

4 Screening Process

4.1 Overview

After the Alternatives Development Workshop, a method with criteria had to be developed to screen all of the proposed alternatives by the Management Partners and the AEP. Three studies from around the country were reviewed to develop the Spine screening process:

- I-25 Valley Highway EIS (Colorado Department of Transportation)¹
- I-70 East Mountain Corridor EIS (Colorado Department of Transportation)²
- I-405 Corridor Program (Washington State Department of Transportation)³

The most significant finding from the studies was how to set up the organization of the alternatives and the progression of screening the alternatives. The Management Partners and AEP completed all of the alternatives screening under the supervision of the Charter Partners. Alternatives from the Alternative Development Workshop were separated into two main categories: backbone and supporting. *Backbone alternatives* affected the entire Spine corridor, and *supporting alternatives* affected only segments, interchanges or specific spots on the corridor. Within the main categories, the backbone category was subdivided into five subcategories:

- Highway capacity
- New routes
- New transit
- System traffic interchange
- Technology

The supporting category was subdivided into seven subcategories:

- Arterial modifications
- Bicycle/pedestrian
- Policy
- Service traffic interchange
- Travel demand management (TDM)/transportation system management (TSM)
- Transit enhancements
- Weaves

By dividing the alternatives into these categories, the study team could focus on the backbone alternatives, which would provide the greatest benefit to the entire corridor. Once the backbone alternatives had been

analyzed and narrowed down, the supporting alternatives could be added to the backbone alternatives to address specific issues.

Each alternative was assigned an alphanumeric identification to indicate the alternative's category and geographical location. The alternatives' identifiers are outlined below:

- S – System Wide Alternative
- I1 – Interchange Alternative – I-10: SR-202L to Baseline Road
- I2 – Interchange Alternative – I-10: Baseline Road to 24th Street
- I3 – Interchange Alternative – I-17: 24th Street to the Stack
- I4 – Interchange Alternative – I-17: Stack to the ACDC/Arizona Canal
- I5 – Interchange Alternative – I-17: ACDC/Arizona Canal to SR-101L
- A1 – Arterial Alternative – 48th Street, Priest Drive and Kyrene Road
- A2 – Arterial Alternative – Baseline Road, Southern Avenue, Broadway Avenue and Buckeye Road
- A3 – Arterial Alternative – 35th Avenue, 27th Avenue and 19th Avenue
- A4 – Arterial Alternative – McDowell Road, Thomas Road, Grand Avenue, Indian School Road, Camelback Road, Bethany Home Road, Glendale Avenue, Northern Avenue, Dunlap Avenue, Peoria Avenue, Cactus Road, Thunderbird Road, Greenway Road, Bell Road and Union Hills Drive
- T – Transit
- ITS – Intelligent Transportation System
- BP – Bicycle/Pedestrian

The alternative screening and selection process was developed with four levels of screening (Figure 4-1):

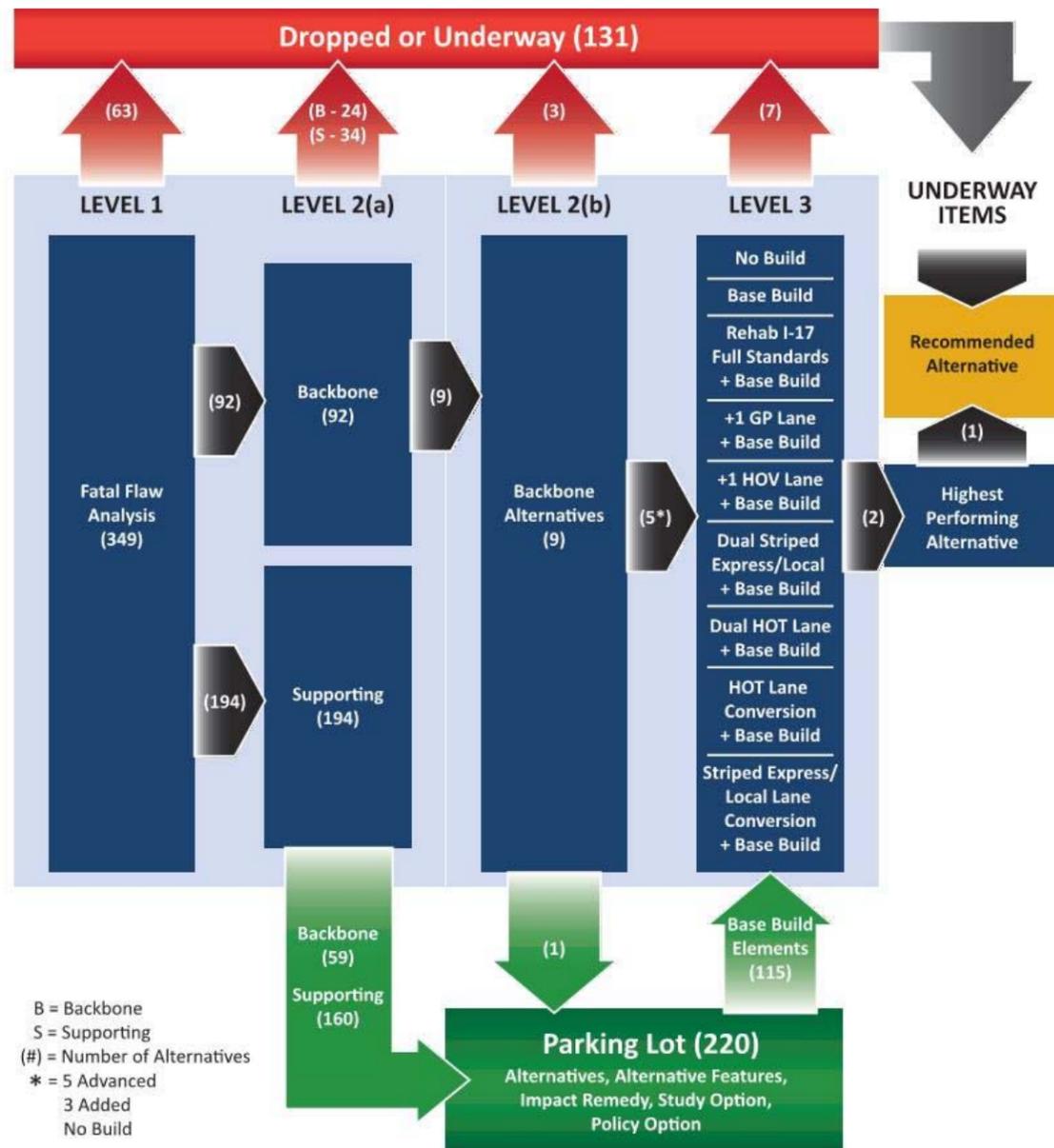
- Level 1 – Fatal flaw and qualitative (349 alternatives)
- Level 2 – Two-phase quantitative screening of backbone and supporting alternatives:
 - Level 2A – Optimization, expand/modernize, performance and sustainability (286 alternatives)
 - Level 2B – Implementation (9 alternatives)
- Level 3 – Quantitative screening of backbone alternatives with supporting alternative elements
 - Environmental, operations, engineering, safety and commerce/economic development (9 alternatives)
- Level 4 – Quantitative hybrid alternative screening (2 alternatives)

¹ <https://www.codot.gov/projects/north-i-25-eis>; project limits were I-25 from I-70 to Wellington

² <http://www.i-70east.com/>; project limits were I-70 from I-25 to Tower Road

³ <http://www.wsdot.wa.gov/projects/I405/>; project limits were the entire I-405 corridor in the Seattle area

Figure 4-1. Alternative Screening and Selection Process



4.2 Level 1 Screening

The Level 1 screening of the 349 alternatives was a fatal flaw, qualitative screening to quickly eliminate the alternatives that did not meet the purpose and need of the project. When necessary, a minimal amount of quantitative analysis was completed for alternatives where qualitative analysis alone would not suffice to determine whether the alternatives met the purpose and need. Table 4-1 shows the Level 1 screening and provides explanations for why alternatives were dropped.

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
S-1000	Construct HOT lanes or convert HOV lanes to HOT lanes (at grade or elevated).		Backbone	Highway capacity	Keep
S-1001	Add a second 2+ HOV lane.		Backbone	Highway capacity	Keep
S-1003	Add one additional general purpose lane in each direction to Interstate.		Backbone	Highway capacity	Keep
S-1004	Add two additional general purpose lanes in each direction to Interstate.		Backbone	Highway capacity	Keep
S-1005	Add three additional general purpose lanes in each direction to Interstate.		Backbone	Highway capacity	Keep
S-1031	Create barrier-separated express/local lane system.	Concept would have significant ROW and environmental impacts along I-17. Will be evaluated on a segment basis.	Backbone	Highway capacity	Keep
S-1037	Add a second 2+ HOV lane with extra-wide inside shoulders (16 feet) for enforcement purposes and to provide the necessary width for future managed lanes conversion.		Backbone	Highway capacity	Keep
S-1038	Create a striped express/local lane system.	Added on August 24, 2015.	Backbone	Highway capacity	Keep
I1-1010	Free express lanes from SR-202L to Broadway Curve.	See S-1029.	Backbone	Highway capacity	Keep
I2-1023	Reevaluate the 1988 C-D system plan, which was a smaller footprint than the EIS terminated recently. Potentially review 1988 plan to route C-D roads south of Split to connect with I-17 and avoid Phoenix Sky Harbor International Airport issues. Limit trucks to local lane section of C-D system.		Backbone	Highway capacity	Keep
I2-1033	Restore HOV balance.		Backbone	Highway capacity	Keep
I3-1000	Access management for north-to-south frontage roads.		Backbone	Highway capacity	Keep
I3-1004	Replace I-17 in kind with current standards to replace the aging infrastructure. Will redesign to reflect the high truck percentages in this segment corridor.		Backbone	Highway capacity	Keep
I3-1018	Extend HOV lanes throughout entire I-17.		Backbone	Highway capacity	Keep
I4-1000	Widen I-17 to full design standards (12-foot lanes and full shoulders).		Backbone	Highway capacity	Keep
I4-1002	Extend HOV lanes through the Stack interchange.		Backbone	Highway capacity	Keep
I4-1003	Eliminate frontage roads to widen I-17 within existing ROW.	Significant access impacts on adjacent residential and businesses.	Backbone	Highway capacity	Keep
I4-1004	Add frontage roads lanes/capacity.		Backbone	Highway capacity	Keep
I4-1005	Limit frontage road access.	Significant access impacts on adjacent residential and businesses.	Backbone	Highway capacity	Keep
I4-1011	Flatten S-curve near Metrocenter/evaluate vertical profile; develop crash map to find cause of accidents.		Backbone	Highway capacity	Keep
I4-1015	Reduce frontage road to one lane to widen I-17.	Frontage road already one lane in several areas.	Backbone	Highway capacity	Keep
I4-1053	Access management plans/frontage road system.		Backbone	Highway capacity	Keep
I1-1018	C-D roads between Pecos Stack and US-60.		Backbone	Highway capacity	Keep
S-1007	Add bus/bus rapid transit (BRT)-only lanes to the Interstate, heavily using park-and-rides.		Backbone	Highway capacity	Keep
S-1008	Add truck-only lanes to the Interstate.		Backbone	Highway capacity	Keep
S-1021	Hard shoulder running.	Only analyze inside shoulder running because the Spine system has (or will have) auxiliary lanes throughout the corridor and DPS's position is to not have outside shoulder running.	Backbone	Highway capacity	Keep
S-1010	Add bus/BRT-only lanes to the arterial corridors of interest.		Backbone	New transit	Keep
S-1039	Heavy transit within Interstate ROW for the length of the Spine corridor.	Added on August 24, 2015.	Backbone	New transit	Keep
I4-1017	Reconsider commuter rail services on Grand Avenue to Phoenix Central Business District.	Compass study considered this and recommended this option.	Backbone	New transit	Keep

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Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
A1-1004	Extend streetcar to Arizona Mills and beyond Wild Horse Pass.	Refer to Valley Metro.	Backbone	New transit	Keep
A2-1015	Exclusive guideway transit: Southern Avenue/Central Phoenix – Phoenix Central Business District to Rural Road.	Central Phoenix Transportation Framework Study.	Backbone	New transit	Keep
A2-1017	Build automated guideway transit on 48th Street/SR-143 from Southern Avenue to Sky Harbor Boulevard.	Southeast Corridor Major Investment Study.	Backbone	New transit	Keep
A2-1018	Extend light rail from Central Avenue to Arizona Mills along the Western Canal.		Backbone	New transit	Keep
T-1005	High-capacity transit from Ahwatukee to downtown Phoenix via Tempe and Phoenix Sky Harbor International Airport (using UPRR ROW).	Related to A1-1009.	Backbone	New transit	Keep
T-1007	High-capacity transit to downtown Glendale.	Currently being studied.	Backbone	New transit	Keep
T-1008	High-capacity transit from Metrocenter to north.		Backbone	New transit	Keep
T-1009	High-capacity transit from Tempe to south.		Backbone	New transit	Keep
T-1011	Reversible bus lane on Broadway from 52nd Street to Central Avenue.		Backbone	New transit	Keep
A1-1009	Reconfigure/Repurpose UPRR spur line for transit purposes and buy out industrial land uses that use it.		Backbone	New transit	Keep
T-1019	Express bus from Pecos Park-and-Ride to Arizona State University (ASU).		Backbone	New transit	Keep
T-1027	ASU West potential light rail extensions from Metrocenter.		Backbone	New transit	Keep
I1-1003	Add DHOVs to South Mountain Freeway to I-10 (east to north and south to west).	Retain. Needs to be studied for geometric feasibility.	Backbone	System traffic interchange	Keep
I1-1004	Direct access from Pecos Park-and-Ride to I-10.	South Mountain Freeway (near-term improvement) will provide access to the Pecos Park-and-Ride lot with an interchange at 40th Street. This will allow access to SR-202L, which connects to I-10.	Backbone	System traffic interchange	Keep
I2-1024	Maintain three westbound US-60 lanes through Broadway Curve to past 40th Street.		Backbone	System traffic interchange	Keep
I1-1016	North to west, east to south Baseline Road/I-10 flyover with a median landing at Baseline.		Backbone	System traffic interchange	Keep
I2-1016	Reconfigure I-10/US-60 connection.	Several alts were developed. Need further study.	Backbone	System traffic interchange	Keep
I1-1015	New high-capacity interchange at Baseline Road.	Possible configurations include single-point urban interchange (SPUI), DDI, ParClo and three-level.	Backbone	System traffic interchange	Keep
I2-1018	Broadway Curve bypass. Extend SR-143 south then curve east to tie to US-60. As an option extend SR-143 south to Baseline Road.	Substantial neighborhood and land use impacts.	Backbone	System traffic interchange	Keep
I2-1029	Southbound SR-143 has numerous devices installed because of lack of signal visibility. Vertical curve needs to be reduced.	As an end-of-freeway condition, alternatives will be explored here to properly address this condition.	Backbone	System traffic interchange	Keep
I2-1000	Add DHOV to SR-143/I-10.	HOVs currently do not exist on SR-143. Nor are there currently plans to add them. I-10 Broadway Curve near-term improvements will force HOV users wanting to use SR-143 to cross the general purpose lanes much further upstream for both I-10 and US-60.	Backbone	System traffic interchange	Keep
I2-1010	Replace/Alter SR-143 and Broadway interchange; eliminate SR-143 loop ramp.	Multiple options exist and should be evaluated for this location.	Backbone	System traffic interchange	Keep
I2-1026	Add westbound Broadway to northbound SR-143 ramp.	Movement is currently served by the Broadway/48th Street intersection.	Backbone	System traffic interchange	Keep
I2-1030	Increase eastbound I-10/Broadway on-ramp capacity.		Supporting	System traffic interchange	Keep
I2-1005	Add DHOV to I-10/Broadway Road.		Backbone	System traffic interchange	Keep
I2-1013	I-10 realignment at the Split.		Backbone	System traffic interchange	Keep
I3-1006	Add DHOVs to Split.		Backbone	System traffic interchange	Keep

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Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
I3-1005	Add DHOVs to Stack.		Backbone	System traffic interchange	Keep
I3-1019	The Stack southeastern quadrant, three concepts from previous I-17 study.	I-17 study.	Backbone	System traffic interchange	Keep
I3-1020	The Stack southwestern quadrant, three concepts from previous I-17 study.	I-17 study.	Backbone	System traffic interchange	Keep
I4-1054	The Stack northeastern quadrant, three concepts from previous I-17 study.	I-17 study.	Backbone	System traffic interchange	Keep
I4-1055	The Stack northwestern quadrant, two concepts from previous I-17 study.	I-17 study.	Backbone	System traffic interchange	Keep
I4-1024	Analyze which DHOV to build at North Stack.		Backbone	System traffic interchange	Keep
I4-1052	Fix the North Stack north to east and south to east movements.		Backbone	System traffic interchange	Keep
ITS-1001	Upgrade ramp metering.	Need more specifics.	Backbone	Technology	Keep
ITS-1003	Expand collection and dissemination of real-time traffic data/conditions within study area and/or Valley wide. Deploy real-time traffic movement and measuring devices (anonymous re-identification devices [ARID]).		Backbone	Technology	Keep
ITS-1005	Coordination on traffic incidents with ADOT and local jurisdictions.		Backbone	Technology	Keep
ITS-1006	Arterial management system (intelligent transportation system [ITS]) – surveillance, traffic control, parking managements, dynamic message signs (DMS), information dissemination and full integration. Including dedicated transit and parking ITS, adaptive traffic signals to adjust to traffic volumes and coordination between freeway and arterials at interchange signals.		Backbone	Technology	Keep
ITS-1007	Closed-circuit television (CCTV), traffic signal sharing responsibilities between agencies.		Backbone	Technology	Keep
ITS-1008	Add transit signal priority (TSP) for bus service on 35th Avenue to help maintain schedules due to frequent school zone crossings. Add TSP to 19th Avenue to help meet connections with light rail transit.		Backbone	Technology	Keep
ITS-1009	Consolidated Traffic Operations Center (TOC).		Backbone	Technology	Keep
ITS-1010	Connected vehicle integration (personal vehicles and freight).		Backbone	Technology	Keep
ITS-1011	Additional traffic operations staff and maintenance staff for City of Phoenix.		Backbone	Technology	Keep
ITS-1012	Better local jurisdiction coordination to close the gap, interconnect between cities.		Backbone	Technology	Keep
ITS-1014	Variable speed control on Interstate.		Backbone	Technology	Keep
ITS-1015	Lane control signals.		Backbone	Technology	Keep
ITS-1016	Active motorways, active management.	Already underway on I-17.	Backbone	Technology	Keep
ITS-1017	Dynamic HOV lane occupancy control.		Backbone	Technology	Keep
ITS-1018	Advance queue warning for northbound traffic on I-10 when approaching Broadway Curve.		Backbone	Technology	Keep
ITS-1019	Automate speed warning in advance of high crash frequency locations.		Backbone	Technology	Keep
S-1016	Interagency coordination for alternative routing during incidents.		Backbone	Technology	Keep
A3-1007	Incorporate TSM and operations into I-17 corridor including 19th and 35th avenues as synchronized alternatives.	This is part of the overarching goal of the I-17 ITS improvements.	Backbone	Technology	Keep
I3-1011	Signal timing for turning trucks at 19th Avenue/I-17.		Backbone	Technology	Keep
I4-1021	Upgrade signal operation at traffic interchanges to emphasize frontage road through movements to fully utilize frontage road capacity.		Backbone	Technology	Keep
ITS-1004	Way finding for emergency/alternative routes.		Backbone	Technology	Keep

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Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
A2-1011	Use Rio Salado Parkway as reliever for east-to-west, serve as catalyst for land use change.		Supporting	Arterial modifications	Keep
A4-1000	Access management plans/frontage road system for crossroads between 19th and 35th avenues.		Supporting	Arterial modifications	Keep
S-1006	Add one additional general purpose lane in each direction to arterial corridors of interest.		Supporting	Arterial modifications	Keep
S-1023	Add more arterial bus pullouts.		Supporting	Arterial modifications	Keep
I3-1010	Coordination between ADOT and Valley Metro on Central Avenue/I-17 crossing.	This alternative may be rolled into the near-term improvements with the passage of Proposition 104.	Supporting	Arterial modifications	Keep
I4-1025	Add mid-mile crossing at Encanto Boulevard.		Supporting	Arterial modifications	Keep
I4-1026	Add mid-mile crossing at Osborn Road.		Supporting	Arterial modifications	Keep
I4-1027	Add mid-mile crossing at Campbell Avenue.		Supporting	Arterial modifications	Keep
I4-1028	Add mid-mile crossing at Missouri Avenue.		Supporting	Arterial modifications	Keep
I4-1029	Add mid-mile crossing at Orangewood Avenue.		Supporting	Arterial modifications	Keep
I4-1030	Add mid-mile crossing at Butler Road.		Supporting	Arterial modifications	Keep
I4-1047	Implement drainage solution for four arterials that flood.		Supporting	Arterial modifications	Keep
I4-1048	Eliminate four old pump stations – ADOT has a design on the shelf for this.		Supporting	Arterial modifications	Keep
A1-1001	Parallel corridor reconfiguration. Create parallel I-10 route on Kyrene and connect Kyrene and Mill Avenue between Baseline Road and US-60.		Supporting	Arterial modifications	Keep
A1-1006	Reversible lane on Kyrene Road.	Check directional splits on Kyrene for 2040.	Supporting	Arterial modifications	Keep
A1-1007	Convert Kyrene Road to an Arizona parkway.	Needs to be in conjunction with A1-1001 to realize the value of adding more capacity to Kyrene.	Supporting	Arterial modifications	Keep
A2-1001	Convert Broadway to a truck arterial (I-10 to SR-202L [South Mountain Freeway]), Southern to a transit corridor, Baseline to vehicular corridor and Alameda/Roeser and Western Canal to a pedestrian/bicycle corridor.		Supporting	Arterial modifications	Keep
A2-1002	Convert Baseline to an indirect left arterial (Arizona parkway).	Related to A2-1013.	Supporting	Arterial modifications	Keep
A2-1003	Access management plan on Southern Avenue.		Supporting	Arterial modifications	Keep
A2-1004	School zones traffic management plan. School zone student drop-off, traffic control, queuing planning and high-intensity activated crosswalk (HAWK) beacons to eliminate 15 miles per hour (mph) school zones.		Supporting	Arterial modifications	Keep
A2-1005	Widen 32nd Street to Baseline Road.		Supporting	Arterial modifications	Keep
A2-1006	If 24th Street closed, need connection between 24th and 16th streets (to not lose 24th Street river crossing).		Supporting	Arterial modifications	Keep
A2-1008	High average daily traffic intersection – consider grade separations.		Supporting	Arterial modifications	Keep
A2-1009	Make Southern Avenue, 16th Street and 7th Street use reversible lanes for peak hour travel. Connect Southern into US-60/I-10 interchange.		Supporting	Arterial modifications	Keep
A2-1010	Access control right-in, right-out only along Baseline Road between Pointe Parkway and Priest.		Supporting	Arterial modifications	Keep
A2-1012	Flatten profile of 32nd Street over I-10.		Supporting	Arterial modifications	Keep
A2-1016	Convert Southern Avenue (US-60 to SR-202L) to a parkway (6 general purpose + 2 BRT).	Southeast Corridor Major Investment Study.	Supporting	Arterial modifications	Keep

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Combined Alternative ID	Description	Comments	Backbone/Supporting	Subcategory	Level 1 Screening
A3-1000	Provide intersection improvements to allow for diversion routes to/from I-17 for parallel routes (27th and 35th avenues), expand north-to-south arterials south of Northern to include 7th Avenue to east. North of Northern, include 7th Street, 43rd Avenue and 51st Avenue.		Supporting	Arterial modifications	Keep
A3-1001	School zones traffic management plan. School zone student drop-off, traffic control, queuing planning and HAWK beacons to eliminate 15 mph school zones.		Supporting	Arterial modifications	Keep
A3-1003	Grade separate 35th Avenue over BNSF/Grand to improve transit service.		Supporting	Arterial modifications	Keep
A3-1004	Convert 35th Avenue to an Arizona parkway with indirect left design.		Supporting	Arterial modifications	Keep
A3-1005	Convert 43rd Avenue to an Arizona parkway with indirect left design.	Outside of current study limits.	Supporting	Arterial modifications	Keep
A3-1008	Analyze intersection geometry to determine current and future traffic demands, check whether turning movement demands are served correctly.		Supporting	Arterial modifications	Keep
A3-1013	Convert 35th Avenue to reversible to provide extra capacity during the peak times.	Need to check directional split of traffic on 35th Avenue in 2040.	Supporting	Arterial modifications	Keep
A4-1003	Convert Northern Avenue to Arizona parkway.		Supporting	Arterial modifications	Keep
A4-1004	Convert Missouri Avenue to Arizona parkway from Grand Avenue to SR-51.		Supporting	Arterial modifications	Keep
A4-1012	School zones traffic management plan. School zone student drop-off, traffic control, queuing planning and HAWK beacons to eliminate 15 mph school zones.	within the Spine corridor study area.	Supporting	Arterial modifications	Keep
A4-1001	Convert Camelback Road to Arizona parkway.		Supporting	Arterial modifications	Keep
A4-1002	Convert Bell Road to Arizona parkway.		Supporting	Arterial modifications	Keep
A4-1014	Continuous-flow intersection at 35th/Camelback, Bell and Northern Avenue.		Supporting	Arterial modifications	Keep
A2-1013	Need detailed review on access on Baseline Road, signals, etc. on corridor.	Related to A2-1002.	Supporting	Arterial modifications	Keep
A2-1014	Access management plan on Baseline Road.		Supporting	Arterial modifications	Keep
A1-1002	Parallel corridor reconfiguration. Create parallel I-10 route on 48th Street. Convert to public street between Point Parkway and Arizona Grand Parkway. Consider converting stop signs into coordinated signal system.	Not consistent with local jurisdictions' land use and transportation plans.	Supporting	Arterial modifications	Keep
A4-1006	Make Encanto/Grand Canal a pedestrian/bicycle and local one lane/one lane roadway.		Supporting	Bicycle/Pedestrian	Keep
A4-1007	Make Campbell a pedestrian/bicycle and local one lane/one lane roadway.		Supporting	Bicycle/Pedestrian	Keep
A4-1008	Make Missouri a pedestrian/bicycle and local one lane/one lane roadway.		Supporting	Bicycle/Pedestrian	Keep
A4-1009	Make Oranewood a pedestrian/bicycle and local one lane/one lane roadway.		Supporting	Bicycle/Pedestrian	Keep
A4-1010	Make Butler a pedestrian/bicycle and local one lane/one lane roadway.		Supporting	Bicycle/Pedestrian	Keep
A4-1011	Make Sweetwater a pedestrian/bicycle and local one lane/one lane roadway.		Supporting	Bicycle/Pedestrian	Keep
A3-1002	Pedestrian overpass for all school and mid-block crossings along 35th, 19th and 27th avenues.	Identify potential locations.	Supporting	Bicycle/Pedestrian	Keep
BP-1000	Add bicycle lanes on Chandler Boulevard from 50th to 54th streets.		Supporting	Bicycle/Pedestrian	Keep
BP-1001	Add bicycle lanes on Ray Road from 50th to 54th streets.		Supporting	Bicycle/Pedestrian	Keep
BP-1002	Add bicycle lanes on Warner Road from 51st to Jewel streets.		Supporting	Bicycle/Pedestrian	Keep
BP-1003	Add bicycle lanes from Sky Harbor Circle to University Drive on 24th Street.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> . This may face a serious FAA hurdle.	Supporting	Bicycle/Pedestrian	Keep
BP-1004	Add bicycle lanes on Adams/Jefferson from 24th to 21st avenues.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1005	Improve bicycle/pedestrian infrastructure on 3rd Street.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1006	Improve bicycle/pedestrian infrastructure on 15th Avenue.		Supporting	Bicycle/Pedestrian	Keep

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Combined Alternative ID	Description	Comments	Backbone/Supporting	Subcategory	Level 1 Screening
BP-1007	Add bicycle lanes on Central Avenue from Apache to Watkins Street.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1008	Add bicycle lanes on Union Hills Drive from 27th Avenue to 24th Drive.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1009	Add bicycle lanes on Rose Garden Lane from 27th to 23rd avenues.		Supporting	Bicycle/Pedestrian	Keep
BP-1010	Add bicycle lanes on Deer Valley from 27th to 23rd avenues.		Supporting	Bicycle/Pedestrian	Keep
BP-1011	Use mid-mile roads as bicycle routes and electric single-occupancy vehicle routes and connect them to park-and-rides.		Supporting	Bicycle/Pedestrian	Keep
BP-1012	Bicycle routes to connect park-and-rides to access express buses.		Supporting	Bicycle/Pedestrian	Keep
BP-1013	Accentuate 15th Avenue bicycle corridor.		Supporting	Bicycle/Pedestrian	Keep
BP-1014	Consider 23rd Avenue as a bicycle corridor.		Supporting	Bicycle/Pedestrian	Keep
BP-1015	Connect east-to-west bicycle/pedestrian corridors across I-17.		Supporting	Bicycle/Pedestrian	Keep
BP-1016	Add bicycle lanes from 27th to 23rd avenues on Indian School Road, connect to existing bicycle lanes east of I-17.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1017	Extend pedestrian/bicycle path under/over I-10 along Western Canal.		Supporting	Bicycle/Pedestrian	Keep
BP-1018	Extend existing multiuse path in Tempe along the Salt River west as far as it will go.		Supporting	Bicycle/Pedestrian	Keep
BP-1019	Extend bicycle lanes on Southern between 48th and Priest Drive.	Could be a challenge under I-10.	Supporting	Bicycle/Pedestrian	Keep
BP-1020	Bicycle integration between 24th Street and Priest (dry crossing along southern bank of Salt River).	A bicycle path along the southern bank of the Salt River is mostly intact. Consider filling in the missing segments on that path instead.	Supporting	Bicycle/Pedestrian	Keep
BP-1021	Add bicycle lanes on Broadway Road from 48th to 55th streets, future connect to Tempe/Phoenix Master Plans.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1022	System-wide detection for pedestrians, bicycles and vehicles on arterials.		Supporting	Bicycle/Pedestrian	Keep
BP-1023	Bicycle/pedestrian crossing at Grand Canal, mid-mile crossings along designated bicycle/trail/multiuse path routes.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1024	Enhance bicycle infrastructure between Pecos and Baseline roads using 50th and 51st streets as much as possible to take bicycle traffic off 48th Street.		Supporting	Bicycle/Pedestrian	Keep
BP-1025	Bicycle/Pedestrian crossings at Knox.		Supporting	Bicycle/Pedestrian	Keep
BP-1026	Bicycle/Pedestrian crossings at Ray Road.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1027	Bicycle/Pedestrian crossings at Chandler Boulevard.		Supporting	Bicycle/Pedestrian	Keep
BP-1028	Bicycle/Pedestrian crossings at Warner Road.		Supporting	Bicycle/Pedestrian	Keep
BP-1029	Bicycle/Pedestrian crossings at Elliot Road.		Supporting	Bicycle/Pedestrian	Keep
BP-1031	Bicycle/Pedestrian crossing at Galveston Street/I-10.		Supporting	Bicycle/Pedestrian	Keep
BP-1032	Bicycle/Pedestrian crossing at Osborn/I-17.	City of Phoenix <i>Comprehensive Bicycle Master Plan</i> .	Supporting	Bicycle/Pedestrian	Keep
BP-1033	Bicycle/Pedestrian crossing at Missouri Avenue/I-17.		Supporting	Bicycle/Pedestrian	Keep
BP-1034	Bicycle/Pedestrian crossing at I-10 along Salt River/Rio Salado.		Supporting	Bicycle/Pedestrian	Keep
BP-1035	Bicycle/Pedestrian crossing at I-10 along Western Canal.		Supporting	Bicycle/Pedestrian	Keep
I1-1008	Frontage roads between Pecos Stack and US-60.		Backbone	Highway capacity	Keep
I1-1027	Create a frontage road system for I-10 between Elliot and Baseline for system redundancy.	Added on August 24, 2015.	Backbone	Highway capacity	Keep

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Combined Alternative ID	Description	Comments	Backbone/Supporting	Subcategory	Level 1 Screening
I2-1032	Get rid of the eastbound C-D pinch point at Fairmont. May require one more southbound I-10 lane.	This area is being altered with I-10 Broadway Curve Near-Term improvements project. May address this alternative.	Supporting	Highway capacity	Keep
I4-1006	Revise merge points on frontage roads.		Supporting	Highway capacity	Keep
I4-1018	Begin a "visual" transition of the ROW/lane widths to prepare drivers for transition to depressed roadway section.		Supporting	Highway capacity	Keep
I3-1014	North-to-south I-17, Durango Curve to Stack: Reconfigure all traffic interchanges to work as a system with frontage/connector roads. Eliminate all partial traffic interchanges.		Supporting	Service traffic interchange	Keep
S-1034	Alternate DHOV traffic interchanges on the inside at half miles with single-occupancy vehicle traffic interchanges at the full miles. This eliminates HOV travelers from merging across.		Supporting	Service traffic interchange	Keep
I1-1000	Add DHOVs to Galveston.		Supporting	Service traffic interchange	Keep
I1-1001	Add DHOVs to Carver.		Supporting	Service traffic interchange	Keep
I1-1002	Add DHOVs to Guadalupe.		Supporting	Service traffic interchange	Keep
I1-1011	New high-capacity interchange at Chandler Boulevard.	Possible configurations include SPUI, DDI, ParClo and three-level.	Supporting	Service traffic interchange	Keep
I1-1012	New high-capacity interchange at Ray Road.	Possible configurations include SPUI, DDI, ParClo and three-level.	Supporting	Service traffic interchange	Keep
I1-1013	New high-capacity interchange at Warner Road.	Possible configurations include SPUI, DDI, ParClo and three-level.	Supporting	Service traffic interchange	Keep
I1-1014	New high-capacity interchange at Elliot Road.	Possible configurations include SPUI, DDI, ParClo and three-level.	Supporting	Service traffic interchange	Keep
I1-1019	New high-capacity interchange at Chandler Boulevard.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1020	Add two-lane (choice lane) exit ramps along I-10 westbound at Ray Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1021	Add two-lane (choice lane) exit ramps along I-10 westbound at Warner Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1022	Add two-lane (choice lane) exit ramps along I-10 westbound at Elliot Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1023	Add two-lane (choice lane) exit ramps along I-10 eastbound at Chandler Boulevard.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1024	Add two-lane (choice lane) exit ramps along I-10 eastbound at Ray Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1025	Add two-lane (choice lane) exit ramps along I-10 eastbound at Warner Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I1-1026	Add two-lane (choice lane) exit ramps along I-10 eastbound at Elliot Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I2-1003	Add DHOV to Kyrene/US-60.		Supporting	Service traffic interchange	Keep
I2-1004	Add DHOV to Hardy/US-60.		Supporting	Service traffic interchange	Keep
I2-1012	Move 24th Street ramps to University for cargo access to Phoenix Sky Harbor International Airport, University traffic interchange instead of the 24th Street traffic interchange. Provide Interstate access to Tower Road.		Supporting	Service traffic interchange	Keep
I2-1034	New high-capacity traffic interchange at 32nd Street.		Supporting	Service traffic interchange	Keep
I2-1035	New high-capacity traffic interchange at 44th Street.		Supporting	Service traffic interchange	Keep
I2-1038	Add two-lane (choice lane) exit ramps along I-10 eastbound at 40th Street.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I2-1039	Add two-lane (choice lane) exit ramps along I-10 eastbound at 32nd Street.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I3-1007	Add DHOV at 7th Street with HOV lanes (split DHOV, BRT lane during peak period between Washington and I-17).		Supporting	Service traffic interchange	Keep
I3-1008	Add DHOVs to Adams/Jefferson couplet.		Supporting	Service traffic interchange	Keep
I3-1009	Add DHOVs to Van Buren.		Supporting	Service traffic interchange	Keep

