight Improvements	Construct 4 lane divided roadway MP 161.5-183	183	162	mi	21.5	$ 6,600,000	$4,260,000	$14,190,000	$2,724,480	$141,900,000	$163,074,480	
		Option A Solution Total						**$4,260,000**	**$14,190,000**	**$2,724,480**	**$141,900,000**	**$163,074,480**	
		Widen shoulder	-	-	mi	21.5	$ 563,000	$360,000	$1,210,000	$1,362,240	$12,104,500	$15,036,740	
		Install center and outside rumble strips	-	-	mi	10.75	$ 12,000	$20,000	$50,000		$516,000	$586,000	length reduced by half since 1 side included in widen shoulder cost
		Install safety edge.	-	-	mi	0	$ 176,000	$0	$0	$0	$0	$0	deleted - included in widen shoulder cost
		Option B Solution Total						**$380,000**	**$1,260,000**	**$1,362,240**	**$12,620,500**	**$15,622,740**	
CS93.6	Burro Creek Safety and Freight Improvements	Widen shoulders (NB only)	147	148	mi	2	$ 563,000	$30,000	$110,000	$126,720	$1,126,000	$1,392,720	
		Increase clear zones (NB only)	-	-	mi	2	$ 130,000				$260,000	$260,000	
		Add guardrails (NB only)	-	-	mi	2	$ 286,000	$20,000	$60,000	$0	$572,000	$652,000	
		Install speed feedback sign (NB only)	-	-	each	1	$ 55,000	$2,000	$10,000	$0	$55,000	$67,000	
		Option A Solution Total						**$52,000**	**$180,000**	**$126,720**	**$2,013,000**	**$2,371,720**	
		Realign northbound MP 146-147	-	-	mi	2	$ 6,510,000	$390,000	$1,300,000	$126,720	$13,020,000	$14,836,720	
		Option B Solution Total						**$390,000**	**$1,300,000**	**$126,720**	**$13,020,000**	**$14,836,720**	
CS93.7	Cane Springs Safety Improvements	Construct 4 lane divided roadway MP 119.7-116.3	109	106	mi	3	$ 6,600,000	$590,000	$1,980,000	$380,160	$19,800,000	$22,750,160	
		Option A Solution Total						**$590,000**	**$1,980,000**	**$380,160**	**$19,800,000**	**$22,750,160**	
		Widen shoulder	-	-	mi	6	$ 1,306,800	$240,000	$780,000	$380,160	$7,840,800	$9,240,960	
		Install center and outside rumble strips	-	-	mi	3	$ 12,000	$1,000	$0	$0	$36,000	$37,000	length reduced by half since 1 side included in widen shoulder cost
		Install safety edge	-	-	mi	0	$ 176,000	$0	$0	$0	$0	$0	deleted - included in widen shoulder cost
		Install speed feedback signs	-	-	each	2	$ 55,000	$3,000	$10,000	$0	$110,000	$123,000	1 per direction
		Option B Solution Total						**$244,000**	**$790,000**	**$380,160**	**$7,986,800**	**$9,400,960**	
CS93.8	Kingman Pavement Improvements	Rehabilitate pavement	71	70	mi	2	$ 610,000	$37,000	$120,000	$0	$1,220,000	$1,377,000	1 mile length x2 directions
		Option A Solution Total						**$37,000**	**$120,000**	**$0**	**$1,220,000**	**$1,377,000**	1 mile length x2 directions
		Replace pavement	-	-	mi	2	$ 3,180,000	$191,000	$640,000	$0	$6,360,000	$7,191,000	
		Option B Solution Total						**$191,000**	**$640,000**	**$0**	**$6,360,000**	**$7,191,000**	
CS93.9	Kingman Area Safety and Freight Improvements	Install northbound climbing lane MP 71 to SR 68 TI.	71	67	mi	4	$ 4,950,000	$590,000	$1,980,000	$253,440	$19,800,000	$22,623,440	
		Solution Total						**$590,000**	**$1,980,000**	**$253,440**	**$19,800,000**	**$22,623,440**	

Candidate #	Name	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost	Quantity Notes
CS93.10	Cerbat Wash Pavement Improvements	Rehabilitate pavement	61	60	sq. ft	2	$ 610,000	$37,000	$120,000	$0	$1,220,000	$1,377,000	1 mile length x2 directions
		Option A Solution Total						**$37,000**	**$120,000**	**$0**	**$1,220,000**	**$1,377,000**	
		Replace pavement	-	-	sq. ft	2	$ 3,180,000	$191,000	$640,000	$0	$6,360,000	$7,191,000	1 mile length x2 directions
		Option B Solution Total						**$191,000**	**$640,000**	**$0**	**$6,360,000**	**$7,191,000**	
CS93.11	Windy Point Safety Improvements	Widen shoulders	58	28	mi	60	$ 563,000	$1,010,000	$3,380,000	$3,801,600	$33,780,000	$41,971,600	
		Install rumble strips	-	-	mi	0	$ 12,000	$0	$0	$0	$0	$0	deleted - included in widen shoulder cost
		Install safety edge	-	-	mi	0	$ 176,000	$0	$0	$0	$0	$0	deleted - included in widen shoulder cost
		Solution Total						**$1,010,000**	**$3,380,000**	**$3,801,600**	**$33,780,000**	**$41,971,600**	

* ' - ' indicates only one solution is being proposed and no options are being considered.

Appendix I: Performance Effectiveness Scores

Need Reduction

			Solution #	CS60W.1	CS60W.2	CS60W.3	CS93.4-A	CS93.4-B	CS93.5-A	CS93.5-B	CS93.5-A	CS93.5-B	CS93.6-A	CS93.6-B	CS93.7-A	CS93.7-B	CS93.9	CS93.11-1	CS93.11-2	CS93.11-3
			Description	Surprise Area Safety Improvements	Wittmann Area Safety Improvements	South Wickenburg Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Cane Springs Safety Improvements	Cane Springs Safety Improvements	Safety and Freight Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements
			Project Beg MP	132	128	114	190	190	166	166	161.5	161.5	146	146	106	106	67	53	42	28
			Project End MP	138	128.5	115	198.5	198.5	183	183	166	166	148	148	109	109	71	58	53	42
			Project Length (miles)	6	0.5	1	8.5	8.5	17	17	4.5	4.5	2	2	3	3	4	5	11	14
			Segment Beg MP	132	120	111	183	183	166	166	149	149	132	132	106	106	67	53	42	28
			Segment End MP	138	132	120	200	200	183	183	166	166	149	149	124	124	71	67	53	42
			Segment Length (miles)	6	12	9	17	17	17	17	17	17	17	17	18	18	4	14	11	14
			Segment #	60W-1	60W-2	60W-3	93-4	93-4	93-5	93-5	93-6	93-6	93-7	93-7	93-9	93-9	93-11	93-12	93-13	93-14
			Current # of Lanes (both directions)	4	4	4	2	2	2	2	4	4	4	4	2	2	4	4	4	4
			Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	one-way	two-way	two-way	two-way
			Additional Lanes (one-way)	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0
			Pro-Rated # of Lanes	4.00	4.00	4.00	3.00	2.00	4.00	2.00	4.00	4.00	4.00	4.00	2.33	2.00	5.00	4.00	4.00	4.00
			Description																	
SAFETY	DIRECTIONAL SAFETY		Orig Segment Directional Safety Index (direction 1)	2.800	0.680	1.350	2.660	2.660	2.640	2.640	1.530	1.530	0.100	0.100	1.270	1.270	3.800	0.590	2.090	0.590
			Orig Segment Directional Fatal Crashes (direction 1)	3	1	2	4	4	4	4	3	3	0	0	2	2	3	1	3	1
			Orig Segment Directional Incap Crashes (direction 1)	3	4	3	5	5	4	4	5	5	3	3	2	2	1	4	8	4
			Original Fatal Crashes in project limits (direction 1)	3	0	1	3	3	4	4	1	1	0	0	0	0	3	1	3	1
			Original Incap Crashes in project limits (direction 1)	3	3	2	4	4	4	4	1	1	0	0	0	0	1	2	8	4
			CMF 1 (direction 1)(lowest CMF)	0.72	0.75	0.62	0.67	0.77	0.67	0.64	0.67	0.64	0.62	1	0.67	0.64	1	0.64	0.64	0.64
			CMF 2 (direction 1)	0.75	0.85	0.77	1	0.89	1	1	1	1	0.64	1	1	0.94	1	1	1	1
			CMF 3 (direction 1)	0.85	1	0.94	1	0.97	1		1	1	0.64	1	1	1	1	1	1	1
			CMF 4 (direction 1)	1	1	1	1	1	1	1	1	1	0.94	1	1	1	1	1	1	1
			CMF 5 (direction 1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
			Total CMF (direction 1)	0.583	0.694	0.532	0.670	0.717	0.670	#VALUE!	0.670	0.640	0.500	1.000	0.670	0.621	1.000	0.640	0.640	0.640
			Fatal Crash reduction (direction 1)	0.840	0.000	0.145	0.990	0.850	1.320	#VALUE!	0.330	0.360	0.000	0.000	0.000	0.000	0.000	0.360	1.080	0.360
			Incap Crash reduction (direction 1)	0.413	1.975	0.120	1.320	1.133	1.320	#VALUE!	0.330	0.360	0.000	0.000	0.000	0.000	0.000	0.720	2.880	1.440
			Post-Project Segment Directional Fatal Crashes (direction 1)	2.160	1.000	1.855	3.010	3.150	2.680	#VALUE!	2.670	2.640	0.000	0.000	2.000	2.000	3.000	0.640	1.920	0.640
			Post-Project Segment Directional Incap Crashes (direction 1)	2.587	2.025	2.880	3.680	3.867	2.680	#VALUE!	4.670	4.640	3.000	3.000	2.000	2.000	1.000	3.280	5.120	2.560
			Post-Project Segment Directional Safety Index (direction 1)	2.039	0.606	1.258	1.996410	2.090058	1.770	1.490	1.370	1.320	0.100	0.100	1.270	1.270	3.800	0.401	1.336	0.380
			Post-Project Segment Directional Safety Index (direction 1)	2.039	0.606	1.258	1.996	2.090	1.770	1.490	1.370	1.320	0.100	0.100	1.270	1.270	3.800	0.401	1.336	0.380
			Orig Segment Directional Safety Index (direction 2)	1.190	0.800	1.520	2.510	2.510	0.820	0.820	0.610	0.610	0.289	0.289	1.940	1.940	1.300	0.660	1.340	1.610
			Orig Segment Directional Fatal Crashes (direction 2)	1	1	2	4	4	1	1	1	1	0	0	3	3	1	1	2	3
			Orig Segment Directional Incap Crashes (direction 2)	5	7	7	1	1	4	4	5	5	9	9	4	4	1	6	4	7
			Original Fatal Crashes in project limits (direction 2)	1	0	2	2	2	1	1	1	1	0	0	0	0	1	0	2	3
			Original Incap Crashes in project limits (direction 2)	5	4	3	1	1	4	4	1	1	5	5	2	2	1	1	4	7
			CMF 1 (direction 2)(lowest CMF)	0.72	0.75	0.62	0.67	0.77	0.67	0.64	0.67	0.64	0.62	0.5	0.67	0.64	0.75	0.64	0.64	0.64
			CMF 2 (direction 2)	0.75	0.85	0.77	1	0.89	1	1	1	1	0.64	1	1	0.94	1	1	1	1
			CMF 3 (direction 2)	0.85	1	0.94	1	0.97	1	1	1	1	0.71	1	1	1	1	1	1	1
			CMF 4 (direction 2)	1	1	1	1	1	1	1	1	1	0.94	1	1	1	1	1	1	1
			CMF 5 (direction 2)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
			Total CMF (direction 2)	0.583	0.694	0.532	0.670	0.717	0.670	0.640	0.670	0.640	0.500	0.500	0.670	0.621	0.750	0.640	0.640	0.640
			Fatal Crash reduction (direction 2)	0.227	0.000	1.553	0.660	0.567	0.330	0.360	0.330	0.360	0.000	0.000	0.000	0.000	0.250	0.000	0.720	1.080
			Incap Crash reduction (direction 2)	0.917	0.800	0.670	0.330	0.283	1.320	1.440	0.330	0.360	2.500	2.500	0.660	0.758	0.250	0.360	1.440	2.520
			Post-Project Segment Directional Fatal Crashes (direction 2)	0.773	1.000	0.447	3.340	3.433	0.670	0.640	0.670	0.640	0.000	0.000	3.000	3.000	0.750	1.000	1.280	1.920
			Post-Project Segment Directional Incap Crashes (direction 2)	4.083	6.200	6.330	0.670	0.717	2.680	2.560	4.670	4.640	6.500	6.500	3.340	3.242	0.750	5.640	2.560	4.480
			Post-Project Segment Directional Safety Index (direction 2)	0.931	0.769	0.542	2.085	2.145	0.520	0.440	0.450	0.400	0.210	0.210	1.911	1.907	0.972	0.644	0.857	1.032
			Post-Project Segment Directional Safety Index (direction 2)	0.931	0.769	0.542	2.085	2.145	0.520	0.440	0.450	0.400	0.210	0.210	1.911	1.907	0.972	0.644	0.857	1.032
	SAFETY INDEX		Current Safety Index	1.995	0.740	1.435	2.585	2.585	1.730	1.730	1.070	1.070	0.195	0.195	1.605	1.605	2.550	0.625	1.715	1.100
			Post-Project Safety Index	1.485	0.687	0.900	2.041	2.117	1.145	0.965	0.910	0.860	0.155	0.155	1.590	1.587	2.386	0.523	1.096	0.706
	Needs		Original Segment Safety Need	5.333	0.482	3.721	9.154	9.154	5.295	5.295	2.321	2.321	0.126	0.126	4.916	4.916	7.464	0.406	4.269	1.962
			Post-Project Segment Safety Need	3.351	0.463	1.229	7.090	7.091	3.133	0.889	1.266	1.22	0.101	0.101	4.865	4.858	6.809	0.341	1.866	0.5290