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
I3-1016	Make Adams/Jefferson couplet a standard split diamond configuration.		Supporting	Service traffic interchange	Keep
I3-1021	Add DHOV to Central Avenue.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I3-1022	Add DHOV to Washington Avenue.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I3-1023	Add DHOV to 15th Avenue.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1001	Connect US-60 (Grand Avenue) to I-17, especially north to northwest and southeast to south movements.		Supporting	Service traffic interchange	Keep
I4-1007	Add DHOVs to Grand Avenue.	See A4-1007.	Supporting	Service traffic interchange	Keep
I4-1008	Add DHOVs to Missouri.		Supporting	Service traffic interchange	Keep
I4-1016	HOV bus ramp exit south of Grand Avenue/BNSF, then tying to new I-10/I-17 bus ramp inside the Stack on the existing southbound frontage road.	Would compete against alternative for HOV lanes on Grand Avenue and a DHOV between I-17 and Grand Avenue (see A4-1007).	Supporting	Service traffic interchange	Keep
I4-1019	Texas turnarounds on all interchanges north of the Stack.		Supporting	Service traffic interchange	Keep
I4-1020	Texas turnarounds on northern side of Camelback to serve Grand Canyon University.		Supporting	Service traffic interchange	Keep
I4-1023	Direct connections to Grand Canyon University at Colter.	Directional needs of this direct connection would need to be established (that is, connect to I-17 north, or connect to I-17 south, or both). Either way, a DHOV at a 1/4 mile crossing would be extremely expensive and challenging. Question whether this would be warranted for a private land use.	Supporting	Service traffic interchange	Keep
I4-1031	New high-capacity traffic interchange at McDowell Road.		Supporting	Service traffic interchange	Keep
I4-1032	New high-capacity traffic interchange at Thomas Road.		Supporting	Service traffic interchange	Keep
I4-1033	New high-capacity traffic interchange at Grand Avenue.		Supporting	Service traffic interchange	Keep
I4-1034	New high-capacity traffic interchange at Indian School Road.		Supporting	Service traffic interchange	Keep
I4-1035	New high-capacity traffic interchange at Camelback Road.		Supporting	Service traffic interchange	Keep
I4-1036	New high-capacity traffic interchange at Bethany Home Road.		Supporting	Service traffic interchange	Keep
I4-1037	New high-capacity traffic interchange at Glendale Avenue.		Supporting	Service traffic interchange	Keep
I4-1038	New high-capacity traffic interchange at Northern Avenue.		Supporting	Service traffic interchange	Keep
I4-1039	New high-capacity traffic interchange at Dunlap Avenue.		Supporting	Service traffic interchange	Keep
I4-1040	New high-capacity traffic interchange at Peoria Avenue.		Supporting	Service traffic interchange	Keep
I4-1041	New high-capacity traffic interchange at Cactus Road.		Supporting	Service traffic interchange	Keep
I4-1042	New high-capacity traffic interchange at Thunderbird Road.		Supporting	Service traffic interchange	Keep
I4-1043	New high-capacity traffic interchange at Bell Road.		Supporting	Service traffic interchange	Keep
I4-1044	New high-capacity traffic interchange at Union Hills Drive.		Supporting	Service traffic interchange	Keep
I4-1049	High-capacity connections at Thunderbird or a new high-capacity interchange.		Supporting	Service traffic interchange	Keep
I4-1050	High-capacity connections at Bell or a new high-capacity interchange.		Supporting	Service traffic interchange	Keep
I4-1056	Add DHOV to Mountain View.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1057	Add DHOV to Paradise Lane.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1058	Add DHOV to Yorkshire Drive/Utopia Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1059	Add DHOV to Union Hills.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
I4-1060	Add two-lane (choice lane) exit ramps along I-17 southbound at Thomas Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1061	Add two-lane (choice lane) exit ramps along I-17 southbound at Camelback Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1062	Add two-lane (choice lane) exit ramps along I-17 southbound at Bethany Home Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1063	Add two-lane (choice lane) exit ramps along I-17 southbound at Peoria Avenue.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1064	Add two-lane (choice lane) exit ramps along I-17 northbound at Indian School Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1065	Add two-lane (choice lane) exit ramps along I-17 northbound at Camelback Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1066	Add two-lane (choice lane) exit ramps along I-17 northbound at Bethany Home Road.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1067	Add two-lane (choice lane) exit ramps along I-17 northbound at Peoria Avenue.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
I4-1068	Add two-lane (choice lane) exit ramps along I-17 northbound at Union Hills Drive.	Central Phoenix Transportation Framework Study.	Supporting	Service traffic interchange	Keep
A4-1005	Grade separation of crossroad through movement through I-17 traffic interchanges.		Supporting	Service traffic interchange	Keep
A4-1013	Add HOV lanes on Grand Avenue between I-17 and downtown. Alternative includes a DHOV on I-17 at Grand Avenue to and from the north.	See I4-1004.	Supporting	Service traffic interchange	Keep
I2-1006	Add DHOV to I-10/Southern Avenue.	Issues attributable to proximity to I-10/US-60 DHOV ramp.	Supporting	Service traffic interchange	Keep
I2-1001	Add DHOV to I-10/Arizona Mills.	Issues attributable to proximity to I-10/US-60 traffic interchange.	Supporting	System traffic interchange	Keep
I2-1036	Add two-lane (choice lane) exit ramps along I-10 westbound at Broadway Road.	Central Phoenix Transportation Framework Study.	Supporting	System traffic interchange	Keep
I2-1037	Add two-lane (choice lane) exit ramps along I-10 westbound at SR-143 and 40th Street.	Central Phoenix Transportation Framework Study.	Supporting	System traffic interchange	Keep
S-1035	Make the HOV lanes a time of use managed lane: HOV only during the peak hours and truck/transit only during midday.		Supporting	TDM/TSM	Keep
I2-1014	Freeway rerouting plans on Broadway with way finding (south of Phoenix Sky Harbor International Airport).		Supporting	TDM/TSM	Keep
S-1002	Convert HOV to 3+ occupancy.		Supporting	TDM/TSM	Keep
S-1011	Enforcement of HOV.		Supporting	TDM/TSM	Keep
S-1012	General purpose/HOV restrictions (trucks, recreational vehicles).		Supporting	TDM/TSM	Keep
S-1013	Emphasize carpool/vanpool, incentivize HOV.		Supporting	TDM/TSM	Keep
S-1015	Parking management districts: Increase rates Downtown, amped-up TDM plan.		Supporting	TDM/TSM	Keep
S-1020	Restricted HOV buffer crossover and access points.		Supporting	TDM/TSM	Keep
S-1033	Increase freeway safety patrols.		Supporting	TDM/TSM	Keep
S-1036	End the alternate fuel vehicle HOV program to improve HOV operations.		Supporting	TDM/TSM	Keep
T-1031	Market travel choices to Ahwatukee residents.		Supporting	TDM/TSM	Keep
I1-1009	Integrated transit and freeway between Galveston and Carver.		Supporting	Transit enhancements	Keep
T-1000	Transit priority access on Baseline crossing I-10.		Supporting	Transit enhancements	Keep
T-1001	Limited stopped/more frequent transit between ASU, Tempe and Chandler.		Supporting	Transit enhancements	Keep
T-1002	Limited stopped/more frequent transit between downtown Capitol to Metrocenter, Deer Valley and Anthem.		Supporting	Transit enhancements	Keep
T-1003	Limited stopped/more frequent transit from Ahwatukee to Tempe (all day).		Supporting	Transit enhancements	Keep
T-1004	Limited stopped/more frequent transit from Ahwatukee to Phoenix (all day).		Supporting	Transit enhancements	Keep

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
T-1010	Improve way finding to park-and-rides.		Supporting	Transit enhancements	Keep
T-1013	Increase peak period/more frequent RAPID/express bus along route.		Supporting	Transit enhancements	Keep
T-1014	New express bus routes.		Supporting	Transit enhancements	Keep
T-1015	Bike lockers with reservation systems at park-and-rides.		Supporting	Transit enhancements	Keep
T-1016	More bicycle capacity on RAPID buses.		Supporting	Transit enhancements	Keep
T-1017	Transit connection with ITS and DMS (real-time transit data).		Supporting	Transit enhancements	Keep
T-1018	Add new park-and-ride just north of SR-101L to relieve Bell Park-and-Ride.		Supporting	Transit enhancements	Keep
T-1020	Add park-and-rides/increased park-and-ride capacity.		Supporting	Transit enhancements	Keep
T-1021	New transit center on northeastern corner of Pecos Stack to serve commuter rail on UPRR spur and BRT on I-10.		Supporting	Transit enhancements	Keep
T-1022	Transit station at 48th Street and Broadway.		Supporting	Transit enhancements	Keep
T-1025	Expand Bell Road Park-and-Ride.		Supporting	Transit enhancements	Keep
T-1026	Move Metrocenter Park-and-Ride on east side of mall.		Supporting	Transit enhancements	Keep
T-1028	Paid park-and-ride incentives for long-term parking and/or add security and shade parking to encourage transit use to go to the airport.		Supporting	Transit enhancements	Keep
T-1029	Retrofit park-and-rides into "mobility hubs" (businesses like cafés, daycares, drycleaners, grocery stores, etc.), explore public-private partnership opportunities.		Supporting	Transit enhancements	Keep
T-1030	Variable transit fare pricing.		Supporting	Transit enhancements	Keep
T-1032	More frequent bus service.		Supporting	Transit enhancements	Keep
S-1029	Create downtown-to-downtown 10-minute headway transit service between all major Valley cities and education centers.		Supporting	Transit enhancements	Keep
S-1022	HOV ramp meter bypass.		Supporting	Transit enhancements	Keep
I4-1051	Develop optimal treatment for bus/HOV bypass lane at Dunlap traffic interchange to access southbound I-17 on-ramp. Near-term issue prior to construction of new DHOV at Mountain View.		Supporting	Transit enhancements	Keep
S-1032	Reverse ramps.	Alternative shifts the weave from mid-mile to under the mile bridges and creates a weave section on the frontage road. Alternative provides substantial on-ramp queuing storage without affecting the cross road, which could benefit dynamic ramp metering strategies.	Supporting	Weaves	Keep
I1-1017	Braid ramp weaves throughout segment.		Supporting	Weaves	Keep
I2-1031	Braid weave northbound I-10 on C-D road between Baseline Road and US-60.		Supporting	Weaves	Keep
I2-1021	Add HOV bypass to SR-202L/SR-101L eastbound to southbound—would alleviate traffic heading to East Valley.	Drop. Outside of the agreed-upon limits of the study.	Backbone	Highway capacity	Drop
I4-1045	Fully depress I-17 between the Stack and the ACDC.	Drop. Does not increase the capacity or improve travel times along the corridor. While the other alternatives may implement this alternative on sections of I-17, this alternative by itself does not contribute to addressing the purpose and need. Therefore, this alternative will not be further analyzed in the Level 2 screening.	Backbone	Highway capacity	Drop

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
S-1019	Reversible/zipper lanes/reversible BRT lane.	Drop. Not reasonable or effective relative to cost as directional volumes are not that pronounced as time progresses so operational benefits would be minimal on the Interstate. This alternative for arterial streets is preserved in alternatives A1-1050, A2-1059, T-1026 and A3-1006. Therefore, this alternative will not be further analyzed in Level 2 screening.	Backbone	Highway capacity	Drop
I1-1005	Widen I-10 (beyond near-term widening).	Duplicate alternative. Addressed more specifically in alternatives S-1003 and S-1004. Therefore, this alternative will not be evaluated in the Level 2 screening.	Backbone	Highway capacity	Drop
I2-1019	Convert I-10 at Broadway Curve to a toll road.	Drop. Contrary to current federal regulation. The current surface transportation act has limited Interstate to toll conversions to three selected test corridors, and all three projects have already been defined.	Backbone	Highway capacity	Drop
I2-1022	Add HOV lane eastbound/westbound I-10 for a total of two lanes.	Drop. Addressed in S-1001. Outbound being studied now.	Backbone	Highway capacity	Drop
I2-1027	Reroute all HOV/managed lanes from I-10 between US-60 and I-17 (the overlap) by routing HOVs down Baseline, Broadway or Southern down 24th Street.	Drop. By rerouting HOV traffic down Baseline, Broadway or Southern, HOV travel times have a high probability of increasing compared with the no-build because of the arterial and traffic signal environment. As a result, HOV traffic would not use this route, making this strategy infeasible. In addition, not clear how this system would interconnect to I-10 at 24th Street when considering the FAA airspace issues at the Split interchange.	Backbone	Highway capacity	Drop
I2-1028	Reroute all HOV/managed lanes from I-10 between US-60 and I-17 (the overlap) by routing HOVs up SR-143 to SR-202L.	Drop. Would not reasonably reduce congestion or improve mobility for the region. This concept essentially relocates the current I-10 "overlap" to SR-202L, creating a new overlap section on that route instead.	Backbone	Highway capacity	Drop
I3-1001	Auxiliary lanes.	Included in no build. Near-term improvements, which are assumed to be in the no build option, include auxiliary lanes from 16th Street to 19th Avenue. Therefore, this alternative will not be further analyzed in Level 2 screening. North-south I-17 section is addressed in I3-1014.	Backbone	Highway capacity	Drop
I3-1017	Figuring out the hub – I-17 around Durango Curve (cannot expand in tunnel).	Duplicate and not specific alternative. Alternative does not offer enough specifics to assess. Other alternatives capture specific alternatives that can be assessed in the Level 2 screening (I3-1001, I3-1002, I4-1002, etc.). Therefore, this alternative will not be further analyzed in Level 2 screening.	Backbone	Highway capacity	Drop
I4-1012	Depress freeway main line and cantilever frontage roads over I-17.	Drop. The high order of magnitude cost and complexity of construction relative to the potential congestion reduction benefits are not in line with each other. Furthermore, the existing ramp functions would have to be replaced to retain current mobility, but cantilevered frontage roads make this next to impossible, geometrically, to accomplish. If some solution were possible, costs associated with doing this would be extreme, further diminishing any potential congestion reduction benefits.	Backbone	Highway capacity	Drop
I4-1013	Convert I-17 to 2-mile ramp spacing.	Drop. Not consistent with local jurisdictions' land use and transportation plans. This alternative would overwhelm the remaining on and off ramps and connecting arterial traffic interchanges, resulting in significant queuing.	Backbone	Highway capacity	Drop
I4-1014	Double deck I-17.	Drop. Unacceptable environmental impacts and extremely high order of magnitude cost and complexity of construction relative to the potential benefits realized.	Backbone	Highway capacity	Drop
I4-1022	Turn frontage roads into local roads.	Drop. Frontage roads between ramp gores are already City of Phoenix-owned roads today.	Backbone	Highway capacity	Drop
I4-1046	Convert west side I-17 frontage roads to multimodal mall (between Metrocenter and Happy Valley) – like 16th Street mall in Denver.	Drop. Does not address the study's purpose and need of reducing congestion and improving travel time reliability in the corridor.	Backbone	Highway capacity	Drop
I2-1020	Take I-10 HOV and US-60 HOV to new separate four-lane HOV express/bypass or new ROW. Follow US-60 to Western Canal to Salt River Project power line along 46th Street to SR-143 to new Durango Parkway/Rio Salado and to SR-202L into I-10.	Drop. Unreasonable and unacceptable environmental consequences.	Backbone	New route	Drop

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
I3-1002	Relocate entire east-west I-17 segment to the south along the Salt River. Possibly integrate with an extended SR-30. Reconstruct existing east-west I-17 segment as an at-grade parkway/arterial.	Drop. This concept does appear to have merit as part of a larger regional mobility solution, but it does not meaningfully address this study's purpose and need and would likely not be feasible to implement within the study's time horizon. Because there is value in this concept for the region as a whole, this study recommends that MAG study this concept further to test how effective this concept is in relieving regional significant routes, most notably the I-10 inner loop and I-10 West (Papago Freeway). In addition, other community benefits may present themselves, such as restoration of the Salt River, and urban renewal through south central Phoenix.	Backbone	New route	Drop
I3-1003	Move I-17 east-to-west section to Buckeye.	Drop. Unreasonable and unacceptable environmental consequences. Major impacts on downtown Phoenix neighborhoods and Title VI of the Civil Rights Act of 1964 [Title VI] /environmental justice (EJ) communities.	Backbone	New route	Drop
I3-1013	North and South Marum Park. Convert 27th Avenue to the southbound general purpose lanes of I-17 from Dunlap to Durango "T". Retain HOV facilities on I-17 and provide 2 HOV each direction. Repurpose areas between 23rd Avenue and I-17 as a linear urban park.	Drop. Unreasonable and unacceptable environmental consequences. Substantial and disproportionate impacts on Title VI/EJ communities and neighborhoods. Likely Section 4(f) of the Department of Transportation Act of 1966 [Section 4(f)] impacts also, and impacts on the cemetery in the southwestern quadrant of the Stack. Finally, reconstruction of the Stack would be required, further increasing the level of impacts in that immediate area.	Backbone	New route	Drop
A3-1011	Punch through South Mountain.	Drop. Unreasonable and unacceptable environmental consequences. South Mountain park is a known Section 4(f) resource, and since alternatives exist to avoid affecting this resource, a Section 4(f) take would not be feasible.	Backbone	New route	Drop
A2-1000	Extend US-60 west to become Baseline Road and upgrade Baseline to limited access (after US-60 is extended into Baseline).	Drop. Substantial and unacceptable environmental impacts, especially related to community impacts, business access and land use compatibility.	Backbone	New route	Drop
S-1025	System-wide commuter rail.	Drop. Not feasible to implement within the timeframe of this study. Furthermore, various commuter rail studies around the Valley have been completed, so there is no need to redo that work.	Backbone	New transit	Drop
T-1006	High-capacity transit to Metrocenter.	Included in no build. Near-term improvements, which are assumed to be in the no build option, include high capacity to Metrocenter. Therefore, this alternative will not be further analyzed Level 2 screening.	Backbone	New transit	Drop
T-1012	Use Washington/Jefferson as transit corridor.	Drop. Washington and Jefferson are already a transit corridor east of downtown and are planned to become a transit corridor west of downtown to access I-10 west of the Stack. This alternative does not directly address increased capacity, travel time, travel time reliability or increased mobility on the Spine corridor. Elements of this alternative will be included in other alternatives that will be analyzed in Level 2; therefore, this alternative will be further analyzed in Level 2 screening.	Backbone	New transit	Drop
I2-1002	Add DHOV to SR-101L/US-60.	Drop. Outside of agreed-upon study limits. Pass concept to MAG.	Backbone	System traffic interchange	Drop
I2-1007	Add DHOV to SR-202L/SR-101L.	Drop. Outside of agreed-upon study limits. Pass concept to MAG.	Backbone	System traffic interchange	Drop
I2-1011	Depressing system ramps near Phoenix Sky Harbor International Airport.	Drop. This concept was studied during the previous I-10 study and was not found to be feasible because of changed FAA guidance. The Runway Protection Zone is a ground footprint issue and not an airspace issue and a section of the I-10 westbound main line falls within the Runway Protection Zone; therefore, the Stack issue will not be fixed by only depressing the system ramps.	Backbone	System traffic interchange	Drop
I2-1025	Grade-separate northbound SR-143/I-10/US-60 westbound to remove merge/weave.	Drop. Addressed with the I-10 Broadway Curve Near-term improvements.	Backbone	System traffic interchange	Drop
ITS-1000	Verify ITS infrastructure along I-10.	Drop. ITS will be analyzed as part of the backbone alternatives; however, this is not an alternative that can be analyzed in a Level 2 screening. The NAR has been verified to be correct.	Backbone	Technology	Drop

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
ITS-1013	Variable speed limit signs between bars, restaurants (Friday night to Sunday morning) to reduce crashes.	Drop. This alternative does not increase capacity or improve travel time or travel time reliability.	Backbone	Technology	Drop
S-1014	Direct HOV-freeway/freeway, arterial/freeway.	Duplicate. General comment. Each of the possible DHOV locations has been identified in the list of alternatives under service traffic interchanges, so that they can be analyzed in the Level 2 screening based on their individual merits.	Backbone/ Supporting	System traffic interchange/Service traffic interchange	Drop
A1-1000	Fund access management plan for high traffic generators (Arizona Mills and Wild Horse Pass Casino); consider remote parking and shuttle access.	Drop. Would not reasonably reduce congestion or improve mobility relative to cost. Remote parking and shuttle service would detract from these destinations, negatively affecting commerce, economic growth and capital investments. Consequently, trip generation cannot be notably altered, thus access to these sites could not be dramatically changed.	Supporting	Arterial modifications	Drop
A1-1003	Parallel corridor reconfiguration. Create parallel and continuous I-10 route on Priest (Avenida del Yaqui).	Drop. This would have substantial and unacceptable environmental impacts on the downtown Guadalupe community because of EJ and Title VI issues.	Supporting	Arterial modifications	Drop
A2-1007	Phoenix Sky Harbor International Airport zone transportation analysis (and ASU and Arizona Mills and layering effect).	Drop. Not a specific-enough alternative to assess.	Supporting	Arterial modifications	Drop
A3-1006	Convert 19th Avenue to an Arizona parkway with indirect left design.	Drop. Arizona parkway is intended to be a high-capacity arterial for vehicles. 19th Avenue is intended to focus on transit-oriented development and use and emphasize nonmotorized transportation modes.	Supporting	Arterial modifications	Drop
A3-1010	Consider reducing capacity on 35th Avenue to create multiuse corridor (with reduced lane widths and bicycle lanes).	Drop. Not reasonably effective in meeting purpose and need because it would decrease the capacity of all vehicular modes of traffic and negatively affect travel times and increase duration of congestion.	Supporting	Arterial modifications	Drop
A3-1012	19th and 35th avenues – need better operations to support I-17.	Duplicate and not specific alternative. Alternative does not offer enough specifics to assess. Other alternatives (I3-1022, ITS-1006, ITS-1011, S-1001, S-1002, A3-1001, A3-1002, A3-1003, A3-1005, A3-1006) capture specific alternatives that can be assessed in the Level 2 screening. Therefore, this alternative will not be further analyzed in Level 2 screening.	Supporting	Arterial modifications	Drop
A1-1005	Enhance bicycle infrastructure on parallel arterials and encourage use of mid-mile streets.	Duplicate and not specific alternative. Alternative does not offer enough specifics to assess. Other alternatives (A4-1015, A4-1016, A4-1017, A4-1018, A4-1019, A4-1020, BP-1005, BP-1006, BP-1011, BP-1013, BP-1014) capture specific alternatives that can be assessed in the Level 2 screening. Therefore, this alternative will not be further analyzed in Level 2 screening.	Supporting	Bicycle/Pedestrian	Drop
BP-1036	Bicycle/Pedestrian crossing at I-10 along Alameda Drive.	Included in no build. Alameda pedestrian bridge will be built with the I-10 Broadway Curve Near-Term Improvements.	Supporting	Bicycle/Pedestrian	Drop
BP-1030	Bicycle/Pedestrian crossing at Guadalupe.	Included in no build. Guadalupe pedestrian bridge will be built with the I-10 Broadway Curve Near-Term Improvements.	Supporting	Bicycle/Pedestrian	Drop
I1-1006	Move ASU campus to Casa Grande.	Drop. Not reasonably feasible to implement and would not address purpose and need.	Supporting	Policy	Drop
I2-1009	Elongate (lengthen) Baseline Road bridge.	Drop. Assume “elongate” means to lengthen, which would require a full replacement of the I-10/Baseline Road bridge. If required, would be addressed in alternatives I1-1015 and I1-1016.	Supporting	Service traffic interchange	Drop
I4-1009	Consider converting single-occupancy vehicle traffic interchanges to DHOV traffic interchanges.	Drop. Does not improve corridors’ interconnections and would negatively affect commerce, economic growth and capital investment.	Supporting	Service traffic interchange	Drop
A1-1008	Connect Southern southbound to I-10 frontage roads (relieve Baseline).	Drop. Not reasonable or effective relative to cost. Frontage roads along I-10 north of Baseline are not feasible without major reconstruction of the I-10/US-60 interchange.	Supporting	Service traffic interchange	Drop
S-1028	Incentivize local travel with tax credits/incentives.	Drop. Does not meet purpose and need, tax credits have not been proven to improve traffic congestion	Supporting	TDM/TSM	Drop
S-1027	Convert Interstate to a toll road.	Drop. Does not meet purpose and need, toll conversion have not been proven to improve traffic congestion.	Supporting	TDM/TSM	Drop

Table 4-1. Level 1 Screening

Combined Alternative ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening
ITS-1002	Drone surveillance.	Drop. Does not reasonably address the purpose and need.	Supporting	TDM/TSM	Drop
S-1009	Add truck-only lanes to the arterial corridors of interest.	Drop. Not reasonably effective in meeting purpose and need since most of the corridors of interest do not have truck volumes that warrant special truck treatment.	Supporting	TDM/TSM	Drop
S-1017	Infill development in employment centers to reduce vehicle miles traveled (VMT).	Drop. MAG does not have the authority to control land use plans. This is the responsibility of the local jurisdictions, making it outside the scope of the Spine study.	Supporting	TDM/TSM	Drop
S-1024	Bring back photo radar on freeway systems.	Drop. Contrary to state policy and could not be effectively implemented with the current environment.	Supporting	TDM/TSM	Drop
S-1026	Educate motorists on insurance laws by providing flyers in Motor Vehicle Division renewals.	Drop. Not responsive to purpose and need because having or not having automobile insurance does not address the goals of the Spine study.	Supporting	TDM/TSM	Drop
I2-1008	Close/Relocate shipping operations from Phoenix Sky Harbor International Airport to Mesa Gateway.	Drop. Outside of the scope of the Spine study. In addition, this concept is not consistent with Sky Harbor's plans and would significantly affect the operations of several businesses that operate out of Phoenix Sky Harbor International Airport and that use the airport's central city location as a cargo hub.	Supporting	TDM/TSM	Drop
I2-1015	Separate truck detour routes from Broadway Curve.	Drop. Not a specific alternative, and no obvious solution is apparent.	Supporting	TDM/TSM	Drop
I3-1012	Restrict trucks from I-10 inner loop. Make I-10 inner loop a state highway.	Drop. Not reasonably feasible to fully implement. Would overstress system traffic interchange ramps at the Stack. Furthermore, some trucks would have origin or destinations more adequately served by the I-10 inner loop.	Supporting	TDM/TSM	Drop
A3-1009	Land uses of 35th Avenue and emerging land uses on 19th Avenue do not accommodate moving trips off of I-17.	Drop. Observation not an alternative. Will consider during alternative evaluation.	Supporting	TDM/TSM	Drop
T-1023	Light rail transit crossing along Mountain View alignment at Metrocenter.	Included in no build. Light rail transit crossing at Mountain View alignment at Metrocenter will be built with the I-10 Broadway Curve Near-Term Improvements.	Supporting	Transit enhancements	Drop
T-1024	Valley Metro is working on a project definition study for Phoenix West/Central Glendale corridor. Potential locations to cross I-17 include Camelback (north side) and Glendale Avenue.	Drop. Not an alternative. For information. Will coordinate with Valley Metro.	Supporting	Transit enhancements	Drop
S-1030	Performance measures of effectiveness (MOEs) of existing systems.	Drop. Not a specific enough comment to assess. Performance measures are current policy for evaluating the corridors.	Supporting	TDM/TSM	Drop
S-1018	Increased local funding for operations management and maintenance.	Drop as an alternative; however, recommend a separate study be performed to inform future funding initiatives. In addition, certain Spine recommendations may include an operations and maintenance funding component if it is critical to achieving the purpose and need.			Drop
I1-1007	Expand project limits to Queen Creek Road.	Drop. Falls far outside of the agreed-upon project limits.			Drop
I2-1017	Do nothing. See how South Mountain and/or near-term improvements will help.	Drop. This is part of the definition of the no build alternative. Drop as a build alternative.			Drop
I4-1010	Architectural treatment to I-17 (make more desirable to drive).	Parking lot. This alternative may be part of a larger solution but does not address purpose and need on its own as it does not increase capacity, improve travel time or mobility or promote economic growth.			Drop
I3-1015	Ask FCDMC how to get rid of Cave Creek Wash at I-17.	Drop. Not reasonably effective in meeting purpose and need.			Drop

4.3 Level 2 Screening

Of the original 349 alternatives from the Alternatives Development Workshop, 286 alternatives passed the Level 1 fatal flaw screening. Of the 286 alternatives, 92 were classified as backbone alternatives and 194 were classified as supporting alternatives.

The Management Partners and AEP developed guiding principles from which criteria would be developed for evaluating alternatives. Initially, four guiding principles (Figure 4-2) were developed and presented to the MAG Transportation Policy Committee. The committee approved the Spine guiding principles, and the fifth guiding principle of “Support Sustainability” was added for developing the evaluation criteria.

Figure 4-2. Guiding Principles for Alternatives



Once the Transportation Policy Committee approved the guiding principles, the Management Partners and AEP developed 19 criteria to evaluate projects across the five guiding principles. The evaluation criteria and associated guiding principles are shown in Table 4-2. These criteria were agreed upon at the AEP meeting on December 21, 2015. The Management Partners and AEP also prioritized and weighted the criteria with a paired comparison exercise. To streamline the Spine study process, it was decided to use the top 11 prioritized criteria, which accounted for 86.6 percent of the weighted evaluation.

Table 4-2. Level 2 Principles and Evaluation Criteria

Optimize	Expand/Modernize	Support Sustainability	Perform	Implement												
Use what is available before making any major physical improvement by engaging technology and practical design criteria.	Upgrade the transportation system to address the growth in trips and congestion beyond what system optimization can provide.	Propose improvements that protect, improve, enhance or restore the natural and built environment, emphasize energy efficiency and minimize life cycle costs.	Focus on meeting the demand for trips between the I-10/I-17 travel markets and system reliability for all travel choices.	Craft alternatives based on bundling principles that will meet service and performance criteria of a reliable I-10/I-17 corridor system.												
Enhances Existing System Utilization	Enhances Safety	Replaces Deficient Infrastructure	Improves Capacity (v/c)	Involves New ROW	Addresses Geometric Feasibility	Preserves the System	Addresses Community/Livability Factors	Protects Natural and Built Environments	Ensures Land Use Compatibility	Reduces Congestion Duration	Improves Travel Time (VMT/VHT)	Improves Travel Time Reliability	Receives Agency Support	Undergoes Benefit-Cost Analysis	Demonstrates Alternative Adaptability	Provides Programming Flexibility

The Level 2 screening was performed at MAG on April 14, 2016. The alternatives were then evaluated in a two-step process. A two-step evaluation process was used for the Level 2 screening, so that only viable backbone alternatives would be evaluated for implementation.

The first step, Level 2A, evaluated all of the alternatives that passed Level 1 screening based on criteria that fell under the guiding principles of Optimize, Perform, Expand/Modernize and Sustainability. All supporting alternatives that survived the Level 2A screening and backbone alternatives not classified as pure alternatives were placed in the “parking lot” and did not require the Level 2B evaluation.

The backbone alternatives that survived the Level 2A screening and were classified as pure alternatives were evaluated in Level 2B against the criteria under the Implement guiding principle.

4.3.1 Level 2A Screening

In Level 2A, the 92 backbone alternatives and 194 supporting alternatives were evaluated by the Management Partners based on the criteria outlined in Table 4-3. The alternatives were rated using a 5-point system, with 1 representing the worst performing and 5 representing the best performing, according to how the alternatives performed against the criteria.

Table 4-3. Level 2A Evaluation Criteria

Criteria	(1) Lower Score		Higher Score (5)	Summary
<i>Optimize: Enhances Existing System Utilization (18.5%)</i> Enhances, but does not expand on, existing infrastructure.	Alternative worsens the utilization of the existing system or necessitates expansion of system.	Alternative results in utilization comparable to "no build."	Alternative increases performance and utilization of existing system infrastructure.	Technological-based alternatives do well.
<i>Optimize: Enhances Safety (8.2%)</i> Ability of the alternative to enhance system safety.	Alternative compromises safety of users.	Alternative's impact on safety is comparable to "no build."	Alternative improves safety for users.	Alternatives that remedy known safety concerns do well.
<i>Perform: Improves Travel Time Reliability (7.8%)</i> Alternative's overall effect on the corridor's ability to move between two destinations.	Alternative substantially decreases travel time reliability compared to "no build."	Alternative is comparable to "no build" travel time reliability, assuming near-term improvements are in place.	Alternative substantially increases travel time reliability compared to "no build."	Alternatives that add capacity or resolve system conflicts (e.g., sight lines, accident areas) do well.
<i>Expand/Modernize: Replaces Deficient Infrastructure (4.6%)</i> Alternative's ability to improve or replace existing deficient infrastructure.	Alternative ignores infrastructure deficiencies and maintenance.	Alternative includes basic maintenance and is comparable to "no build."	Alternative replaces or fully rehabilitates outdated or deficient infrastructure.	Alternatives that replace or fully rehabilitate deficient infrastructure do well.
<i>Perform: Reduces Congestion Duration (4.4%)</i> Alternative's effect on congestion in 2040.	Alternative substantially increases the duration of congestion compared to "no build."	Alternative is comparable to "no build" effect on congestion duration, assuming near-term improvements are in place.	Alternative substantially reduces the duration of congestion compared to "no build."	Alternatives that measurably add capacity or resolve congestion-related conflicts (e.g., weaves, incident management) do well.
<i>Perform: Improves Travel Time (4.4%)</i> Alternative's effect to improve travel time across all modes.	Alternative substantially increases travel time as compared to "no build."	Alternative is comparable to "no build" effect on travel time, assuming near-term improvements are in place.	Alternative substantially decreases travel time as compared to "no build."	Alternatives that improve travel time in more than one mode do well.
<i>Sustainability: Disproportionate Impacts on Title VI, EJ Communities; Livability Factors (5.3%)</i> Disproportionally affects Title VI and EJ communities or negatively affects livability for neighboring communities.	Alternative disproportionately affects Title VI or EJ communities, or negatively affects adjacent communities relative to "no build."	Alternative is comparable to "no build," assuming near-term improvements are in place.	Alternative improves or has the ability to improve Title VI or EJ communities, or enhances adjacent communities relative to "no build."	Alternatives that are transit-based or improve modal choice do well.

Alternatives were then placed into one of the recommendation categories shown in Table 4-4. Alternatives were dropped only if fatal flaws were found during the Level 2 quantitative analysis. All surviving supporting alternatives from the Level 2A analysis were put in the parking lot (see Figure 4-2) to be evaluated as value-added components once the backbone alternatives had been evaluated. The surviving backbone alternatives were either carried forward to the Level 2B screening or added to the parking lot if they would not work as an overall backbone alternative.

MAG and ADOT scored and categorized all of the backbone and supporting alternatives in Level 2A. Once the scoring and categorization was completed, the Management Partners reviewed the Level 2A screening.

Table 4-4. Level 2A Recommendation Categories

Recommendation	Comment/Notes
Alternative	Reflects the backbone or core alternative concepts.
Alternative Feature	Reflects an element or feature to be added to or considered as part of a backbone/core alternative(s).
Impact Remedy	Reflects elements or concepts that can be considered as an alternative implementation impact remedy.
Policy Option	Reflects concepts that can be considered upon an agency policy change or legislative solution.
Study Option	Reflects concepts that can be considered upon further study.
Parking Lot	Reflects all concepts classified as an alternative feature, impact remedy, policy option or study option. Parking lot ideas will not receive any further analysis in Level 2B or Level 3 screening and will be revisited once the preferred alternative is selected.
Underway	Reflects concepts that are already being implemented and therefore exempt from future consideration.
Drop	Reflects concepts that are recommended to be eliminated from further consideration.

Nine backbone alternatives were carried forward to the next level of screening. See Tables 4-5 and 4-6 for the detailed Level 2A analysis. Table 4-7 documents the justification for the Level 2A scoring.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
1	Highway capacity	S-1000	Construct HOT lanes or convert HOV to HOT lanes (at grade or elevated). Rated as converted only.	4	3	5	3	3	3	3	3.641	22	Alternative	Consider as an overall backbone alternative.
2	Highway capacity	S-1038	Create a striped express/local lane system.	4	3	4	3	3	3	3	3.494	25	Alternative	Consider as an overall backbone alternative.
3	Highway capacity	I4-1000	Widen I-17 to full design standards (12-foot lanes and full shoulders).	2	5	4	4	3	4	2	3.177	31	Alternative	Consider as an overall backbone alternative.
4	Highway capacity	I3-1004	Replace I-17 in kind with current standards to replace the aging infrastructure. Will redesign to reflect the high truck percentages in this segment corridor.	2	3	4	5	3	2	3	2.889	37	Alternative	Merge with number 18 as an overall backbone alternative.
5	Highway capacity	S-1037	Add a second 2+ HOV lane with extra wide inside shoulders (16-foot) for enforcement purposes and to provide the necessary width for future managed lanes conversion.	1	5	5	3	4	3	2	2.889	37	Alternative	The 16-foot inside median design requires additional pavement that does not necessarily improve travel time; however, it does enhance safety and improve travel time reliability. Carry to the Level 2B screening.
6	Highway capacity	S-1001	Add a second 2+ HOV lane.	1	3	5	3	4	3	2	2.581	57	Alternative	Would not significantly improve travel time or travel time reliability for all users but would improve travel time and travel time reliability for HOV users. Carry to Level 2B screening.
7	Highway capacity	S-1008	Add truck-only lanes to the Interstate. Rated as an add lane.	1	4	3	3	3	3	3	2.459	68	Alternative	Poor score; commercial vehicle volumes do not warrant the need for separate lanes throughout the entire corridor. Requires additional lane as it is not a HOV lane conversion. Carry to Level 2B screening.
8	Highway capacity	S-1010	Add bus/BRT-only lanes to the Interstate, heavily using park-and-rides. Rated as an add lane.	1	3	3	3	3	3	4	2.404	76	Alternative	Poor score; public transportation demand does not warrant the need for separate lanes throughout the entire corridor. Requires additional lane as it is not a HOV lane conversion. Carry to Level 2B screening.
9	Highway capacity	I4-1018	Begin a "visual" transition of the ROW/lane widths to prepare drivers for transition to depressed roadway section.	4	4	4	3	3	3	3	3.648	21	Alternative Feature	Design-specific; add as a global recommendation for the design development phase of the project.
10	Highway capacity	I4-1006	Revise merge points on frontage roads (potential for X-ramps).	4	4	3	3	3	3	3	3.502	24	Alternative Feature	Consider as an overall backbone alternative feature.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
11	Highway capacity	S-1021	Hard shoulder running.	5	1	3	3	3	3	3	3.387	28	Alternative Feature	Hard shoulder running works well on freeway corridors without auxiliary lanes. Presently, 81% of the corridor mileage has auxiliary lanes, making this concept difficult to implement.
12	Highway capacity	I4-1011	Flatten S-curve near Metrocenter. Evaluate vertical profile; develop crash map to find cause of accidents.	2	4	4	5	3	3	3	3.126	33	Alternative Feature	Design-specific; add to all build alternatives for improving safety along this portion of I-17.
13	Highway capacity	I4-1015	Where I-17 frontage roads are more than one lane, reduce the frontage road to one lane to widen I-17.	2	2	3	3	4	3	3	2.581	57	Alternative Feature	Poor score; reduces effectiveness of the overall frontage road system, creates access issues on and off of the Interstate, and would push more vehicles onto I-17.
14	Highway capacity	I1-1018	C-D roads between Pecos Stack and US-60.	1	4	4	3	4	4	1	2.571	59	Alternative Feature	Poor score; concept has a high disproportionate impact on Title VI and EJ communities and is not warranted for better operations along most of that segment of I-10.
15	Highway capacity	I3-1018	Extend HOV lanes throughout entire I-17.	1	4	3	3	4	3	3	2.541	61	Alternative Feature	Recommended in the MAG RTP; incorporate into alternative other than no-build.
16	Highway capacity	I4-1002	Extend HOV lanes through the Stack interchange.	1	4	3	3	4	3	3	2.541	61	Alternative Feature	Recommended in the MAG RTP; incorporate into alternative other than no-build.
17	Highway capacity	I4-1003	Eliminate frontage roads to widen I-17 within existing ROW. Will require buying out properties that lose access if frontage road provided only access point.	2	2	3	3	4	3	2	2.481	67	Drop	Poor score; eliminates access to many businesses, disproportionate impacts on Title VI and EJ communities, creates access issues on and off of the Interstate at the interchanges, and would push more vehicles onto I-17.
18	Highway capacity	I2-1023	Reevaluate the 1988 C-D system plan, which was a smaller footprint than the EIS terminated recently. Potentially review 1988 plan to route C-D roads south of the Split to connect with I-17 and avoid Phoenix Sky Harbor International Airport issues. Limit trucks to local lane section of C-D system.	1	2	4	5	4	4	1	2.436	73	Drop	Poor score; Part of the concept is being implemented through the near-term improvements (Broadway Curve Project) and the remainder of the concept has a high disproportionate impact on Title VI and EJ communities.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
19	Highway capacity	S-1004	Add two additional general purpose lanes in each direction to Interstate.	1	3	4	3	4	4	1	2.417	74	Drop	Poor score; considerable impacts to land uses along I-17; two additional lanes do not enhance existing system utilization, would require the replacement of existing infrastructure that is not deficient and have disproportionate impacts on EJ and Title VI communities..
20	Highway capacity	S-1005	Add three or more additional general purpose lanes in each direction to Interstate.	1	2	5	3	4	4	1	2.410	75	Drop	Poor score; considerable impacts to land uses along I-17; two additional lanes do not enhance existing system utilization, would require the replacement of existing infrastructure that is not deficient and have disproportionate impacts on EJ and Title VI communities..
21	Highway capacity	I2-1033	Restore HOV balance.	1	4	3	3	4	3	3	2.541	61	Impact Remedy	Incorporate, if appropriate, after the backbone recommendation is made for the overall corridor master plan.
22	Highway capacity	I1-1027	Create a frontage road system for I-10 between Elliot and Baseline roads for system redundancy.	1	4	3	3	3	3	3	2.459	68	Impact Remedy	Incorporate, if appropriate, within the existing ROW, after the backbone recommendation is made for the overall corridor master plan.
23	Highway capacity	S-1003	Add one additional general purpose lane in each direction to Interstate.	1	3	3	3	4	3	3	2.387	80	Alternative	Similar to add second +2 HOV lane (S-1001) with different operational results. Carry forward as a parallel alternative.
24	Highway capacity	I4-1004	Add frontage roads lanes/capacity.	1	3	3	3	3	3	2	2.205	86	Impact Remedy	Incorporate, if appropriate, after the backbone recommendation is made for the overall corridor master plan.
25	Highway capacity	I1-1008	Frontage roads between Pecos Stack and US-60.	1	3	3	3	3	3	1	2.105	87	Impact Remedy	Incorporate, if appropriate, within the existing ROW, after the backbone recommendation is made for the overall corridor master plan.
26	Highway capacity	I1-1010	Free express lanes from SR-202L to Broadway Curve.	3	3	4	3	3	3	3	3.147	32	Merge with Concept 8	Merge with concept 8 as an overall backbone alternative. (No shoulders are assumed.)
27	Highway capacity	S-1031	Create barrier-separated express/local lane system.	2	4	4	3	4	4	3	3.118	34	Merge with Concept 8	Can evaluate at the same time as concept 8 (striped express/local lane system)
28	Highway capacity	I4-1053	Access management plans/frontage road system.	5	5	3	3	3	3	2	3.904	15	Policy Option	Design-specific; add as a global policy recommendation for the design development phase of the project.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
29	Highway capacity	I3-1000	Access management for north-to-south frontage roads.	5	5	3	3	3	3	2	3.904	15	Policy Option	Design-specific; add as a global policy recommendation for the design development phase of the project.
30	Highway capacity	I4-1005	Limit frontage road access.	5	4	3	3	3	3	2	3.750	17	Policy Option	Design-specific; add as a global policy recommendation for the design development phase of the project.
31	Highway capacity	I2-1032	Get rid of the eastbound C-D pinch point at Fairmont. May require one more southbound I-10 lane.								-	88	Underway	Will be addressed during the near-term improvement strategy.
32	New transit	T-1019	Express bus from Pecos park-and-ride to ASU.	5	3	3	3	3	3	3	3.695	19	Alternative Feature	Design-specific; add to all build alternatives as background for alternative evaluation.
33	New transit	A1-1009	Reconfigure/Repurpose UPRR spur line for transit purposes, buy out industrial land uses that use it.	4	3	3	3	3	3	4	3.447	26	Alternative Feature	Poor score; takes away an economic base in the southern portions of Tempe.
34	New transit	S-1039	Heavy transit rail within Interstate ROW for the length of the Spine corridor.	1	3	4	3	4	4	5	2.816	46	Alternative Feature	Poor score; does not enhance existing system utilization; would improve travel times for rail users; it is cost-prohibitive.
35	New transit	A2-1018	Extend light rail from Central Avenue to Arizona Mills along the Western Canal.	1	4	3	3	3	3	5	2.658	56	Alternative Feature	Enhances light rail safety by keeping the light rail corridor outside of the roadway corridor; would serve Title VI and EJ communities.
36	New transit	A2-1017	Build automated guideway transit on 48th Street/SR-143 from Southern Avenue to Sky Harbor Boulevard.	1	3	3	3	3	3	5	2.504	64	Alternative Feature	Poor score; high cost; Sky Train is a system intended for Phoenix Sky Harbor International Airport use only. A new line to serve outside the airport use would minimize its envisioned overall operation.
37	New transit	A1-1004	Extend streetcar to Arizona Mills mall and beyond Wild Horse.	1	2	3	3	3	3	5	2.350	82	Drop	Poor score; high cost; does not fit into Tempe's overall plans for high-capacity transit per Tempe's <i>General Plan</i> ; not a high travel demand for this concept.
38	New transit	A2-1015	Exclusive guideway transit: Southern Avenue/Central Phoenix – Phoenix Central Business District to Rural Road.	1	3	4	3	4	4	5	2.816	46	Drop	Low score; potential spot improvement; will pass along for transit planning efforts between Phoenix and Tempe.
39	New transit	S-1010	Add bus/BRT-only lanes to the arterial corridors of interest.	1	3	4	3	4	4	4	2.716	49	Drop	Low score; recommendation is too broad to consider as the corridors of interest are not identified. Phoenix is evaluating arterials within the Spine study area for BRT through T2050.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
40	New transit	T-1011	Reversible bus lane on Broadway from 52nd Street to Central Avenue	1	2	3	3	3	3	5	2.350	82	Drop	Low score; potential spot improvement; will pass along for transit planning efforts between Phoenix and Tempe.
41	New transit	I4-1017	Reconsider commuter rail services on Grand Avenue to Central Business District.	1	3	3	3	3	3	5	2.504	64	Study Option	Commuter rail planning along this corridor is under consideration.
42	New transit	T-1008	High-capacity transit from Metrocenter to north.	1	3	3	3	3	3	5	2.504	64	Study Option	Planning for the ASU West light rail transit extension is under study.
43	New transit	T-1027	ASU West potential light rail extensions from Metrocenter.	1	3	3	3	3	3	4	2.404	76	Study Option	Planning for the ASU West light rail transit extension is under study.
44	New transit	T-1009	High-capacity transit from Tempe to south.	1	3	3	3	3	3	4	2.404	76	Study Option	Commuter rail planning along this corridor is under consideration.
45	New transit	T-1005	High-capacity transit from Ahwatukee to downtown Phoenix via Tempe and Phoenix Sky Harbor International Airport (using UPRR ROW).	1	3	3	3	3	3	3	2.305	84	Study Option	Commuter rail planning along this corridor is under consideration.
46	New transit	T-1007	High-capacity transit to downtown Glendale.								—	88	Underway	Planning for the Glendale West light rail transit extension is underway.
47	System traffic interchange	I1-1015	New high-capacity interchange at Baseline Road.	1	5	4	4	4	4	3	3.011	35	Alternative Feature	Add to all build alternatives to mitigate existing deficiency.
48	System traffic interchange	I2-1010	Replace/Alter SR-143 and Broadway interchange, eliminate SR-143 loop ramp.	1	5	4	4	4	4	3	3.011	35	Alternative Feature	Add to all build alternatives to mitigate existing deficiency.
49	System traffic interchange	I1-1016	North-to-west and east-to-south Baseline/I-10 flyover with a median landing at Baseline Road.	1	4	4	3	4	4	4	2.870	39	Alternative Feature	Location-specific; modifications to the I-10/Baseline Road traffic interchange will be added to all build alternatives to mitigate existing deficiency.
50	System traffic interchange	I3-1005	Add DHOVs to Stack.	1	5	4	3	4	3	3	2.842	43	Alternative Feature	Construction is difficult given the current geometrics of the I-10/I-17 Stack interchange and the pending construction of the bus ramp on the west side of the interchange. Carry forward to Level 2B screening.
51	System traffic interchange	I3-1006	Add DHOVs to Split.	1	5	4	3	4	3	3	2.842	43	Alternative Feature	Construction is difficult; however, the geometrics are possible. High cost.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
				Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities				
52	System traffic interchange	I2-1013	I-10 realignment at the Split.	1	4	4	5	4	3	2	2.761	48	Alternative Feature	Realignment does not enhance existing system utilization and is only needed if future designs invade the Phoenix Sky Harbor International Airport air spaces. Has a poor score on Enhances Existing System Utilization. Carry forward to Level 2 screening.
53	System traffic interchange	I2-1029	Southbound SR-143 has numerous devices installed because of lack of signal visibility. Vertical curve needs to be reduced.	1	5	3	4	3	3	3	2.699	50	Alternative Feature	Similar to number 57; add to all build alternatives to mitigate existing deficiency.
54	System traffic interchange	I1-1003	Add DHOVs to South Mountain Freeway to I-10 (east to north and south to west).	1	4	4	3	4	3	3	2.688	55	Alternative Feature	Has a poor score on Enhances Existing System Utilization. While it is possible, the alignment would affect Pecos Park (primary function is a retention basin) and some vertical alignment issues. Carry forward to Level 2B screening.
55	System traffic interchange	I1-1004	Direct access from Pecos park-and-ride to I-10.	1	4	3	3	3	3	3	2.459	68	Alternative Feature	Has a poor score on Enhances Existing System Utilization. Pecos park-and-ride is located at SR-202L/40th Street traffic interchange; better solution is to move the park-and-ride to I-10 and Galveston; concept would also require a DHOV at I-10/SR-202L. Carry forward to Level 2B screening (dependent on concept 47; I1-1031).
56	System traffic interchange	I3-1019	The Stack traffic interchange southeastern quadrant, three concepts from previous I-17 study.	1	3	4	5	4	4	2	2.690	51	Drop	Concept from the I-17 Corridor Study does not enhance existing system utilization and has a disproportionate impact to Title VI and EJ communities.
57	System traffic interchange	I3-1020	The Stack traffic interchange southwestern quadrant, three concepts from previous I-17 study.	1	3	4	5	4	4	2	2.690	51	Drop	Concept from the I-17 Corridor Study does not enhance existing system utilization and has a disproportionate impact to Title VI and EJ communities.
58	System traffic interchange	I4-1054	The Stack traffic interchange northeastern quadrant, three concepts from previous I-17 study.	1	3	4	5	4	4	2	2.690	51	Drop	Concept from the I-17 Corridor Study does not enhance existing system utilization and has a disproportionate impact to Title VI and EJ communities.
59	System traffic interchange	I4-1055	The Stack traffic interchange northwestern quadrant, two concepts from previous I-17 study.	1	3	4	5	4	4	2	2.690	51	Drop	Concept from the I-17 Corridor Study does not enhance existing system utilization and has a disproportionate impact to Title VI and EJ communities.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
60	System traffic interchange	I2-1018	Broadway Curve bypass. Extend SR-143 south then curve east to tie to US-60. As an option extend SR-143 south to Baseline.	1	4	4	3	4	4	1	2.571	59	Drop	Considered as an early alternative for the I-10 Corridor Study EIS; dropped due to considerable impacts to the land uses and Title VI and EJ communities adjacent to I-10. Has a poor score on Enhances Existing System Utilization.
61	System traffic interchange	I2-1005	Add DHOV to I-10/Broadway Road.	1	3	3	3	3	3	4	2.404	76	Drop	Substandard weave would be introduced between DHOV at I-10/Broadway and the I-10/US-60/SR-143.
62	System traffic interchange	I2-1036	Add two-lane (choice lane) exit ramps along I-10 westbound at Broadway Road.	1	4	4	3	4	4	4	2.870	39	Impact Remedy	Incorporate, if appropriate, after the backbone recommendation is made for the overall corridor master plan.
63	System traffic interchange	I2-1037	Add two-lane (choice lane) exit ramps along I-10 westbound at SR-143 and 40th Street.	1	4	4	3	4	4	4	2.870	39	Impact Remedy	Incorporate, if appropriate, after the backbone recommendation is made for the overall corridor master plan.
64	System traffic interchange	I4-1024	Analyze which DHOV to build at North Stack.	1	5	4	3	4	3	3	2.842	43	Impact Remedy	Study for identifying the DHOV on SR-101L on the west to/from I-17 on the south was completed in 2003; incorporate, if appropriate, after the recommendation is made for the overall corridor master plan.
65	System traffic interchange	I2-1026	Add westbound Broadway to northbound SR-143 ramp.	1	3	4	3	3	3	3	2.451	71	Impact Remedy	This movement is already accounted for at the Broadway Road/48th Street intersection; however, determine whether a free-flow right-turn lane is needed and feasible to accommodate this movement.
66	System traffic interchange	I2-1030	Increase eastbound I-10/Broadway on-ramp capacity.	1	3	4	3	3	3	3	2.451	71	Impact Remedy	Incorporate, if appropriate, after the backbone recommendation is made for the overall corridor master plan.
67	System traffic interchange	I2-1000	Add DHOV to SR 143/I-10.	1	3	3	3	4	3	3	2.387	80	Impact Remedy	Incorporate, if appropriate, after the backbone recommendation is made for the overall corridor master plan.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
68	System traffic interchange	I2-1001	Add DHOV to I-10/Arizona Mills mall.	1	3	3	3	3	3	3	2.305	84	Impact Remedy	Due to space constraints, associated with dropping a DHOV into Arizona Mills parking lot. Possible legality issue with dropping a DHOV onto a street owned by Arizona Mills. Constructibility issues due to the proximity to I-10/US-60/SR-143 interchange. Does not appear to be a high HOV demand for Arizona Mills. It is also not open during the AM peak. Add to parking lot as Impact Remedy to be evaluated after preferred alternative is selected.
69	System traffic interchange	I2-1016	Reconfigure I-10/US-60 connection.	1	4	4	5	4	4	2	2.844	42	Underway	Will be addressed during the near-term improvement strategy.
70	System traffic interchange	I2-1024	Maintain three westbound US-60 lanes through Broadway Curve to past 40th Street.								-	88	Underway	Recommended in the near-term improvement strategy.
71	System traffic interchange	I4-1052	Fix the North Stack north to east and south to east movements.								-	88	Underway	Pending SR-101L widening project between I-17 and SR-51 will address this matter.
72	Technology	ITS-1001	Upgrade ramp metering.	5	5	5	3	4	4	3	4.462	2	Alternative Feature	Add to all build alternatives, where ramp lengths permit, to mitigate existing deficiency.
73	Technology	I3-1011	Signal timing for turning trucks at 19th Avenue/I-17.	5	5	3	3	4	3	4	4.186	9	Alternative Feature	Add as a near-term study recommendation for the master plan.
74	Technology	ITS-1015	Lane control signals.	4	5	5	3	4	4	3	4.115	10	Alternative Feature	Part of a comprehensive Managed Motorways application; meets recommendations from MAG Managed Lanes Network Development Strategy – Phase I study.
75	Technology	ITS-1016	Active motorways, active management.	4	5	5	3	4	4	3	4.115	10	Alternative Feature	Add to all build alternatives; meets recommendations from MAG Managed Lanes Network Development Strategy – Phase I study.
76	Technology	A3-1007	Incorporate transportation systems management and operations (TSMO) into I-17 corridor including 19th and 35th avenues as synchronized alternatives.	4	5	4	3	4	4	4	4.068	12	Alternative Feature	Although not a specific concept, identifies the need for a coordinated TSMO approach to be incorporated into all alternatives.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
77	Technology	ITS-1014	Variable speed control on Interstate.	4	4	5	3	4	4	3	3.961	14	Alternative Feature	Part of a comprehensive Managed Motorways application; meets recommendations from MAG Managed Lanes Network Development Strategy – Phase I study.
78	Technology	ITS-1019	Automated speed warning in advance of high crash frequency locations.	4	5	3	3	4	3	3	3.739	18	Alternative Feature	Part of a comprehensive Managed Motorways application; meets recommendations from MAG Managed Lanes Network Development Strategy – Phase I study.
79	Technology	ITS-1008	Add TSP for bus service on 35th Avenue to help maintain schedules due to frequent school zone crossings. Add TSP to 19th Avenue to help meet connections with light rail transit.	3	4	4	3	2	4	4	3.400	27	Impact Remedy	Policy recommendation for incorporation, as appropriate, after the backbone recommendation is identified for the corridor master plan.
80	Technology	ITS-1011	Additional traffic operations staff and maintenance staff for City of Phoenix.	5	5	4	3	4	4	3	4.316	4	Policy Option	Recommendation needs policy discussion between regional TSMO partners, MAG, and the City of Phoenix.
81	Technology	I4-1021	Upgrade signal operation at traffic interchanges to emphasize frontage road through movements to fully utilize frontage road capacity.	5	3	2	3	2	2	3	3.383	29	Policy Option	Policy recommendation for incorporation, as appropriate, after the backbone recommendation is identified for the corridor master plan.
82	Technology	ITS-1017	Dynamic HOV lane occupancy control.	4	3	3	3	3	3	3	3.348	30	Policy Option	Requires policy change at from the state government governing the application of HOV lanes.
83	Technology	S-1016	Interagency coordination for alternate routing during incidents.	5	5	4	3	4	4	3	4.316	4	Study Option	Overall corridor master plan recommendation; separate follow-up study and plan.
84	Technology	ITS-1009	Consolidated TOC.	5	4	5	3	4	4	3	4.308	7	Study Option	MAG developing Systems Management and Operations plan for identifying techniques to deploy this technology.
85	Technology	ITS-1006	Arterial management system (ITS) – surveillance, traffic control, parking management, DMS, information dissemination and full integration. Including dedicated transit and parking ITS, adaptive traffic signals to adjust to traffic volumes and coordination between freeway and arterials at interchange signals.	4	5	5	3	4	5	3	4.197	8	Study Option	MAG developing Systems Management and Operations plan for identifying techniques to deploy this technology.

Table 4-5. Level 2A Screening – Backbone

Row No.	Category	Alt. ID	Weights:								Weighted Score	2A Rank	Recommendation	Notes/Comments
			0.185	0.082	0.078	0.046	0.044	0.044	0.053	Description				
			Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities					
86	Technology	ITS-1010	Connected vehicle integration (personal vehicles and freight).	4	5	4	3	4	4	3	3.968	13	Study Option	Difficult to implement presently as the connected/autonomous vehicle data needs are not known at this time.
87	Technology	ITS-1004	Way finding for emergency/alternate routes.	4	5	3	3	3	3	3	3.656	20	Study Option	MAG developing Systems Management and Operations plan for identifying techniques to deploy this technology.
88	Technology	ITS-1005	Coordination on traffic incidents with ADOT and local jurisdictions.	5	5	5	3	5	4	3	4.545	1	Underway	ADOT/DPS continue to improve incident communication.
89	Technology	ITS-1003	Expand collection and dissemination of real-time traffic data/conditions within study area and/or Valley wide. Deploy real-time traffic movement and measuring devices (ARID).	5	5	5	3	4	4	3	4.462	2	Underway	Part of the long-term TSMO plan for the metropolitan area; MAG developing Systems Management and Operations plan for identifying regional goals for deploying the collected data.
90	Technology	ITS-1012	Better local jurisdiction coordination to close the gap, interconnect between cities.	5	5	4	3	4	4	3	4.316	4	Underway	Regional Community Network throughout the metropolitan area is underway; future planning to incorporate potential software modifications as technology warrants.
91	Technology	ITS-1018	Advance queue warning for northbound traffic on I-10 when approaching Broadway Curve.	4	5	3	3	4	3	2	3.639	23	Underway	System presently in place with network of travel time data along the freeway main line.
92	Technology	ITS-1007	CCTV, traffic signal sharing responsibilities between agencies.								-	88	Underway	System presently in place.

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
I4-1047	Implement drainage solution for four arterials that flood.	Add to cost opinions in the rehab/reconstruct alternatives.	Supporting	Arterial modifications	Keep	Alternative Feature
I4-1048	Eliminate 4 old pump stations - ADOT has a design on the shelf for this.	Add to cost opinions in the rehab/reconstruct alternatives.	Supporting	Arterial modifications	Keep	Alternative Feature
A1-1006	Reversible lane on Kyrene Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand. Impacts to adjacent land-uses may be considerable.	Supporting	Arterial modifications	Keep	Alternative Feature
A2-1002	Convert Baseline to an indirect left arterial (Arizona parkway).	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Alternative Feature
A1-1002	Parallel corridor reconfiguration. Create parallel I-10 route on 48th Street. Convert to public street between Point Pkwy and Arizona Grand Pkwy. Consider converting stop signs into coordinated signal system.		Supporting	Arterial modifications	Keep	Alternative Feature
A2-1011	Use Rio Salado Parkway as reliever for E/W, serve as catalyst to land-use change.	Policy behind concept is outside of the goals for this Corridor Master Plan.	Supporting	Arterial modifications	Keep	Drop
I4-1025	Add mid-mile crossing at Encanto Boulevard. (all modes)	Location studied as part of Central Phoenix Framework Study; mid-mile crossing at this location was not recommended due to neighborhood impacts and costs (Assessment of Alternative Improvement Strategies technical memo).	Supporting	Arterial modifications	Keep	Drop
I4-1026	Add mid-mile crossing at Osborn Road. (all modes)	Location studied as part of Central Phoenix Framework Study; mid-mile crossing at this location was not recommended due to neighborhood impacts and costs (Assessment of Alternative Improvement Strategies technical memo).	Supporting	Arterial modifications	Keep	Drop
I4-1027	Add mid-mile crossing at Campbell Avenue. (all modes)	Location studied as part of Central Phoenix Framework Study; mid-mile crossing at this location was not recommended due to neighborhood impacts and costs (Assessment of Alternative Improvement Strategies technical memo).	Supporting	Arterial modifications	Keep	Drop
I4-1028	Add mid-mile crossing at Missouri Avenue. (all modes)	Location studied as part of Central Phoenix Framework Study; mid-mile crossing at this location was not recommended due to neighborhood impacts and costs (Assessment of Alternative Improvement Strategies technical memo).	Supporting	Arterial modifications	Keep	Drop
I4-1029	Add mid-mile crossing at Orangewood Avenue. (all modes)	Location studied as part of Central Phoenix Framework Study; mid-mile crossing at this location was not recommended due to neighborhood impacts and costs (Assessment of Alternative Improvement Strategies technical memo).	Supporting	Arterial modifications	Keep	Drop
I4-1030	Add mid-mile crossing at Butler Road. (all modes)	Location studied as part of Central Phoenix Framework Study; mid-mile crossing at this location was not recommended due to neighborhood impacts and costs (Assessment of Alternative Improvement Strategies technical memo).	Supporting	Arterial modifications	Keep	Drop
A1-1001	Parallel corridor reconfiguration. Create parallel I-10 route on Kyrene and connect Kyrene and Mill Avenue between Baseline and US-60.	There would be considerable impact to adjacent land uses and upon the Town of Guadalupe if this concept was constructed along Kyrene Road.	Supporting	Arterial modifications	Keep	Drop
A1-1007	Convert Kyrene to an Arizona parkway.	Not studied in the Central Phoenix Framework Study; however, ROW needs and impact to adjacent land uses would be significant.	Supporting	Arterial modifications	Keep	Drop
A2-1006	If 24th Street closed, need connection between 24th and 16th Street (to not lose 24th Street river crossing).	No recommendation has been made by FAA to Phoenix Aviation to close 24th Street.	Supporting	Arterial modifications	Keep	Drop
A4-1004	Convert Missouri Avenue to Arizona parkway from Grand Avenue to SR-51.	Not studied in the Central Phoenix Framework Study; however, ROW needs and impact to adjacent land uses would be significant because Missouri Avenue is a smaller collector road with mainly surrounded with residential land use.	Supporting	Arterial modifications	Keep	Drop

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
S-1006	Add one additional general purpose lane in each direction to arterial corridors of interest.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
S-1023	Add more arterial bus pullouts.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
A2-1005	Widen 32nd St to Baseline Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
A2-1008	High average daily traffic intersection – consider grade separations.	The Central Phoenix Framework Study considered more than 35 intersections where volumes exceeded 80,000 vehicles per day (roughly the point of LOS failure). Of those locations, only five locations (83rd Avenue/Bell Road), 19th Avenue/Indian School Road, 7th Avenue/Indian School Road, 7th St/McDowell Road, and 16th St/Glendale Avenue) were identified with good benefit-cost ratios for future consideration. ROW is of a concern. Incorporate, where appropriate, after the backbone recommendation is made for mitigation purposes.	Supporting	Arterial modifications	Keep	Impact Remedy
A2-1009	Make Southern Avenue, 16th Street and 7th Street use reversible lanes for peak hour travel. Connect Southern into US-60/I-10 interchange.	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made. In addition, traffic interchange between Southern Avenue and I-10 is not feasibility due to the US-60 system interchange.	Supporting	Arterial modifications	Keep	Impact Remedy
A2-1012	Flatten profile of 32nd St over I-10.	Incorporate, if appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
A2-1016	Convert Southern Avenue (US-60 to SR-202L) to a parkway (6 general purpose +2 BRT).	Roadway considered in Central Phoenix Framework and Southeast Major Investment Studies as potential for an Urban Arizona parkway (with reduced footprint) and Transit-Oriented Parkway, respectively; however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Impact Remedy
A3-1000	Provide intersection improvements to allow for diversion routes to/from I-17 for parallel routes (27th and 35th), expand north-to-south arterials south of Northern to include 7th Avenue to East. North of Northern, include 7th Street, 43rd Avenue, and 51st Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
A3-1004	Convert 35th Avenue to an Arizona parkway with indirect left design.	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Impact Remedy
A3-1005	Convert 43rd Avenue to an Arizona parkway with indirect left design.	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Impact Remedy
A3-1008	Analyze intersection geometry to current and future traffic demands, check if turning movement demands are serviced correctly.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
A3-1013	Convert 35th avenue to reversible to provide extra capacity during the peak times.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand. Impacts to adjacent land-uses may be considerable.	Supporting	Arterial modifications	Keep	Impact Remedy

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
A4-1003	Convert Northern Avenue to Arizona parkway.	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Impact Remedy
A4-1001	Convert Camelback to Arizona parkway.	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Impact Remedy
A4-1002	Convert Bell Road to Arizona parkway.	Roadway considered in Central Phoenix Framework Study as potential for an Urban Arizona parkway (with reduced footprint); however, study cites significant ROW needs to accommodate a six-lane facility. Only consider, where appropriate, after the backbone recommendation is made.	Supporting	Arterial modifications	Keep	Impact Remedy
A4-1014	Continuous-flow intersection at 35th/ Camelback, Bell, Northern.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Arterial modifications	Keep	Impact Remedy
A4-1000	Access management plans/frontage road system for crossroads between 19th Avenue and 35th Avenue.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A2-1001	Convert Broadway to a truck arterial (I-10 to SR-202L South Mountain Freeway), Southern to a transit corridor, Baseline to vehicular corridor and Alameda/Roeser and western canal to pedestrian/bicycle corridor.	Considerable policy and enforcement needs would be necessary to implement this concept.	Supporting	Arterial modifications	Keep	Policy Option
A2-1003	Access Management plan on Southern Avenue.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A2-1004	School zones traffic management plan. School zone student drop-off, traffic control, queuing planning, and HAWK beacons to eliminate 15 mph school zones.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A2-1010	Access control right in right out only along Baseline Road between Pointe Parkway and Priest.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A3-1001	School zones traffic management plan. School zone student drop-off, traffic control, queuing planning, and HAWK beacons to eliminate 15 mph school zones.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A4-1012	School zones traffic management plan. School zone student drop-off, traffic control, queuing planning, and HAWK beacons to eliminate 15 mph school zones.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A2-1014	Access Management plan on Baseline Road.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Policy Option
A2-1013	Need detailed review on access on Baseline Road, signals, etc. on corridor.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Arterial modifications	Keep	Study Option
I3-1010	Coordination between ADOT and Valley Metro on Central Avenue/I-17 crossing.	Coordination underway for construction of new I-17 overcrossing of Central Avenue prior to 2021 construction of South Central Light Rail Transit line.	Supporting	Arterial modifications	Keep	Underway
A3-1003	Grade separate 35th over BNSF/Grand to improve transit service.	Reconstruction of US-60/35th Avenue/Indian School Road grade separation recommended in the US-60 COMPASS project.	Supporting	Arterial modifications	Keep	Underway
BP-1012	Bike routes to connect park-and-rides to access express buses.	Consider, in conjunction with the City of Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1015	Connect East/West bicycle/pedestrian corridors across I-17.	Consider, in conjunction with the City of Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1017	Extend pedestrian/bicycle path under/over I-10 along Western canal.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
BP-1018	Extend existing multi use path in Tempe along the Salt River west as far as it will go.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1023	Bicycle/Pedestrian crossing at Grand Canal, mid-mile crossings, along designated bicycle/trail/multiuse path routes.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1025	Bicycle/Pedestrian Crossings at Knox.	Consider, in conjunction with the City of Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1026	Bicycle/Pedestrian Crossings at Ray Road.	Incorporate bicycle/pedestrian recommendation at all service interchanges that may be identified for reconstruction as part of the corridor master plan.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1027	Bicycle/Pedestrian Crossings at Chandler Boulevard.	Incorporate bicycle/ pedestrian recommendation at all service interchanges that may be identified for reconstruction as part of the corridor master plan.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1028	Bicycle/Pedestrian Crossings at Warner Road.	Incorporate bicycle/pedestrian recommendation at all service interchanges that may be identified for reconstruction as part of the corridor master plan.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1029	Bicycle/Pedestrian Crossings at Elliot Road.	Incorporate bicycle/pedestrian recommendation at all service interchanges that may be identified for reconstruction as part of the corridor master plan.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1031	Bicycle/Pedestrian crossing Galveston Street/I-10.	Potential new DHOV interchange; consider, in conjunction with the Cities of Chandler and Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1032	Bicycle/Pedestrian crossing Osborn/I-17.	Consider, in conjunction with the City of Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1033	Bicycle/Pedestrian crossings Missouri Avenue/I-17.	Consider, in conjunction with the City of Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
BP-1034	Bicycle/Pedestrian crossing at I-10 along Salt River/Rio Salado.	Consider, in conjunction with the City of Phoenix plans and their non-motorized transportation plans.	Supporting	Bicycle/Pedestrian	Keep	Alternative Feature
A3-1002	Pedestrian overpass for all school and mid-block crossings along 35th, 19th Avenue, and 27th Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/17 Corridor; and only if warranted due to a traffic mitigation needed along these city streets.	Supporting	Bicycle/Pedestrian	Keep	Impact Remedy
BP-1035	Bicycle/Pedestrian crossing at I-10 along Western Canal.	Same as concept number 152.	Supporting	Bicycle/Pedestrian	Keep	Merge with Concept BP-1017
A4-1006	Make Encanto/Grand Canal a pedestrian/bicycle and local one lane/one lane roadway.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
A4-1007	Make Campbell a pedestrian/bicycle and local one lane/one lane roadway.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
A4-1008	Make Missouri a pedestrian/bicycle and local one lane/one lane roadway.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
A4-1009	Make Orangewood a pedestrian/bicycle and local one lane/one lane roadway.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
A4-1010	Make Butler a pedestrian/bicycle and local one lane/one lane roadway.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
A4-1011	Make Sweetwater a pedestrian/bicycle and local one lane/one lane roadway.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
BP-1000	Add bicycle lanes on Chandler Boulevard from 50th to 54th Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1001	Add bicycle lanes on Ray Road from 50th to 54th Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1002	Add bicycle lanes on Warner Road from 51st Street to Jewel Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1003	Add bicycle lanes from Sky Harbor Circle to University Drive on 24th Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1004	Add bicycle lanes on Adams/Jefferson from 24th to 21st Avenue.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1005	Improve Bicycle/Pedestrian infrastructure on 3rd Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1006	Improve Bicycle/Pedestrian infrastructure on 15th Avenue.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1007	Add bicycle lanes on Central Avenue from Apache to Watkins Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1008	Add bicycle lanes on Union Hills Drive from 27th Avenue to 24th Drive.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1009	Add bicycle lanes on Rose Garden Lane from 27th to 23rd Avenue.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1010	Add bicycle lanes on Deer Valley from 27th to 23rd Avenue.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1011	Utilize mid-mile roads as bicycle routes and electric single-occupancy vehicle route and connect them to park-and-rides.	Potential policy recommendation for cities to consider as local thoroughfare plans are considered.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1013	Accentuate 15th Avenue bicycle corridor.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1014	Consider 23rd Avenue as a bicycle corridor.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1016	Add bicycle lanes from 27th to 23rd Avenue on Indian School Road, connect to existing bicycle lanes east of I-17.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1019	Extend bicycle lanes on Southern between 48th and Priest Drive.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1020	Bike integration between 24th Street and Priest (dry crossing along south bank of Salt River).	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1021	Add bicycle lanes on Broadway Road from 48th to 55th Street, future connect to Tempe/Phoenix Master Plans.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1024	Enhance bicycle infrastructure between Pecos Road and Baseline Road using 50th and 51st streets as much as possible to take bicycle traffic off of 48th Street.	Recommendation for cities to consider for all arterials meeting I-10/I-17 Corridor; planning underway for these concepts as part of the SR-202L/South Mountain Freeway trail construction.	Supporting	Bicycle/Pedestrian	Keep	Policy Option
BP-1022	System wide detection for pedestrian, bicycle and vehicles on arterials.	Continuing improvement for cities to consider; also part of TSMO planning for the region.	Supporting	Bicycle/Pedestrian	Keep	Underway