		Solution #	CS60W.1	CS60W.2	CS60W.3	CS93.4-A	CS93.4-B	CS93.5-A	CS93.5-B	CS93.5-A	CS93.5-B	CS93.6-A	CS93.6-B	CS93.7-A	CS93.7-B	CS93.9	CS93.11-1	CS93.11-2	CS93.11-3
		Description	Surprise Area Safety Improvements	Wittmann Area Safety Improvements	South Wickenburg Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Cane Springs Safety Improvements	Cane Springs Safety Improvements	Safety and Freight Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements
		Project Beg MP	132	128	114	190	190	166	166	161.5	161.5	146	146	106	106	67	53	42	28
		Project End MP	138	128.5	115	198.5	198.5	183	183	166	166	148	148	109	109	71	58	53	42
		Project Length (miles)	6	0.5	1	8.5	8.5	17	17	4.5	4.5	2	2	3	3	4	5	11	14
		Segment Beg MP	132	120	111	183	183	166	166	149	149	132	132	106	106	67	53	42	28
		Segment End MP	138	132	120	200	200	183	183	166	166	149	149	124	124	71	67	53	42
		Segment Length (miles)	6	12	9	17	17	17	17	17	17	17	17	18	18	4	14	11	14
		Segment #	60W-1	60W-2	60W-3	93-4	93-4	93-5	93-5	93-6	93-6	93-7	93-7	93-9	93-9	93-11	93-12	93-13	93-14
		Current # of Lanes (both directions)	4	4	4	2	2	2	2	4	4	4	4	2	2	4	4	4	4
		Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	one-way	two-way	two-way	two-way
		Additional Lanes (one-way)	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0
		Pro-Rated # of Lanes	4.00	4.00	4.00	3.00	2.00	4.00	2.00	4.00	4.00	4.00	4.00	2.33	2.00	5.00	4.00	4.00	4.00
		Description																	
MOBILITY	MOBILITY INDEX	Original Segment Mobility Index	0.770	0.680	0.480	0.610	0.610	0.300	0.300	0.280	0.280	0.130	0.130	0.260	0.260	0.660	0.220	0.210	0.230
		Post-Project # of Lanes (both directions)	4.00	4.00	4.00	3.00	2.00	4.00	2.00	4.00	4.00	4.00	4.00	2.33	2.00	5.00	4.00	4.00	4.00
		Post-Project Segment Mobility Index	0.77	0.68	0.48	0.40	0.61	0.14	0.30	0.28	0.14	0.13	0.13	0.21	0.26	0.52	0.22	0.21	0.23
		Post-Project Segment Mobility Index	0.770	0.680	0.480	0.400	0.610	0.140	0.300	0.280	0.140	0.130	0.130	0.210	0.260	0.520	0.220	0.210	0.230
	FUT V/C	Original Segment Future V/C	1.040	1.010	0.750	0.730	0.730	0.360	0.360	0.330	0.330	0.150	0.150	0.310	0.310	0.780	0.250	0.230	0.270
		Post-Project Segment Future V/C	1.040	1.010	0.750	0.480	0.730	0.170	0.360	0.170	0.330	0.150	0.150	0.250	0.310	0.620	0.250	0.230	0.270
		Post-Project Segment Future V/C	1.040	1.010	0.750	0.480	0.730	0.170	0.360	0.170	0.330	0.150	0.150	0.250	0.310	0.620	0.250	0.230	0.270
	PEAK HOUR V/C	Original Segment Peak Hour V/C (direction 1)	0.420	0.280	0.200	0.380	0.380	0.170	0.170	0.190	0.190	0.100	0.100	0.250	0.250	0.610	0.260	0.260	0.240
		Original Segment Peak Hour V/C (direction 2)	0.440	0.270	0.200	0.390	0.390	0.170	0.170	0.190	0.190	0.100	0.100	0.250	0.250	0.580	0.260	0.260	0.240
		Adjusted total # of Lanes for use in directional peak hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.00	4.00	N/A	N/A	6.00	N/A	N/A	N/A
		Post-Project Segement Peak Hr V/C (direction 1)	0.420	0.28	0.20	0.26	0.38	0.08	0.17	0.09	0.09	0.10	0.10	0.20	0.25	0.61	0.26	0.26	0.24
		Post-Project Segement Peak Hr V/C (direction 2)	0.440	0.27	0.20	0.26	0.39	0.08	0.17	0.09	0.09	0.10	0.10	0.20	0.25	0.39	0.26	0.26	0.24
		Post-Project Segment Peak Hr V/C (direction 1)	0.420	0.280	0.200	0.260	0.380	0.080	0.170	0.090	0.090	0.100	0.100	0.200	0.250	0.610	0.260	0.260	0.240
		Post-Project Segment Peak Hr V/C (direction 2)	0.440	0.270	0.200	0.260	0.390	0.080	0.170	0.090	0.090	0.100	0.100	0.200	0.250	0.390	0.260	0.260	0.240
	TTI AND PTI	Safety Reduction Factor	0.744	0.929	0.627	0.789	0.819	0.662	0.558	0.850	0.804	0.797	0.797	0.991	0.989	0.936	0.836	0.639	0.642
		Safety Reduction	0.256	0.071	0.373	0.211	0.181	0.338	0.442	0.150	0.196	0.203	0.203	0.009	0.011	0.064	0.164	0.361	0.358
		Mobility Reduction Factor	1.000	1.000	1.000	0.656	1.000	0.467	1.000	1.000	0.500	1.000	1.000	0.808	1.000	0.788	1.000	1.000	1.000
		Mobility Reduction	0.000	0.000	0.000	0.344	0.000	0.533	0.000	0.000	0.500	0.000	0.000	0.192	0.000	0.212	0.000	0.000	0.000
		Mobility effect on TTI	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
		Mobility effect on PTI	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
		Safety effect on TTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Safety effect on PTI	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
		Original Directional Segment TTI (direction 1)	1.020	1.120	2.380	1.250	1.250	1.040	1.040	1.040	1.040	1.110	1.110	1.000	1.000	1.000	1.000	1.000	1.000
		Original Directional Segment PTI (direction 1)	1.360	1.730	9.650	2.130	2.130	1.420	1.420	1.420	1.420	1.630	1.630	1.030	1.030	2.850	1.160	1.180	1.180
		Original Directional Segment TTI (direction 2)	1.100	1.040	1.000	1.350	1.350	1.030	1.030	1.030	1.030	1.060	1.060	1.000	1.000	1.810	1.000	1.000	1.000
		Original Directional Segment PTI (direction 2)	1.500	1.320	2.430	5.930	5.930	1.410	1.410	1.410	1.410	1.610	1.610	1.000	1.000	11.650	1.100	1.060	1.060
		Reduction Factor for Segment TTI	0.000	0.000	0.000	0.103	0.000	0.160	0.000	0.000	0.150	0.000	0.000	0.058	0.000	0.064	0.000	0.000	0.000
		Reduction Factor for Segment PTI	0.077	0.021	0.112	0.132	0.054	0.208	0.133	0.045	0.159	0.061	0.061	0.041	0.003	0.062	0.049	0.108	0.108
		Post-Project Directional Segment TTI (direction 1)	1.020	1.120	2.380	1.121	1.250	1.020	1.040	1.040	1.020	1.110	1.110	1.000	1.000	1.000	1.000	1.000	1.000
		Post-Project Directional Segment PTI (direction 1)	1.256	1.693	9.650	1.849	2.014	1.124	1.232	1.356	1.194	1.531	1.531	1.015	1.026	2.674	1.103	1.052	1.053
		Post-Project Directional Segment TTI (direction 2)	1.100	1.040	1.000	1.211	1.350	1.015	1.030	1.030	1.015	1.060	1.060	1.000	1.000	1.695	1.000	1.000	1.000
		Post-Project Directional Segment PTI (direction 2)	1.385	1.292	2.430	5.147	5.608	1.117	1.223	1.347	1.186	1.610	1.610	1.000	1.000	10.931	1.046	1.030	1.030
	CLOSURE EXTENT	Orig Segment Directional Closure Extent (direction 1)	0.200	0.100	0.270	0.510	0.510	0.060	0.060	0.150	0.150	0.020	0.020	0.060	0.060	0.460	0.060	0.020	0.090
		Orig Segment Directional Closure Extent (direction 2)	0.100	0.000	0.090	0.060	0.060	0.180	0.180	0.050	0.050	0.110	0.110	0.240	0.240	0.150	0.030	0.110	0.020
		Segment Closures with fatalities/injuries	9	2	7	11	11	12	12	10	10	9	9	15	15	6	3	4	7
		Total Segment Closures	9	6	16	14	14	20	20	15	15	11	11	27	27	12	6	7	7
		% Closures with Fatality/Injury	1.00	0.33	0.44	0.79	0.79	0.60	0.60	0.67	0.67	0.82	0.82	0.56	0.56	0.50	0.50	0.57	1.00
		Closure Reduction	0.256	0.024	0.163	0.165	0.142	0.203	0.265	0.100	0.131	0.166	0.166	0.005	0.006	0.032	0.082	0.206	0.358
		Closure Reduction Factor	0.744	0.976	0.837	0.835	0.858	0.797	0.735	0.900	0.869	0.834	0.834	0.995	0.994	0.968	0.918	0.794	0.642
		Post-Project Segment Directional Closure Extent (direction 1)	0.149	0.098	0.226	0.426	0.438	0.048	0.110	0.135	0.130	0.017	0.017	0.060	0.060	0.445	0.055	0.016	0.058
		Post-Project Segment Directional Closure Extent (direction 2)	0.074	0.000	0.075	0.050	0.051	0.143	0.037	0.045	0.043	0.110	0.110	0.239	0.238	0.150	0.028	0.087	0.013
	BICYCLE ACCOM	Orig Segment Bicycle Accomodation %	100.0%	99.0%	72.0%	81.0%	81.0%	82.0%	82.0%	80.0%	80.0%	91.0%	63.0%	48.0%	48.0%	100.0%	77.0%	87.0%	54.0%
		Orig Segment Outside Shoulder width	12	8	8	7	7	7	7	9	9	10	10	5	5	10	8	6	6
		Post-Project Segment Outside Shoulder width	12	8	8	10	7	10	10	10	10	10	10	10	10	10	10	10	10
		Post-Project Segment Bicycle Accomodation (%)	100.0%	99.0%	72.0%	100.0%	81.0%	100.0%	100.0%	100.0%	100.0%	99.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Post-Project Segment Bicycle Accomodation (%)	100.0%	99.0%	72.0%	100.0%	81.0%	100.0%	100.0%	100.0%	100.0%	99.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Needs	Original Segment Mobility Need	1.353	0.759	9.435	0.964	0.964	1.250	1.250	0.679	0.679	1.205	1.205	1.003	1.003	1.497	0.602	0.493	0.902
		Post-Project Segment Mobility Need	1.340	0.758	9.428	0.382	0.358	0.345	0.520	0.614	0.599	1.125	0.946	1.001	1.001	1.232	0.597	0.417	0.431