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
I3-1014	North-South I-17, Durango Curve to Stack: Reconfigure all traffic interchanges to work as a system with frontage/connector roads. Eliminate all partial traffic interchanges.	Effort studied and recommended as part of CRAVE assessing near-term improvements to I-17 between 16th St and 19th Avenue; incorporate into the third backbone alternative, Adaptive Access, for remaining segment.	Supporting	Service traffic interchange	Keep	Alternative Feature
S-1034	Alternate DHOV traffic interchanges on the inside at half miles with single-occupancy vehicle traffic interchanges at the full miles. This eliminates HOV travelers from merging across.	Spine will analyze which DHOVs are appropriate on the Spine corridor. The Central Phoenix Framework Study considered more than 90 DHOV locations on all freeway corridors within SR-101L and identified 11 new locations, including 6 locations along the corridor.	Supporting	Service traffic interchange	Keep	Alternative Feature
I1-1000	Add DHOVs to Galveston.	Recommended in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; work with public transportation providers to identify how the infrastructure can be incorporated into existing and future transit services.	Supporting	Service traffic interchange	Keep	Alternative Feature
I1-1001	Add DHOVs to Carver.	Recommended in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; work with public transportation providers to identify how the infrastructure can be incorporated into existing and future transit services.	Supporting	Service traffic interchange	Keep	Alternative Feature
I3-1008	Add DHOVs to Adams/Jefferson Couplet.	Recommended in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; work with public transportation providers to identify how the infrastructure can be incorporated into existing and future transit services.	Supporting	Service traffic interchange	Keep	Alternative Feature
I3-1022	Add DHOV to Washington Avenue.	Recommended in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; work with public transportation providers to identify how the infrastructure can be incorporated into existing and future transit services.	Supporting	Service traffic interchange	Keep	Alternative Feature
I4-1023	Direct connections to Grand Canyon University at Colter.	After the backbone recommendation is made for the overall I-10/I-17 Corridor, it will be important to appropriately plan for the reconstruction needs of the I-17/Camelback Road interchange to accommodate a projected 30,000 student population; effort is underway in continuing Valley Metro/MAG/ADOT/Stakeholder discussions.	Supporting	Service traffic interchange	Keep	Alternative Feature
I4-1056	Add DHOV to Mountain View.	Recommended in the Central Phoenix Framework Study; has been identified in the long-term needs by the City of Phoenix.	Supporting	Service traffic interchange	Keep	Alternative Feature
I4-1057	Add DHOV to Paradise Lane.	Recommended in the Central Phoenix Framework Study; work with public transportation providers to identify how infrastructure can be incorporated into existing and future transit services.	Supporting	Service traffic interchange	Keep	Alternative Feature
I1-1002	Add DHOVs to Guadalupe.	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to impacts on Title VI communities.	Supporting	Service traffic interchange	Keep	Drop
I2-1003	Add DHOV to Kyrene/US-60.	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
I2-1004	Add DHOV to Hardy/US-60.	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
I3-1007	Add DHOV at 7th Street with HOV lanes (Split DHOV, BRT lane during peak period between Washington and I-17).	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
I3-1009	Add DHOVs to Van Buren.	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
I3-1021	Add DHOV to Central Avenue.	Selection of Central Avenue as HCT corridor for South Central project prohibits this construction.	Supporting	Service traffic interchange	Keep	Drop
I3-1023	Add DHOV to 15th Avenue.	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
I4-1008	Add DHOVs to Missouri.	Studied in the Southeast Corridor Major Investment and Central Phoenix Framework Studies; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
I4-1016	HOV bus ramp exit south of Grand Avenue/BNSF, then tying to new I-10/I-17 bus ramp inside the Stack on the existing southbound frontage road.	The proposed design for the I-10/Van Buren St bus ramp is meant to ultimately carry Light Rail Transit vehicles for the West line; once this conversion is made, a bus type of connection would not be appropriate.	Supporting	Service traffic interchange	Keep	Drop
I4-1058	Add DHOV to Yorkshire Drive/Utopia Road.	Studied in the Central Phoenix Framework Study; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
I4-1059	Add DHOV to Union Hills.	Studied in the Central Phoenix Framework Study; dropped from recommendation due to lack of support from public transportation providers and potential construction expenses.	Supporting	Service traffic interchange	Keep	Drop
A4-1013	Add HOV lanes on Grand Avenue between I-17 and downtown. Alternative includes a DHOV on I-17 at Grand Avenue to and from the north.	HOV Lanes were dropped from consideration in the US-60 COMPASS project due to ROW restrictions; DHOV recommended and consistent with number 206.	Supporting	Service traffic interchange	Keep	Drop
I1-1011	New high-capacity interchange at Chandler Boulevard.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1012	New high-capacity interchange at Ray Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1013	New high-capacity interchange at Warner Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1014	New high-capacity interchange at Elliot Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1019	New high-capacity interchange at Chandler Boulevard.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1020	Add two-lane (choice lane) exit ramps along I-10 westbound at Ray Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1021	Add two-lane (choice lane) exit ramps along I-10 westbound at Warner Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1022	Add two-lane (choice lane) exit ramps along I-10 westbound at Elliot Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1023	Add two-lane (choice lane) exit ramps along I-10 eastbound at Chandler Boulevard.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1024	Add two-lane (choice lane) exit ramps along I-10 westbound at Ray Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1025	Add two-lane (choice lane) exit ramps along I-10 eastbound at Warner Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I1-1026	Add two-lane (choice lane) exit ramps along I-10 eastbound at Elliot Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
I2-1012	Move 24th Street ramps to University for cargo access to Phoenix Sky Harbor International Airport, University traffic interchange instead of the 24th Street traffic interchange. Provide interstate access to Tower Road.	Identified as a potential mitigation measure for accommodating a DHOV ramp between I-17 and I-10 to/from the east; incorporate, where appropriate, after the backbone recommendation is made for the corridor.	Supporting	Service traffic interchange	Keep	Impact Remedy
I2-1034	New high-capacity traffic interchange at 32nd Street.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I2-1035	New high-capacity traffic interchange at 44th Street.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I2-1038	Add two-lane (choice lane) exit ramps along I-10 eastbound at 40th Street.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I2-1039	Add two-lane (choice lane) exit ramps along I-10 eastbound at 32nd Street.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I3-1016	Make Adams/Jefferson couplet a standard split diamond configuration.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1001	Connect US-60 (Grand Avenue) to I-17, especially north to northwest and southeast to south movements.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1007	Add DHOVs to Grand Avenue.	Recommended in the US-60/Grand Avenue COMPASS Study; work with public transportation providers to identify how the infrastructure can be incorporated into existing and future transit services.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1019	Texas turnarounds on all interchanges north of the Stack.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1020	Texas turnarounds on north side of Camelback to serve Grand Canyon University.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1031	New high-capacity traffic interchange at McDowell.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1032	New high-capacity traffic interchange at Thomas.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1033	New high-capacity traffic interchange at Grand Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1034	New high-capacity traffic interchange at Indian School.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1035	New high-capacity traffic interchange at Camelback Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1036	New high-capacity traffic interchange at Bethany Home Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1037	New high-capacity traffic interchange at Glendale Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1038	New high-capacity traffic interchange at Northern Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1039	New high-capacity traffic interchange at Dunlap Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
I4-1040	New high-capacity traffic interchange at Peoria Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1041	New high-capacity traffic interchange at Cactus Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1042	New high-capacity traffic interchange at Thunderbird Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1043	New high-capacity traffic interchange at Bell Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1044	New high-capacity traffic interchange at Union Hills Drive.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1049	High capacity connections at Thunderbird or a new high-capacity interchange.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1050	High capacity connections at Bell or a new high-capacity interchange.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1060	Add two-lane (choice lane) exit ramps along I-17 southbound at Thomas Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1061	Add two-lane (choice lane) exit ramps along I-17 southbound at Camelback Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1062	Add two-lane (choice lane) exit ramps along I-17 southbound at Bethany Home Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1063	Add two-lane (choice lane) exit ramps along I-17 southbound at Peoria Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1064	Add two-lane (choice lane) exit ramps along I-17 northbound at Indian School Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1065	Add two-lane (choice lane) exit ramps along I-17 northbound at Camelback Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1066	Add two-lane (choice lane) exit ramps along I-17 northbound at Bethany Home Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1067	Add two-lane (choice lane) exit ramps along I-17 northbound at Peoria Avenue.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I4-1068	Add two-lane (choice lane) exit ramps along I-17 northbound at Union Hills Drive.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
A4-1005	Grade separation of crossroad through movement through I-17 traffic interchanges.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	Service traffic interchange	Keep	Impact Remedy
I2-1036	Add two-lane (choice lane) exit ramps along I-10 westbound at Broadway Road.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	System traffic interchange	Keep	Impact Remedy
I2-1037	Add two-lane (choice lane) exit ramps along I-10 westbound at SR-143 and 40th Street.	Incorporate, where appropriate, after the backbone recommendation is made for the overall I-10/I-17 Corridor to meet 2040 travel demand.	Supporting	System traffic interchange	Keep	Impact Remedy
S-1020	Restricted HOV buffer crossover and access points.	Strategy under consideration as a corridor master plan alternative.	Supporting	TDM/TSM	Keep	Alternative Feature

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
I2-1014	Freeway re-routing plans on Broadway with way finding (south of Phoenix Sky Harbor International Airport).	Alternate alignments of I-10 and I-17 are not consistent with the guiding criteria for developing this Corridor Master Plan.	Supporting	TDM/TSM	Keep	Drop
S-1035	Make the HOV lanes a time of use managed lane: HOV only during the peak hours and truck/transit only during mid-day.	Action requires legislative change; promise of Managed Motorways application as an initial consideration may lessen the need for stricter HOV lane controls.	Supporting	TDM/TSM	Keep	Policy Option
S-1002	Convert HOV to 3+ occupancy.	Action requires legislative change; promise of Managed Motorways application as an initial consideration may lessen the need for stricter HOV lane controls.	Supporting	TDM/TSM	Keep	Policy Option
S-1012	General purpose/HOV restrictions (trucks, recreational vehicles).	Would require legislative action.	Supporting	TDM/TSM	Keep	Policy Option
S-1015	Parking management districts: Increase rates Downtown, amped up TDM plan.	Action requires policy change for the City of Phoenix; will impact land-use decisions and could be detrimental to the long-term goals for Downtown redevelopment.	Supporting	TDM/TSM	Keep	Policy Option
S-1036	End the alternate fuel vehicle HOV program to improve HOV operations.	Decision for the next-generation RTP to address; requires administrative/legislative change.	Supporting	TDM/TSM	Keep	Policy Option
S-1011	Enforcement of HOV.	ADOT/DPS implementing plans for stricter HOV enforcement underway.	Supporting	TDM/TSM	Keep	Underway
S-1013	Emphasize carpool/vanpool, incentivize HOV.	Continuing recommendation under consideration and development by the region's public transportation providers.	Supporting	TDM/TSM	Keep	Underway
S-1033	Increase freeway safety patrols.	Recommendation is consistent with long-term RTP policies for the program.	Supporting	TDM/TSM	Keep	Underway
T-1000	Transit priority access on Baseline crossing I-10.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Alternative Feature
T-1018	Add new park-and-ride just north of SR-101L to relieve Bell park-and-ride.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Alternative Feature
S-1029	Create downtown-to-downtown 10 minute headway transit service between all major valley cities and education centers.	Continuing recommendation under consideration and development by the region's public transportation providers; potential policy recommendation from this study.	Supporting	Transit enhancements	Keep	Alternative Feature
S-1022	HOV ramp meter bypass.	Requires additional infrastructure; may not be needed given the promise of a Managed Motorways application.	Supporting	Transit enhancements	Keep	Alternative Feature
I1-1009	Integrated transit and freeway between Galveston and Carver.	Direct HOV interchanges have been recommended by previous studies and will be considered in this Corridor Master Plan if it supports existing and future public transportation service needs; this concept does not have enough definition.	Supporting	Transit enhancements	Keep	Drop
I4-1051	Develop optimal treatment for bus/HOV bypass lane at Dunlap traffic interchange to access southbound I-17 on-ramp. Near-term issue prior to construction of new DHOV at Mountain View.	A near-term strategy that could take time to implement and not permit a focused efforts on developing the I-17/Mountain View DHOV traffic interchange.	Supporting	Transit enhancements	Keep	Drop
T-1010	Improve way finding to park-and-rides.	Policy recommendation from this study.	Supporting	Transit enhancements	Keep	Policy Option
T-1013	Increase peak period/more frequent RAPID/express bus along route.	As no specific RAPID/express routes are identified, consider their implementation as an overall policy recommendation from this study for continuing planning with public transportation providers.	Supporting	Transit enhancements	Keep	Policy Option
T-1015	Bike lockers with reservation systems at park-and-rides.	Potential policy recommendation from this study.	Supporting	Transit enhancements	Keep	Policy Option
T-1016	More bicycle capacity on RAPID buses.	Potential policy recommendation from this study.	Supporting	Transit enhancements	Keep	Policy Option
T-1017	Transit connection with ITS and DMS (real-time transit data).	Potential policy recommendation from this study.	Supporting	Transit enhancements	Keep	Policy Option

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
T-1028	Paid park-and-ride incentives for long term parking and/or add security and shade parking to encourage transit use to go to the airport.	Continuing recommendation under consideration and development by the region's public transportation providers; potential policy recommendation from this study.	Supporting	Transit enhancements	Keep	Policy Option
T-1029	Retrofit park-and-rides into "mobility hubs" (businesses like cafés, daycares, drycleaners, grocery stores, etc.), explore P3 opportunities.	Continuing recommendation under consideration and development by the region's public transportation providers; potential policy recommendation from this study.	Supporting	Transit enhancements	Keep	Policy Option
T-1030	Variable transit fare pricing.	Continuing recommendation under consideration and development by the region's public transportation providers.	Supporting	Transit enhancements	Keep	Policy Option
T-1032	More Frequent bus service.	Continuing recommendation under consideration and development by the region's public transportation providers.	Supporting	Transit enhancements	Keep	Policy Option
T-1001	Limited stopped/more frequent transit between ASU, Tempe and Chandler.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Study Option
T-1002	Limited stopped/more frequent transit between downtown capitol to Metrocenter, Deer Valley, and Anthem.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Study Option
T-1003	Limited stopped/more frequent transit from Ahwatukee to Tempe (all day).	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Study Option
T-1004	Limited stopped/more frequent transit from Ahwatukee to Phoenix (all day).	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Study Option
T-1014	New express bus routes.	As no specific express routes are identified, consider their implementation as an overall policy recommendation from this study for continuing planning with public transportation providers.	Supporting	Transit enhancements	Keep	Study Option
T-1020	Add park-and-rides/Increased park-and-ride capacity.	Continuing recommendation under consideration and development by the region's public transportation providers.	Supporting	Transit enhancements	Keep	Study Option
T-1021	New transit center northeast corner of Pecos Stack to serve commuter rail on UPRR spur and BRT on I-10.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services; long-term recommendation that needs further study when decisions are made about commuter rail operations in metropolitan Phoenix.	Supporting	Transit enhancements	Keep	Study Option
T-1022	Transit station at 48th Street and Broadway.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Study Option
T-1025	Expand Bell Road park-and-ride.	Explore concept with public transportation providers to identify if this recommendation supports or enhances existing and future transit services.	Supporting	Transit enhancements	Keep	Study Option
T-1026	Move Metrocenter park-and-ride on east side of mall.	Land-use decision for land owner and Phoenix Public Transportation; under study by Valley Metro for consideration with the Light Rail Extension and Mountain View DHOV efforts.	Supporting	Transit enhancements	Keep	Underway
S-1032	Reverse Ramps.	Added to the third backbone alternative, Adaptive Access, identified for the overall Corridor Master Plan.	Supporting	Weaves	Keep	Alternative Feature
I1-1017	Braid ramp weaves throughout segment.	Incorporate, where needed, in the third backbone alternative, Adaptive Access, for the overall Corridor Master Plan.	Supporting	Weaves	Keep	Impact Remedy
I2-1031	Braid weave northbound I-10 on C-D road between Baseline and US-60.	Part of the Near-Term Improvement Strategy.	Supporting	Weaves	Keep	Underway
A1-1000	Fund access management plan for high traffic generators (Arizona Mills and Wild Horse Pass Casino) Consider remote parking and shuttle access.	Outside the scope of this Corridor Master Plan.	Supporting	Arterial modifications	Drop	Not applicable
A1-1003	Parallel corridor reconfiguration. Create parallel and continuous I-10 route on Priest (Avenida del Yaqui).	Not compatible with Town of Guadalupe Master Plan.	Supporting	Arterial modifications	Drop	Not applicable

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
A2-1007	Phoenix Sky Harbor International Airport zone transportation analysis (and ASU and Arizona Mills and layering effect).	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting	Arterial modifications	Drop	Not applicable
A3-1006	Convert 19th Avenue to an Arizona parkway with indirect left design.	Not compatible with City of Phoenix Master Plan.	Supporting	Arterial modifications	Drop	Not applicable
A3-1010	Consider reducing capacity on 35th Avenue to create multiuse corridor (with reduced lane widths and bicycle lanes).	Not compatible with City of Phoenix Master Plan.	Supporting	Arterial modifications	Drop	Not applicable
A3-1012	19th and 35th avenues - need better operations to support I-17.	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting	Arterial modifications	Drop	Not applicable
A1-1005	Enhance bicycle infrastructure on parallel arterials and encourage use of mid-mile streets.	Not specific enough of an alternative to incorporate into the Corridor Master Plan. Incorporating other specific mid-mile crossings.	Supporting	Bicycle/Pedestrian	Drop	Not applicable
BP-1036	Bicycle/Pedestrian crossing at I-10 along Alameda Drive.	Incorporated in the No-Build Alternative.	Supporting	Bicycle/Pedestrian	Drop	Not applicable
BP-1030	Bicycle/Pedestrian Crossings at Guadalupe.	Incorporated in the No-Build Alternative.	Supporting	Bicycle/Pedestrian	Drop	Not applicable
I1-1006	Move ASU campus to Casa Grande.	Outside the scope of this Corridor Master Plan.	Supporting	Policy	Drop	Not applicable
I2-1006	Add DHOV to I-10/Southern Avenue.	Not feasible because of the proximity of I-10/US-60 system interchange.	Supporting	Service traffic interchange	Drop	Not applicable
I2-1009	Elongate (lengthen) Baseline Road bridge.	Incorporated in the alternative to reconstruct Baseline Road.	Supporting	Service traffic interchange	Drop	Not applicable
I4-1009	Consider converting single-occupancy vehicle traffic interchanges to DHOV traffic interchanges.		Supporting	Service traffic interchange	Drop	Not applicable
A1-1008	Connect Southern, South Bound to I-10 frontage roads (relieve Baseline).	Not feasible because of the proximity of I-10/US-60 system interchange.	Supporting	Service traffic interchange	Drop	Not applicable
S-1014	Direct HOV-freeway/freeway, arterial/freeway	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting	System traffic interchange/Service traffic interchange	Drop	Not applicable
T-1031	Market travel choices to Ahwatukee residents.	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
S-1028	Incentivize local travel with tax credits/incentives.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
S-1027	Convert Interstate to a toll road.	Requires an act of Congress to convert an Interstate to a toll road.	Supporting	TDM/TSM	Drop	Not applicable
ITS-1002	Drone surveillance.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
S-1009	Add truck only lanes to the arterial corridors of interest.	Not compatible with City of Phoenix Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
S-1017	Infill development in employment centers to reduce VMT.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
S-1024	Bring back photo radar on freeway systems.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable

Table 4-6. Level 2A Screening – Supporting Concepts

Combined Alt. ID	Description	Comments	Backbone/ Supporting	Subcategory	Level 1 Screening	Level 2 Screening
S-1026	Educate motorists on insurance laws by providing flyers in MVD renewals.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
I2-1008	Close/Relocate shipping operations from Phoenix Sky Harbor International Airport to Mesa Gateway.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
I2-1015	Separate truck detour routes from Broadway Curve.	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
I3-1012	Restrict trucks from I-10 inner loop. Make I-10 inner loop a state highway.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
A3-1009	Land uses of 35th avenue and emerging land uses on 19th avenue don't accommodate moving trips off of I-17.	Outside the scope of this Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
S-1030	Performance MOEs of existing systems.	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting	TDM/TSM	Drop	Not applicable
T-1023	Light rail transit crossing along Mountain View alignment at Metrocenter.	Referred to Valley Metro.	Supporting	Transit enhancements	Drop	Not applicable
T-1024	Valley Metro is working on a project definition study for Phoenix west/Central Glendale corridor. Potential locations to cross I-17 include Camelback (north side) and Glendale Avenue.	Referred to Valley Metro.	Supporting	Transit enhancements	Drop	Not applicable
S-1018	Increased local funding for operations management and maintenance.	Outside the scope of this Corridor Master Plan.	Supporting		Drop	Not applicable
I1-1007	Expand project limits to Queen Creek Road.	Outside the scope of this Corridor Master Plan.	Supporting		Drop	Not applicable
I2-1017	Do nothing – see how South Mountain and/or near-term improvements will help.	No-build alternative.	Supporting		Drop	Not applicable
I4-1010	Architectural treatment to I-17 (make more desirable to drive).	Not specific enough of an alternative to incorporate into the Corridor Master Plan.	Supporting		Drop	Not applicable
I3-1015	Ask FCDMC how to get rid of Cave Creek Wash at I-17.	Outside the scope of this Corridor Master Plan.	Supporting		Drop	Not applicable

Table 4-7. Level 2A Screening – Scoring Justification

Row No.	Alt. ID	Category	Weights:		0.185	0.082	0.078	0.046	0.044	0.044	0.053
			Description	Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities	
1	S-1000	Highway capacity	Construct HOT lanes or convert HOV to HOT lanes (at grade or elevated). Rated as converted only.	4 – Rated for converting HOV lane to HOT lane and not for adding a lane.	3 – Safety would not improve when compared to no build.	5 – Would improve travel time reliability for users of HOT lanes.	3 – Does not replace deficient infrastructure.	3 – HOT lanes would not reduce congestion duration for the overall corridor.	3 – Would only improve travel time for HOT users and not measurably improve travel time for the entire corridor.	3 – Minimal to moderate impacts to 4(f)/Section 6(f) of the Land and Water Conservation Act [Section 6(f)]; same or similar to No-Build for EJ.	
2	S-1001	Highway capacity	Add a second 2+ HOV lane.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	5 – Would improve travel time reliability for users of HOV lanes.	3 – Does not replace deficient infrastructure.	4 – A second HOV lane throughout the interstate corridor would reduce HOV congestion duration.	3 – Would only improve travel time for HOV users and not measurably improve travel time for the entire corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
3	S-1003	Highway capacity	Add one additional general purpose lane in each direction to Interstate.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not measurably improve travel time reliability for corridor users.	3 – Does not replace deficient infrastructure.	4 – One additional general purpose lane would measurably reduce congestion duration.	3 – Would not measurably improve travel time for the entire corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
4	S-1004	Highway capacity	Add two additional general purpose lanes in each direction to Interstate.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability for users of general purpose lanes.	3 – Does not replace deficient infrastructure.	4 – Two additional general purpose lane would measurably reduce congestion duration.	4 – Would moderately improve travel time for the entire corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
5	S-1005	Highway capacity	Add three additional general purpose lanes in each direction to Interstate.	1 – Rated 1 because it adds new pavement.	2 – Safety is decreased when compared to no build because of increased weaves.	5 – Would improve travel time reliability for users of general purpose lanes.	3 – Does not replace deficient infrastructure.	4 – Three additional general purpose lane would measurably reduce congestion duration.	4 – Would moderately improve travel time for the entire corridor.	1 – Negatively affects EJ; high impacts on 4(f) and 6(f) properties.	
6	S-1031	Highway capacity	Create barrier separated express/local lane system.	2 – Enhances existing system utilization but expands existing system and infrastructure.	4 – Safety is increased when compared to no build because it decreases weaving.	4 – Would improve travel time reliability by separating out the local weaving from the express lanes.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by separating out the local traffic and eliminating the weaves.	4 – Would moderately improve travel time for the entire corridor by separating the local traffic from express traffic.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
7	S-1037	Highway capacity	Add a second 2+ HOV lane with extra wide inside shoulders (16') for enforcement purposes and to provide the necessary width for future managed lanes conversion.	1 – Rated 1 because it adds new pavement.	5 – Safety for HOV traffic and DPS enforcement would significantly increase when compared to no build.	5 – Would improve travel time reliability for HOV users by adding an additional lane extra wide shoulders.	3 – Does not replace deficient infrastructure.	4 – A second HOV lane throughout the interstate corridor would reduce HOV congestion duration.	3 – Would only improve travel time for HOV users and not measurably improve travel time for the entire corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	

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Row No.	Alt. ID	Category	Weights:		0.185	0.082	0.078	0.046	0.044	0.044	0.053
			Description	Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities	
8	S-1038	Highway capacity	Create a striped express/local lane system.	4 – Enhances existing system utilization with small infrastructure changes and without expanding existing system.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability by separating out the local weaving from the express lanes (stripe only).	3 – Does not replace deficient infrastructure.	3 – Express/local lanes would not reduce congestion duration because it adds no new capacity.	3 – Would not improve travel time for the entire corridor because local and express traffic is only separated by a stripe.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
9	I1-1008	Highway capacity	Frontage roads between Pecos stack and US 60.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	1 – Negatively affects EJ; high impacts on 4(f) and 6(f) properties.	
10	I1-1010	Highway capacity	Free express lanes from SR-202L to Broadway curve.	3 – Enhances existing system utilization but changes existing system.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability for the express lane users by removing the weaving movements.	3 – Does not replace deficient infrastructure.	3 – Express/local lanes would not reduce congestion duration because it adds no new capacity.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
11	I1-1027	Highway capacity	Create a frontage road system for I-10 between Elliot and Baseline for system redundancy.	1 – Rated 1 because it adds new pavement.	4 – Safety is increased when compared to no build because would remove some local traffic form I-10 and provide a parallel route to I-10.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ. (Rating changed because it can all be completed within ADOT ROW.)	
12	I2-1023	Highway capacity	Reevaluate the 1988 C-D system plan, which was a smaller footprint than the EIS terminated recently. Potentially review 1988 plan to route C-D roads south of Split to connect with I-17 and avoid Phoenix Sky Harbor International Airport issues. Limit trucks to local lane section of C-D system.	1 – Rated 1 because it adds new pavement.	4 – Safety is increased when compared to no build because would remove some local traffic form I-10 and provide a parallel route to I-10.	4 – Would improve travel time reliability by removing the weaving movements.	5 – Replaces deficient infrastructure in project area.	4 – Would reduce congestion duration by separating out the local traffic and eliminating the weaves.	4 – Would moderately improve travel time for the entire corridor by separating the local traffic from express traffic.	1 – Negatively affects EJ; high impacts on 4(f) and 6(f) properties.	
13	I2-1032	Highway capacity	Get rid of the eastbound C-D pinch point at Fairmont. May require 1 more southbound I-10 lane.	Dropped by evaluation team – addressed by near term improvement strategy.							
14	I2-1033	Highway capacity	Restore HOV balance.	1 – Rated 1 because it adds new pavement.	4 – Increases safety when compared to no build by providing HOV balance within the corridor.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – A second HOV lane to restore the HOV balance would reduce HOV congestion duration.	3 – Would only improve travel time for HOV users and not measurably improve travel time for the entire corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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Row No.	Alt. ID	Category	Weights:		0.185	0.082	0.078	0.046	0.044	0.044	0.053
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15	I3-1000	Highway capacity	Access management for north-south frontage roads.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would be significantly increase on the frontage roads with access management.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
16	I3-1004	Highway capacity	Replace I-17 in kind with current standards to replace the aging infrastructure. Will redesign to reflect the high truck percentages in this segment corridor.	2 – Rated 2 because it expands existing system but stays within existing ROW.	5 – Significantly increases safety when compared to no build because it brings the entire corridor up to standards.	4 – Would improve travel time reliability by bringing the segment to current standards and replacing all deficient infrastructure.	5 – Replaces all deficient infrastructure within project area.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	4 – Would improve travel times by bringing the interstate corridor up to standard. Infrastructure would be able to better handle incident management.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
17	I3-1018	Highway capacity	Extend HOV lanes throughout entire I-17.	1 – Rated 1 because it adds new pavement.	4 – Increases safety when compared to no build by eliminating HOV discontinuity.	3 – Would not measurably improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce HOV congestion duration.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
18	I4-1000	Highway capacity	Widen I-17 to full design standards (12' lanes and full shoulders).	2 – Rated 2 because it expands existing system but stays within existing ROW.	5 – Significantly increases safety when compared to no build because it brings lanes and shoulders up to standards.	4 – Would improve travel time reliability by bringing the segment to current standards.	4 – Replaces some deficient infrastructure within project area.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	4 – Would improve travel times by bringing the interstate corridor up to standard. Infrastructure would be able to better handle incident management.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
19	I4-1002	Highway capacity	Extend HOV lanes through the Stack interchange.	1 – Rated 1 because it adds new pavement.	4 – Increases safety when compared to no build by eliminating HOV discontinuity.	3 – Would not measurably improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce HOV congestion duration.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
20	I4-1003	Highway capacity	Eliminate frontage roads to widen I-17 within existing ROW.	2 – Rated 2 because it moves pavement from frontage road to interstate but stays within existing ROW.	2 – Decreases safety by moving the local traffic that uses frontage roads to I-17 mainline and increases weaving.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by adding capacity to I-17.	3 – Would not measurably improve travel time for that segment of the corridor. All local traffic would move local traffic to I-17.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	

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21	I4-1004	Highway capacity	Add frontage roads lanes/capacity.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
22	I4-1005	Highway capacity	Limit frontage road access.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	4 – Safety would increase on the frontage roads with access management.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
23	I4-1006	Highway capacity	Revise merge points on frontage roads.	4 – Enhances existing system utilization with small infrastructure changes and without expanding existing system.	4 – Revising merge points would increase safety on frontage roads because it would help solve weaving issues.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
24	I4-1011	Highway capacity	Flatten S-curve near Metrocenter. Evaluate vertical profile; develop crash map to find cause of accidents.	2 – Realignment would go outside of ROW and add new pavement but would not expand existing system.	4 – Safety would increase because it would increase sight distance and provide a better transition between the elevated and depressed sections of I-17.	4 – Would improve travel time reliability by fixing a section in the interstate corridor that has a high crash frequency.	5 – Replaces all deficient infrastructure within project area.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
25	I4-1015	Highway capacity	Reduce frontage road to one lane to widen I-17.	2 – Rated 2 because it moves pavement from frontage road to interstate but stays within existing ROW.	2 – Decreases safety by moving some of the local traffic that uses frontage roads to I-17 mainline and increases weaving.	3 – Would not improve travel time reliability. Same as adding one lane to the interstate.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by adding capacity to I-17.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
26	I4-1018	Highway capacity	Begin a "visual" transition of the ROW/lane widths to prepare drivers for transition to depressed roadway section.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	4 – Safety would increase because it would prepare drivers	4 – Would improve travel time reliability by fixing a section in the interstate corridor that has a high crash frequency.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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27	I4-1053	Highway capacity	Access management plans/frontage road system.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would be significantly increase on the frontage roads with access management.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity to the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for that segment of the corridor.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
28	I1-1018	Highway capacity	C-D roads between Pecos Stack and US-60.	1 – Rated 1 because it adds new pavement.	4- Safety would increase because weaving would be separated from I-10 mainline.	4 – Would improve travel time reliability by removing the weaving movements.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by separating out the local traffic and eliminating the weaves.	4 – Would improve travel times by separating out the local traffic and eliminating the weaves.	1 – Negatively affects EJ; high impacts on 4(f) and 6(f) properties.	
29	S-1007	Highway capacity	Add bus/BRT-only lanes to the Interstate, heavily using park-and-rides.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity or encourage a large enough mode shift on the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for all the users of the corridor.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
30	S-1008	Highway capacity	Add truck-only lanes to the Interstate.	1 – Rated 1 because it adds new pavement.	4 – Safety increases by keeping the trucks in one lane.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity on the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time for all the users of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
31	S-1021	Highway capacity	Hard shoulder running.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	1 – Safety would decrease especially in sections that have auxiliary lanes.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration because it does not add enough capacity on the interstate corridor to make a measurable difference.	3 – Would not measurably improve travel time of the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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Row No.	Alt. ID	Category	Weights:		0.185	0.082	0.078	0.046	0.044	0.044	0.053
			Description	Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities	
32	S-1010	New transit	Add bus/BRT-only lanes to the arterial corridors of interest.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability to the Spine corridor by removing a significant number of vehicle users from the corridor and giving transit users a reliable travel mode.	3 – Does not replace deficient infrastructure.	4 – Would moderately reduce congestion duration on the arterials by improving bus operations and eliminating the in street bus stops that block a lane of traffic.	4 – Would moderately improve the travel time of the arterials by improving bus operations and eliminating the in street bus stops that block a lane of traffic.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
33	S-1039	New transit	Heavy transit rail within Interstate ROW for the length of the Spine corridor.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability to the Spine corridor by removing a significant number of vehicle users from the corridor and giving transit users a reliable travel mode.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration because it adds capacity and would encourage a large mode shift on the interstate corridor to make a measurable difference.	4 – Would moderately improve the travel time of the interstate because enough interstate users would switch transportation mode.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
34	I4-1017	New transit	Reconsider commuter rail services on Grand Avenue to Central Business District.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability to the Spine corridor.	3 – Does not replace deficient infrastructure.	3 – Would not measurably reduce congestion duration of the corridor.	3 – Would not measurably improve travel time of the corridor.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
35	A1-1004	New transit	Extend streetcar to Arizona Mills mall and beyond Wild Horse.	1 – Rated 1 because it adds new track.	2 – Safety would decrease because the street car would be on a major arterial and have more conflict points between vehicles and the street car.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not measurably reduce congestion of duration of the corridor as not enough users would switch modes of transportation. Street car would rely on existing arterials.	3 – Would not measurably improve travel time of the corridor as not enough users would switch modes of transportation. Street car would rely on existing arterials.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
36	A2-1015	New transit	Exclusive guideway transit: Southern Avenue/Central Phoenix – Phoenix Central Business District to Rural Road.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability to the Spine corridor by removing a significant number of vehicle users from the corridor and giving transit users a reliable travel mode.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration because it adds capacity and would encourage a large mode shift on the corridor to make a measurable difference.	4 – Would moderately improve the travel time of the interstate because enough interstate users would switch transportation mode.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	