		Solution #	CS60W.1	CS60W.2	CS60W.3	CS93.4-A	CS93.4-B	CS93.5-A	CS93.5-B	CS93.5-A	CS93.5-B	CS93.6-A	CS93.6-B	CS93.7-A	CS93.7-B	CS93.9	CS93.11-1	CS93.11-2	CS93.11-3
		Description	Surprise Area Safety Improvements	Wittmann Area Safety Improvements	South Wickenburg Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Cane Springs Safety Improvements	Cane Springs Safety Improvements	Safety and Freight Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements
		Project Beg MP	132	128	114	190	190	166	166	161.5	161.5	146	146	106	106	67	53	42	28
		Project End MP	138	128.5	115	198.5	198.5	183	183	166	166	148	148	109	109	71	58	53	42
		Project Length (miles)	6	0.5	1	8.5	8.5	17	17	4.5	4.5	2	2	3	3	4	5	11	14
		Segment Beg MP	132	120	111	183	183	166	166	149	149	132	132	106	106	67	53	42	28
		Segment End MP	138	132	120	200	200	183	183	166	166	149	149	124	124	71	67	53	42
		Segment Length (miles)	6	12	9	17	17	17	17	17	17	17	17	18	18	4	14	11	14
		Segment #	60W-1	60W-2	60W-3	93-4	93-4	93-5	93-5	93-6	93-6	93-7	93-7	93-9	93-9	93-11	93-12	93-13	93-14
		Current # of Lanes (both directions)	4	4	4	2	2	2	2	4	4	4	4	2	2	4	4	4	4
		Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	one-way	two-way	two-way	two-way
		Additional Lanes (one-way)	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0
		Pro-Rated # of Lanes	4.00	4.00	4.00	3.00	2.00	4.00	2.00	4.00	4.00	4.00	4.00	2.33	2.00	5.00	4.00	4.00	4.00
		Description																	
FREIGHT	TTTI AND TPTI	Mobility effect on TTTI	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		Mobility effect on TPTI	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
		Safety effect on TTTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Safety effect on TPTI	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		Original Directional Segment TTTI (direction 1)	1.050	1.150	2.900	1.380	1.380	1.110	1.110	1.110	1.110	1.150	1.150	1.000	1.000	1.090	1.060	1.060	1.060
		Original Directional Segment TPTI (direction 1)	1.150	1.670	12.050	2.380	2.380	1.600	1.600	1.600	1.600	1.710	1.710	1.000	1.000	2.850	1.180	1.200	1.200
		Original Directional Segment TTTI (direction 2)	1.140	1.090	1.000	1.600	1.600	1.140	1.140	1.140	1.140	1.200	1.200	1.000	1.000	2.000	1.050	1.040	1.040
		Original Directional Segment TPTI (direction 2)	1.750	1.320	1.910	3.920	3.920	1.660	1.660	1.660	1.660	2.030	2.030	1.010	1.010	6.850	1.150	1.130	1.130
		Reduction Factor for Segment TTTI (both directions)	0.000	0.000	0.000	0.052	0.000	0.080	0.000	0.000	0.075	0.000	0.000	0.029	0.000	0.032	0.000	0.000	0.000
		Reduction Factor for Segment TPTI (both directions)	0.038	0.011	0.056	0.066	0.027	0.104	0.066	0.022	0.079	0.030	0.030	0.021	0.002	0.031	0.025	0.054	0.054
		Post-Project Directional Segment TTTI (direction 1)	1.050	1.150	2.900	1.309	1.380	1.021	1.110	1.110	1.027	1.150	1.150	0.986	1.000	1.055	1.060	1.060	1.060
		Post-Project Directional Segment TPTI (direction 1)	1.106	1.652	12.050	2.223	2.315	1.434	1.494	1.564	1.473	1.658	1.658	0.990	0.999	2.762	1.151	1.135	1.135
		Post-Project Directional Segment TTTI (direction 2)	1.140	1.090	1.000	1.517	1.600	1.049	1.140	1.140	1.055	1.200	1.200	1.000	1.000	2.000	1.050	1.040	1.040
		Post-Project Directional Segment TPTI (direction 2)	1.683	1.306	1.910	3.661	3.814	1.487	1.550	1.623	1.528	2.030	2.030	1.005	1.008	6.850	1.122	1.069	1.069
	FREIGHT INDEX	Original Segment TPTI (direction 1)	1.150	1.670	12.050	2.380	2.380	1.600	1.600	1.600	1.600	1.710	1.710	1.000	1.000	2.850	1.180	1.200	1.200
		Original Segment TPTI (direction 2)	1.750	1.320	1.910	3.920	3.920	1.660	1.660	1.660	1.660	2.030	2.030	1.010	1.010	6.850	1.150	1.130	1.130
		Original Segment Freight Index	0.690	0.669	0.143	0.317	0.317	0.613	0.613	0.613	0.613	0.535	0.535	0.995	0.995	0.206	0.858	0.870	0.810
		Post-Project Segment TPTI (direction 1)	1.106	1.652	12.050	2.223	2.315	1.434	1.494	1.564	1.473	1.658	1.658	0.990	0.999	2.762	1.151	1.135	1.135
		Post-Project Segment TPTI (direction 2)	1.683	1.306	1.910	3.661	3.814	1.487	1.550	1.623	1.528	2.030	2.030	1.005	1.008	6.850	1.122	1.069	1.069
		Post-Project Segment Freight Index	0.717	0.676	0.143	0.340	0.326	0.685	0.657	0.628	0.666	0.542	0.542	1.003	0.996	0.208	0.880	0.907	0.907
	CLOSURE DURATION	Orig Segment Directional Closure Duration (dir 1)	34.600	19.970	38.690	179.420	179.420	9.080	9.080	33.080	33.080	13.750	13.750	8.740	8.740	60.450	8.330	7.040	20.320
		Orig Segment Directional Closure Duration (dir 2)	16.900	0.000	11.220	18.860	18.860	41.690	41.690	15.280	15.280	37.550	37.550	53.240	53.240	7.500	6.600	27.330	4.220
		Segment Closures with fatalities	9	2	7	11	11	12	12	10	10	9	9	15	15	6	3	4	7
		Total Segment Closures	9	6	16	14	14	20	20	15	15	11	11	27	27	12	6	7	7
		% Closures with Fatality	1.00	0.33	0.44	0.79	0.79	0.60	0.60	0.67	0.67	0.82	0.82	0.56	0.56	0.50	0.50	0.57	1.00
		Closure Reduction	0.256	0.024	0.163	0.165	0.142	0.203	0.265	0.100	0.131	0.166	0.166	0.005	0.006	0.032	0.082	0.206	0.358
		Closure Reduction Factor	0.744	0.976	0.837	0.835	0.858	0.797	0.735	0.900	0.869	0.834	0.834	0.995	0.994	0.968	0.918	0.794	0.642
		Post-Project Segment Directional Closure Duration (direction 1)	25.754	19.496	32.379	149.743	153.921	7.238	6.671	29.782	28.752	11.463	11.463	8.696	8.685	58.507	7.648	5.588	13.039
		Post-Project Segment Directional Closure Duration (direction 2)	12.579	0.000	9.390	15.740	16.180	33.232	30.629	13.757	13.281	37.550	37.550	52.970	52.902	7.500	6.059	21.694	2.708
	VERT CLR	Original Segment Vertical Clearance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Original vertical clearance for specific bridge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Post-Project vertical clearance for specific bridge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Post-Project Segment Vertical Clearance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Post-Project Segment Vertical Clearance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Needs	Original Segment Freight Need	0.144	0.124	13.482	0.824	0.824	3.271	3.271	3.268	3.268	3.757	3.757	0.2	0.2	2.11	0.183	0.2	0.2
		Post-Project Segment Freight Need	0.133	0.1237	13.480	0.6267	0.798	2.233	2.744	3.174	2.516	3.695	3.53	0.197	0.196	2.1	0.179	0.2	0.2

		Solution #	CS60W.1	CS60W.2	CS60W.3	CS93.4-A	CS93.4-B	CS93.5-A	CS93.5-B	CS93.5-A	CS93.5-B	CS93.6-A	CS93.6-B	CS93.7-A	CS93.7-B	CS93.9	CS93.11-1	CS93.11-2	CS93.11-3
		Description	Surprise Area Safety Improvements	Wittmann Area Safety Improvements	South Wickenburg Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Wickenburg Ranch Area Safety Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Joshua Tree Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Burro Creek Safety and Freight Improvements	Cane Springs Safety Improvements	Cane Springs Safety Improvements	Safety and Freight Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements	Windy Point Safety Improvements
		Project Beg MP	132	128	114	190	190	166	166	161.5	161.5	146	146	106	106	67	53	42	28
		Project End MP	138	128.5	115	198.5	198.5	183	183	166	166	148	148	109	109	71	58	53	42
		Project Length (miles)	6	0.5	1	8.5	8.5	17	17	4.5	4.5	2	2	3	3	4	5	11	14
		Segment Beg MP	132	120	111	183	183	166	166	149	149	132	132	106	106	67	53	42	28
		Segment End MP	138	132	120	200	200	183	183	166	166	149	149	124	124	71	67	53	42
		Segment Length (miles)	6	12	9	17	17	17	17	17	17	17	17	18	18	4	14	11	14
		Segment #	60W-1	60W-2	60W-3	93-4	93-4	93-5	93-5	93-6	93-6	93-7	93-7	93-9	93-9	93-11	93-12	93-13	93-14
		Current # of Lanes (both directions)	4	4	4	2	2	2	2	4	4	4	4	2	2	4	4	4	4
		Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	one-way	two-way	two-way	two-way
		Additional Lanes (one-way)	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0
		Pro-Rated # of Lanes	4.00	4.00	4.00	3.00	2.00	4.00	2.00	4.00	4.00	4.00	4.00	2.33	2.00	5.00	4.00	4.00	4.00
		Description																	
PAVEMENT	PAVEMENT INDEX	Original Segment Pavement Index								3.709			3.859						
		Original Segment IRI in project limits								66.213			91.774						
		Original Segment Cracking in project limits								4.2			4.5						
		Post-Project IRI in project limits								48.106			67.80025						
		Post-Project IRI in project limits	0	0	0	0	0	0	0	48.106	0	0	67.80025	0	0	0	0	0	0
		Post-Project Cracking in project limits								2.1			3						
		Post-Project Cracking in project limits	0	0	0	0	0	0	0	2.1	0	0	3	0	0	0	0	0	0
		Post-Project Segment Pavement Index								3.851			3.903						
		Post-Project Segment Pavement Index	0	0	0	0	0	0	0	3.851	0	0	3.903	0	0	0	0	0	0
	DIRECTION PSR	Original Segment Directional PSR (direction 1)								3.841			3.786						
		Original Segment Directional PSR (direction 2)								3.581			3.814						
		Original Segment IRI in project limits	0	0	0	0	0	0	0	66.213	0	0	91.774375	0	0	0	0	0	0
		Post-Project directional IRI in project limits	0	0	0	0	0	0	0	48.106	0	0	67.80025	0	0	0	0	0	0
		Post-Project Segment Directional PSR (direction 1)								3.841			3.786						
		Post-Project Segment Directional PSR (direction 2)								3.836			3.907						
		Post-Project Segment Directional PSR (direction 1)	0	0	0	0	0	0	0	3.841	0	0	3.786	0	0	0	0	0	0
		Post-Project Segment Directional PSR (direction 2)	0	0	0	0	0	0	0	3.836	0	0	3.907	0	0	0	0	0	0
	% FAIL	Original Segment % Failure								13.3%			3.03%						
		Post-Project Segment % Failure								11.8%			3.03%						
		Post-Project Segment % Failure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.8%	0.0%	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Needs	Original Segment Pavement Need								0.233			0.030						
		Post-Project Segment Pavement Need								0.171			0.030						

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	
CS60W.1	Surprise Area Safety Improvements	138	4.141			0.000	0.00	0.000			0.000	0.00	0.000	5.333	3.351	1.982	2.95	5.85	1.353	1.340	0.013	2.02	0.03	0.144	0.133	0.011	0.84	0.01	5.884
CS60W.2	Wittmann Area Safety Improvements	128	0.164			0.000	0.00	0.000			0.000	0.00	0.000	0.482	0.448	0.034	2.73	0.09	0.128	0.127	0.001	0.37	0.00	0.124	0.123734982	0.000	0.65	0.00	0.093
CS60W.3	South Wickenburg Area Safety Improvements	115	0.829			0.000	0.00	0.000			0.000	0.00	0.000	3.721	1.229	2.492	1.95	4.86	9.435	9.428	0.007	2.66	0.02	13.482	13.478	0.004	2.47	0.01	4.887
CS93.4-A	Wickenburg Ranch Area Safety Improvements	198.5	63.929	0.000	0.000	0.000	1.52	0.000			0.000	0.00	0.000	9.154	7.090	2.064	3.71	7.66	0.571	0.368	0.203	6.55	1.33	0.824	0.6267	0.197	5.09	1.00	9.990
CS93.4-B	Wickenburg Ranch Area Safety Improvements	198.5	0.952			0.000	0.00	0.000			0.000	0.00	0.000	9.154	7.383	1.771	3.71	6.57	0.571	0.479	0.091	6.55	0.60	0.824	0.7175	0.107	5.09	0.54	7.713
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	128.943	0.000	0.000	0.000	1.51	0.000			0.000	0.00	0.000	5.295	3.133	2.162	3.04	6.57	0.699	0.334	0.365	9.51	3.47	3.271	2.233	1.038	7.84	8.14	18.181
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	12.353			0.000	0.00	0.000			0.000	0.00	0.000	5.295	0.889	4.406	3.04	13.39	0.699	0.501	0.199	9.51	1.89	3.271	2.746	0.525	7.84	4.12	19.401
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	34.132	0.233	0.171	0.063	1.41	0.088			0.000	0.00	0.000	2.321	1.266	1.055	2.43	2.56	0.679	0.516	0.163	7.76	1.26	3.268	3.174	0.094	7.78	0.73	4.646
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	3.270			0.000	0.00	0.000			0.000	0.00	0.000	2.321	1.220	1.101	2.43	2.68	0.679	0.502	0.177	7.76	1.37	3.268	2.516	0.752	7.78	5.85	9.898
CS93.6-A	Burro Creek Safety and Freight Improvements	148	2.372			0.000	0.00	0.000			0.000	0.00	0.000	0.126	0.101	0.025	0.89	0.02	0.879	0.761	0.118	5.25	0.62	3.757	3.701	0.056	5.18	0.29	0.931
CS93.6-B	Burro Creek Safety and Freight Improvements	148	14.834	0.030	0.030	0.000	0.68	0.000			0.000	0.00	0.000	0.126	0.101	0.025	0.89	0.02	0.879	0.761	0.118	5.25	0.62	3.757	3.53	0.227	5.18	1.18	1.816
CS93.7-A	Cane Springs Safety Improvements	109	25.751			0.000	1.18	0.000			0.000	0.00	0.000	4.916	4.865	0.051	2.51	0.13	1.003	0.495	0.508	5.75	2.92	0.2	0.198	0.002	5.31	0.01	3.055
CS93.7-B	Cane Springs Safety Improvements	109	9.401			0.000	0.00	0.000			0.000	0.00	0.000	4.916	4.858	0.058	2.51	0.14	1.003	0.494	0.509	5.75	2.93	0.2	0.196	0.004	5.31	0.02	3.093
CS93.9	Kingman Area Safety and Freight Improvements	71	22.623			0.000		0.000			0.000	0.00	0.000	7.464	6.809	0.655	3.17	2.07	1.497	1.255	0.242	3.21	0.78	2.11	2.090	0.020	1.73	0.04	2.887
CS93.11-1	Windy Point Safety Improvements	58	6.995			0.000	0.00	0.000			0.000	0.00	0.000	0.406	0.341	0.065	2.28	0.15	0.602	0.430	0.172	4.63	0.80	0.183	0.180	0.003	3.69	0.01	0.957
CS93.11-2	Windy Point Safety Improvements	58	15.390			0.000	0.00	0.000			0.000	0.00	0.000	4.269	1.866	2.403	2.80	6.73	0.492	0.417	0.075	5.28	0.40	0.195	0.187	0.008	3.60	0.03	7.153
CS93.11-3	Windy Point Safety Improvements	58	19.587			0.000	0.00	0.000			0.00	0.00	0.000	1.962	0.529	1.43	2.81	4.027	0.904	0.434	0.470	5.43	2.55	0.195	0.179	0.016	3.60	0.06	6.637