Table 4-7. Level 2A Screening – Scoring Justification

Row No.	Alt. ID	Category	Weights:		0.185	0.082	0.078	0.046	0.044	0.044	0.053
			Description	Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities	
37	A2-1017	New transit	Build automated guideway transit on 48th Street/SR-143 from Southern Avenue to Sky Harbor Boulevard.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
38	A2-1018	New transit	Extend light rail from Central Avenue to Arizona Mills along the Western Canal.	1 – Rated 1 because it adds new track.	4 – Removes LTR from conflict with traffic down the middle of an arterial.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
39	T-1005	New transit	High-capacity transit from Ahwatukee to downtown Phoenix via Tempe and Phoenix Sky Harbor International Airport (using UPRR ROW).	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
40	T-1007	New transit	High-capacity transit to downtown Glendale.	Dropped by evaluation team – unclear how this would benefit travel along I-17/currently being addressed by Valley Metro studies pursuant to project recommendation by the RTP.							
41	T-1008	New transit	High-capacity transit from Metrocenter to north.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
42	T-1009	New transit	High-capacity transit from Tempe to south.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
43	T-1011	New transit	Reversible bus lane on Broadway from 52nd Street to Central Avenue	1 – Rated 1 because it adds new pavement.	2 – Safety would decrease if there are bus stops between 52nd St and Central Ave.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	5 – Potential to improve EJ and Title VI communities; avoids all impacts to 4(f) and 6(f) properties.	
44	A1-1009	New transit	Reconfigure/Repurpose UPRR spur line for transit purposes, buy out industrial land uses that use it.	4 – Uses existing railroad track and does not require new track to be laid.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
45	T-1019	New transit	Express bus from Pecos park-and-ride to ASU.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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46	T-1027	New transit	ASU West potential light rail extensions from Metrocenter.	1 – Rated 1 because it adds new track.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not improve travel time reliability.	3 – Would not improve travel time.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
47	I1-1003	System traffic interchange	Add DHOVs to South Mountain Freeway to I-10 (east to north and south to west).	1 – Rated 1 because it adds new pavement.	4 – Safety would increase because it would eliminate HOV weaving.	4 – Would improve travel time reliability for HOV users by eliminating the need to weave for system movements.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration for HOV users by eliminating the need to weave for the system movement.	3 – Would improve travel time only for HOV users and not for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
48	I1-1004	System traffic interchange	Direct access from Pecos park-and-ride to I-10.	1 – Rated 1 because it adds new pavement.	4 – Safety would increase because it would eliminate HOV weaving.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
49	I2-1024	System traffic interchange	Maintain three westbound US-60 lanes through Broadway Curve to past 40th Street.	Dropped by evaluation team – addressed by near term improvement strategy.							
50	I1-1016	System traffic interchange	North-to-west and east-to-south Baseline/I-10 flyover with a median landing at Baseline Road.	1 – Rated 1 because it adds new pavement.	4 – Safety would increase because conflict points would be eliminated at the intersection.	4 – Would improve travel time reliability by bypassing the I-10/Baseline Rd traffic interchange.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration because it significantly increases the interchange capacity.	4 – Would improve travel time by increasing the capacity of the interchange and removing the bottleneck.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
51	I2-1016	System traffic interchange	Reconfigure I-10/US-60 connection.	1 – Rated 1 because it adds new pavement.	4 – Safety would increase because it is assumed that weaves would be improved and any deficient infrastructure would be replaced.	4 – Would improve travel time reliability by increasing the capacity of the interchange and improving weaves.	5 – Replaces all deficient infrastructure within project area.	4 – Would reduce congestion duration by increasing the capacity of the interchange and improving weaves.	4 – Would improve travel time by increasing the capacity of the interchange and improving weaves.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
52	I1-1015	System traffic interchange	New high-capacity interchange at Baseline Road.	1 – Rated 1 because it adds new pavement.	5 – Improvement in safety is inherent in replacing the interchange.	4 – Would improve travel time reliability by increasing the capacity of the interchange and removing the bottleneck.	4 – Replaces some deficient infrastructure within project area.	4 – Would reduce congestion duration because it significantly increases the interchange capacity.	4 – Would improve travel time by increasing the capacity of the interchange and removing the bottleneck.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
53	I2-1001	System traffic interchange	Add DHOV to I-10/Arizona Mills mall.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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54	I2-1018	System traffic interchange	Broadway Curve bypass. Extend SR-143 south then curve east to tie to US-60. As an option extend SR-143 south to Baseline.	1 – Rated 1 because it adds new pavement.	4 – Safety would increase because it would eliminate weaves and major conflict points.	4 – Would improve travel time reliability by providing more capacity with a parallel route at the Broadway curve segment.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by providing more capacity with a parallel route at the Broadway curve segment.	4 – Would improve travel time by providing more capacity with a parallel route at the Broadway curve segment.	1 – Negatively affects EJ; high impacts on 4(f) and 6(f) properties.	
55	I2-1029	System traffic interchange	Southbound SR-143 has numerous devices installed because of lack of signal visibility. Vertical curve needs to be reduced.	1 – Rated 1 because it adds new pavement.	5 – Purpose of alt is to improve safety	3 – Would not improve travel time reliability.	4 – Replaces some deficient infrastructure within project area.	3 – Would not reduce congestion duration.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
56	I2-1000	System traffic interchange	Add DHOV to SR-143/I-10.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration for HOV users by eliminating the need to weave for the system movement.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
57	I2-1010	System traffic interchange	Replace/Alter SR-143 and Broadway interchange, eliminate SR-143 loop ramp.	1 – Rated 1 because it adds new pavement.	5 – Improvement in safety is inherent in replacing the interchange.	4 – Would improve travel time reliability by increasing the capacity of the interchange, removing the bottleneck of the loop, and eliminating weaves.	4 – Replaces some deficient infrastructure within project area.	4 – Would reduce congestion duration by increasing the capacity of the interchange, removing the bottleneck of the loop, and eliminating weaves.	4 – Would improve travel time by increasing the capacity of the interchange, removing the bottleneck of the loop, and eliminating weaves.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
58	I2-1026	System traffic interchange	Add westbound Broadway to northbound SR-143 ramp.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
59	I2-1030	System traffic interchange	Increase eastbound I-10/Broadway on-ramp capacity.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability by increasing the capacity of the exit ramp.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by increasing the capacity of the exit ramp.	4 – Would improve travel time by increasing the capacity of the exit ramp.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
60	I2-1005	System traffic interchange	Add DHOV to I-10/Broadway Road.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration.	3 – Would not improve travel time for all corridor users.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
61	I2-1036	System traffic interchange	Add two-lane (choice lane) exit ramps along I-10 westbound at Broadway Road.	1 – Rated 1 because it adds new pavement.	4 – Safety would increase when compared to no build and reduce the chance of the ramp backing up on the interstate.	4 – Would improve travel time reliability by increasing the capacity of the exit ramp.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by increasing the capacity of the exit ramp.	4 – Would improve travel time by increasing the capacity of the exit ramp.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	

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62	I2-1037	System traffic interchange	Add two-lane (choice lane) exit ramps along I-10 westbound at SR-143 and 40th Street.	1 – Rated 1 because it adds new pavement.	4 – Safety would increase when compared to no build and reduce the chance of the ramp backing up on the interstate.	4 – Would improve travel time reliability by increasing the capacity of the exit ramp.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by increasing the capacity of the exit ramp.	4 – Would improve travel time by increasing the capacity of the exit ramp.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
63	I2-1013	System traffic interchange	I-10 realignment at the Split.	1 – Rated 1 because it adds new pavement.	4 – Improvement in safety is inherent in replacing the interchange.	4 – Would improve travel time reliability by improving sight distance issues and reducing incidents.	5 – Replaces all deficient infrastructure within project area.	4 – It is assumed that a realignment of the Split would improve system weaves.	3 – Would not measurably improve travel time because the purpose of realigning the Split is only to move it outside of the Sky Harbor RPZ. There are not capacity issues at the Split.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
64	I3-1006	System traffic interchange	Add DHOVs to Split.	1 – Rated 1 because it adds new pavement.	5 – Safety would increase because it would eliminate HOV weaving.	4 – Would improve travel time reliability for HOV users by eliminating the need to weave for the system movement.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration for HOV users by eliminating the need to weave for the system movement.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
65	I3-1005	System traffic interchange	Add DHOVs to Stack.	1 – Rated 1 because it adds new pavement.	5 – Safety would increase because it would eliminate HOV weaving.	4 – Would improve travel time reliability for HOV users by eliminating the need to weave for the system movement.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration for HOV users by eliminating the need to weave for the system movement.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
66	I3-1019	System traffic interchange	The Stack traffic interchange southeastern quadrant, three concepts from previous I-17 study.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability by increasing capacity and separating out the weave movements.	5 – Replaces all deficient infrastructure within project area.	4 – Would improve congestion duration by increasing capacity and separating out the weave movements.	4 – Would improve travel time by increasing capacity and separating out the weave movements.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
67	I3-1020	System traffic interchange	The Stack traffic interchange southwestern quadrant, three concepts from previous I-17 study.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability by increasing capacity and separating out the weave movements.	5 – Replaces all deficient infrastructure within project area.	4 – Would improve congestion duration by increasing capacity and separating out the weave movements.	4 – Would improve travel time by increasing capacity and separating out the weave movements.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
68	I4-1054	System traffic interchange	The Stack traffic interchange northeastern quadrant, three concepts from previous I-17 study.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability by increasing capacity and separating out the weave movements.	5 – Replaces all deficient infrastructure within project area.	4 – Would improve congestion duration by increasing capacity and separating out the weave movements.	4 – Would improve travel time by increasing capacity and separating out the weave movements.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	

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69	I4-1055	System traffic interchange	The Stack traffic interchange northwestern quadrant, two concepts from previous I-17 study.	1 – Rated 1 because it adds new pavement.	3 – Safety would not improve when compared to no build.	4 – Would improve travel time reliability by increasing capacity and separating out the weave movements.	5 – Replaces all deficient infrastructure within project area.	4 – Would improve congestion duration by increasing capacity and separating out the weave movements.	4 – Would improve travel time by increasing capacity and separating out the weave movements.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
70	I4-1024	System traffic interchange	Analyze which DHOV to build at North Stack.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would increase because it would eliminate HOV weaving.	4 – Would improve travel time reliability for HOV users by eliminating the need to weave for the system movement.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration for HOV users by eliminating the need to weave for the system movement.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
71	I4-1052	System traffic interchange	Fix the North Stack north to east and south to east movements.	Dropped by evaluation team – addressed with the SR-101L/Pima, I-17 to SR-51 add lanes project.							
72	ITS-1001	Tech	Upgrade ramp metering.	5 – Rated 5 because it will theoretically significantly increase interstate capacity and travel time reliability with only upgrading ramp meters.	5 – Safety would increase because it would introduce smart metering to the interstate.	5 – Would improve travel time reliability by controlling the rate of vehicles entering the interstate corridor.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by controlling the rate of vehicles entering the interstate corridor.	4 – Would improve travel time by controlling the rate of vehicles entering the interstate corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
73	ITS-1003	Tech	Expand collection and dissemination of real-time traffic data/conditions within study area and/or Valley wide. Deploy real-time traffic movement and measuring devices (ARID).	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would improve when compared to no build.	5 – Would improve travel time reliability by giving users better information on traffic so that users can adjust their route to underutilized corridors.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by giving users better information on traffic so that users can adjust their route to underutilized corridors.	4 – Would improve travel time by giving users better information on traffic so that users can adjust their route to underutilized corridors.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
74	ITS-1005	Tech	Coordination on traffic incidents with ADOT and local jurisdictions.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would improve when compared to no build.	5 – Would improve travel time reliability by improving incident management.	3 – Does not replace deficient infrastructure.	5 – Would reduce congestion duration by improving incident management.	4 – Would improve travel time by improving incident management.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
75	ITS-1006	Tech	Arterial management system (ITS) – surveillance, traffic control, parking management, DMS, information dissemination and full integration. Including dedicated transit and parking ITS, adaptive traffic signals to adjust to traffic volumes and coordination between freeway and arterials at interchange signals.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	5 – Would improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration.	5 – Would improve travel time.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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76	ITS-1007	Tech	CCTV, traffic signal sharing responsibilities between agencies.	Dropped by evaluation team – effort presently underway through the Regional Community Network.							
77	ITS-1008	Tech	Add TSP for bus service on 35th Avenue to help maintain schedules due to frequent school zone crossings. Add TSP to 19th Avenue to help meet connections with light rail transit.	3 – Only enhances transit system at the detriment of the arterial system.	4 – Safety would improve for transit services when compared to no build.	4 – Would improve travel time reliability for transit users.	3 – Does not replace deficient infrastructure.	2 – Would not reduce congestion duration on the arterials for the majority of the arterial users.	4 – Would improve travel time for transit users.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
78	ITS-1009	Tech	Consolidated TOC.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	4 – Safety would improve when compared to no build.	5 – Would improve travel time reliability by improving agency coordination.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by improving agency coordination.	4 – Would improve travel time by improving agency coordination.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
79	ITS-1010	Tech	Connected vehicle integration (personal vehicles and freight).	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	4 – Would improve travel time reliability by utilizing the technology built into connected vehicle that will increase corridor capacity.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by utilizing the technology built into connected vehicle that will increase corridor capacity.	4 – Would improve travel time by utilizing the technology built into connected vehicle that will increase corridor capacity.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
80	ITS-1011	Tech	Additional traffic operations staff and maintenance staff for City of Phoenix.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would improve when compared to no build.	4 – Would improve travel time reliability by providing Phoenix with more staff resources.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by providing Phoenix with more staff resources.	4 – Would improve travel time by providing Phoenix with more staff resources.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
81	ITS-1012	Tech	Better local jurisdiction coordination to close the gap, interconnect between cities.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would improve when compared to no build.	4 – Would improve travel time reliability by increasing agency coordination.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by increasing agency coordination.	4 – Would improve travel time by increasing agency coordination.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
82	ITS-1014	Tech	Variable speed control on Interstate.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	4 – Safety would improve when compared to no build.	5 – Would improve travel time reliability by giving agencies the ability set speed appropriate to conditions.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by mitigating shock waves through the system caused by incidents and preventing secondary incidents.	4 – Would improve travel time by mitigating shock waves through the system caused by incidents.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

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83	ITS-1015	Tech	Lane control signals.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	5 – Would improve travel time reliability by providing information to corridor users.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by providing information to corridor users.	4 – Would improve travel time by providing information to corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
84	ITS-1016	Tech	Active motorways, active management.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	5 – Would improve travel time reliability by allowing agencies to actively manage the corridor.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by allowing agencies to actively manage the corridor.	5 – Would improve travel time by allowing agencies to actively manage the corridor.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
85	ITS-1017	Tech	Dynamic HOV lane occupancy control.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	3 – Safety would not improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration for HOV users.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
86	ITS-1018	Tech	Advance queue warning for northbound traffic on I-10 when approaching Broadway Curve.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by allowing interstate users to find alternate routes earlier.	3 – Would not improve travel time for all corridor users.	2 – Could affect 4(f)/6(f) properties; minor EJ impacts.	
87	ITS-1019	Tech	Automated speed warning in advance of high crash frequency locations.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by mitigating shock waves through the system caused by incidents and preventing secondary incidents.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
88	S-1016	Tech	Interagency coordination for alternate routing during incidents.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – Safety would improve when compared to no build.	4 – Would improve travel time reliability by improving agency coordination and incident management.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by improving agency coordination and incident management.	4 – Would improve travel time by improving agency coordination and incident management.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

Table 4-7. Level 2A Screening – Scoring Justification

Row No.	Alt. ID	Category	Weights:		0.185	0.082	0.078	0.046	0.044	0.044	0.053
			Description	Enhances Existing System Utilization	Enhances Safety	Improves Travel Time Reliability	Replaces Deficient Infrastructure	Reduces Congestion Duration	Improves Travel Time	Disproportionate Impacts on Title VI and EJ Communities	
89	A3-1007	Tech	Incorporate TSMO into I-17 corridor including 19th and 35th avenues as synchronized alternatives.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	4 – Would improve travel time reliability by improving agency coordination and incident management.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion duration by improving agency coordination and incident management.	4 – Would improve travel time by improving agency coordination and incident management.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
90	I3-1011	Tech	Signal timing for turning trucks at 19th Avenue/I-17.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	5 – would reduce queues	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	4 – Would reduce congestion and queues at 19th Ave/I-17	3 – Would not improve travel time for all corridor users.	4 – Potential to improve EJ; minimal impact on 4(f) and 6(f) properties.	
91	I4-1021	Tech	Upgrade signal operation at traffic interchanges to emphasize frontage road through movements to fully utilize frontage road capacity.	5 – Enhances existing system utilization without expanding the existing system and infrastructure.	3 – Safety would not improve when compared to no build.	2 – Would decrease travel time reliability for the crossing arterials at the traffic interchanges.	3 – Does not replace deficient infrastructure.	2 – Would increase congestion duration on crossing arterials at the traffic interchanges.	2 – Would increase travel time for the crossing arterials at the traffic interchanges.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	
92	ITS-1004	Tech	Way finding for emergency/alternate routes.	4 – Enhances existing system utilization without adding new pavement or track and only minimal infrastructure upgrades.	5 – Safety would improve when compared to no build.	3 – Would not improve travel time reliability.	3 – Does not replace deficient infrastructure.	3 – Would not reduce congestion duration for all corridor users.	3 – Would not improve travel time for all corridor users.	3 – Minimal to moderate impacts to 4(f)/6(f); same or similar to No-Build for EJ.	

4.3.2 Level 2B Screening

The Level 2B screening focused only on the ability to implement the nine backbone alternatives that came out of the Level 2A screening. The implementation criteria and the associated scoring weighting were established by the Management Partners at the outset of the Level 2 screening. The surviving backbone alternatives and percentages were evaluated against the implementation criteria, which are listed in Table 4-8. Backbone alternatives moved to the next level of screening if they received a high implementation score and addressed the project’s purpose and need. Backbone alternatives were dropped only if the alternatives did not improve corridor capacity and reliability or addressed only a narrow segment of corridor users, such as adding truck-only lanes and bus/BRT-only lanes.

Five backbone alternatives survived and advanced to the Level 3 screening. The five backbone alternatives included:

- Rehabilitating and rebuilding I-17 to full standards.
- Adding a general purpose lane in each direction.
- Adding an additional HOV lane in each direction.
- Converting the existing HOV lanes into HOT lanes.
- Converting the existing HOV lanes into striped express local lanes.

It was decided to create two additional backbone alternatives that were variations of converting the existing HOV lanes to either HOT or striped express/local lanes. Because the conversion options did not add capacity by providing an additional lane, such as the options to add a general purpose or an HOV lane, two options were added that converted the existing HOV lanes to a HOT or an express/local lane and also added a second HOT or express/local lane. This was done so that the HOT and express/local lanes options would not be at a capacity disadvantage in the Level 3 screening. See Table 4-9 for the Level 2B screening results and Table 4-10 for the Level 2B screening scoring justification.

Table 4-8. Spine Level 2B Screening

Criteria	(1) Lower Score		Higher Score (5)	Summary
Implement: Practicability (11.7%) <i>Based on cost, logistics and operation, how easy/hard is this to implement.</i>	Alternative’s magnitude of cost, constructibility and/or reliance on technological advancement pose a considerable challenge.	Alternative’s magnitude of cost, constructibility and/or reliance on technological advancement pose a moderate challenge.	Alternative has a low magnitude of cost, has ease of constructibility and/or relies on existing technology.	Alternatives that promote operational enhancements do well.
Implement: Agency Support (11.7%) <i>What levels of support exist or what are the anticipated impacts (e.g., ROW takes).</i>	Alternative would have little or no agency and stakeholder support.	Alternative would have moderate or mixed agency and stakeholder support.	Alternative would have considerable or full agency and stakeholder support.	Alternatives that can be implemented with little disruption or have existing support do well.
Implement: Alternative Adaptability (5%) <i>Alternative’s ability to adapt to changing demographics.</i>	Alternative cannot be easily modified or changed (e.g., relies on physical infrastructure improvements).	Alternative has moderate flexibility for modification (e.g., lane conversions, signs).	Alternative can easily be modified (e.g., technology).	Alternatives that are technology-based do well.
Implement: Programming Flexibility (5%) <i>Alternative’s ability to be phased or segmented.</i>	Alternative is not easily phased or segmented (e.g., unable to break into segments of independent utility).	Alternative has moderate flexibility for phasing or segmentation.	Alternative can easily be phased or segmented or has flexibility in implementation.	Alternatives that can be phased or are spot improvements do well.

Table 4-9. Level 2B Screening – Backbone

Row No.	Category	Alt. ID	Weights ->				Weighted Score	2B Rank	Recommendation	Notes/Comments	
			0.117 Practicability	0.117 Agency Support	0.05 Alternative Adaptability	0.05 Programming Flexibility					
1	Highway capacity	I4-1000	Widen I-17 to full design standards (12-foot lanes and full shoulders).	3	4	3	4	3.500	1	Alternative	Carry forward to Level 3 screening.
2	Highway capacity	S-1001	Add a second 2+ HOV lane.	2	3	4	4	2.949	2	Alternative	Carry forward to Level 3 screening.
3	Highway capacity	S-1038	Create a striped express/local lane system.	4	2	3	2	2.850	3	Alternative	Carry forward to Level 3 screening.
4	Highway capacity	S-1037	Add a second 2+ HOV lane with extra-wide inside shoulders (16-foot) for enforcement purposes and to provide the necessary width for future managed lanes conversion.	1	3	4	4	2.599	4	Make an Alternative Feature	Similar to S-1001 and would work operationally the same. Make this an alternative feature that will be considered after S-1001 is evaluated.
5	Highway capacity	S-1000	Construct HOT lanes or convert HOV to HOT lanes (at grade or elevated). Rated as converted only.	3	2	3	2	2.500	5	Alternative	Carry forward to Level 3 screening.
6	Highway capacity	S-1003	Add one additional general purpose lane in each direction to Interstate.	2	3	2	3	2.500	5	Alternative	Carry forward to Level 3 screening.
7	Highway capacity	S-1008	Add truck-only lanes to the Interstate. Rated as an add lane.	2	3	3	1	2.350	7	Drop	Poor score; commercial vehicle volumes do not warrant the need for separate lanes throughout the entire corridor. Requires additional lane as it is not an HOV lane conversion.
8	Highway capacity	S-1010	Add bus/BRT-only lanes to the Interstate, heavily using park-and-rides. Rated as an add lane.	2	2	3	2	2.150	8	Drop	Poor score; public transportation demand does not warrant the need for separate lanes throughout the entire corridor. Requires additional lane as it is not an HOV lane conversion.
9	Highway capacity	I3-1004	Replace I-17 in kind with current standards to replace the aging infrastructure. Will redesign to reflect the high truck percentages in this segment corridor.	2	2	1	1	1.701	9	Drop	Major reconstruction requires full standards on the Interstate.

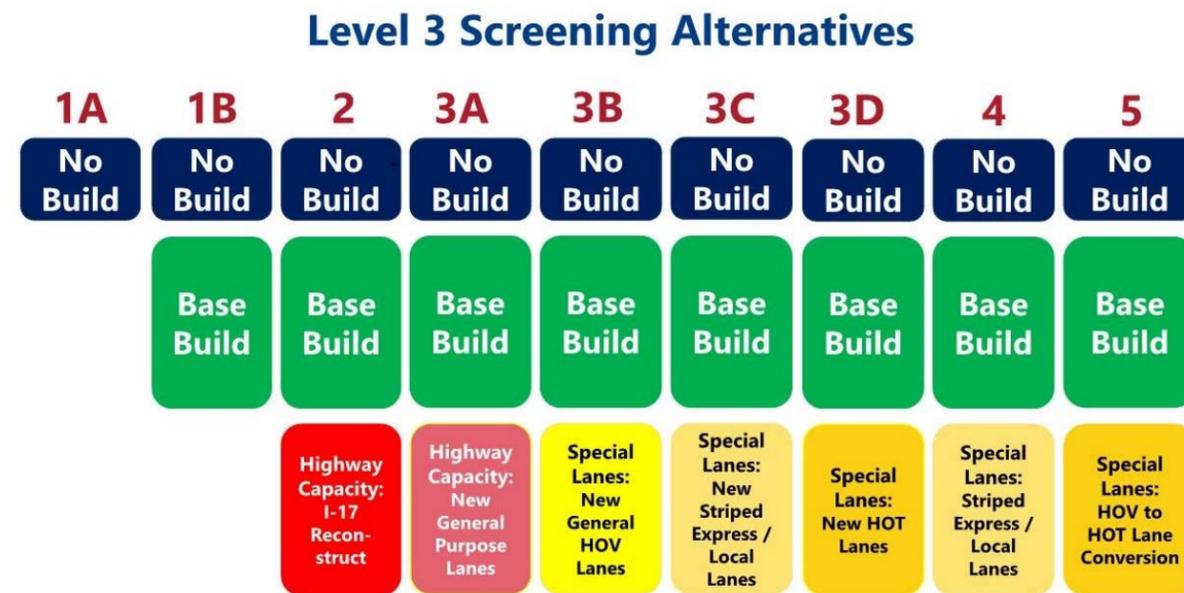
Table 4-10. Level 2B Scoring Justification

Row No.	Category	Alt. ID	Weights ->		0.117	0.117	0.050	0.050
			Description	Practicability				
1	Highway capacity	I4-1000	Widen I-17 to full design standards (12-foot lanes and full shoulders).	3 – Moderate order of magnitude of cost when compared to other alternatives.	4 – Majority of support to replace I-17 since it is old and many infrastructure components are deficient. Cost and maintenance of traffic during construction detract from support.	3 – Can be partially modified (converted) to adapt to changing demographics due to added pavement.	4 – Has some programming flexibility (phase funding and termini).	
2	Highway capacity	S-1001	Add a second 2+ HOV lane.	2 – Higher order of magnitude cost due to adding an additional lane	2 – Does not have broad support at this time because it is a restricted lane.	4 – Can be partially modified (converted) to adapt to changing demographics.	4 – Has moderate programming flexibility (phase funding, and termini).	
3	Highway capacity	S-1038	Create a striped express/local lane system.	4 – Lower order of magnitude cost than other alternatives that provide similar function. The logistics of construction are deemed feasible.	2 – Low support because of unknowns regarding how well it would work as a solution.	3 – Can be partially modified (converted) to adapt to changing demographics.	3 – Has moderate programming flexibility (phase funding and termini).	
4	Highway capacity	S-1037	Add a second 2+ HOV lane with extra-wide inside shoulders (16-foot) for enforcement purposes and to provide the necessary width for future managed lanes conversion.	1 – Much higher order of magnitude cost than other alternatives that provide similar function. The logistics of construction are deemed infeasible due to the needed ROW and the extra pavement needed for shoulders.	3 – Mixed support due to ROW requirements, the cost of adding the additional pavement throughout the entire corridor and because it is a restricted lane.	4 – Can be partially modified (converted) to adapt to changing demographics.	4 – Has moderate programming flexibility (phase funding and termini).	
5	Highway capacity	S-1000	Construct HOT lanes or convert HOV to HOT lanes (at grade or elevated). Rated as converted only.	3 – Moderate order of magnitude of cost when compared to other alternatives.	2 – Does not have broad support at this time because they are restricted lanes.	3 – Can be partially modified (converted) to adapt to changing demographics.	2 – Has some programming flexibility (phase funding and termini).	
6	Highway capacity	S-1003	Add one additional general purpose lane in each direction to Interstate.	2 – Higher order of magnitude cost due to adding an additional lane.	3 – Has mixed support due to possible ROW requirements and the cost of adding a lane throughout the entire corridor.	2 – Can be modified to adapt to changing demographics with some difficulty due to politics.	3 – Has moderate programming flexibility (phase funding and termini).	
7	Highway capacity	S-1008	Add truck-only lanes to the Interstate. Rated as an add lane.	2 – Higher order of magnitude cost than other alternatives that provide similar function. The logistics of operations are deemed possibly infeasible.	3 – Would have mixed support due to ROW requirements and the cost.	3 – Can be partially modified (converted) to adapt to changing demographics.	1 – Little or no flexibility due to location/length of project.	
8	Highway capacity	S-1010	Add bus/BRT-only lanes to the Interstate, heavily using park-and-rides. Rated as an add lane.	2 – Higher order of magnitude cost than other alternatives that provide similar function. The logistics of construction are deemed possibly infeasible due to needed ROW.	3 – Mixed support due to additional ROW needs.	3 – Can be partially modified (converted) to adapt to changing demographics.	3 – Has moderate programming flexibility (phase funding and termini).	
9	Highway capacity	I3-1004	Replace I-17 in kind with current standards to replace the aging infrastructure. Will redesign to reflect the high truck percentages in this segment corridor.	2 – Higher order of magnitude cost than other alternatives that provide similar function.	2 – Would have minimal support due to not bringing the corridor up to current standards and fixing existing issues.	1 – Cannot be easily modified to address changing demographics (once given, cannot be easily removed).	1 – Little or no flexibility due to location/length of project.	

4.4 Level 3 Screening

Level 3 screening qualitatively and quantitatively analyzed the seven backbone alternatives that survived the Level 2B screening and compared them against each other, the base build and the no build alternatives. Each of the backbone alternatives from the Level 2B screening was assumed to include the base build option, which included the no build condition. All of the Level 3 alternatives were assigned an alphanumeric identifier for organizational purposes. See Figure 4-3 for the organization of Level 3 alternatives.

Figure 4-3. Level 3 Alternatives Organization



The Base Build Alternative was created by assembling a group of spot improvements from the supporting alternatives that were placed in parking lot (Figure 4-1). The spot improvement projects were selected with input from the Management Partners and AEP and would improve the corridor in the areas of technology, access, transit, bicycles and pedestrians, and Interstate weaving sections.

Two elements in the Base Build Alternative required separate analysis: service interchanges and weaving sections. In the NAR, the service interchanges were analyzed and prioritized based on environmental factors, operational factors, safety factors, infrastructure condition, economic factors and public feedback. See Table 4-11 for the prioritized service interchange list. The top 10 service interchanges were identified to be included in the Base Build Alternative. In addition to the top 10 interchanges, 4 other service interchanges were identified as having significant east-to-west traffic and regional east-to-west connectivity. These service interchanges are Glendale Avenue, Bell Road, Northern Avenue and Indian School Road and were ranked 11th, 12th, 13th and 17th, respectively. While these additional interchanges on the significant east-to-west connector arterials did not fall within the 10 worst interchanges, they were close to 10 worst interchanges and clearly demonstrate a need. The identified service interchanges and all of the weaving segments were analyzed based on operations, safety and infrastructure.

All of the supporting alternatives included in the Base Build Alternative were compatible with all of the other Level 3 alternatives; therefore, the Base Build Alternative was included as part of all the other Level 3 alternatives.

Table 4-11. Prioritized Service Interchanges

Rank	Interchange	Total Weighted Score	Environmental Score	Operations Score	Safety Score	Infrastructure Score	Economic Score	Public Feedback Score
1	Peoria Avenue traffic interchange	158	233	150	122	180	133	160
2	Baseline Road traffic interchange	172	250	146	178	175	167	120
3	Dunlap Avenue traffic interchange	179	267	165	133	225	133	160
4	48th Street traffic interchange	179	250	169	233	125	100	140
5	19th Avenue traffic interchange	181	233	208	189	125	133	220
6	Thunderbird Road traffic interchange	185	233	192	156	180	233	200
7	Thomas Road traffic interchange	187	217	196	167	220	100	160
8	Camelback Road traffic interchange	188	250	192	167	200	167	160
9	7th Avenue traffic interchange	189	200	212	200	175	100	180
10	Cactus Road traffic interchange	199	233	200	200	180	167	220
11	Glendale Avenue traffic interchange	203	200	181	189	250	200	180
12	Bell Road traffic interchange	204	267	204	178	220	167	200
13	Northern Avenue traffic interchange	205	233	192	167	260	200	180
14	Greenway Road traffic interchange	205	250	150	244	180	233	200
15	24th Street traffic interchange	207	250	242	244	150	100	180
16	Grant Street traffic interchange	208	200	222	300	100	167	200
17	Indian School Road traffic interchange	209	267	204	144	280	167	200
18	16th Street traffic interchange	212	217	200	233	220	100	200
19	Bethany Home Road traffic interchange	212	217	196	189	250	200	220
20	Central Avenue grade separation	212	150	300	256	160	133	140
21	7th Street traffic interchange	213	167	212	244	225	133	180
22	Elliot Road traffic interchange	217	250	208	200	250	167	200
23	32nd Street/University Drive traffic interchange	218	217	158	244	250	133	220
24	Jefferson/Adams Street traffic interchange	220	150	235	289	200	100	160
25	Broadway Road traffic interchange	221	250	196	278	220	133	120
26	Van Buren Street grade separation	222	233	300	278	140	133	140
27	Buckeye Road traffic interchange	225	183	252	267	200	133	200
28	McDowell Road traffic interchange	225	233	238	222	275	100	140
29	Ray Road traffic interchange	230	250	177	256	250	200	200
30	40th Street traffic interchange	230	250	212	289	175	133	260
31	Southern Avenue grade separation	239	267	300	278	200	133	120

Table 4-11. Prioritized Service Interchanges

Rank	Interchange	Total Weighted Score	Environmental Score	Operations Score	Safety Score	Infrastructure Score	Economic Score	Public Feedback Score
32	Grand Avenue grade separation	247	233	300	267	250	100	160
33	Warner Road traffic interchange	248	283	235	267	250	167	220
34	Chandler Boulevard traffic interchange	251	267	250	256	300	133	160
35	Union Hills Drive traffic interchange	254	200	226	278	300	200	200
36	Utopia Road traffic interchange	264	267	300	300	250	133	180
37	Guadalupe Road grade separation	273	233	300	300	250	300	220

4.4.1 Service Interchange Analyses

4.4.1.1 Operational

Various MOEs were defined relative to the operations at service traffic interchanges to assist in the prioritization of traffic interchange needs within the Spine corridor. Data were derived from MAG’s TransCAD model for the following MOEs:

- Peak period arterial cross street and ramp volumes
- Peak period volume-to-capacity (v/c) ratios
- Ramp turn ratios

Peak Period Arterial Cross Street and Ramp Volumes

Traffic volumes were extracted from the MAG TransCAD model for both the AM and PM peak periods at locations on the freeway on-ramps, freeway off-ramps, arterial cross-street approaches and between ramp termini to identify those locations experiencing the highest level of traffic demand.

Peak Period Volume to Capacity Ratios

Volume-to-capacity ratios were derived by comparing each of the extracted volumes to the model capacities for each interchange for the AM and PM peak periods. The resulting congestion indices provided insight as to those locations requiring additional ramp capacities as well as cross-street capacity.

Ramp Turn Ratios

Based on the extracted peak period volumes at the interchange ramps and arterial cross streets, an estimate of the percentage of turning traffic (versus through traffic) was derived at each ramp termini. This MOE provided insight as to the role arterial cross-traffic played in the overall interchange performance relative to freeway access.

4.4.1.2 Safety

All of the crash data for the traffic interchanges were available from the NAR. To determine the most frequent location and type of crash, crash diagrams were drawn for each of the identified service interchanges. These exhibits provided a tool to assess what types of accidents were the most common and where those accidents occurred. The exhibits allowed the Spine study team to speculate on the potential root causes of those crashes. The figures are in Appendix E and are summarized in Table 4-12.

Table 4-12. Collision Data Summary

Traffic Interchange	2011–2013									Comments
	Total Crashes	Fatal	Injury	Rear End	Angle	Left Turn	Sideswipe	Pedestrian	Bicycle	
I-10/Baseline Road	273	0	57	149	8	42	58	3	1	Primarily eastbound rear-end crashes
I-10/SR-143/48th Street and I-10/Broadway Road	77	0	36	8	5	60	4	0	0	Primarily westbound left turns hitting eastbound through
I-17/7th Avenue	82	0	38	44	8	9	16	1	1	Primarily rear-end crashes on northbound traffic interchange
I-17/19th Avenue	109	0	36	32	17	40	11	0	0	Primarily left-turn crashes on northbound traffic interchange
I-17/Adams Street	37	0	12	7	19	2	7	0	0	Primarily westbound to northbound/southbound angle crashes
I-17/Jefferson Street	68	0	11	6	18	3	35	0	0	Primarily eastbound sideswipe crashes
I-17/Thomas Road	112	0	37	45	14	22	17	4	0	Primarily left-turn/angle crashes northbound traffic interchange
I-17/Camelback Road	132	0	34	73	14	7	23	1	2	Primarily westbound rear ends
I-17/Dunlap Avenue	177	0	56	70	11	21	49	1	5	Primarily eastbound to westbound crashes (lefts and head-on)
I-17/Peoria Avenue	198	1	58	81	13	45	33	1	5	Primarily left-turn crashes on northbound traffic interchange
I-17/Cactus Road	112	0	31	55	14	12	18	1	1	No obvious crash pattern
I-17/Thunderbird Road	190	0	58	104	22	24	26	0	2	Primarily southbound rear-end crashes

The problem areas identified in the service interchange operations and crash analysis are graphically represented in Figure 4-4 to Figure 4-7. These exhibits show the relationship between capacity needs and high-crash locations.

Figure 4-4. Interchange Needs Summary: Baseline Road and Interstate 10, 7th Avenue and Interstate 17

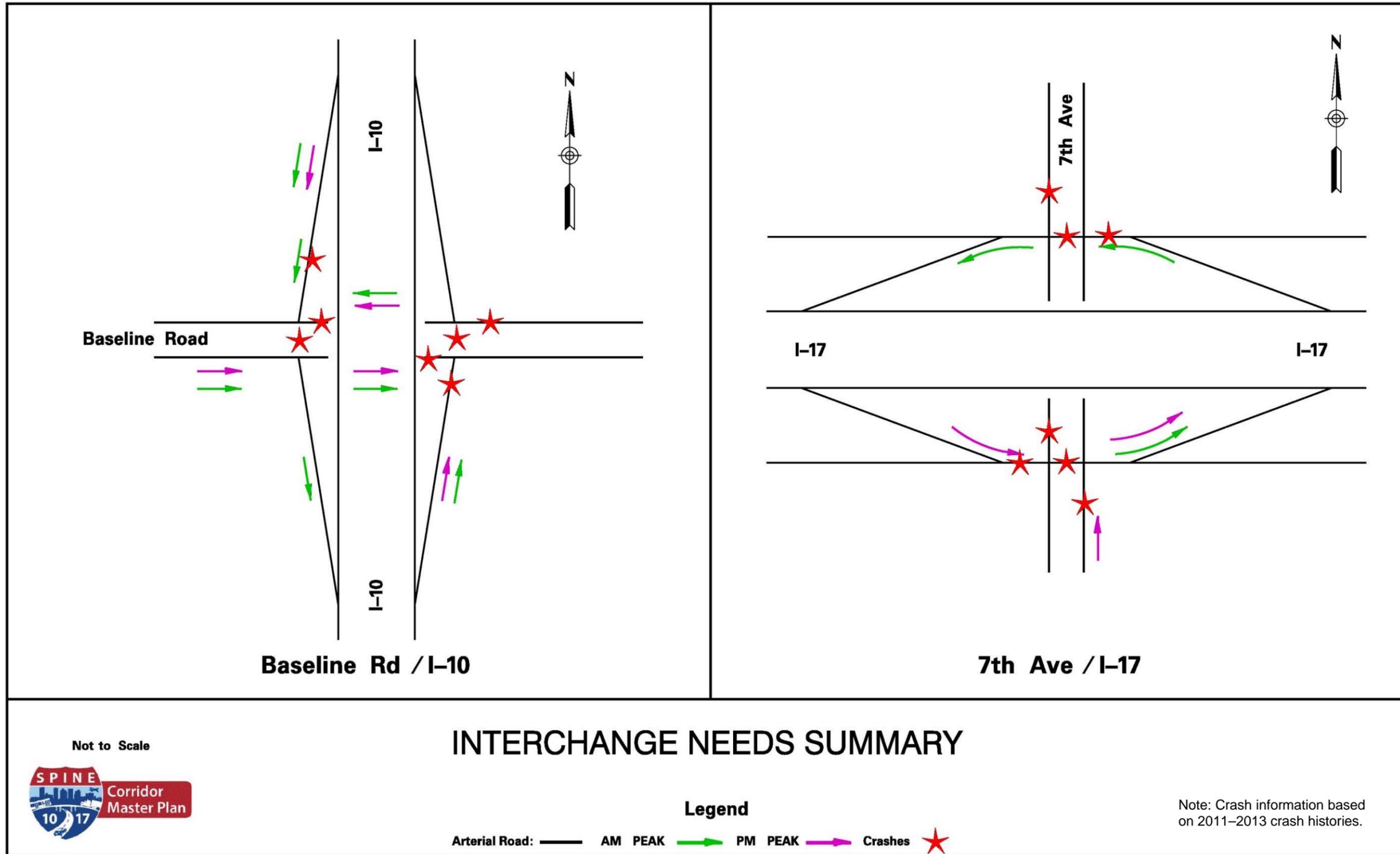


Figure 4-5. Interchange Needs Summary: 19th Avenue and Interstate 17, Thomas Road and Interstate 17

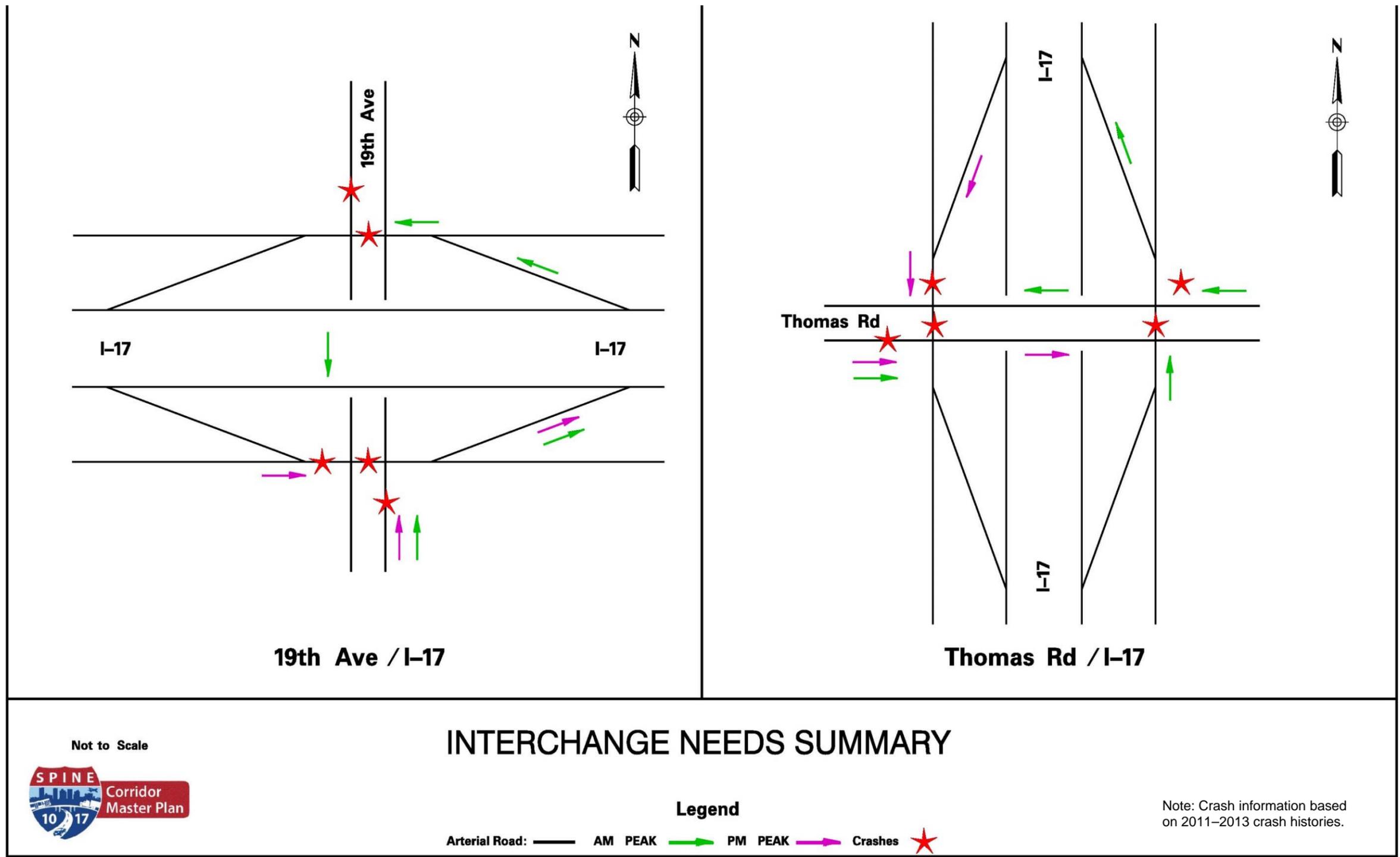


Figure 4-6. Interchange Needs Summary: Dunlap Avenue and Interstate 17; Peoria Avenue and Interstate 17

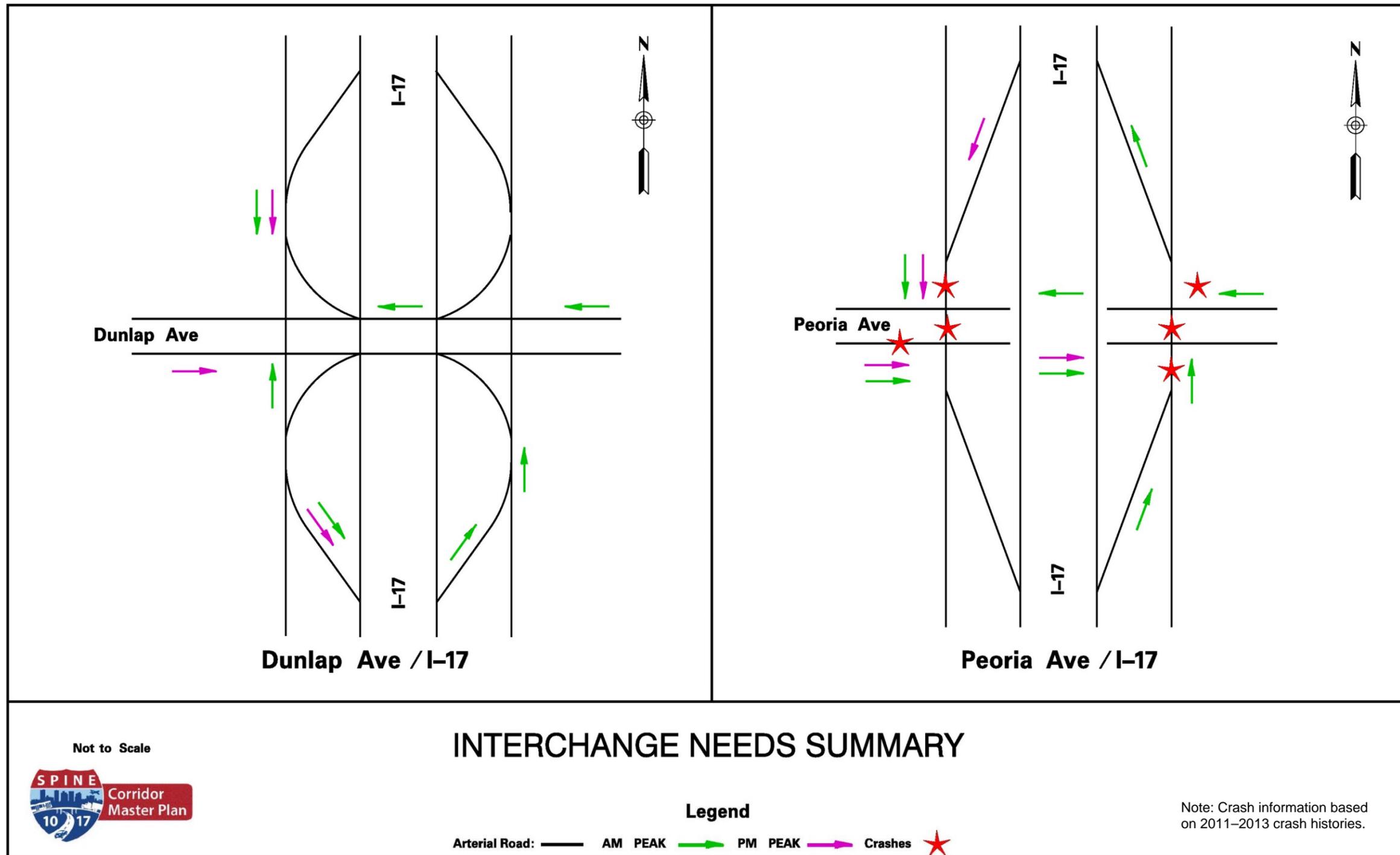
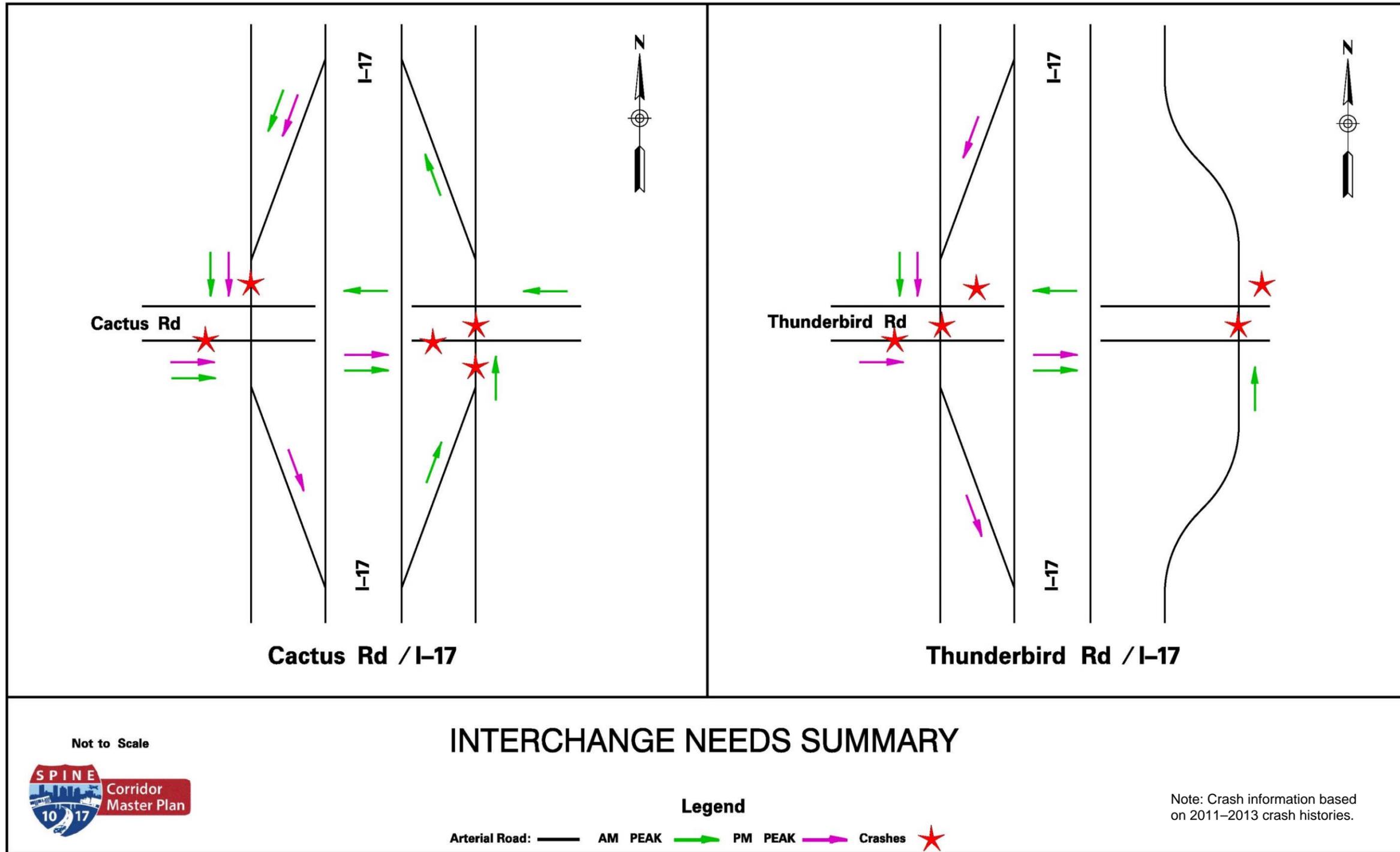


Figure 4-7. Interchange Needs Summary: Cactus Road and Interstate 17; Thunderbird Road and Interstate 17



4.4.1.3 Service Interchange Infrastructure

The infrastructure at each of the identified service interchanges was analyzed to determine which improvements were needed. Google Earth and Google Earth Street View were used for each of the interchanges to complete a quick infrastructure inventory and identify the areas of improvement including visual sight lines, vertical and horizontal clearances, lane reductions, availability of bicycle/pedestrian facilities and lighting levels. The infrastructure improvements for the interchanges and the associated east-to-west arterials included in the Base Build Alternative are summarized in Table 4-13. The concept-level 5 percent horizontal layout design plans are in Appendix F.

Table 4-13. Infrastructure Improvements Included in the Base Build Alternative

Interchange or Arterial	Infrastructure Improvements
I-10/Baseline Road traffic interchange	<ul style="list-style-type: none"> Reconfigure interchange to a DDI. Realign Wendler Drive to align with Arizona Grand Parkway. May cause a total take with Frys. Reconfigure interchange to a DDI with a northbound to westbound flyover that drops into the median of Baseline Road. Realign Wendler Drive to align with Arizona Grand Parkway. May cause a total take with Frys. Reconfigure interchange by adding a loop ramp to the southbound to westbound movement. Realign the southbound on ramp to be aligned with Wendler Drive. Concept eliminates one traffic signal. Reconfigure interchange with a half cloverleaf to the south, with ramp terminals at Wendler and Arizona Mills. Concept eliminates two traffic signals.
I-10/Broadway Road/SR-143 traffic interchange	<ul style="list-style-type: none"> See KMZ layouts.
I-17/7th Avenue traffic interchange ^a	<ul style="list-style-type: none"> Add third through lane in each direction on the arterial. Eliminate driveway on frontage road ramp gore and terminal. Place stop sign on frontage road prior to off ramp merge. Make on ramps dual lane metered.
I-17/19th Avenue traffic interchange ^a	<ul style="list-style-type: none"> Add third through lane on 19th Avenue in both directions through traffic interchange. Optimize signal pair. Implement dual left southbound-eastbound movement. Implement dual lane eastbound on-ramp. Relocate Durango Street/19th Avenue intersection north. Lengthen westbound off ramp. Extend all three lanes farther west for eastbound frontage road terminal. Implement triple left for eastbound to northbound.
I-17/Jefferson-Adams traffic interchange	<ul style="list-style-type: none"> Reconfigure interchange to a split diamond. Reconstruct Van Buren to be up in the air as high as possible for clearance. Reconstruct UPRR bridge to the south.

Table 4-13. Infrastructure Improvements Included in the Base Build Alternative

Interchange or Arterial	Infrastructure Improvements
I-17/Thomas Road traffic interchange	<ul style="list-style-type: none"> Extend third eastbound through lane to 23rd Avenue. Eliminate Verde Lane access off of the southbound off-ramp. Add right-turn lanes to eastbound and westbound Thomas Road approach on-ramps. Explore eliminating driveway access along Thomas Road and on frontage roads between crossroad and ramp gores. Consider triple left on southbound to eastbound movement. Note that three-level traffic interchange configuration is not viable due to Grand Avenue flyover. Also, cannot widen Thomas Road under the Grand Avenue flyover bridge. Possible frontage road compatible DDI concept—large ROW takes required, but ROW takes would eliminate some problematic driveway access points along Thomas Road and frontage road.
I-17/Indian School Road traffic interchange	<ul style="list-style-type: none"> Convert to a three-level traffic interchange. Third level would be Indian School Road through movement. Majority of widening would occur to the north side of Indian School Road. Second highest east-to-west demand in the I-17 corridor. Complements the east-to-west flyover of Indian School Road over the Grand/UPRR corridor.
I-17/Camelback Road traffic interchange	<ul style="list-style-type: none"> Convert to a three-level traffic interchange. Third level would be Camelback Road through movement. Majority of widening would occur to the north side of Camelback Road. Have light rail transit share the east-to-west flyover. Concept in development now.
I-17/Northern Avenue traffic interchange	<ul style="list-style-type: none"> Most logical location for three-level traffic interchange to handle major east-to-west flows. Connectivity using Northern Parkway over to SR-303L and east to SR-51. Northeastern quadrant access may be problematic.
I-17/Dunlap Road traffic interchange	<ul style="list-style-type: none"> Not an ideal candidate for a three-level traffic interchange. Intense land use in area will make it challenging, including access to Metrocenter, hotels and the wastewater treatment plant. In addition, Dunlap will include light rail transit from 19th Avenue to 25th Avenue, further deteriorating Dunlap performance for east-to-west vehicular travel. Keep as a SPUI or convert to a tight diamond. Converting back to a tight diamond may not sacrifice much capacity (if at all), but would likely address many of the safety problems. Extend left-turn storage for westbound to southbound movement along Dunlap. Restrict access points along Dunlap between 29th and 25th avenues. Add a third westbound lane from 19th Avenue to 25th Avenue. Consider adding a third westbound lane between 3rd and 25th avenues. Need to coordinate with light rail transit work. Townley Avenue has access off of the northbound off ramp. Multiple driveway access points off of all ramps and within the arterial control of access.
I-17 Peoria Avenue traffic interchange	<ul style="list-style-type: none"> Upgrade to three through lanes and dual lefts with no shared lanes between the ramp terminals. Add a third westbound through lane between I-17 and 19th Avenue. Evaluate establishing limited access between 28th Drive and I-17 If keeping as a tight diamond, replace bridges to improve sight lines (intersection and signal heads). Raise I-17 profile to improve vertical clearance and consider raising it to 18 to 20 feet to open up sight lines to traffic signal heads. Also, consider replacing the bridges with a 10- to 20-foot open median to allow light through to further eliminate the tunnel effect. Upgrade drainage system.

Table 4-13. Infrastructure Improvements Included in the Base Build Alternative

Interchange or Arterial	Infrastructure Improvements
I-17/Cactus Road traffic interchange	<ul style="list-style-type: none"> • Upgrade southbound off ramp to two lane exit (drop lane + option lane). • Replace bridges to improve sight lines (intersection and signal heads). Raise I-17 profile to improve vertical clearance and consider raising it to 18 to 20 feet to open up sight lines to traffic signal heads. Also, consider replacing the bridges with a 10- to 20-foot open median to allow light through to further eliminate the tunnel effect. • Upgrade drainage system. • Add a third westbound through lane on Cactus. Do this by shifting the centerline of Cactus south 12 feet at the traffic interchange. Any widening would be done to the south, but would also make use of the large raised and painted islands in Cactus.
I-17/Thunderbird Road traffic interchange	<ul style="list-style-type: none"> • Replace I-17 bridges to increase sight lines at southbound intersection and to signal heads. Also, widen Thunderbird between the ramp terminals to three through lanes each direction, and dual lefts in both directions. Raise I-17 profile to improve vertical clearance and consider raising it to 18 to 20 feet to open up sight lines to traffic signal heads. Also, consider replacing the bridges with a 10- to 20-foot open median to allow light through to further eliminate the tunnel effect. • Reprofile I-17 (raise 10 feet) to help with sight distance, mitigate drainage issues, simplify maintenance of traffic. • Widen Thunderbird by one lane on the north side between Cave Creek Wash and 20th Lane. Then restripe a full seven-lane section on Thunderbird. • Widen Thunderbird to the south side between 34th and 30th avenues. Restripe to a full seven-lane section. Requires acquisition of two residences. • Convert Thunderbird to a three-level traffic interchange with the lowest level being Thunderbird through, middle level being ramp platform and top level being I-17. Restrict access points between 30th Avenue and southbound ramp terminal to right in/right out.
I-17/Greenway Road traffic interchange	<ul style="list-style-type: none"> • If keeping as a tight diamond, replace bridges to improve sight lines (intersection and signal heads). Raise I-17 profile to improve vertical clearance and consider raising it to 18 to 20 feet to open up sight lines to traffic signal heads. Also, consider replacing the bridges with a 10- to 20-foot open median to allow light through to further eliminate the tunnel effect. • Upgrade drainage system. • Add a third westbound through lane on Greenway from 19th Avenue to just west of the traffic interchange. Would likely require taking about 12 homes and 1 or 2 businesses. To accomplish this, the alignment of Greenway would have to be skewed slightly through the traffic interchange so that the retaining walls in the northeastern and southwestern quadrants are not affected (these are very expensive secant retaining walls). Therefore, most widening would occur in the northwestern and southeastern quadrants.
I-17/Bell Road traffic interchange	<ul style="list-style-type: none"> • If keeping as a diamond, replace old bridges and raise I-17 to achieve proper vertical clearance. • Upgrade Bell between ramp terminals to side-by-side dual left turns instead of back-to-back dual left turns.

^a 7th and 19th avenues need to be treated as a system when reconfiguring (along with 11th and 15th avenues, which do not have access).

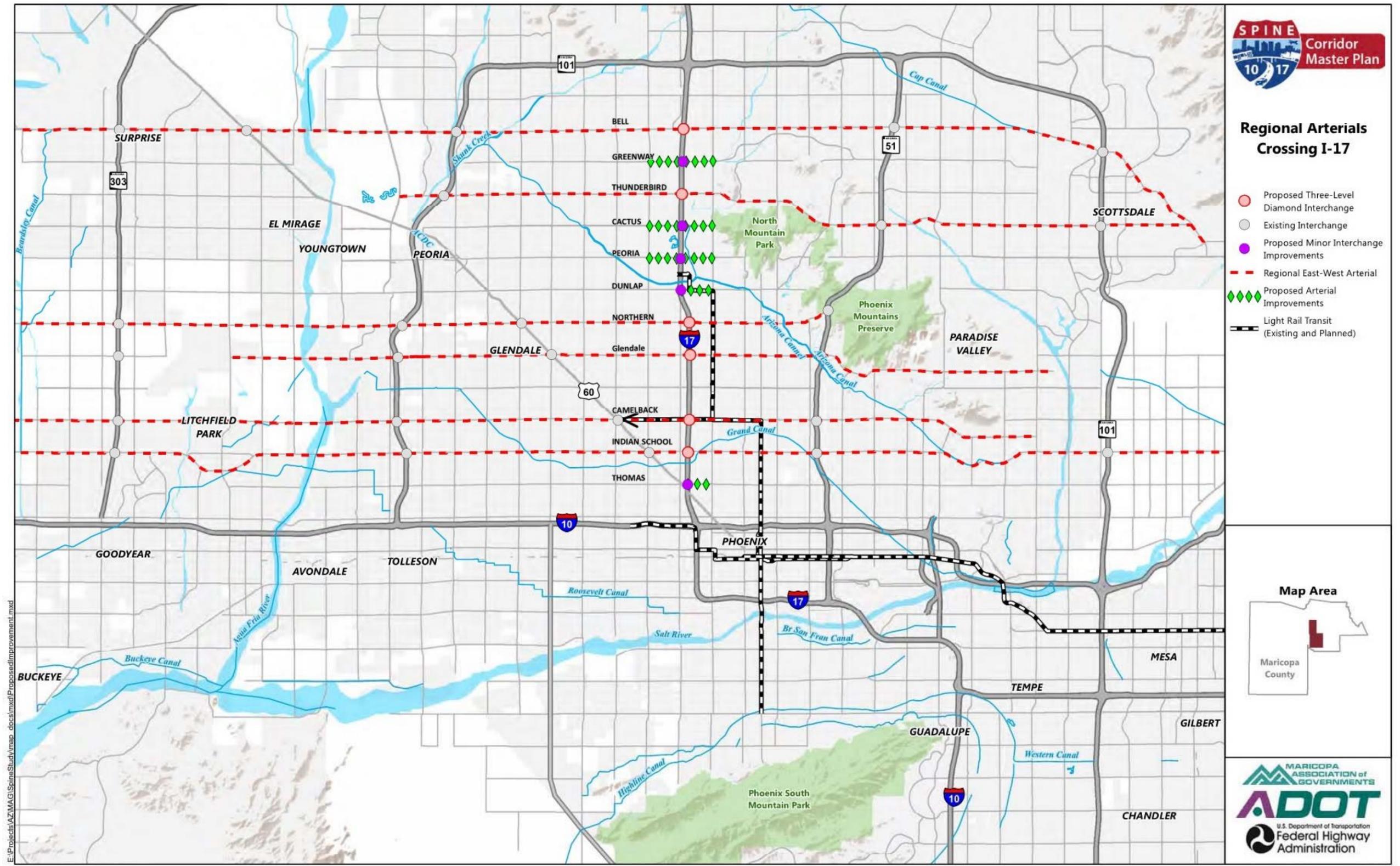
4.4.1.4 Service Interchange Conclusion

At the conclusion of the safety, operations and engineering assessments at each of the 14 service interchange locations, recommendations for improvements were prepared for each location. In some cases, the service interchange recommendations were for total interchange reconstruction, but more common recommendations were for relatively simple infrastructure replacement elements and arterial capacity upgrades.

As this evaluation unfolded, the interchange needs between the Stack and the North Stack revealed a unique issue not present in the rest of the Spine corridor. One of the major common problems with these interchanges was the very high demand of east-to-west traffic flow crossing over I-17. Because there are no mid-mile crossings of I-17 in this area, all east-to-west traffic trying to cross I-17 must pass through the service interchanges. Due to the traffic volumes, the through movement significantly degrades the operational performance of the interchange. As a result of this discovery, it was concluded that the best way to improve many of these interchanges was to provide additional I-17 crossings to relieve the interchanges. Unfortunately, adding mid-mile crossings was not a feasible recommendation because of business or neighborhood impacts. This led to the realization that these east-to-west relief roadways had to occur within the interchange locations.

Because I-17 includes one-way frontage roads between the Stack and the North Stack, the only feasible option to add capacity to the east-to-west relief roadways was to add an east-west flyover structure either over or under the interchange (depending on the current geometry). Because the cost of adding a flyover would be very expensive, it was decided that if the flyovers were placed every few miles along the Spine corridor on arterials with regional east-to-west connectivity, it would significantly relieve the pressure on the other adjacent interchanges. Furthermore, not all of the interchange locations were physically suited for such an upgrade. Consequently, the Spine study team looked closely at every interchange along I-17 between the Stack and the North Stack to find suitable locations for this modified interchange type, called a three-level traffic interchange. Five interchange locations were identified that could reasonably be modified to include this new east-to-west connection, and one location was identified through agency input. Those locations included Indian School Road, Camelback Road, Glendale Avenue, Northern Avenue, Thunderbird Road and Bell Road. The map that resulted from this analysis is shown in Figure 4-8. The map also shows all the other interchange recommendations as related to upgrading east-to-west capacities.

Figure 4-8. Regional Arterials Crossing I-17



E:\Projects\AZ\MAOG\SpineStudy\map_docs\mxd\ProposedImprovement.mxd

Source: ADOT, ALRIS, FEMA

4.4.2 Main Line Weaving Analysis

Because the NAR had not inventoried any of the Interstate weaving segments, all of the weaving segments had to be analyzed to determine which segments should be included in the Base Build Alternative. The weaving segments were considered from the basis of infrastructure and operations because the safety data did not provide enough detail to isolate the crashes that occurred only due to weaving movements. The weave length was analyzed for the infrastructure for each of the weaves. It was found that the weave lengths varied from 929 to 8,610 feet within the Spine corridor. The operations were analyzed and the density and LOS of each weave was determined. The summary of the results of the weave analysis are in Figure 4-9.

4.4.2.5 Weave Analysis Methodology

As indicated in the *Highway Capacity Manual 2010* (HCM 2010), a weave analysis is a qualitative assessment of the critical lane-changing activity between closely located merge and diverge segments such as freeway on- and off-ramps. Lane-changing movements represent the unique operational feature of a weaving segment and are affected by geometric characteristics such as length, width and configuration—as well as free-flow speed and demand flow rates for each movement within a weaving segment. The HCM 2010 defines a range of LOS parameters representing varying operating conditions at weave segments and the driver’s perception of these conditions.

Like all freeway analysis, LOS in a weave segment is related to density; however, according to HCM 2010, “density thresholds in weaving segments are somewhat higher than those for similar basic freeway segments as it is believed that drivers will tolerate higher densities in an area where lane-changing turbulence is expected.”

Table 4-14 details the LOS criteria for weaving segments on uninterrupted segments of multilane surface facilities, including freeway segments and C-D roadways.

Table 4-14. Level of Service for Weave Analysis

Level of Service	Freeway Weaving Segments (pc/mile/lane)	Weaving Segments on Multilane Highways or C-D Roadways (pc/mile/lane)
A	≤10.0	≤12.0
B	>10.0 and ≤20.0	>12.0 and ≤24.0
C	>20.0 and ≤28.0	>24.0 and ≤32.0
D	>28.0 and ≤35.0	>32.0 and ≤36.0
E	>35.0	>36.0
F	Demand exceeds capacity	

Source: Transportation Research Board, 2010, *Highway Capacity Manual*, Washington, D.C.

LOS associated with weave segments is derived through an operations analysis that measures many variables including geometric design, weaving and non-weaving volumes and volume adjustments, the segment’s free-flow speed, lane change characteristics, segment capacity, lane-changing rates and the average speeds of weaving and non-weaving vehicles. Collectively, these inputs were used to make calculated estimates of the capacity and LOS of weaving segments in the Spine corridor.

After completing this analysis, the conclusion was that, in general, operational problems and safety problems did not coexist within the same segments. It was determined that this is because when weave sections fail, cars must slow significantly to navigate through the weave. This slower speed reduces crash rates. The opposite is true as well; as vehicles navigate a weave at a high speed, it results in a higher likelihood of crashes. As a result of these findings, the Spine study team concluded that expensive weave section fixes (e.g., braiding ramps, C-D roads or ramp eliminations) were not viable recommendations, especially on I-17 where the majority of the operational problems exist. This is because I-17 already includes frontage roads and the existence of these frontage roads makes it more challenging to implement the typical weave fixes. Upgrading the exit ramp gores to a dual-lane exit and increasing substandard weaving segments where practical was instead recommended corridor-wide to be a low-cost, low-impact incremental upgrade that would help in most locations.

The only exception to this weave recommendation is along I-10 between Baseline and Elliot roads. This section was found to have a high number of crashes relative to the other weaving segments, possibly due to it being twice as long as most of the other weaving segments. No frontage roads currently exist along I-10 at this location and other regional operational issues exist within this 2-mile stretch, such as the lack of parallel arterial routes, except for Priest Road/Avenida del Yaqui on the east and 48th Street/Point Parkway on the west. Both of these arterials will never be able to handle significant traffic volumes and, as a result, this 2-mile stretch of I-10 is unique in the Spine corridor for not having parallel arterial relief in the event of a freeway incident. It was recommended to upgrade the weave section in this 2-mile section by extending the existing C-D roadways that exist north of Baseline Road to the south down to the Elliot Road interchange. These separated roadways would provide a much-needed relief valve for incident management, help mitigate the high accident rates in that weave section and help relieve pass-through traffic through the Point Parkway and Guadalupe neighborhoods.