Emphasis Area Scoring

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
CS60W.1	Surprise Area Safety Improvements	138	4.141	2.411	2.352	0.059	2.95	1.50	0.26	0.346	0.346	0.000	2.02	1.50	0.00	1.532	1.520	0.011	0.84	1.50	0.01
CS60W.2	Wittmann Area Safety Improvements	128	0.164	2.411	2.399	0.012	2.73	1.50	0.05	0.346	0.346	0.000	2.32	1.50	0.00	1.532	1.525	0.007	0.65	1.50	0.01
CS60W.3	South Wickenburg Area Safety Improvements	115	0.829	2.411	2.317	0.094	1.95	1.50	0.27	0.346	0.346	0.000	2.66	1.50	0.00	1.532	1.532	0.000	2.47	1.50	0.00
CS93.4-A	Wickenburg Ranch Area Safety Improvements	198.5	63.929	2.411	2.233	0.178	3.71	1.50	0.99	0.346	0.327	0.019	6.55	1.50	0.19	1.532	1.505	0.027	5.09	1.50	0.20
CS93.4-B	Wickenburg Ranch Area Safety Improvements	198.5	0.952	2.411	2.258	0.153	3.71	1.50	0.85	0.346	0.346	0.000	6.55	1.50	0.00	1.532	1.520	0.012	5.09	1.50	0.09
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	128.943	2.411	2.218	0.193	3.04	1.50	0.88	0.346	0.332	0.014	9.51	1.50	0.20	1.532	1.532	0.000	7.84	1.50	0.00
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	12.353	2.411	2.159	0.252	3.04	1.50	1.15	0.346	0.346	0.000	9.51	1.50	0.00	1.532	1.532	0.000	7.84	1.50	0.00
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	34.132	2.411	2.359	0.052	2.43	1.50	0.19	0.346	0.346	0.000	7.76	1.50	0.00	1.532	1.511	0.021	7.78	1.50	0.24
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	3.270	2.411	2.342	0.069	2.43	1.50	0.25	0.346	0.346	0.000	7.76	1.50	0.00	1.532	1.463	0.069	7.78	1.50	0.81
CS93.6-A	Burro Creek Safety and Freight Improvements	148	2.372	2.411	2.398	0.013	0.89	1.50	0.02	0.346	0.346	0.000	5.25	1.50	0.00	1.532	1.522	0.010	5.18	1.50	0.08
CS93.6-B	Burro Creek Safety and Freight Improvements	148	14.834	2.411	2.398	0.013	0.89	1.50	0.02	0.346	0.346	0.000	5.25	1.50	0.00	1.532	1.491	0.041	5.18	1.50	0.32
CS93.7-A	Cane Springs Safety Improvements	109	25.751	2.411	2.406	0.005	2.51	1.50	0.02	0.346	0.346	0.000	5.75	1.50	0.00	1.532	1.527	0.005	5.31	1.50	0.04
CS93.7-B	Cane Springs Safety Improvements	109	9.401	2.411	2.405	0.006	2.51	1.50	0.02	0.346	0.346	0.000	5.75	1.50	0.00	1.532	1.532	0.000	5.31	1.50	0.00
CS93.9	Kingman Area Safety and Freight Improvements	71	22.623	2.411	2.398	0.013	3.17	1.50	0.06	0.346	0.343	0.003	3.21	1.50	0.01	1.532	1.531	0.001	1.73	1.50	0.00
CS93.11-1	Windy Point Safety Improvements	58	6.995	2.411	2.384	0.027	2.28	1.50	0.094	0.346	0.346	0.000	4.63	1.50	0.00	1.532	1.512	0.020	3.69	1.50	0.11
CS93.11-2	Windy Point Safety Improvements	58	15.390	2.411	2.280	0.131	2.80	1.50	0.551	0.346	0.346	0.000	5.28	1.50	0.00	1.532	1.506	0.025	3.04	1.50	0.12
CS93.11-3	Windy Point Safety Improvements	58	19.587	2.411	2.311	0.100	2.81	1.50	0.421	0.346	0.346	0.000	5.43	1.50	0.00	1.532	1.442	0.090	3.04	1.50	0.41

Performance Effectiveness Scoring

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
CS60W.1	Surprise Area Safety Improvements	138	4.141	6.16	3.75	15.3	85.37	6.00	16628	2	99768
CS60W.2	Wittmann Area Safety Improvements	128	0.164	0.15	0.39	15.3	5.45	0.50	11776	2	5888
CS60W.3	South Wickenburg Area Safety Improvements	115	0.829	5.16	0.93	15.3	88.45	1.00	14780	2	14780
CS93.4-A	Wickenburg Ranch Area Safety Improvements	198.5	63.929	11.37	3.05	20.2	10.94	8.50	7948	2	67559.62
CS93.4-B	Wickenburg Ranch Area Safety Improvements	198.5	0.952	8.66	3.05	15.3	423.62	8.50	7948	2	67559.62
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	128.943	19.26	0.45	20.2	1.37	17.00	803	1	6825.5
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	12.353	20.55	0.86	15.3	22.00	17.00	803	2	13651
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	34.132	5.08	1.96	20.2	5.90	4.50	7977	2	35896.5
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	3.270	10.95	1.96	15.3	100.68	4.50	7977	2	35896.5
CS93.6-A	Burro Creek Safety and Freight Improvements	148	2.372	1.03	0.49	15.3	3.27	2.00	7487	1	7487
CS93.6-B	Burro Creek Safety and Freight Improvements	148	14.834	2.15	0.49	20.2	1.45	2.00	7487	1	7487
CS93.7-A	Cane Springs Safety Improvements	109	25.751	3.11	1.50	20.2	3.67	3.40	7562	2	25710.8
CS93.7-B	Cane Springs Safety Improvements	109	9.401	3.11	1.50	15.3	7.61	3.40	7562	2	25710.8
CS93.9	Kingman Area Safety and Freight Improvements	71	22.623	2.96	1.96	15.3	3.93	4.00	17931	1	35862
CS93.11-1	Windy Point Safety Improvements	58	6.995	1.16	4.61	15.3	11.69	14.00	13069	2	182967.4
CS93.11-2	Windy Point Safety Improvements	58	15.390	7.82	4.33	15.3	33.65	11.00	13134	2	144474
CS93.11-3	Windy Point Safety Improvements	58	19.587	7.47	3.02	15.3	17.64	5.00	13357	2	66785.34

Appendix J: Solution Prioritization Scores

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			
CS60W.1	Surprise Area Safety Improvements	138	4.141	0.000	0.0%	0.000	0.0%	6.109	99.2%	0.028	0.5%	0.023	0.4%	6.160	1.14	1.51	1.78	1.36	1.36	1.776	1.08	**164**
CS60W.2	Wittmann Area Safety Improvements	128	0.164	0.000	0.0%	0.000	0.0%	0.141	95.1%	0.000	0.3%	0.007	4.6%	0.149	1.14	1.51	1.78	1.36	1.36	1.760	0.62	**6**
CS60W.3	South Wickenburg Area Safety Improvements	115	0.829	0.000	0.0%	0.000	0.0%	5.133	99.5%	0.018	0.4%	0.010	0.2%	5.161	1.14	1.51	1.78	1.36	1.36	1.778	1.85	**291**
CS93.4-A	Wickenburg Ranch Area Safety Improvements	198.5	63.929	0.000	0.0%	0.000	0.0%	8.645	76.0%	1.516	13.3%	1.209	10.6%	11.371	1.14	1.51	1.78	1.36	1.36	1.679	1.15	**21**
CS93.4-B	Wickenburg Ranch Area Safety Improvements	198.5	0.952	0.000	0.0%	0.000	0.0%	7.421	85.7%	0.599	6.9%	0.636	7.3%	8.656	1.14	1.51	1.78	1.36	1.36	1.720	1.15	**838**
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	128.94302	0.000	0.0%	0.000	0.0%	7.454	38.7%	3.674	19.1%	8.135	42.2%	19.263	1.14	1.51	1.78	1.36	1.36	1.523	1.23	**3**
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	12.35307	0.000	0.0%	0.000	0.0%	14.545	70.8%	1.890	9.2%	4.117	20.0%	20.552	1.14	1.51	1.78	1.36	1.36	1.657	1.23	**45**
CS93.5-A	Joshua Tree Safety and Freight Improvements	183	34.131977	0.088	1.7%	0.000	0.0%	2.754	54.2%	1.262	24.9%	0.974	19.2%	5.079	1.14	1.51	1.78	1.36	1.36	1.584	1.46	**14**
CS93.5-B	Joshua Tree Safety and Freight Improvements	183	3.2699302	0.000	0.0%	0.000	0.0%	2.926	26.7%	1.372	12.5%	6.656	60.8%	10.954	1.14	1.51	1.78	1.36	1.36	1.472	1.46	**216**
CS93.6-A	Burro Creek Safety and Freight Improvements	148	2.372	0.000	0.0%	0.000	0.0%	0.039	3.8%	0.618	60.3%	0.368	35.9%	1.025	1.14	1.51	1.78	1.36	1.36	1.376	1.46	**7**
CS93.6-B	Burro Creek Safety and Freight Improvements	148	14.834	0.000	0.0%	0.000	0.0%	0.039	1.8%	0.618	28.7%	1.494	69.4%	2.151	1.14	1.51	1.78	1.36	1.36	1.368	1.46	**3**
CS93.7-A	Cane Springs Safety Improvements	109	25.751	0.000	0.0%	0.000	0.0%	0.146	4.7%	2.919	93.8%	0.046	1.5%	3.111	1.14	1.51	1.78	1.36	1.36	1.380	1.08	**5**
CS93.7-B	Cane Springs Safety Improvements	109	9.401	0.000	0.0%	0.000	0.0%	0.166	5.3%	2.927	94.0%	0.021	0.7%	3.114	1.14	1.51	1.78	1.36	1.36	1.382	1.08	**11**
CS93.9	Kingman Area Safety and Freight Improvements	71	22.623	0.000	0.0%	0.000	0.0%	2.135	72.1%	0.791	26.7%	0.037	1.2%	2.963	1.14	1.51	1.78	1.36	1.36	1.663	1.54	**10**
CS93.11-1	Windy Point Safety Improvements	58	6.9953333	0.000	0.0%	0.000	0.0%	0.242	20.9%	0.797	68.7%	0.121	10.5%	1.161	1.14	1.51	1.78	1.36	1.36	1.448	1.00	**17**
CS93.11-2	Windy Point Safety Improvements	58	15.389733	0.000	0.0%	0.000	0.0%	7.279	93.1%	0.396	5.1%	0.146	1.9%	7.820	1.14	1.51	1.78	1.36	1.36	1.751	0.92	**54**
CS93.11-3	Windy Point Safety Improvements	58	19.586933	0.000	0.0%	0.000	0.0%	4.448	59.6%	2.551	34.2%	0.467	6.3%	7.466	1.14	1.51	1.78	1.36	1.36	1.610	1.08	**31**

Appendix K: Preliminary Scoping Reports for Prioritized Solutions

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Surprise Area Safety Improvements	
City/Town Name: -	**County: Maricopa**
Primary Route/Street: US 60W	
Beginning Limit: MP 138	
End Limit: MP 132	
Project Length: 6.0 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: *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: MP 138 – 132 has a safety index below the statewide average. Crash data analysis indicates 4 fatal crashes and 8 incapacitating injury crashes occurred along the project corridor, 50% involving SHSP top 5 emphasis areas (matching the statewide average). Mobility Need: MP 138 – 132 has a fair mobility performance index. Freight Need: MP 138 – 132 has a good freight performance index. Safety Hot Spot: Crash concentration WB MP 138-137.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need and high crash concentration WB MP 138-137.			