Figure 4-9. Spine Corridor Weave Analysis

Spine Corridor Weave Analysis											
AM						PM					
Direction	On-Ramp	Off-Ramp	Weave Length (ft)	Density	LOS	Direction	On-Ramp	Off-Ramp	Weave Length (ft)	Density	LOS
Southbound						Southbound					
SB I-17	Union Hills Drive	Bell Road	2070	39.5	E	SB I-17	Union Hills Drive	Bell Road	2070	35.9	F
SB I-17	Bell Road	Greenway Road	2619	47.7	E	SB I-17	Bell Road	Greenway Road	2619	45.1	E
SB I-17	Greenway Road	Thunderbird Road	2624	57.0	F	SB I-17	Greenway Road	Thunderbird Road	2624	54.9	F
SB I-17	Thunderbird Road	Cactus Road	2593	66.3	F	SB I-17	Thunderbird Road	Cactus Road	2593	57.8	F
SB I-17	Cactus Road	Peoria Road	1733	69.1	F	SB I-17	Cactus Road	Peoria Road	1733	56.8	F
SB I-17	Peoria Road	Dunlap Road	1611	66.7	F	SB I-17	Peoria Road	Dunlap Road	1611	60.7	F
SB I-17	Dunlap Road	Northern Avenue	2211	62.7	F	SB I-17	Dunlap Road	Northern Avenue	2211	61.4	F
SB I-17	Northern Avenue	Glendale Avenue	2970	58.9	F	SB I-17	Northern Avenue	Glendale Avenue	2970	56.6	F
SB I-17	Glendale Avenue	Bethany Home Road	3075	62.9	F	SB I-17	Glendale Avenue	Bethany Home Road	3075	56.4	F
SB I-17	Bethany Home Road	Camelback Road	2980	56.8	F	SB I-17	Bethany Home Road	Camelback Road	2980	53.9	F
SB I-17	Camelback Road	Indian School	2961	59.0	F	SB I-17	Camelback Road	Indian School	2961	56.7	F
SB I-17	Indian School	Thomas Road	2973	46.7	F	SB I-17	Indian School	Thomas Road	2973	53.1	F
SB I-17	Thomas Road	McDowell	1774	35.2	E	SB I-17	Thomas Road	McDowell	1774	39.5	E
SB I-17*	Thomas Road	I-10	3480	42.9	F	SB I-17*	Thomas Road	I-10	3480	42.9	F
SB I-17	19th Avenue	7th Avenue	2949	32.3	D	SB I-17	19th Avenue	7th Avenue	2949	42.5	F
SB I-17	7th Avenue	7th Street	3084	36.1	E	SB I-17	7th Avenue	7th Street	3084	43.7	E
SB I-17	7th Street	16th Street	2878	37.7	E	SB I-17	7th Street	16th Street	2878	49.1	F
SB I-10	University Drive	40th Street	929	41.1	E	SB I-10	University Drive	40th Street	929	64.5	F
SB I-10	40th Street	48th Street	2184	31.6	D	SB I-10	40th Street	48th Street	2184	53.7	E
SB I-10	40th Street	48th Street	2184	31.7	D	SB I-10	40th Street	48th Street	2184	54.2	F
SB I-10*	48th Street	US 60	3842	31.6	D	SB I-10*	48th Street	US 60	3842	57.5	F
SB I-10*	Broadway Road	US 60	4960	27.6	C	SB I-10*	Broadway Road	US 60	4960	63.4	F
SB I-10*	US 60	Elliot	8610	22.5	C	SB I-10*	US 60	Elliot	8610	48.9	E
SB I-10	Baseline	Elliot	7664	23.2	C	SB I-10	Baseline	Elliot	7664	60.5	F
SB I-10	Elliot	Warner	2606	22.9	C	SB I-10	Elliot	Warner	2606	59.2	F
SB I-10	Warner	Ray	1752	21.6	C	SB I-10	Warner	Ray	1752	61.0	F
SB I-10	Ray	Chandler	2111	16.1	B	SB I-10	Ray	Chandler	2111	45.7	E
Northbound						Northbound					
NB I-10	Chandler	Ray	2011	11.3	B	NB I-10	Chandler	Ray	2011	13.4	B
NB I-10	Ray	Warner	2700	33.5	D	NB I-10	Ray	Warner	2700	37.9	F
NB I-10	Warner	Elliot	2171	34.2	D	NB I-10	Warner	Elliot	2171	41.5	E
NB I-10	Elliot	Baseline	7579	37.9	F	NB I-10	Elliot	Baseline	7579	51.2	F
NB I-10*	Elliot	US 60	8559	31.4	D	NB I-10*	Elliot	US 60	8559	38.0	F
NB I-10	Broadway	40th Street	3551	36.1	E	NB I-10	Broadway	40th Street	3551	48.6	F
NB I-10	48th Street (SR 143)	40th Street	2712	39.4	E	NB I-10	48th Street (SR 143)	40th Street	2712	56.0	F
NB I-17	16th Street	7th Street	2826	27.2	C	NB I-17	16th Street	7th Street	2826	58.2	F
NB I-17	7th Street	7th Avenue	2755	28.7	D	NB I-17	7th Street	7th Avenue	2755	69.9	F
NB I-17	7th Avenue	19th Avenue	2698	24.4	C	NB I-17	7th Avenue	19th Avenue	2698	63.1	F
NB I-17*	Adams Street	I-10	1057	24.9	C	NB I-17*	Adams Street	I-10	1057	71.0	F
NB I-17*	I-10 (&McDowell)	Thomas Road	1603	28.4	D	NB I-17*	I-10 (&McDowell)	Thomas Road	1603	85.8	F
NB I-17	Thomas Road	Indian School	2965	31.1	D	NB I-17	Thomas Road	Indian School	2965	91.8	F
NB I-17	Indian School	Camelback Road	2663	31.2	D	NB I-17	Indian School	Camelback Road	2663	94.1	F
NB I-17	Camelback Road	Bethany Home Road	2910	30.0	D	NB I-17	Camelback Road	Bethany Home Road	2910	84.0	F
NB I-17	Bethany Home Road	Glendale Avenue	3077	30.7	D	NB I-17	Bethany Home Road	Glendale Avenue	3077	91.7	F
NB I-17	Glendale Avenue	Northern Avenue	2831	35.0	D	NB I-17	Glendale Avenue	Northern Avenue	2831	108.2	F
NB I-17	Northern Avenue	Dunlap Road	2659	38.8	E	NB I-17	Northern Avenue	Dunlap Road	2659	147.5	F
NB I-17	Dunlap Road	Peoria Road	1857	34.0	D	NB I-17	Dunlap Road	Peoria Road	1857	133.6	F
NB I-17	Peoria Road	Cactus Road	1817	31.1	D	NB I-17	Peoria Road	Cactus Road	1817	138.5	F
NB I-17	Cactus Road	Thunderbird Road	2525	29.6	D	NB I-17	Cactus Road	Thunderbird Road	2525	99.4	F
NB I-17	Thunderbird Road	Greenway Road	2657	32.3	D	NB I-17	Thunderbird Road	Greenway Road	2657	118.3	F
NB I-17	Greenway Road	Bell Road	1821	28.9	D	NB I-17	Greenway Road	Bell Road	1821	74.7	F
NB I-17	Bell Road	Union Hills Drive	2771	28.3	D	NB I-17	Bell Road	Union Hills Drive	2771	90.4	F

* Indicates System Interchange

Level of Service (LOS)	
Density of Weaving Segments	
A	0 - 10
B	> 10 - 20
C	> 20 - 28
D	> 28 - 35
E	> 35
F	Demand Exceeds Capacity

4.4.3 Arterial Network Analysis

After screening the Interstate alternatives and service interchanges, the arterial network crossing I-17 was analyzed to determine which arterials would best promote east-to-west movement across I-17. Drawing from the arterial analysis performed in the NAR, missing infrastructure components were identified, with the focus on the regional east-to-west arterials as shown in Figure 4-8. The missing arterial infrastructure identified included lane discontinuities between 35th and 19th avenues, service traffic interchange configurations not matching the projected traffic patterns and missing bicycle and pedestrian facilities. Supporting alternatives that proposed improvements for the crossing arterials were also evaluated for inclusion in the arterial improvement recommendation. As Figure 4-8 demonstrates, Valley Metro's light rail transit along Camelback Road and Dunlap Avenue was also taken into account for the Spine recommendations.

Once the analysis was completed for the I-17 east-to-west crossing arterials, the arterial improvements were incorporated into the Base Build Alternative. The I-17 east-to-west crossing arterials identified for improvements, which included traffic interchange improvements, are:

- Thomas Road
- Indian School Road
- Camelback Road
- Glendale Avenue
- Northern Avenue
- Dunlap Avenue
- Peoria Avenue
- Cactus Road
- Thunderbird Road
- Greenway Avenue
- Bell Road

4.4.4 Level 3 Alternatives

The Level 3 screening evaluated each of the alternatives in the categories of engineering, safety, public acceptance, operations and cost. For the purposes of evaluation, the Spine corridor was divided into five segments, similar to the segmentation used in the Alternative Development Workshop:

- I-10: SR-202L to Southern Avenue
- I-10: Southern Avenue to 24th Street
- I-17: 24th Street to McDowell Road
- I-17: McDowell Road to Dunlap Avenue
- I-17: Dunlap Avenue to SR-101L

The following sections describe each of the Level 3 screening criteria.

4.4.4.1 No-Build (Alternative 1A)

The No-Build Alternative consists of the corridor’s existing conditions as of December 2014 with routine maintenance and with the City of Chandler, City of Tempe and City of Phoenix Capital Improvement Programs (CIPs) and Transportation Master Plans, three Valley Metro light rail transit lines listed in Figure 4-10 and a group of projects within the Interstate corridor known as the near-term improvements. The near-term improvement projects were included in the No-Build Alternative because they had been approved for design and construction prior to December 2014. The No-Build Alternative was assumed to be included with all other Level 3 alternatives. See Figure 4-10 for the full list of projects included in the No-Build Alternative.

Figure 4-10. Alternatives and Project Assumptions for Level 3 Screening: Alternative 1A

Category	Projects	Notes and Comments
Alternative 1A – No-Build		
RTP	2035 RTP	All regionally modal projects, including South Central, Phoenix West, Glendale Downtown light rail transit lines. Improvements identified in the RTP for I-10 and I-17 omitted, except for Near-Term Strategy: +1 general purpose lane, southbound I-10, I-17 Split and US-60; C-D lanes and ramp braids, SR-143 and US-60; +1 general purpose lane, I-10, US-60 to Ray Road; Bicycle/pedestrian crossings at Alameda and Guadalupe
RTP	Phoenix CIP	Local projects not accounted for in RTP
RTP	Phoenix Transportation 2050	Project list to be determined
RTP	Tempe CIP	Local projects not accounted for in RTP
RTP	Chandler CIP	Local projects not accounted for in RTP
Maintenance	Routine Maintenance	Signing, striping, drainage, electrical, landscaping, etc.
TDM/TSM	ADOT TSMO Division Rollout	System operations and safety, incident response
TDM/TSM	Trip Reduction Program	Run by the Maricopa County Air Quality Department

4.4.4.2 Base Build (Alternative 1B)

The Base Build Alternative is a conglomeration of supporting alternatives from the Level 2 screening and the No-Build Alternative. The Management Partners and AEP evaluated all of the supporting alternatives that passed the Level 2 screening and determined which alternatives would be included in the Base Build Alternative for Level 3 screening. The projects included in the Base Build Alternative fit into one of the following categories:

- Technology
- Access
- Transit
- Bicycle/pedestrian
- Weave

See Figure 4-11 for a complete list of projects included in the Base Build Alternative.

Figure 4-11. Alternatives and Project Assumptions for Level 3 Screening: Alternative 1B

Category	Projects	Notes and Comments
Alternative 1B – Base Build (includes No-Build Alternative)		
Technology	Freeway Technology Package	Need to identify credit to take in the travel demand modeling evaluation; projects/strategies identified for freeways, arterials, driver/traveler/jurisdictional information, and connected/autonomous vehicles.
Technology	System Operations and Maintenance Staffing	
Access	I-10/Baseline Road	Traffic interchange #2 priority – Proposing a DDI, but looked at a flyover/ParClo concept as well (see Appendix H).
Access	I-10/SR-143/48th Street I-10/Broadway	Traffic interchange #4 priority - three concepts developed (see Appendix H): Replace southbound SR-143 loop ramp to eastbound I-10; braided ramps along SR-143 between I-10 and University; replace SR-143/48th Street and Broadway bridges over I-10; add a DHOV connector between SR-143 and I-10 to/from the south
Access	I-10/40th Street	Traffic interchange #30 priority – If mainline widening configurations below warrant, consider reconfiguring the traffic interchange to a standard diamond to eliminate the loop ramp to maximize the span under the bridge and/or to minimize new ROW. Needs further investigation based on selected alternative.
Access	I-17/7th Avenue	Traffic interchange #9 priority – Widened tight diamond with additional arterial through lanes and other operational upgrades
Access	I-17/19th Avenue	Traffic interchange #5 priority – Widened tight diamond with additional arterial through lanes and other operational upgrades
Access	I-17/Jefferson/Adams	Traffic interchange #24 priority – Convert to a more standard split diamond and incorporate bicycle/pedestrian elements
Access	I-17/Thomas Road	Traffic interchange #7 priority – Extend third Thomas Road eastbound lane to 23rd Avenue and other operational upgrades
Access	I-17/Indian School Road	Traffic interchange #17 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows
Access	I-17/Camelback Road	Traffic interchange #8 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows and light rail transit
Access	I-17/Northern Avenue	Traffic interchange #13 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows
Access	I-17/Dunlap Road	Traffic interchange #3 priority – Upgrade current configuration with operational improvements, and extend third westbound lane (19th Avenue to 3rd Avenue)
Access	I-17/Peoria Avenue	Traffic interchange #1 priority – Widened tight diamond with additional arterial through lanes, bicycle/pedestrian accommodations and other operational upgrades. Upgrade drainage system.
Access	I-17/Cactus Road	Traffic interchange #10 priority – Upgrade current configuration with operational improvements, and extend third westbound lane. Upgrade drainage system.

Figure 4-11. Alternatives and Project Assumptions for Level 3 Screening: Alternative 1B

Category	Projects	Notes and Comments
Access	I-17/Thunderbird Road	Traffic interchange #6 priority – Convert to a three-level diamond traffic interchange to accommodate very large east-to-west regional flows, incorporate bicycle/pedestrian elements, widen Thunderbird to a seven-lane section between 20th Lane and 34th Avenue, and upgrade drainage system
Access	I-17/Greenway Road	Traffic interchange #14 priority – Upgrade current configuration with operational improvements and extend third westbound lane to 19th Avenue. Upgrade drainage system.
Access	I-17/Bell Road	Traffic interchange #12 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows. Expand park-and-ride lot in southwestern quadrant.
Transit	I-10/Galveston DHOV	Taken from the SE Corridor MIS recommendation; requested advancement by Chandler.
Transit	I-17/Central Avenue Light Rail Transit Crossing	Presently in RTP; I-17 bridge replacement and reprofiling required
Transit	I-17/Van Buren Light Rail Transit Crossing	Presently in RTP; Van Buren bridge over I-17 to be replaced and raised to better accommodate the split diamond and Jefferson/Adams
Transit	I-10/I-17 Stack Bus Ramps	Bus ramps from median of I-10 west of the Stack and then routed along the existing southbound frontage road on I-17 south to Van Buren Road. Southbound frontage road would be closed.
Transit	I-17/Camelback Light Rail Transit Crossing	Presently in RTP; included in the three-level diamond traffic interchange concept noted above
Transit	I-17/Mountain View Light Rail Transit Crossing	Presently in RTP; I-17 needs to reserve space for this future crossing over the Interstate
Transit	I-17/Bell Road Park-and-Ride Lot Expansion	Expand lot in conjunction with the Bell Road three-level diamond traffic interchange concept above
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-10/Chandler Blvd	Proposed bicycle/pedestrian crossing to connect Ahwatukee to Chandler across I-10
Bicycle/Pedestrian	Traffic interchange Upgrades - I-10/Warner Road	From Tempe 2015 Transportation Master Plan
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-10/Highline Canal	Just south of Baseline; Spine recommendation to connect Phoenix, Tempe and Guadalupe and to discourage bicycles from using the Baseline traffic interchange
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-10/Western Canal	North of Baseline at Arizona Mills Mall; from Tempe 2015 Transportation Master Plan and Phoenix Bike Plan Priority #33 – connects Tempe and Phoenix bicycle routes
Bicycle/Pedestrian	Traffic Interchange Upgrades - I-10/32nd Street	From Phoenix Bike Plan, noted as an identified barrier
Bicycle/Pedestrian	Traffic interchange Upgrades - I-10/24th Street	From Phoenix Bike Plan, Priority #2

Figure 4-11. Alternatives and Project Assumptions for Level 3 Screening: Alternative 1B

Category	Projects	Notes and Comments
Bicycle/Pedestrian	Traffic interchange Upgrades - I-17/Jefferson/Adams	From Phoenix Bike Plan, Priority #8
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-17/Osborn Road/Grand Canal	Just south of Indian School - Phoenix Bike Plan, Priority #5/15
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-17/Missouri Ave	Mid-mile between Camelback and Bethany Home (supports Grand Canyon University) – from Phoenix Bike Plan, Priority #17
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-17/Maryland Ave	Existing bicycle/pedestrian crossing at mid-mile between Bethany Home and Glendale. To remain, or to be replaced if affected by freeway widening.
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-17/Arizona Canal	Existing bicycle/pedestrian crossing just north of Dunlap. To remain, or to be replaced if affected by freeway widening.
Bicycle/Pedestrian	Traffic interchange Upgrades - I-17/Northern	Bicycle/pedestrian crash hot spot; solution integrated into traffic interchange reconstruction
Bicycle/Pedestrian	Traffic interchange Upgrades - I-17/Peoria	Bicycle/pedestrian crash hot spot; solution integrated into traffic interchange modernization
Bicycle/Pedestrian	Traffic interchange Upgrades - I-17/Thunderbird	From Phoenix Bike Plan, noted as an identified barrier; bicycle/pedestrian crash hot spot; solution integrated into traffic interchange reconstruction
Bicycle/Pedestrian	Traffic interchange Upgrades - I-17/Greenway	From Phoenix Bike Plan, noted as an identified barrier
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing - I-17/Paradise Lane-Grandview	From Phoenix Bike Plan, noted as an identified barrier; mid-mile between Greenway and Bell
Bicycle/Pedestrian	Traffic interchange Upgrades - I-17/Union Hills Drive	From Phoenix Bike Plan, Priority #21
Weave	Dual Lane Exit Ramp Conversions	Convert exit ramps with exit only from auxiliary lanes to a two-lane exit (option + drop lane) throughout corridor where feasible.
Weave	I-10; Elliot to Baseline	Extend the US-60 C-D road system south from Baseline Road to Elliot Road to improve the safety of this weave, to provide a barrier-separated roadway for system redundancy where no good arterial redundancy exists today, and to aid in ramp storage length for both of the south side Baseline Road ramps.

4.4.4.3 I-17 Reconstruction (Alternative 2)

The I-17 Reconstruction Alternative consists of the No-Build Alternative, Base Build Alternative and reconstructing the I-17 main line to full design standards. For a complete description of the I-17 Reconstruction Alternative, see Figure 4-12.

Figure 4-12. Alternatives and Project Assumptions for Level 3 Screening: Alternative 2

Category	Projects	Notes and Comments
Alternative 2 – I-17 Reconstruction (includes No-Build and Base Build Alternatives)		
Highway Capacity	I-17, I-10 Split to I-10 Stack	Reconstruct pavements, bridges, interchanges, drainage to full standards with added auxiliary lanes. Design exceptions may be needed in spot areas and will be looked at on a case-by-case basis. Consider provisions for an SR-30 connection at Durango Curve, particularly when constructing new bridges, both in terms of location and clearances.
Highway Capacity	I-17, I-10 Stack to Peoria Ave	Reconstruct pavements, bridges (where appropriate), drainage to full standards. Design exceptions may be needed in spot areas and will be looked at on a case-by-case basis.
Highway Capacity	I-17, Peoria Ave to SR-101L	Reconstruct bridges (where appropriate) and drainage to full standards. Design exceptions may be needed in spot areas and will be looked at on a case-by-case basis.

4.4.4.4 New General Purpose Lanes (Alternative 3A)

The New General Purpose Lanes Alternative consists of the No-Build Alternative, Base Build Alternative and adding one general purpose lane in each direction along the entire Spine corridor. For a complete description of the New General Purpose Lanes Alternative, see Figure 4-13.

Figure 4-13. Alternatives and Project Assumptions for Level 3 Screening: Alternative 3A

Category	Projects	Notes and Comments
Alternative 3A – Add General Purpose Lanes, widening to match existing standards (includes No-Build and Base Build Alternatives)		
Highway Capacity	I-10, Pecos Stack to Split	Add one general purpose lane in each direction.
Highway Capacity	I-17, Split to Stack	Add one general purpose lane in each direction.
Highway Capacity	I-17, Stack to North Stack	Add one general purpose lane in each direction.

4.4.4.5 New HOV Lanes (Alternative 3B)

The New HOV Lanes Alternative consists of the No-Build Alternative, Base Build Alternative and adding one HOV lane in each direction along the entire Spine corridor. For a complete description of the New HOV Lanes Alternative, see Figure 4-14.

Figure 4-14. Alternatives and Project Assumptions for Level 3 Screening: Alternative 3B

Category	Projects	Notes and Comments
Alternative 3B – Add HOV Lanes, widening and restoring full standards where applicable (includes No-Build and Base Build Alternatives)		
Special Lanes	I-10, Pecos Stack to Split	Add a second HOV lane (2+ occupancy) in each direction.
Special Lanes	I-10/I-17 Split Interchange	Add a two-way DHOV connector between I-17 and I-10 to the east.
Special Lanes	I-17, Split to Stack	Alternative 2 + Add an HOV lane (2+ occupancy) on I-17 each direction.
Special Lanes	I-17, Stack to North Stack	Alternative 2 + Add a second HOV lane (2+ occupancy) each direction.

4.4.4.6 Dual Express Lanes (Alternative 3C)

The Dual Express Lanes Alternative consists of the No-Build Alternative, Base Build Alternative and creating a stripe-separated dual express lane system in each direction along the entire Spine corridor. This alternative requires the conversion of the existing HOV system to an express lane system and the construction of a second express lane. For a complete description of the Dual Express Lanes Alternative, see Figure 4-15.

Figure 4-15. Alternatives and Project Assumptions for Level 3 Screening: Alternative 3C

Category	Projects	Notes and Comments
Alternative 3C – Dual Express Lanes, widening and restoring full standards where applicable (includes No-Build and Base Build Alternatives)		
Special Lanes	I-10, Pecos Stack to Split	Add one new lane and then restripe all existing general purpose lanes and new lane into two express lanes and all others as local lanes. Ingress and egress points to be determined. Maintain single HOV.
Special Lanes	I-17, Stack to North Stack	Add one new lane and then restripe all existing general purpose lanes and new lane into two express lanes and all others as local lanes. Ingress and egress points to be determined. Maintain single HOV.

4.4.4.7 Dual HOT Lanes (Alternative 3D)

The Dual HOT Lanes Alternative consists of the No-Build Alternative, Base Build Alternative and creating a stripe-separated dual HOT lane system in each direction along the entire Spine corridor. This alternative requires the conversion of the existing HOV system to a HOT lane system and the construction of a second HOT lane. For a complete description of the Dual HOT Lanes Alternative, see Figure 4-16.

Figure 4-16. Alternatives and Project Assumptions for Level 3 Screening: Alternative 3D

Category	Projects	Notes and Comments
Alternative 3D – Dual HOT Lanes, widening and restoring full standards where applicable (includes No-Build and Base Build Alternatives)		
Special Lanes	I-10, Pecos Stack to Split	Convert existing HOV to HOT and add a second HOT lane in each direction.
Special Lanes	I-10/I-17 Split Interchange	Add a two-way DHOT connector between I-17 and I-10 to the east.
Special Lanes	I-17, Split to Stack	Alternative 2 + Add a HOT lane on I-17 each direction.
Special Lanes	I-17, Stack to North Stack	Convert existing HOV to HOT and add a second HOT lane each direction.

4.4.4.8 Striped Express/Local Lanes (Alternative 4)

The Striped Express/Local Lanes Alternative consists of the No-Build Alternative, Base Build Alternative and creating a stripe-separated express lane system in each direction along the entire Spine corridor. This alternative is similar to the Dual Express Lanes Alternative because it converts of the existing HOV system to an express lane system; however, it does not construct a second express lane, leaving the express lane system a single-lane system. For a complete description of the Striped Express/Local Lanes Alternative, see Figure 4-17.

Figure 4-17. Alternatives and Project Assumptions for Level 3 Screening: Alternative 4

Category	Projects	Notes and Comments
Alternative 4 – Express/Local Lanes (includes No-Build and Base Build Alternatives)		
Special Lanes	I-10, Pecos Stack to Split	Restripe all existing general purpose lanes into one express lane and all others as local lanes. Ingress and egress points to be determined. Maintain HOV in lane 1.
Special Lanes	I-17, Stack to North Stack	Restripe all existing general purpose lanes into one express lane and all others as local lanes. Ingress and egress points to be determined. Maintain HOV in lane 1.

4.4.4.9 HOT Lane Conversion (Alternative 5)

The HOT Lane Conversion Alternative consists of the No-Build Alternative, Base Build Alternative and creating a stripe-separated HOT lane system in each direction along the entire Spine corridor. This alternative is similar to the Dual HOT Lanes Alternative because it converts of the existing HOV system to a HOT lane system; however, it does not construct a second HOT lane, leaving the HOT lane system a single-lane system. For a complete description of the HOT Lane Conversion Alternative, see Figure 4-18.

Figure 4-18. Alternatives and Project Assumptions for Level 3 Screening: Alternative 5

Category	Projects	Notes and Comments
Alternative 5 – HOT Lanes (HOV Conversion, includes No-Build and Base Build Alternatives)		
Special Lanes	I-10, Pecos Stack to Split	Converts existing HOV lanes to HOT lanes to implement lane pricing. Ingress and egress points to be determined.
Special Lanes	I-17, Stack to North Stack	Converts existing HOV lanes to HOT lanes to implement lane pricing. Ingress and egress points to be determined.

4.4.5 Level 3 Screening

4.4.5.1 Infrastructure Analysis

Because the Level 3 screening had a quantitative component, concept layouts were required for all of the build alternatives. The first iteration of the concept layouts were lane line diagrams to achieve consensus on what the build alternatives consisted of and to provide a guide for creating networks for the travel demand model, which would be used to analyze each of the alternatives. Once the lane line diagrams were finalized and approved on July 14, 2016, full-concept 5 percent horizontal layout design plans were drawn for each of the build alternatives. The 5 percent design plans were used to determine whether the concepts met design standards and replaced old infrastructure and to determine the quantity of new ROW required and cost of the improvements.

4.4.5.2 Safety Analysis

Each of the alternatives was evaluated based on safety factors identified by the crash modification factors (CMFs) developed for ADOT's corridor profile studies and developed by the CMF Clearinghouse. Seventeen CMF items were identified as applicable to the Spine study alternatives and are summarized in Figure 4-19. Because of the level of design, the safety analysis completed for the alternatives was only qualitative in nature and considered the alternatives by segment rather than evaluating crash hot spots. A more detailed safety analysis was completed on the service traffic interchanges and can be reviewed in Appendix E.

Figure 4-19. Level 3 and 4 Screening – Safety Assessment Summary

I-10/I-17 Corridor Master Plan Level 3 and 4 Screening - Safety Assessment Summary

Improvement	CMF*	Crash Reduction %	SPINE ALTERNATIVES																																																											
			1A					1B					2					3A					3B					3C					3D					4					5																			
Segments			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5															
Widen Lane	1	0%											X	X	X								X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X	
Widen Shoulder (>=4')	0.64	36%											X	X	X								X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X	
Rehabilitate Shoulder	0.72	28%											X	X	X								X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X	
Rehabilitate Pavement	0.7	30%											X	X	X			X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X	
Rehabilitate Bridge	0.95	5%											X	X	X			X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X	
Construct Auxillary Lanes	0.78	22%											X										X																																							
Construct High-Occupancy Vehicle (HOV) Lane	0.95	5%																					X	X	X	X							X	X	X	X																										
Construct New General Purpose Lane	0.9	10%	X					X					X					X	X	X	X		X					X	X	X	X		X					X					X					X					X									
Add Freeway Collector-Distributor roads	0.9	10%		X				X	X				X	X				X	X				X	X				X	X				X	X				X	X				X	X				X	X				X	X								
Widen and modify Entry/Exit Ramps	0.21	79%						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Convert continuous access HOV to limited access	1.54	-54%																										N	N	N	N							N	N	N	N																					
Convert HOV lanes to high occupancy Toll (HOT) lanes	0.95	5%																															X	X	X	X							X	X	X	X		X	X	X	X		X	X	X	X						
Increase lane width from 11 feet to 12 feet	0.95	5%											X	X									X	X									X	X																												
DHOV (eliminates weave and reduces conflict points)		+						X					X					X					X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X												
ITS for ATM	0.8	20%						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
ITS for Incident Management	0.85	15%	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
Install Pedestrian Bridge ¹	0.1	90%	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										

* Crash Modification Factor (CMF) — multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure
Source: CMF's developed for ADOT Corridor profile studies, HSM, CMF Clearing house, and other state and national resources.
¹Pedestrian only crash benefit

Segment Definition

1	I-10; Pecos Stack to Southern Ave
2	I-10; Southern Ave to Split
3	I-17; Split to Grand Ave
4	I-17; Grand Ave to Dunlap Ave
5	I-17; Dunlap Ave to North Stack

4.4.5.3 Scoring Against Public Priorities (Prior to Public Involvement Effort)

During the three public meetings held on February 25, February 26, and March 4, 2015, supporting the NAR for this study, the public prioritized eight corridor improvement strategies to indicate how it would like to see the Spine study solve the issues within the Spine corridor. The public prioritized the following criteria accordingly:

- Improve commute – 19.10 percent
- Add travel choices – 13.12 percent
- Protect the environment – 12.07 percent
- Increase connections – 11.75 percent
- Promote neighborhoods – 11.65 percent
- Improve commerce – 11.23 percent
- Minimize cost – 10.60 percent
- Emphasize jobs – 10.49 percent

Each of the alternatives was evaluated by segment on how well it implemented each of these improvement strategies, with a rating of 1 indicating significantly worse than today's corridor, 5 indicating the same as today's corridor and 10 indicating significantly better than today's corridor. The scoring process was qualitative. Figures 4-20 to 4-24 summarize how the alternatives scored against public priorities for the Level 3 screening.

Figure 4-20. Level 3 Screening Summary of Findings – Public Input Score: Freeway Segment I-10, SR-202L to US-60

Alternative		Improve Commute	Add Travel Choices	Protect the Environment	Increase Connections	Promote Neighborhoods	Improve Commerce	Minimize Cost	Emphasize Jobs	Total Score (Higher = Better)
Public Weighting		19.10%	13.12%	12.07%	11.75%	11.65%	11.23%	10.60%	10.49%	
Today	Northbound/Westbound	5	5	5	5	5	5	5	5	5.00
Today	Southbound/Eastbound	5	5	5	5	5	5	5	5	5.00
1A	Northbound/Westbound	7	5	6	8	4	7	4	5	5.86
1A	Southbound/Eastbound	7	5	6	8	4	7	4	5	5.86
1B	Northbound/Westbound	7	7	4	9	4	7	4	5	6.00
1B	Southbound/Eastbound	7	7	4	9	4	7	4	5	6.00
2	Northbound/Westbound	7	7	4	9	4	7	4	5	6.00
2	Southbound/Eastbound	7	7	4	9	4	7	4	5	6.00
3A	Northbound/Westbound	9	7	3	9	3	8	1	5	5.93
3A	Southbound/Eastbound	9	7	3	9	3	8	2	5	6.04
3B	Northbound/Westbound	7	9	5	10	3	7	2	6	6.27
3B	Southbound/Eastbound	7	9	5	10	3	7	2	6	6.27
3C	Northbound/Westbound	9	7	5	9	3	9	2	5	6.39
3C	Southbound/Eastbound	9	7	5	9	3	9	2	5	6.39
3D	Northbound/Westbound	8	8	5	9	3	9	2	6	6.44
3D	Southbound/Eastbound	8	8	5	9	3	9	2	6	6.44
4	Northbound/Westbound	8	7	4	9	4	8	4	5	6.30
4	Southbound/Eastbound	8	7	4	9	4	8	4	5	6.30
5	Northbound/Westbound	7	8	4	9	4	8	2	6	6.13
5	Southbound/Eastbound	7	8	4	9	4	8	2	6	6.13

Notes: 1 = significantly worse than today; 5 = same as today; 10 = significantly better than today

Figure 4-21. Level 3 Screening Summary of Findings – Public Input Score: Freeway Segment I-10, US-60 to I-17 Split

Alternative		Improve Commute	Add Travel Choices	Protect the Environment	Increase Connections	Promote Neighborhoods	Improve Commerce	Minimize Cost	Emphasize Jobs	Total Score (Higher = Better)
Public Weighting		19.10%	13.12%	12.07%	11.75%	11.65%	11.23%	10.60%	10.49%	
Today	Northbound/Westbound	5	5	5	5	5	5	5	5	5.00
Today	Southbound/Eastbound	5	5	5	5	5	5	5	5	5.00
1A	Northbound/Westbound	5	5	5	5	5	5	5	5	5.00
1A	Southbound/Eastbound	7	5	6	5	4	7	5	5	5.61
1B	Northbound/Westbound	7	6	4	9	5	7	4	6	6.09
1B	Southbound/Eastbound	8	6	5	9	4	9	4	6	6.51
2	Northbound/Westbound	7	6	4	9	5	7	4	6	6.09
2	Southbound/Eastbound	8	6	5	9	4	9	4	6	6.51
3A	Northbound/Westbound	8	6	3	9	4	8	2	6	5.94
3A	Southbound/Eastbound	9	6	4	9	3	10	3	6	6.47
3B	Northbound/Westbound	7	8	4	10	4	7	1	7	6.14
3B	Southbound/Eastbound	8	8	5	10	3	9	1	7	6.56
3C	Northbound/Westbound	9	6	4	9	4	9	1	6	6.26
3C	Southbound/Eastbound	7	6	5	9	3	10	1	6	5.99
3D	Northbound/Westbound	9	7	4	9	4	9	1	7	6.49
3D	Southbound/Eastbound	10	7	5	9	3	10	1	7	6.80
4	Northbound/Westbound	8	6	4	9	5	8	4	6	6.39
4	Southbound/Eastbound	6	6	5	9	4	9	4	6	6.12
5	Northbound/Westbound	8	7	4	9	5	8	3	7	6.52
5	Southbound/Eastbound	9	7	5	9	4	9	3	7	6.83

Notes: 1 = significantly worse than today; 5 = same as today; 10 = significantly better than today

Figure 4-22. Level 3 Screening Summary of Findings – Public Input Score: Freeway Segment I-17, I-10 Split to Stack

Alternative		Improve Commute	Add Travel Choices	Protect the Environment	Increase Connections	Promote Neighborhoods	Improve Commerce	Minimize Cost	Emphasize Jobs	Total Score (Higher = Better)
Public Weighting		19.10%	13.12%	12.07%	11.75%	11.65%	11.23%	10.60%	10.49%	
Today	Northbound/Westbound	5	5	5	5	5	5	5	5	5.00
Today	Southbound/Eastbound	5	5	5	5	5	5	5	5	5.00
1A	Northbound/Westbound	5	5	5	5	5	5	5	5	5.00
1A	Southbound/Eastbound	5	5	5	5	5	5	5	5	5.00
1B	Northbound/Westbound	5	5	5	6	4	7	4	6	5.22
1B	Southbound/Eastbound	5	5	5	6	4	7	4	6	5.22
2	Northbound/Westbound	6	5	4	6	4	9	2	6	5.31
2	Southbound/Eastbound	7	5	4	6	4	9	2	6	5.50
3A	Northbound/Westbound	8	5	3	6	3	9	1	6	5.35
3A	Southbound/Eastbound	7	5	3	6	3	9	1	6	5.16
3B	Northbound/Westbound	7	8	2	8	2	9	1	7	5.65
3B	Southbound/Eastbound	6	8	2	8	2	9	1	7	5.46
3C	Northbound/Westbound	9	5	2	6	2	8	1	6	5.19
3C	Southbound/Eastbound	7	5	2	6	2	8	1	6	4.81
3D	Northbound/Westbound	5	6	2	6	2	8	1	7	4.66
3D	Southbound/Eastbound	6	6	2	6	2	8	1	7	4.85
4	Northbound/Westbound	8	5	5	6	4	7	4	6	5.80
4	Southbound/Eastbound	6	5	5	6	4	7	4	6	5.42
5	Northbound/Westbound	4	6	5	6	4	7	3	7	5.16
5	Southbound/Eastbound	5	6	5	6	4	7	3	7	5.35

Notes: 1 = significantly worse than today; 5 = same as today; 10 = significantly better than today

Figure 4-23. Level 3 Screening Summary of Findings – Public Input Score: Freeway Segment I-17, Stack to Dunlap

Alternative		Improve Commute	Add Travel Choices	Protect the Environment	Increase Connections	Promote Neighborhoods	Improve Commerce	Minimize Cost	Emphasize Jobs	Total Score (Higher = Better)
Public Weighting		19.10%	13.12%	12.07%	11.75%	11.65%	11.23%	10.60%	10.49%	
Today	Northbound	5	5	5	5	5	5	5	5	5.00
Today	Southbound	5	5	5	5	5	5	5	5	5.00
1A	Northbound	5	5	5	5	5	5	5	5	5.00
1A	Southbound	5	5	5	5	5	5	5	5	5.00
1B	Northbound	5	7	4	7	4	8	4	8	5.81
1B	Southbound	5	7	4	7	4	8	4	8	5.81
2	Northbound	5	7	3	7	3	8	2	8	5.36
2	Southbound	5	7	3	7	3	8	2	8	5.36
3A	Northbound	6	7	2	7	2	9	1	9	5.42
3A	Southbound	8	7	2	7	2	9	1	9	5.80
3B	Northbound	5	8	1	7	1	8	2	8	5.01
3B	Southbound	5	8	1	7	1	8	2	8	5.01
3C	Northbound	7	7	1	7	1	10	2	7	5.38
3C	Southbound	8	7	1	7	1	10	2	7	5.58
3D	Northbound	7	8	1	7	1	10	2	8	5.62
3D	Southbound	6	8	1	7	1	10	2	8	5.43
4	Northbound	6	7	4	7	4	9	4	7	6.00
4	Southbound	7	7	4	7	4	9	4	7	6.20
5	Northbound	6	8	4	7	4	9	3	8	6.13
5	Southbound	5	8	4	7	4	9	3	8	5.94

Notes: 1 = significantly worse than today; 5 = same as today; 10 = significantly better than today

Figure 4-24. Level 3 Screening Summary of Findings – Public Input Score: Freeway Segment I-17, Dunlap to SR-101L

Alternative		Improve Commute	Add Travel Choices	Protect the Environment	Increase Connections	Promote Neighborhoods	Improve Commerce	Minimize Cost	Emphasize Jobs	Total Score (Higher = Better)
Public Weighting		19.10%	13.12%	12.07%	11.75%	11.65%	11.23%	10.60%	10.49%	
Today	Northbound	5	5	5	5	5	5	5	5	5.00
Today	Southbound	5	5	5	5	5	5	5	5	5.00
1A	Northbound	5	5	5	5	5	5	5	5	5.00
1A	Southbound	5	5	5	5	5	5	5	5	5.00
1B	Northbound	5	7	4	7	4	8	4	8	5.81
1B	Southbound	5	7	4	7	4	8	4	8	5.81
2	Northbound	5	7	3	7	3	8	1	8	5.25
2	Southbound	5	7	3	7	3	8	1	8	5.25
3A	Northbound	7	7	2	7	2	9	1	9	5.61
3A	Southbound	7	7	2	7	2	9	1	9	5.61
3B	Northbound	5	8	1	7	1	8	2	8	5.01
3B	Southbound	5	8	1	7	1	8	2	8	5.01
3C	Northbound	7	7	1	7	1	10	2	7	5.38
3C	Southbound	7	7	1	7	1	10	2	7	5.38
3D	Northbound	6	8	1	7	1	10	2	8	5.43
3D	Southbound	6	8	1	7	1	10	2	8	5.43
4	Northbound	6	7	4	7	4	9	4	7	6.00
4	Southbound	6	7	4	7	4	9	4	7	6.00
5	Northbound	5	8	4	7	4	9	3	8	5.94
5	Southbound	5	8	4	7	4	9	3	8	5.94

Notes: 1 = significantly worse than today; 5 = same as today; 10 = significantly better than today

4.4.5.4 Operations Analyses

The Level 3 screening consisted of identifying a variety of MOEs that provided a quantitative comparison of the relative effects of each alternative on traffic operations in the Spine corridor. Data was derived from MAG's TransCAD Regional Travel Demand Model for the following MOEs:

- General purpose and HOV lane travel times
- Person trips
- General purpose and HOV lane v/c ratio
- Freeway duration of congestion
- VMT and percent congested VMT
- VHT and percent congested VHT
- Travel speed

The following describes the methodology used to derive each of these MOEs. A summary of these resulting MOEs for each of the alternatives is provided in Figures 4-25 through 4-29 and Figures 4-31 through 4-35.