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

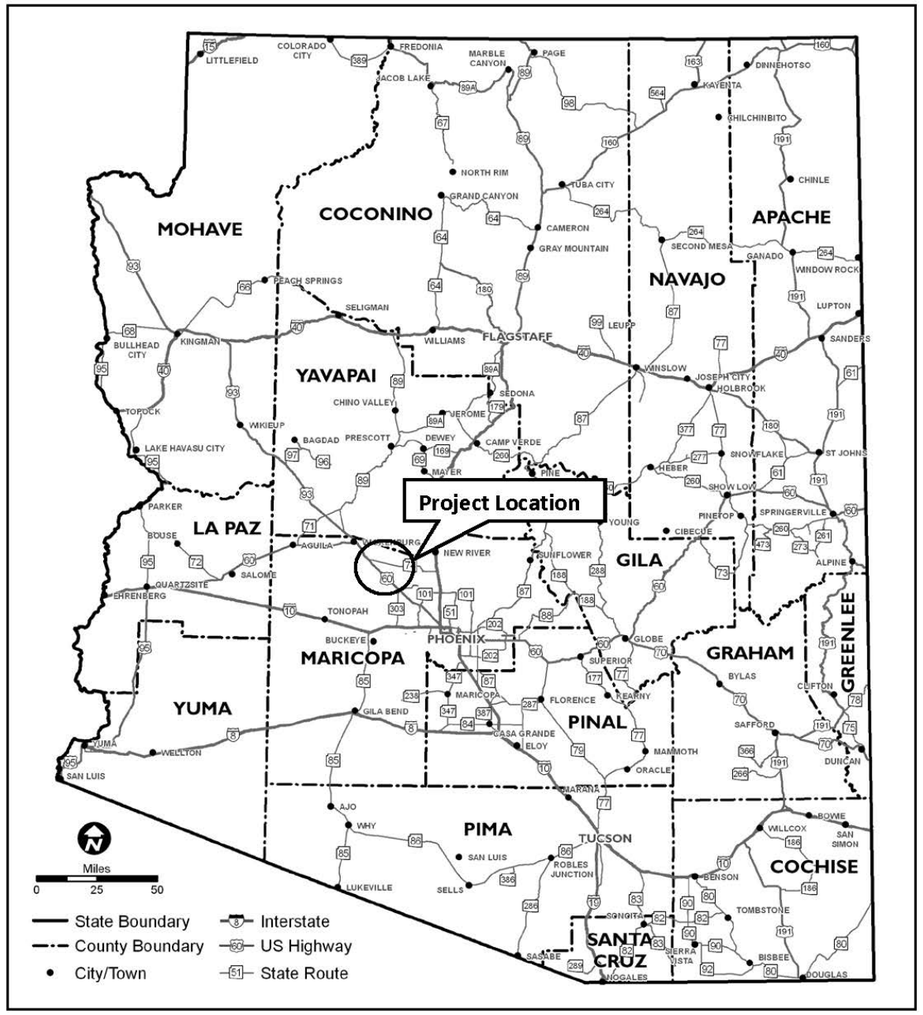
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$ 112,000	$ 370,000	$ 0	$ 3,659,000	$ 4,141,000

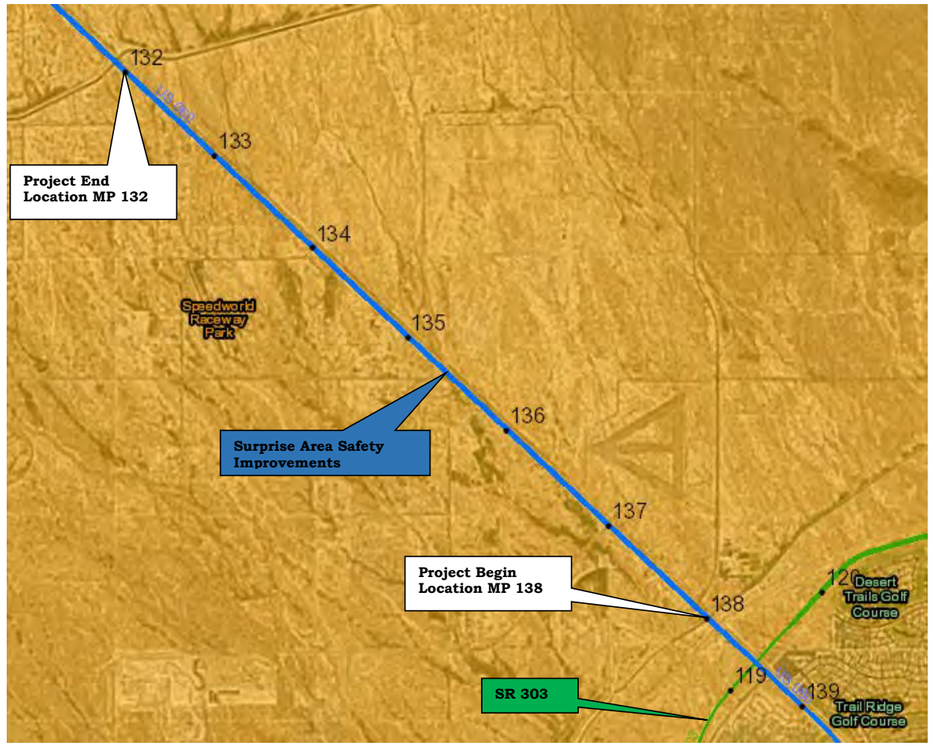
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map** 2) **Project Vicinity Map** 3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: SR 303L
- Project End Location: Central Arizona Project (CAP) Canal

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Install lighting between 163rd Avenue and SR303L: 1-mile (0.5-mile length x 2 directions)
• Rehabilitate shoulders/rumble strips and install safety edge: 12-mile (6-mile length x 2 directions)
• Improve signal visibility: 1 each (signalized 4-legged intersection)

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Wittmann Area Safety Improvements	
City/Town Name: -	**County: Maricopa**
Primary Route/Street: US 60W	
Beginning Limit: MP 132	
End Limit: MP 120	
Project Length: 12.0 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: *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: MP 132 – 120 has a safety index above the statewide average. Crash data analysis indicates 2 fatal crashes and 11 incapacitating injury crashes occurred along the project corridor, 69% involving SHSP top 5 emphasis areas (below the statewide average). Mobility Need: MP 132 – 120 has a good mobility performance index. Freight Need: MP 132 – 120 has a good freight performance index. Safety Hot Spot: Crash concentration WB MP 129-128.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need and high crash concentration WB MP 129-128.			

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

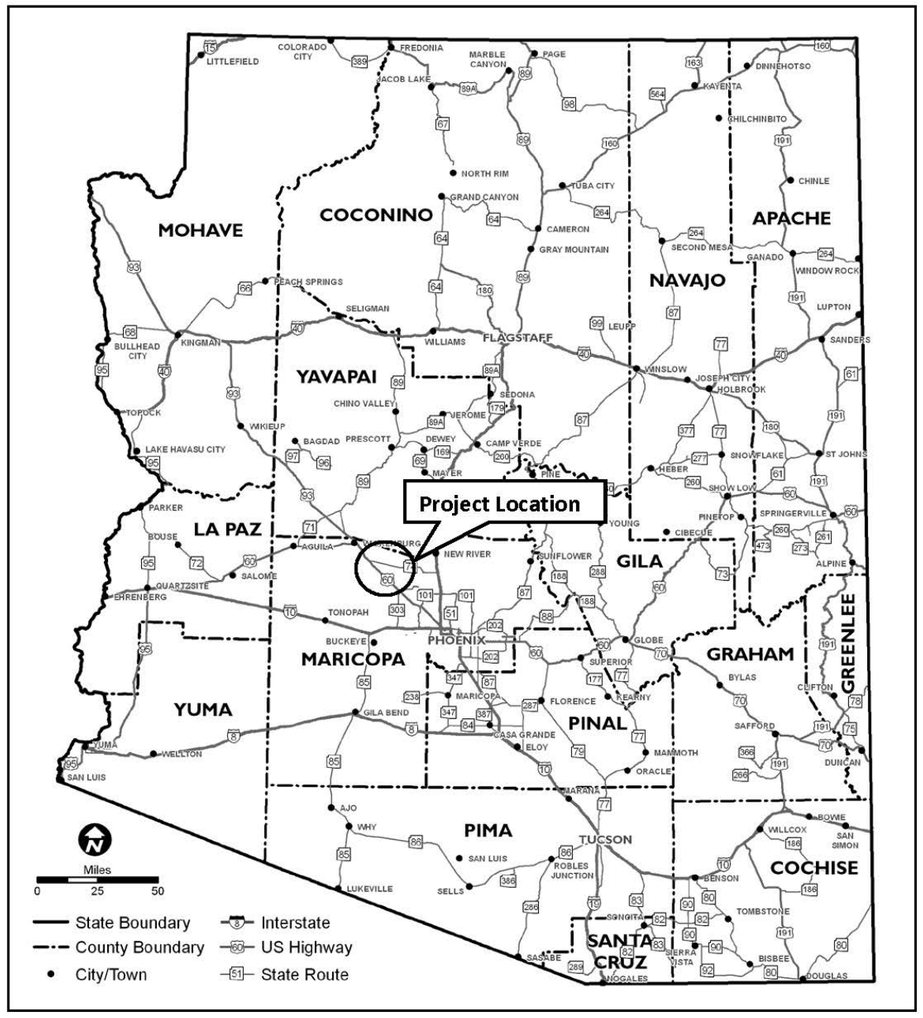
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$ 4,000	$ 17,000	$ 0	$ 143,000	$ 164,000

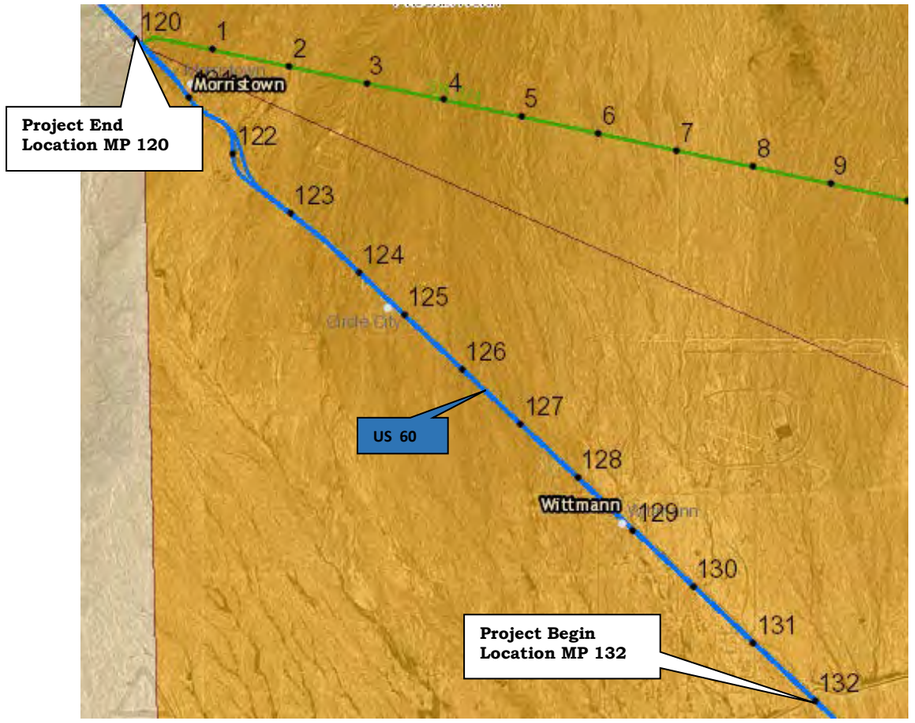
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map** 2) **Project Vicinity Map** 3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: Hayden-Rhodes Aqueduct (CAP)
- Project End Location: SR 74
- Mileposts: MP 132 – MP 120

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Install additional advanced signal warning sign with flashing beacon approximately 1000' upstream of Center Street: 2 (both directions) • Improve signal visibility: 1 (signalized 4-legged intersection)

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 03-01-2017	**ADOT Project Manager:**
Project Name: South Wickenburg Ranch Area Safety Improvements	
City/Town Name:	**County:** Maricopa
Primary Route/Street: US 60W	
Beginning Limit: MP 115	
End Limit: MP 114	
Project Length: 1.0 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: *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: MP 115-114 has a safety index below the statewide average. Crash data analysis indicates 4 fatal crashes and 10 incapacitating injury crashes occurred along the project corridor, 57% involving SHSP top 5 emphasis areas (below the statewide average). Mobility Need: MP 115-114 has a good mobility performance index. Freight Need: MP 115-114 has a poor freight performance index. Safety Hot Spot: Crash concentration WB MP 115-114.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need and high crash concentration WB MP 115-114.			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒

ADOT

PRELIMINARY SCOPING REPORT

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)*	

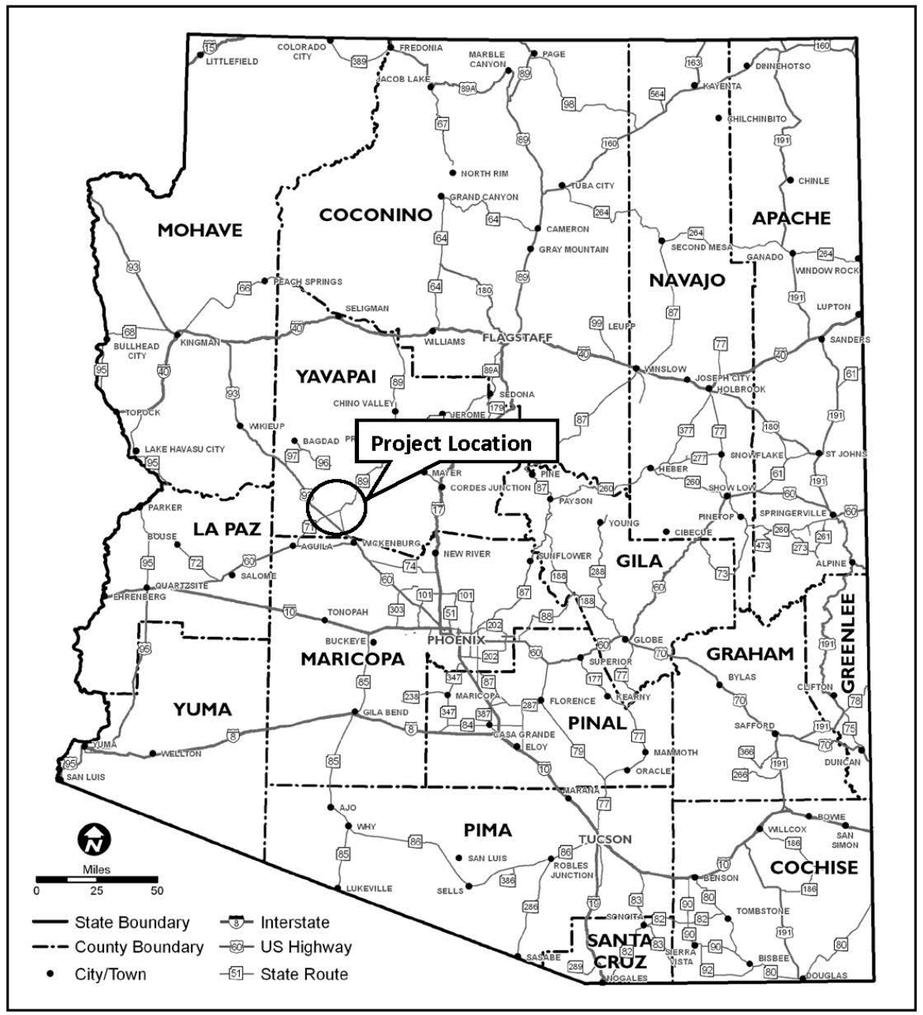
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$ 34,000	$ 108,000	$ 0	$ 1,062,800	$ 1,204,800

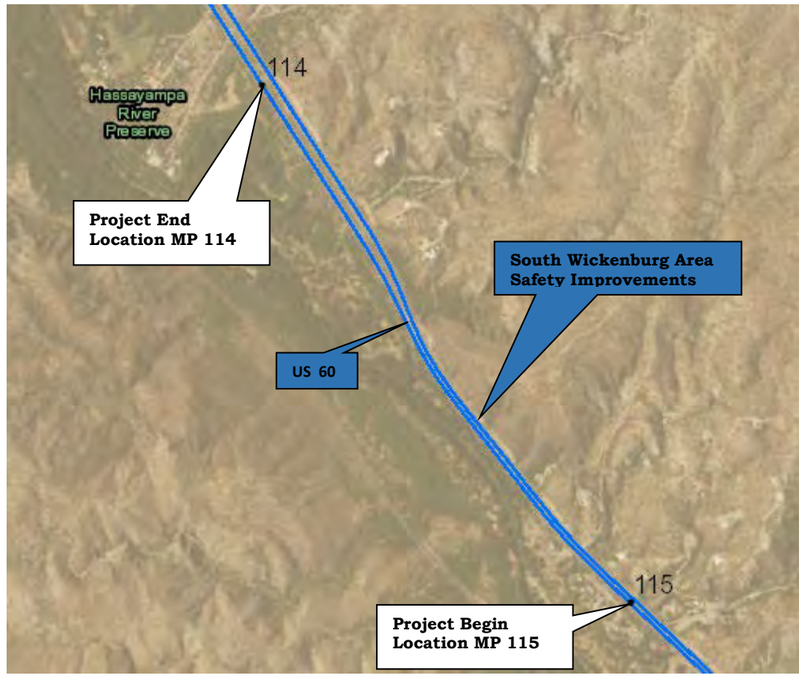
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: SR 74 (ADOT Central Northwest District Boundary)
- Project End Location: Jct US 60 / US 93 (Wickenburg)
- Mileposts: MP 115 - MP 114

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Install left side/median guardrails between MP 114-115: 2-miles (1-mile length x2 directions)
• Install speed feedback sign: 2 (one per direction)
• Install high visibility edge line striping: 4-miles (divided highway, 1-mile length x4 edges (left and right))

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-01-2017	**ADOT Project Manager:**
Project Name: Wickenburg Ranch Area Safety Improvements	
City/Town Name:	**County: Maricopa and Yavapai**
Primary Route/Street: US 93	
Beginning Limit: MP 198.5	
End Limit: MP 190	
Project Length: 8.5 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: *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: MP 198.5 – 190 has a safety index significantly below the statewide average. Crash data analysis indicates 8 fatal crashes and 6 incapacitating injury crashes occurred along the project corridor, 50% involving SHSP top 5 emphasis areas (matching the statewide average). Mobility Need: MP 198.5 – 190 has a good mobility performance index. Freight Need: MP 198.5 – 190 has a fair freight performance index. Safety Hot Spot: Crash concentration SB MP 195-193.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need and high crash concentration SB MP 195-193.			

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

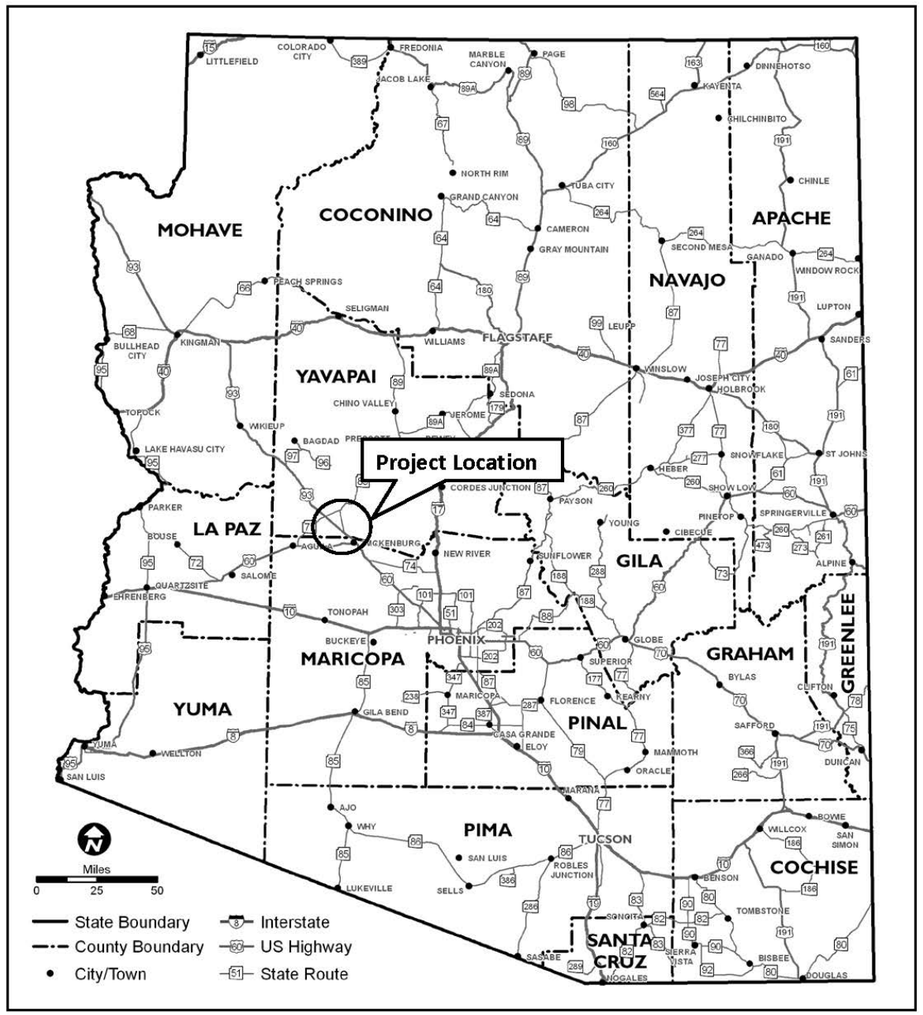
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
Option B $ 25,000	$ 76,000	$ 0	$ 808,700	$ 909,700

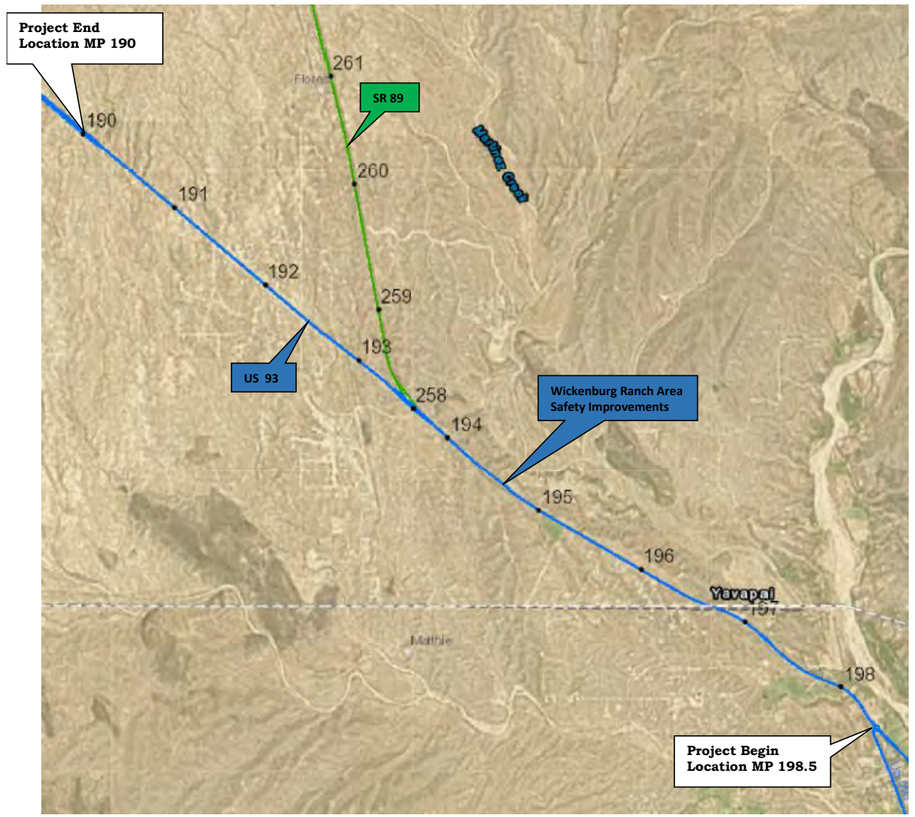
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: Jct US 60 / US 93 (Wickenburg)
- Project End Location: SR 71
- Mileposts: MP 198.5 – MP 190

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
Option B • Install center rumble strips: 8.5-mile • Install high visibility edge line striping: 17 miles (8.5-mile length x 2 directions) • Install high visibility signage: 20 signs • Add delineators: 17 miles (8.5-mile length x 2 directions)

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Joshua Tree Safety and Freight Improvements	
City/Town Name:	**County:** Yavapai
Primary Route/Street: US 93	
Beginning Limit: MP 183	
End Limit: MP 161.5	
Project Length: 21.5 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: *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: MP 183 – 161.5 has a safety index below the statewide average. Crash data analysis indicates 5 fatal crashes and 9 incapacitating injury crashes occurred along the project corridor, 43% involving SHSP top 5 emphasis areas (above the statewide average). Mobility Need: MP 183 – 161.5 has a good mobility performance index.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety and freight need.			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

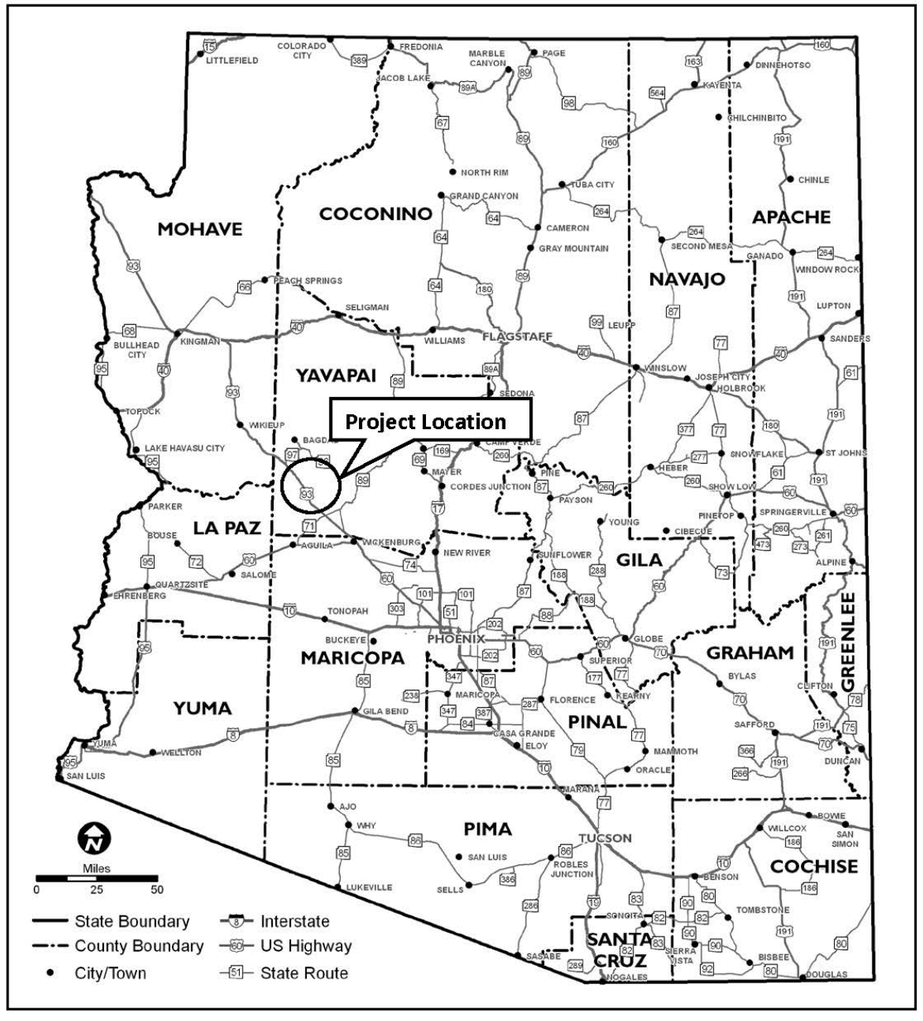
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
Option B $ 380,000	$ 1,260,000	$ 1,362,240	$ 12,620,500	$ 15,622,740

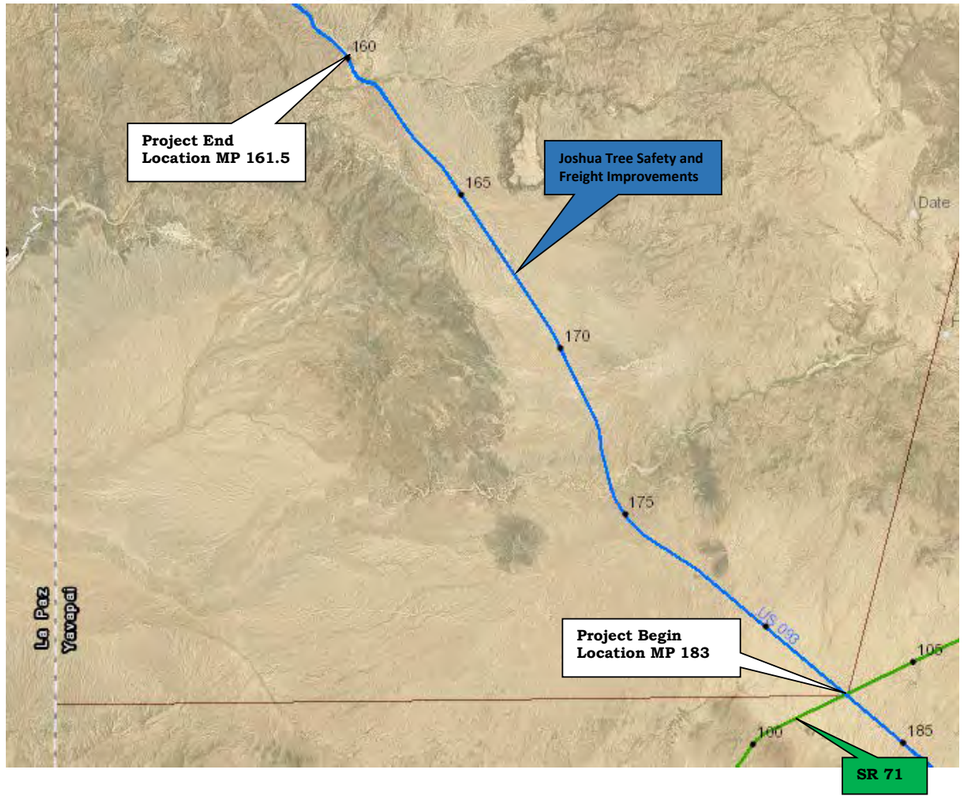
PROJECT DELIVERY		
Delivery: ☐ Design-Bid-Build	☐ Design-Build	☐ Other:
Design Program Year: FY		
Construction Program Year: FY		

ATTACHMENTS
1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: SR 71
- Project End Location: Undefined Wash
- Mileposts: MP 183 – MP 161.5

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
Option B • Widen shoulder: 21.5-mile • Install center and outside rumble strips: 10.75-mile (length reduced by half since 1 side included in widen shoulder cost) • Install safety edge (included in widen shoulder cost)

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Burro Creek Safety and Freight Improvements	
City/Town Name: -	**County: Yavapai**
Primary Route/Street: US 93	
Beginning Limit: MP 147	
End Limit: MP 146	
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: *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: MP 147 – 146 has an average safety index in comparison to the statewide average. Crash data analysis indicates 4 fatal crashes and 10 incapacitating injury crashes occurred along the project corridor, 29% involving SHSP top 5 emphasis areas (above the statewide average). Mobility Need: MP 147 – 146 has a good mobility performance index. Freight Need: MP 147 – 146 has a poor performance index.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety and freight needs.			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

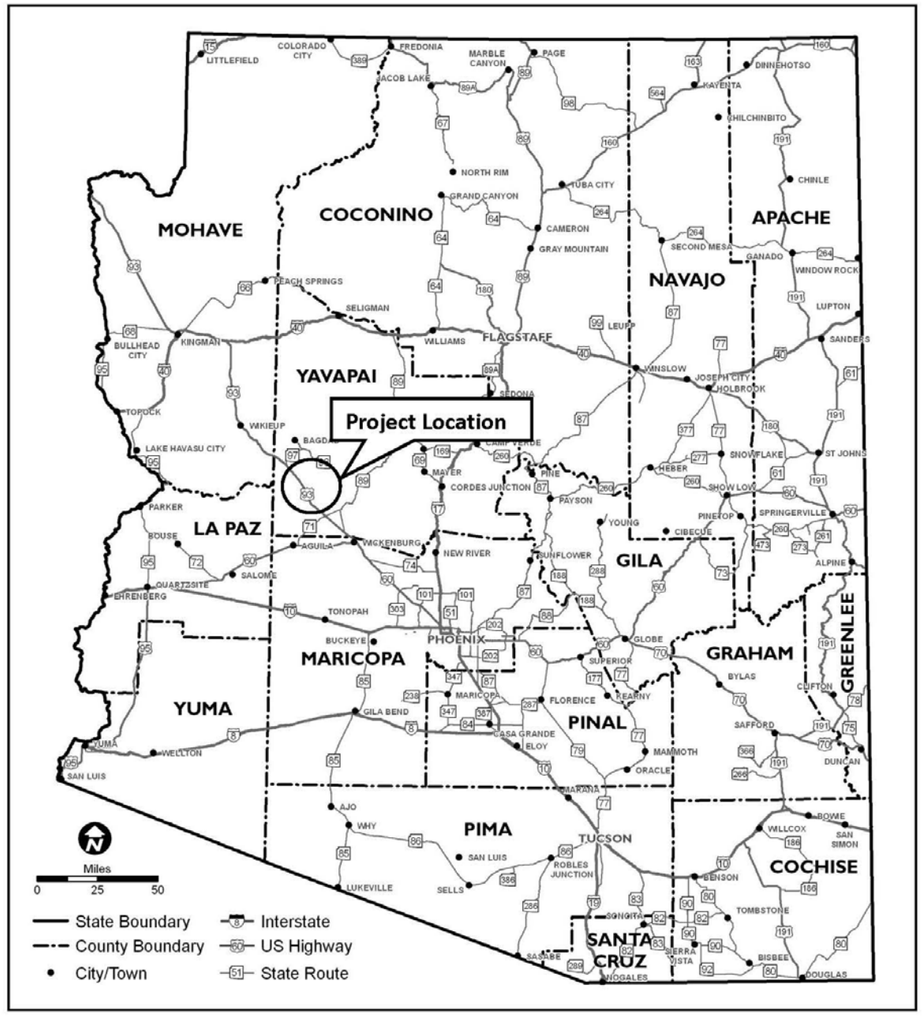
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
Option A $ 32,000	$ 100,000	$ 63,360	$ 1,034,000	$ 1,229,360
Option B $ 200,000	$ 650,000	$ 63,360	$ 6,510,000	$ 7,423,360

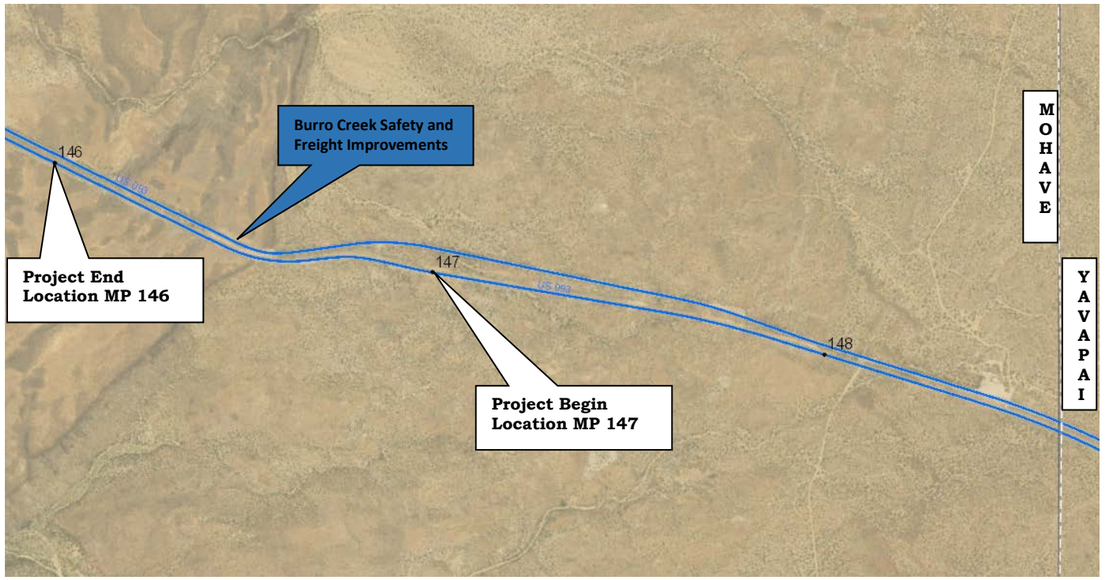
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: Undefined Wash
- Project End Location: Undefined Wash
- Mileposts: MP 147 – MP 146

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
Option A • Widen shoulders (NB only) • Increase clear zones (NB only) • Add guardrails (NB only) • Install speed feedback sign (NB only) Option B • Realign northbound MP 146-147

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Cane Springs Safety Improvements	
City/Town Name: -	**County: Yavapai/Mohave**
Primary Route/Street: US 93	
Beginning Limit: MP 109	
End Limit: MP 106	
Project Length: 3 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: *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: MP 109 – 106 has a safety index above the statewide average. Crash data analysis indicates 12 incapacitating injury crashes occurred along the corridor, 42% involving SHSP top 5 emphasis area behaviors (above the statewide average). Freight Need: MP 109 – 106 has a poor freight performance index in comparison to the statewide average.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety and freight needs.			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

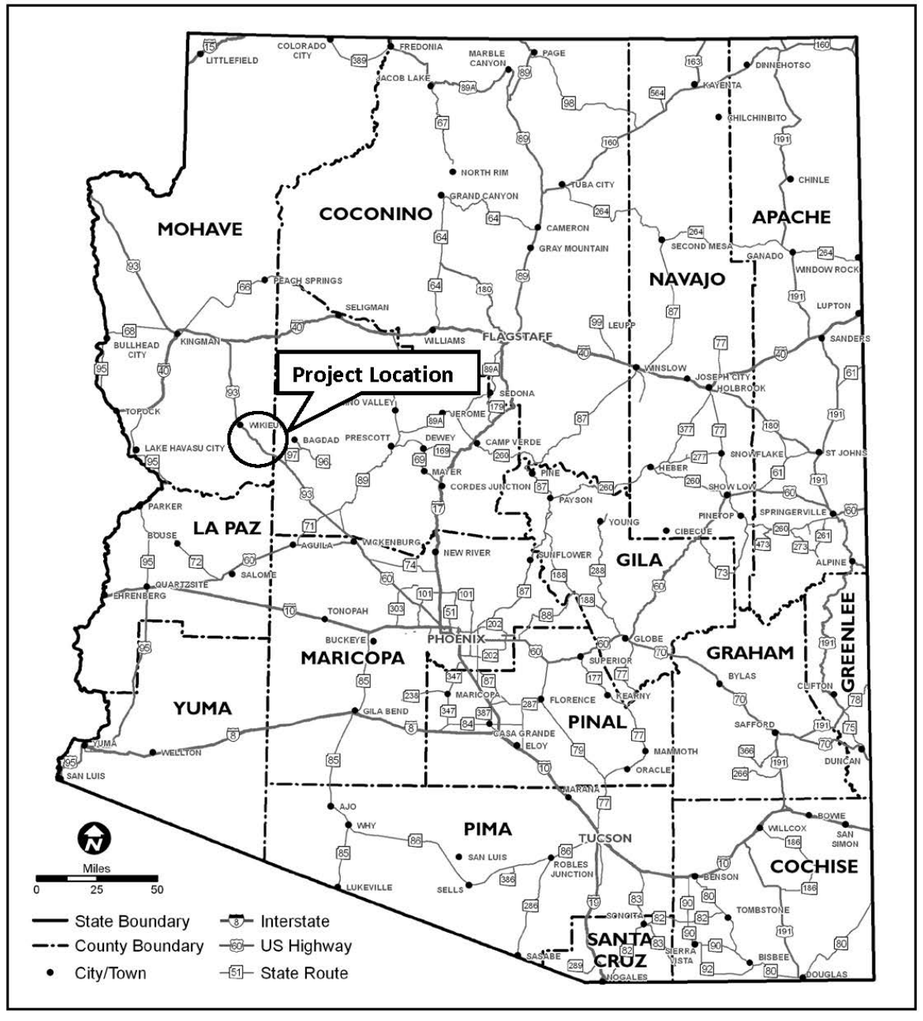
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
Option A $ 590,000	$ 1,980,000	$ 380,160	$ 19,800,000	$ 22,750,160
Option B $ 244,000	$ 790,000	$ 380,160	$ 7,986,800	$ 9,400,960

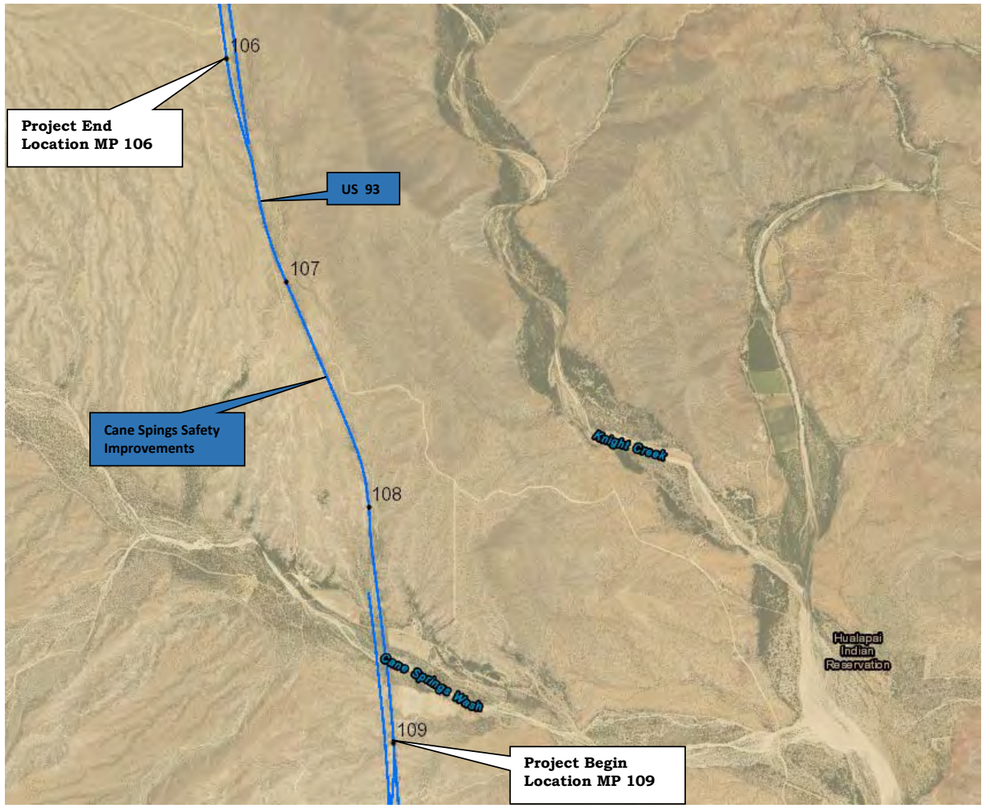
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map
2) Project Vicinity Map
3) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: Upper Trout Creek Road
- Project End Location: Cane Springs Ranch Road
- Mileposts: MP 109 – MP 106

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
Option A • Construct 4 lane divided roadway MP 109-106: 3-miles
Option B • Widen shoulder: 6-miles (3.4-mile length x 2 directions) • Install center and outside rumble strips: 3-miles (length reduced by half since 1 side included in widen shoulder cost) • Install safety edge: 2-each (1 per direction)

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Kingman Area Safety and Freight Improvements	
City/Town Name:	**County:** Mohave
Primary Route/Street: US 93	
Beginning Limit: MP 71	
End Limit: MP 67	
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: *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: MP 71 – 67 has a safety index below the statewide average. Crash data analysis indicates 5 fatal crashes and 6 incapacitating injury crashes occurred along the project corridor, 45% involving SHSP top 5 emphasis area behaviors (above the statewide average). Mobility Need: MP 71 – 67 has a good mobility performance index. Freight Need: MP 71 – 67 has a good freight performance index.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need.			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

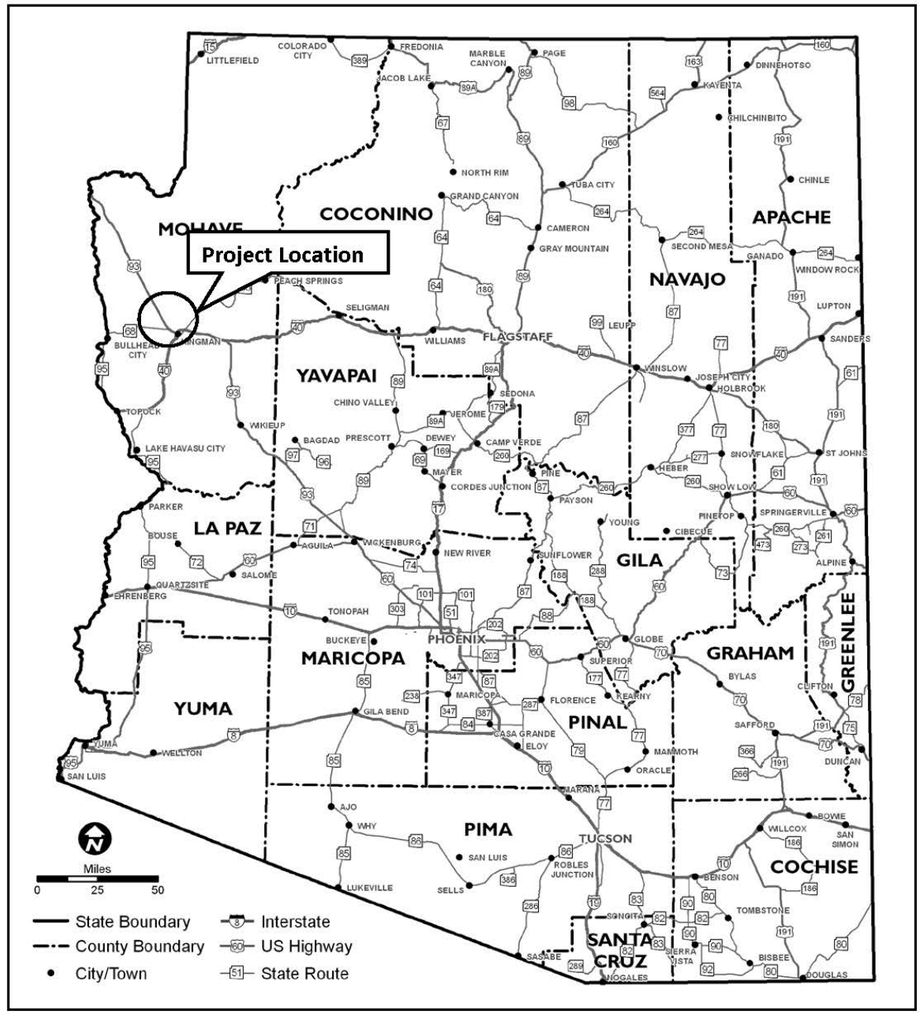
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$ 590,000	$ 1,980,000	$ 253,440	$ 19,800,000	$ 22,623,440

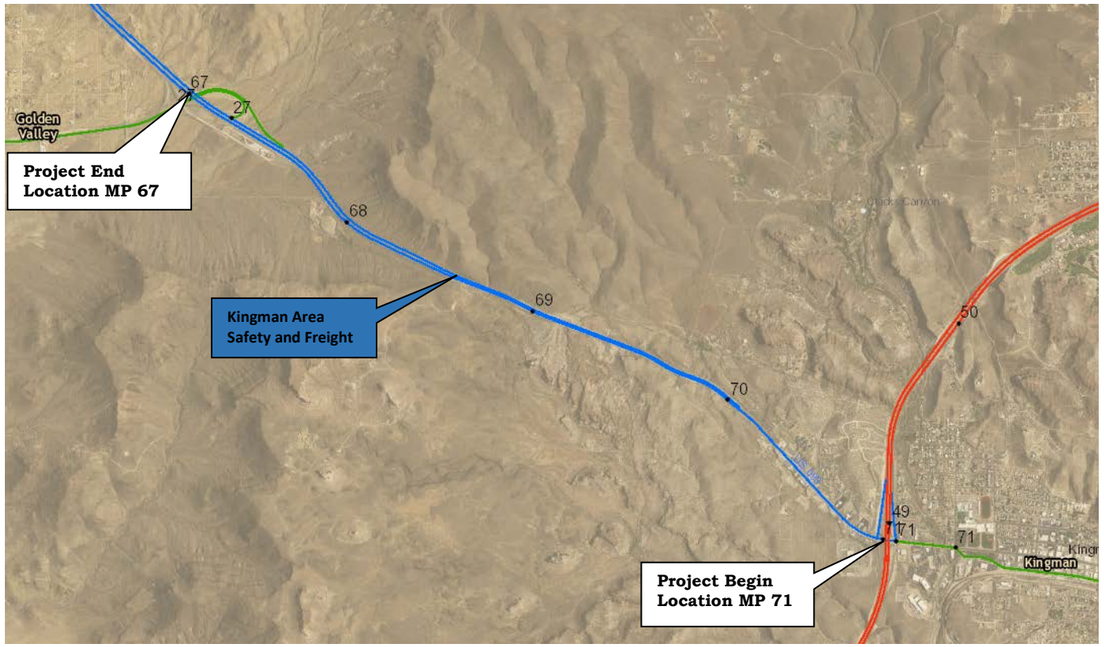
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



- Project Start Location: Chicken Springs Road
- Project End Location: Blake Ranch Road
- Mileposts: MP 71 – MP 67

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
Install northbound climbing lane MP 71 to SR 68 TI: 4-miles

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 03-02-2017	**ADOT Project Manager:**
Project Name: Windy Point Safety Improvements	
City/Town Name:	**County: Mohave**
Primary Route/Street: US 93	
Beginning Limit: MP 58	
End Limit: MP 28	
Project Length: 30 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: *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: MP 58 – 28 has a safety index below the statewide average. Crash data analysis indicates 4 fatal crashes and 2 incapacitating injury crashes occurred along the project corridor, 17% involving SHSP top 5 emphasis area behaviors (above the statewide average). Mobility Need: MP 58 – 28 has a good mobility performance index. Freight Need: MP 58 – 28 has a poor freight performance index.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need.			

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

ADOT **PRELIMINARY SCOPING REPORT**

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)*	

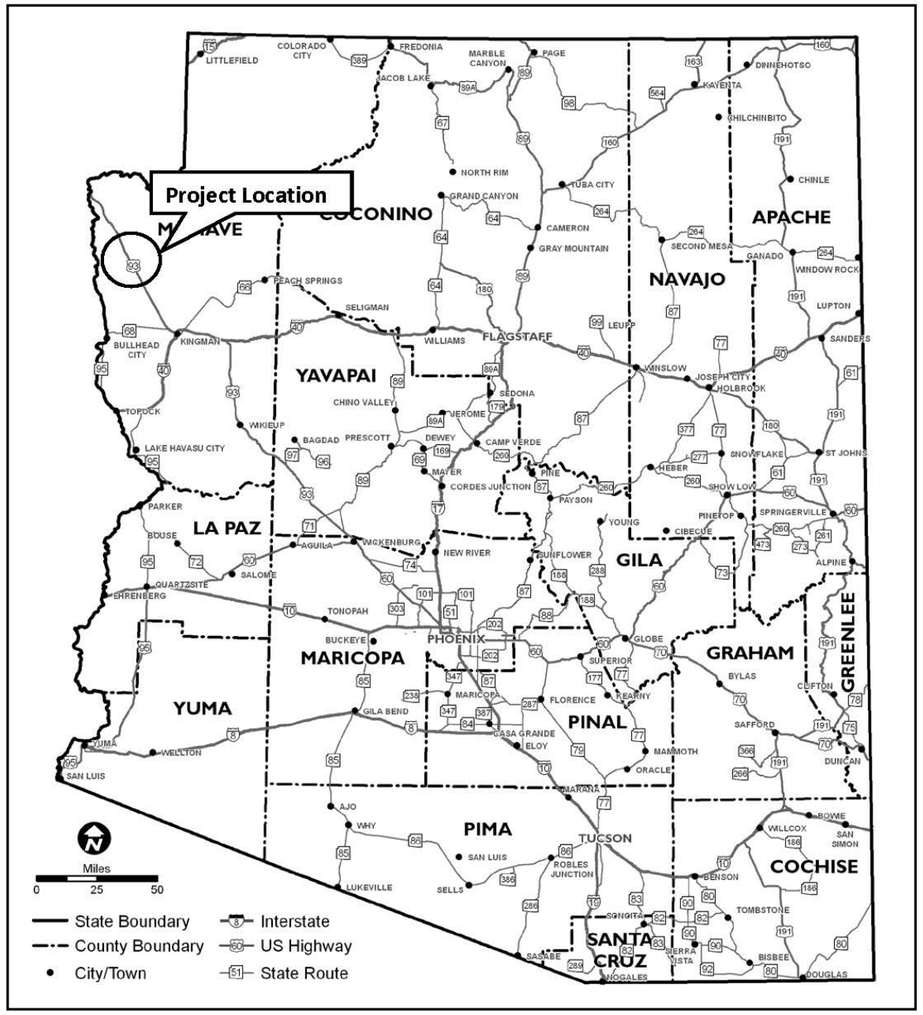
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$ 1,010,000	$ 3,380,000	$ 3,801,600	$ 33,780,000	$ 41,971,600

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**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

- Project Start Location: Hermit Drive
- Project End Location: Comanche Drive
- Mileposts: MP 58 – MP 28

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
Widen shoulders: 60-mile (30-mile length x 2 directions)
Install rumble strips
Install safety edge