General Purpose and High Occupancy Vehicle Lanes Travel Times

This summary analysis was completed by extracting the travel times in the general purpose lanes and the HOV lanes in the TransCAD model for every specified segment of the Spine corridor in the PM peak hour for each of the alternatives. Results are presented in minutes.

Person Trips

This analysis provides an estimate of the number of persons traveling through the Spine corridor in the PM peak hour. Highway general purpose and HOV lanes (and HOT lanes in some alternatives) were identified for each of the segments and the respective traffic volumes for each facility type were then obtained from the TransCAD model. General purpose lanes and HOV lanes were given distinct multipliers to account for the average person count in each trip occurring within the Spine corridor; a multiplier was not applied to HOT trips due to a lack of trend data in the Phoenix metropolitan area. Transit trips were derived from passenger counts along transit routes for each segment of the Spine corridor. The total person trips is the sum of the general purpose lanes person count, HOV/HOT lanes person count and the transit trips count.

General Purpose and High Occupancy Vehicle Lanes Volume-to-Capacity Ratio

These figures were obtained by conducting a cutline analysis using ArcGIS software. Cut lines are used to gauge traffic flow and network characteristics of the links that cross the cutline. Thirteen cut lines were used to evaluate levels of traffic congestion for both general purpose and HOV lanes, with at least two cut lines in each of the segments. The cut lines identified the facility type for each lane of traffic, the capacity for each lane and the traffic flows at each link crossing the cut line. The resulting v/c ratios represent the average level of congestion across cut lines in each of the summarized segments during the PM peak hour.

Freeway Duration of Congestion

For purposes of this analysis, congestion was defined as a condition when speeds dropped below 45 mph. ADOT Freeway Management System (FMS) data were reviewed to define a per-lane volume threshold for each segment above which speeds historically dropped below 45 mph. Network characteristics and traffic volume data were extracted from the TransCAD model for each analysis period: AM, midday, PM, and nighttime. Levels of congestion were determined using the model volumes in conjunction with the established per-lane capacity threshold for each segment. For periods where the model-generated volume exceeded the established segment capacity threshold, the excess volume was assigned to adjacent periods until volumes no longer surpassed the per-lane capacity threshold for each time period.

Vehicle Miles Traveled and Percent Congested Vehicle Miles Traveled

This analysis focused on collecting the VMT for each of the freeway segments as well as the surface streets adjacent to each of the respective segments. Total VMT was summarized as well as congested VMT, or VMT occurring only on network links that experienced a v/c ratio greater than 0.84. The total VMT and congested VMT values were then used to determine the percentage of VMT occurring on congested roadways. This analysis was done using ArcGIS software.

Vehicle Hours Traveled and Percent Congested Vehicle Hours Traveled

This analysis focuses on collecting the VHT for each of the freeway segments as well as the surface streets adjacent to each of the respective segments. Total VHT was summarized as well as congested VHT, or VHT occurring only on network links that experienced a v/c ratio greater than 0.84. The total VHT and constrained VHT values were then used to determine the percentage of VHT occurring during roadway congestion. This analysis was done using ArcGIS software.

Travel Speed

This analysis was conducted using the results from the VMT and VHT analyses. The average speed in each of the segments was derived by dividing the total VMT by the VHT, resulting in average speed in mph.

4.4.5.5 Conclusions

Once the analysis for Level 3 was completed, it was compiled and presented to the Management Partners on October 24, 2016. The results of the analysis were presented as shown in Figures 4-25 to 4-29.

At the conclusion of the Level 3 screening, it became apparent that a single Level 3 alternative did not best serve all of the segments within the Spine corridor. The Management Partners and AEP decided that a Level 4 screening should be completed on two hybrid alternatives that combined the best parts of the alternatives in the Level 3 screening.

Figure 4-25. Level 3 Screening Summary of Findings: Freeway Segment I-10, SR-202L to Southern Ave

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	N/A	Yes	911,139	40.7%	26,216	45.6%	34.8	5.74	4.09	29,782	0.71	0.35	3.25
Today	Southbound/Eastbound	\$0.0	0.0	5.00	N/A	Yes						10.13	5.49	38,896	1.02	0.51	2.50
No-Build	Northbound/Westbound	\$0.0	0.0	5.86	N/A	Yes	1,103,239	38.6%	32,110	45.3%	34.4	5.25	4.28	32,195	0.76	0.40	0.50
No-Build	Southbound/Eastbound	\$0.0	0.0	5.86	N/A	Yes						7.71	5.87	43,078	1.11	0.53	0.00
1B	Northbound/Westbound	\$111.5	0.9	6.00	N/A	Yes	1,110,984	38.5%	32,388	45.3%	34.3	5.28	4.36	32,639	0.77	0.42	0.50
1B	Southbound/Eastbound	\$123.7	9.5	6.00	N/A	Yes						7.79	6.11	43,776	1.12	0.56	0.00
2	Northbound/Westbound	\$111.5	0.9	6.00	N/A	Yes	1,110,476	38.6%	32,411	45.4%	34.3	5.28	4.32	32,430	0.76	0.41	0.50
2	Southbound/Eastbound	\$123.7	9.5	6.00	N/A	Yes						7.79	6.06	43,659	1.11	0.55	0.00
3A	Northbound/Westbound	\$125.6	2.2	5.93	N/A	Yes	1,155,579	38.3%	32,595	44.0%	35.5	4.74	4.33	35,656	0.72	0.41	0.00
3A	Southbound/Eastbound	\$137.9	9.7	6.04	N/A	Yes						6.73	5.97	47,927	1.07	0.54	0.00
3B	Northbound/Westbound	\$130.1	2.2	6.27	N/A	Yes	1,127,593	37.8%	32,349	44.9%	34.9	5.30	3.97	34,292	0.78	0.27	0.50
3B	Southbound/Eastbound	\$139.8	9.7	6.27	N/A	Yes						7.71	4.97	46,696	1.11	0.40	0.00
3C	Northbound/Westbound	\$136.0	2.2	6.39	N/A	Yes	1,073,724	40.7%	32,656	48.4%	32.9	4.90	3.90	27,118	0.70	0.11	0.00
3C	Southbound/Eastbound	\$145.7	9.7	6.39	N/A	Yes						7.30	4.50	37,440	1.04	0.16	0.00
3D	Northbound/Westbound	\$142.0	2.2	6.44	N/A	Yes	1,157,201	26.8%	32,605	36.9%	35.5	4.50	4.30	34,011	0.65	0.43	0.00
3D	Southbound/Eastbound	\$151.6	9.7	6.44	N/A	Yes						6.00	6.10	44,499	1.00	0.60	0.00
4	Northbound/Westbound	\$119.4	0.9	6.30	N/A	Yes	1,112,285	41.6%	32,545	47.5%	34.2	5.35	4.22	32,031	0.81	0.39	0.50
4	Southbound/Eastbound	\$130.6	9.6	6.30	N/A	Yes						7.96	5.81	43,565	1.15	0.56	0.00
5 ^b	Northbound/Westbound	\$127.2	0.9	6.13	N/A	Yes	1,096,973	37.4%	32,376	44.5%	33.9	5.05	4.71	30,633	0.73	0.53	0.25
5 ^b	Southbound/Eastbound	\$138.5	9.6	6.13	N/A	Yes						7.31	7.32	40,806	1.08	0.68	0.00

^a Person-trips includes HOV, general purpose and transit trips.

^b For Alternative 5, all HOT (HOV) travel times are based on fixed pricing, not congestion pricing.

Figure 4-26. Level 3 Screening Summary of Findings: Freeway Segment I-10, Southern Ave to 24th Street

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,323,101	42.1%	40,440	43.8%	32.7	8.24	6.57	51,547	0.94	0.57	4.25
Today	Southbound/Eastbound	\$0.0	0.0	5.00	No	Yes						10.27	7.86	48,585	1.10	0.67	4.25
No-Build	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,476,599	55.5%	54,810	58.1%	26.9	8.83	6.79	58,490	0.95	0.56	9.00
No-Build	Southbound/Eastbound	\$0.0	0.0	5.61	No	No						9.02	7.46	51,086	1.01	0.64	11.25
1B	Northbound/Westbound	\$170.4	1.5	6.09	Yes	No	1,481,941	55.2%	54,588	58.2%	27.1	8.77	6.83	57,965	0.95	0.58	8.50
1B	Southbound/Eastbound	\$166.7	3.1	6.51	Yes	No						8.86	7.36	48,858	0.99	0.64	9.75
2	Northbound/Westbound	\$170.4	1.5	6.09	Yes	No	1,486,229	55.7%	55,144	59.0%	27.0	9.00	6.81	59,170	0.96	0.57	9.50
2	Southbound/Eastbound	\$166.7	3.1	6.51	Yes	No						9.03	7.42	49,550	1.00	0.63	11.00
3A	Northbound/Westbound	\$185.7	5.7	5.94	Yes	No	1,525,293	54.6%	55,038	57.8%	27.7	7.79	6.63	62,586	0.89	0.56	5.50
3A	Southbound/Eastbound	\$163.7	0.1	6.47	Yes	No						8.21	7.42	53,445	0.93	0.62	4.00
3B	Northbound/Westbound	\$206.0	5.7	6.14	Yes	Yes	1,513,748	53.9%	54,815	57.7%	27.6	9.00	5.65	63,681	0.95	0.53	7.00
3B	Southbound/Eastbound	\$197.4	0.1	6.56	Yes	Yes						9.01	6.55	53,074	1.00	0.51	8.25
3C	Northbound/Westbound	\$206.3	5.7	6.26	Yes	Yes	1,472,237	54.1%	56,798	60.0%	25.9	10.80	5.40	54,477	0.88	0.30	5.00
3C	Southbound/Eastbound	\$179.3	0.1	5.99	Yes	Yes						7.20	5.60	44,942	0.92	0.28	2.00
3D	Northbound/Westbound	\$213.6	5.7	6.49	Yes	Yes	1,541,729	42.7%	54,663	51.4%	28.2	7.30	6.00	60,239	0.83	0.62	3.75
3D	Southbound/Eastbound	\$204.8	0.1	6.80	Yes	Yes						7.30	7.10	51,439	0.89	0.63	1.50
4	Northbound/Westbound	\$174.9	1.5	6.39	Yes	No	1,482,932	55.1%	54,819	58.4%	27.1	9.10	6.20	57,496	1.00	0.50	8.50
4	Southbound/Eastbound	\$171.1	3.1	6.12	Yes	No						8.88	7.07	48,653	1.05	0.59	10.25
5 ^b	Northbound/Westbound	\$180.5	1.5	6.52	Yes	No	1,476,847	54.4%	55,434	59.4%	26.6	8.27	6.86	53,778	0.91	0.60	5.00
5 ^b	Southbound/Eastbound	\$176.7	3.1	6.83	Yes	No						8.70	8.66	46,985	0.98	0.58	8.00

^a Person-trips includes HOV, general purpose and transit trips.

^b For Alternative 5, all HOT (HOV) travel times are based on fixed pricing, not congestion pricing.

Figure 4-27. Level 3 Screening Summary of Findings: Freeway Segment I-17, 24th Street to McDowell Road

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,345,668	39.1%	46,077	38.5%	29.2	13.87	10.50	25,609	1.14	N/A	4.25
Today	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						9.40	9.13	17,072	0.84	N/A	4.50
No-Build	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,585,619	53.4%	66,877	57.2%	23.7	17.89	13.99	26,549	1.09	N/A	6.75
No-Build	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						10.40	10.40	19,005	0.74	N/A	6.00
1B	Northbound/Westbound	\$164.6	0.0	5.22	No	No	1,582,217	52.7%	66,715	56.6%	23.7	17.74	13.96	26,875	1.08	N/A	7.25
1B	Southbound/Eastbound	\$155.4	0.0	5.22	No	No						10.32	10.32	18,757	0.74	N/A	6.00
2	Northbound/Westbound	\$216.0	1.3	5.31	Yes	Yes	1,591,498	51.9%	66,181	55.6%	24.0	16.99	13.98	29,372	1.15	N/A	9.50
2	Southbound/Eastbound	\$208.7	0.3	5.50	Yes	Yes						9.53	9.53	20,400	0.78	N/A	6.75
3A	Northbound/Westbound	\$203.8	0.2	5.35	No	No	1,635,872	52.9%	66,565	55.9%	24.6	16.18	13.25	34,374	1.04	N/A	5.00
3A	Southbound/Eastbound	\$200.2	0.0	5.16	No	No						8.94	8.94	23,205	0.69	N/A	5.75
3B	Northbound/Westbound	\$240.5	2.0	5.65	Yes	Yes	1,620,082	50.6%	65,914	55.0%	24.6	17.34	8.00	36,356	0.97	0.74	6.00
3B	Southbound/Eastbound	\$271.9	0.8	5.46	Yes	Yes						10.01	6.27	24,104	0.68	0.39	5.50
3C	Northbound/Westbound	\$241.6	2.0	5.19	Yes	Yes	1,603,466	47.6%	63,651	52.5%	25.2	13.20	13.10	32,977	0.91	N/A	4.00
3C	Southbound/Eastbound	\$238.3	0.8	4.81	Yes	Yes						8.20	8.20	21,435	0.60	N/A	5.50
3D	Northbound/Westbound	\$248.3	2.0	4.66	Yes	Yes	1,679,854	47.2%	66,058	53.1%	25.4	12.70	11.90	33,405	0.95	1.03	1.00
3D	Southbound/Eastbound	\$279.7	0.8	4.85	Yes	Yes						7.90	7.30	22,122	0.60	0.73	2.50
4	Northbound/Westbound	\$173.6	0.0	5.80	No	No	1,582,783	52.8%	66,753	56.9%	23.7	17.70	13.83	26,901	0.98	N/A	7.25
4	Southbound/Eastbound	\$165.6	0.0	5.42	No	No						10.30	10.30	18,747	0.68	N/A	6.00
5 ^b	Northbound/Westbound	\$172.5	0.0	5.16	No	No	1,586,366	54.3%	67,896	58.8%	23.4	17.54	12.72	28,306	0.97	N/A	6.25
5 ^b	Southbound/Eastbound	\$164.4	0.0	5.35	No	No						9.91	9.91	20,275	0.66	N/A	6.00

^a Person-trips includes HOV, general purpose and transit trips.

^b For Alternative 5, all HOT (HOV) travel times are based on fixed pricing, not congestion pricing.

Figure 4-28. Level 3 Screening Summary of Findings: Freeway Segment I-17, McDowell Road to Dunlap Avenue

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,151,262	49.3%	38,737	51.2%	29.7	12.17	6.74	35,467	1.18	0.57	3.75
Today	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						8.31	6.20	21,188	0.96	0.42	3.75
No-Build	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,320,490	65.3%	56,416	69.4%	23.4	15.44	7.78	38,525	1.46	0.75	5.50
No-Build	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						10.16	7.01	28,615	1.09	0.54	3.25
1B	Northbound/Westbound	\$210.9	10.0	5.81	No	No	1,335,828	65.5%	57,241	69.5%	23.3	15.42	7.82	38,689	1.45	0.76	5.75
1B	Southbound/Eastbound	\$211.0	10.9	5.81	No	No						10.35	7.05	28,951	1.09	0.55	3.25
2	Northbound/Westbound	\$286.1	17.7	5.36	Yes	Yes	1,324,039	64.3%	56,015	67.9%	23.6	15.40	7.69	38,553	1.45	0.74	5.50
2	Southbound/Eastbound	\$286.8	18.7	5.36	Yes	Yes						10.27	7.01	28,739	1.09	0.54	3.25
3A	Northbound/Westbound	\$257.8	15.3	5.42	No	No	1,415,175	65.0%	57,016	68.1%	24.8	14.14	7.68	47,228	1.36	0.75	4.50
3A	Southbound/Eastbound	\$264.8	17.8	5.80	No	No						8.76	6.83	34,281	0.99	0.54	2.75
3B	Northbound/Westbound	\$288.6	24.9	5.01	Yes	Yes	1,356,692	59.2%	55,418	65.5%	24.5	15.21	6.36	45,038	1.23	0.61	4.00
3B	Southbound/Eastbound	\$288.2	26.5	5.01	Yes	Yes						10.10	5.66	35,102	0.98	0.37	1.00
3C	Northbound/Westbound	\$294.6	24.9	5.38	Yes	Yes	1,274,438	53.7%	53,979	62.8%	23.6	7.10	5.30	31,230	1.03	0.30	0.00
3C	Southbound/Eastbound	\$294.1	26.5	5.58	Yes	Yes						6.60	5.50	25,943	0.81	0.11	0.00
3D	Northbound/Westbound	\$296.5	24.9	5.62	Yes	Yes	1,479,879	60.2%	58,002	66.4%	25.5	12.20	10.70	44,982	1.30	0.96	2.25
3D	Southbound/Eastbound	\$296.0	26.5	5.43	Yes	Yes						7.70	6.60	31,803	0.89	0.65	1.50
4	Northbound/Westbound	\$216.9	10.0	6.00	No	No	1,319,995	64.4%	55,996	67.9%	23.6	15.41	7.10	37,531	1.32	0.69	5.50
4	Southbound/Eastbound	\$217.0	10.9	6.20	No	No						10.33	6.55	28,265	1.03	0.52	3.00
5 ^b	Northbound/Westbound	\$218.8	10.0	6.13	No	No	1,355,958	69.0%	59,078	72.1%	23.0	14.64	12.71	35,057	1.24	1.01	3.25
5 ^b	Southbound/Eastbound	\$218.6	10.9	5.94	No	No						9.71	8.11	30,100	0.95	0.75	4.00

^a Person-trips includes HOV, general purpose and transit trips.

^b For Alternative 5, all HOT (HOV) travel times are based on fixed pricing, not congestion pricing.

Figure 4-29. Level 3 Screening Summary of Findings: Freeway Segment I-17, Dunlap Avenue to SR-101L

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,003,857	31.5%	28,573	31.7%	35.1	11.81	7.69	35,783	1.02	0.47	2.25
Today	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						7.02	5.46	27,394	0.87	0.36	2.50
No-Build	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,213,005	45.0%	40,251	49.0%	30.1	16.21	10.55	41,260	1.27	0.69	5.25
No-Build	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						8.37	6.26	31,309	1.07	0.50	4.75
1B	Northbound/Westbound	\$238.6	3.7	5.81	No	No	1,218,234	44.9%	40,238	49.0%	30.3	16.32	10.56	41,191	1.28	0.70	5.25
1B	Southbound/Eastbound	\$237.4	4.9	5.81	No	No						8.35	6.24	31,254	1.07	0.50	4.75
2	Northbound/Westbound	\$301.0	3.6	5.25	Yes	Yes	1,217,909	44.5%	40,201	48.4%	30.3	16.37	10.62	41,402	1.28	0.70	5.25
2	Southbound/Eastbound	\$300.3	4.1	5.25	Yes	Yes						8.38	6.27	31,361	1.07	0.50	4.75
3A	Northbound/Westbound	\$264.8	6.0	5.61	No	No	1,287,080	44.3%	40,511	47.6%	31.8	14.02	10.32	49,320	1.22	0.69	4.50
3A	Southbound/Eastbound	\$263.7	7.6	5.61	No	No						7.24	6.19	36,236	0.99	0.49	4.00
3B	Northbound/Westbound	\$329.4	7.2	5.01	Yes	Yes	1,244,659	43.2%	40,263	47.6%	30.9	16.18	7.97	46,662	1.27	0.61	4.50
3B	Southbound/Eastbound	\$320.0	7.2	5.01	Yes	Yes						8.43	5.48	33,951	1.07	0.40	4.00
3C	Northbound/Westbound	\$332.4	7.2	5.38	Yes	Yes	1,167,327	39.4%	39,410	46.5%	29.6	8.60	6.30	32,468	1.08	0.42	0.00
3C	Southbound/Eastbound	\$323.0	7.2	5.38	Yes	Yes						6.20	5.20	23,844	0.91	0.27	0.00
3D	Northbound/Westbound	\$337.3	7.2	5.43	Yes	Yes	1,311,589	36.0%	40,537	40.4%	32.4	12.50	11.70	46,228	1.17	0.69	3.75
3D	Southbound/Eastbound	\$327.9	7.2	5.43	Yes	Yes						6.70	6.00	34,125	0.93	0.46	3.00
4	Northbound/Westbound	\$241.6	3.7	6.00	No	No	1,216,743	43.7%	40,118	47.8%	30.3	16.11	9.93	40,468	1.35	0.67	5.00
4	Southbound/Eastbound	\$240.3	4.9	6.00	No	No						8.15	6.03	30,791	1.12	0.47	4.75
5 ^b	Northbound/Westbound	\$246.5	3.7	5.94	No	No	1,216,893	47.5%	40,638	51.0%	29.9	15.60	15.23	38,953	1.25	0.78	4.00
5 ^b	Southbound/Eastbound	\$245.2	4.9	5.94	No	No						7.85	7.54	28,752	1.01	0.59	3.00

^a Person-trips includes HOV, general purpose and transit trips.

^b For Alternative 5, all HOT (HOV) travel times are based on fixed pricing, not congestion pricing.

Results of the analysis and backup documentation showed that the expanded HOV lane options and the HOT lane options both notably improved the Spine corridor over the other alternatives. Consensus was reached by the Management Partners to carry a draft recommendation forward for an enhanced managed lane solution. When comparing the HOV and HOT lane alternatives, the differences were negligible, so the group could not conclude which of the two was best. As a result, the recommendation carried into the Level 4 screening would be to build out the enhanced HOV lane system between US-60 and the North Stack, and to only build Alternative 1B (Base Build) between the Pecos Stack and US-60. If, in the future, a HOT lane system is pursued in the Valley, the enhanced HOV lane system is easily convertible to a HOT lane system and so the recommendation maintains flexibility for the future.

This recommendation was called the Highest Performing Alternative (HPA). While consensus was achieved on the strategy of managed lanes, there were several variations on details within the recommended alternative, HPA. The Management Partners decided at the October 24, 2016, meeting that two versions of the HPA should be carried forward into a more detailed Level 4 screening, and the alternative that came out of Level 4 would be the recommended alternative.

4.5 Level 4 Screening

The Level 4 screening evaluated two hybrid alternatives: HPA1 and HPA2. The hybrid alternatives consisted of the No-Build Alternative, the Base Build Alternative and the additional HOV lane alternative. Several additional service DHOV ramps were also included in the HPA options. Three significant differences between HPA1 and HPA2 were:

- Between US-60 and the Split, HPA1 would add one additional HOV lane and HPA2 would add one additional HOV lane and one additional general purpose lane.
- The HPA1 ramp configuration between the Split and the Durango Curve would be the existing ramp configuration, and the HPA2 ramp configuration between the Split and the Durango Curve would be a reverse ramp configuration.
- HPA1 would have a DHOV at I-17 and 7th Street. HPA2 would have a DHOV at I-10 and North Sky Harbor Circle.

All the differences between HPA1 and HPA2 are shown in Figure 4-30.

4.5.1 Highest Performing Alternative 1 Description

HPA1 consisted of the No-Build Alternative, Base Build Alternative and combining the two Level 3 alternatives to add HOV lanes and general purpose lanes. This alternative would convert the HOV system into a managed lane system and would add an additional managed lane from the I-10/US-60 system interchange to the North Stack. In addition to adding another managed lane to the system, HPA1 would add DHOVs at:

- I-10 and Galveston (half DHOV to the north)
- I-10 and SR-143 (half DHOV to the south)

- I-10 and I-17 Split
- I-17 and 7th Street (half DHOV to the east)
- I-17 and Grand Avenue (half DHOV to the north)
- I-17 and SR-101L

For a complete description of HPA1, see Figure 4-30.

4.5.2 Highest Performing Alternative 2 Description

HPA2 consisted of the No-Build Alternative, Base Build Alternative and combining two Level 3 alternatives to add HOV lanes and general purpose lanes. This alternative would convert the HOV system into a managed lane system and would add an additional managed lane in each direction from the I-10/US-60 system interchange to the North Stack. It also would add another general purpose lane in each direction from the I-10/US-60 system traffic interchange to the I-10/I-17 Split and would change the ramp configuration between the I-10/I-17 Split to the I-17 Durango Curve to reverse ramps. HPA2 would also supplement its managed lane system by adding DHOVs at:

- I-10 and Galveston (half DHOV to the north)
- I-10 and SR-143 (half DHOV to the south)
- I-10 and I-17 Split
- I-10 and North Sky Harbor Circle (half DHOV to the south)
- I-17 and 7th Street (half DHOV to the east)
- I-17 and Grand Avenue (half DHOV to the north)
- I-17 and SR-101L

For a complete description of HPA2, see Figure 4-30.

Figure 4-30. Alternatives and Project Assumptions for Fourth Level Screening

Category	Projects	Notes and Comments
Alternative 1A – No-Build		
RTP	2035 RTP	All regionally modal projects, including South Central, Phoenix West, Glendale Downtown light rail transit lines. Improvements identified in the RTP for I-10 and I-17 omitted, except for Near-Term Strategy: +1 general purpose lane, southbound I-10, I-17 Split and US-60; C-D lanes and ramp braids, SR-143 and US-60; +1 general purpose Lane, I-10, US-60 to Ray Road; Bicycle/pedestrian crossings at Alameda and Guadalupe
RTP	Phoenix CIP	Local projects not accounted for in RTP
RTP	Phoenix Transportation 2050	Project list to be determined
RTP	Tempe CIP	Local projects not accounted for in RTP
RTP	Chandler CIP	Local projects not accounted for in RTP
Maintenance	Routine Maintenance	Signing, striping, drainage, electrical, landscaping, etc.
TDM/TSM	ADOT TSMO Division Rollout	System operations and safety, incident response
TDM/TSM	Trip Reduction Program	Run by the Maricopa County Air Quality Department

Alternative 1B – Base Build (includes No-Build Alternative)

Technology	Freeway Technology Package	Need to identify credit to take in the travel demand modeling evaluation; projects/strategies identified for freeways, arterials, driver/traveler/jurisdictional information, and connected/autonomous vehicles
Technology	System Operations and Maintenance Staffing	
Access	I-10/Baseline Road	Traffic interchange #2 priority – Proposing a DDI, but looked at a flyover/ParClo concept as well
Access	I-10/SR-143/48th Street I-10/Broadway	Traffic interchange #4 priority – three concepts developed Replace southbound SR-143 loop ramp to eastbound I-10; braided ramps along SR-143 between I-10 and University; replace SR-143/48th Street and Broadway bridges over I-10; add a DHOV connector between SR-143 and I-10 to/from the south
Access	I-10/40th Street	Traffic interchange #30 priority – If mainline widening configurations below warrant, consider reconfiguring the traffic interchange to a standard diamond to eliminate the loop ramp to maximize the span under the bridge and/or to minimize new ROW. Needs further investigation based on selected alternative.
Access	I-17/7th Avenue	Traffic interchange #9 priority – Widened tight diamond with additional arterial through lanes and other operational upgrades
Access	I-17/19th Avenue	Traffic interchange #5 priority – Widened tight diamond with additional arterial through lanes and other operational upgrades
Access	I-17/Jefferson/Adams	Traffic interchange #24 priority – Convert to a more standard split diamond and incorporate bicycle/pedestrian elements
Access	I-17/Thomas Rd	Traffic interchange #7 priority – Extend third Thomas Road eastbound lane to 23rd Avenue and other operational upgrades
Access	I-17/Indian School Road	Traffic interchange #17 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows

Figure 4-30. Alternatives and Project Assumptions for Fourth Level Screening

Category	Projects	Notes and Comments
Access	I-17/Camelback Road	Traffic interchange #8 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows and light rail transit
Access	I-17/Northern Avenue	Traffic interchange #13 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows
Access	I-17/Dunlap Road	Traffic interchange #3 priority – Upgrade current configuration with operational improvements, and extend third westbound lane (19th Avenue to 3rd Avenue)
Access	I-17/Peoria Avenue	Traffic interchange #1 priority – Widened tight diamond with additional arterial through lanes, bicycle/pedestrian accommodations and other operational upgrades. Upgrade drainage system.
Access	I-17/Cactus Road	Traffic interchange #10 priority – Upgrade current configuration with operational improvements, and extend third westbound lane. Upgrade drainage system.
Access	I-17/Thunderbird Road	Traffic interchange #6 priority – Convert to a three-level diamond traffic interchange to accommodate very large east-to-west regional flows, incorporate bicycle/pedestrian elements, widen Thunderbird to a seven-lane section between 20th Lane and 34th Avenue, and upgrade drainage system
Access	I-17/Greenway Road	Traffic interchange #14 priority – Upgrade current configuration with operational improvements, and extend third westbound lane to 19th Avenue. Upgrade drainage system.
Access	I-17/Bell Road	Traffic interchange #12 priority – Convert to three-level diamond traffic interchange to accommodate very large east-to-west regional flows. Expand park-and-ride lot in southwestern quadrant.
Transit	I-10/Galveston DHOV	Taken from the SE Corridor MIS recommendation; requested advancement by Chandler
Transit	I-17/Central Avenue Light Rail Transit Crossing	Presently in RTP; I-17 bridge replacement and reprofiling required
Transit	I-17/Van Buren Light Rail Transit Crossing	Presently in RTP; Van Buren bridge over I-17 to be replaced and raised to better accommodate the Split diamond and Jefferson/Adams
Transit	I-10/I-17 Stack Bus Ramps	Bus ramps from median of I-10 west of the Stack and then routed along the existing southbound frontage road on I-17 south to Van Buren Road. Southbound frontage road would be closed.
Transit	I-17/Camelback Light Rail Transit Crossing	Presently in RTP; included in the three-level diamond traffic interchange concept noted above
Transit	I-17/Mountain View Light Rail Transit Crossing	Presently in RTP; I-17 needs to reserve space for this future crossing over the Interstate
Transit	I-17/Bell Road Park-and-Ride Lot Expansion	Expand lot in conjunction with the Bell Road three-level diamond traffic interchange concept above
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing – I-10/Chandler Boulevard	Proposed bicycle/pedestrian crossing to connect Ahwatukee to Chandler across I-10
Bicycle/Pedestrian	Traffic interchange Upgrades – I-10/Warner Road	From Tempe 2015 Transportation Master Plan
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing – I-10/Highline Canal	Just south of Baseline; Spine recommendation to connect Phoenix, Tempe and Guadalupe and to discourage bikes from using the Baseline traffic interchange
Bicycle/Pedestrian	Bicycle/Pedestrian Crossing – I-10/Western Canal	North of Baseline at Arizona Mills Mall; from Tempe 2015 Transportation Master Plan and Phoenix Bike Plan Priority #33 - Connects Tempe and Phoenix bicycle routes

Figure 4-30. Alternatives and Project Assumptions for Fourth Level Screening

Category	Projects	Notes and Comments
Bicycle/ Pedestrian	Traffic interchange upgrades – I-10/32nd Street	From Phoenix Bike Plan, noted as an identified barrier
Bicycle/ Pedestrian	Traffic interchange upgrades - I-10/24th Street	From Phoenix Bike Plan, Priority #2
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Jefferson/Adams	From Phoenix Bike Plan, Priority #8
Bicycle/ Pedestrian	Bicycle/Pedestrian Crossing – I-17/Osborn Road/Grand Canal	Just south of Indian School - Phoenix Bike Plan, Priority #5/15
Bicycle/ Pedestrian	Bicycle/Pedestrian Crossing – I-17/Missouri Ave	Mid-mile between Camelback and Bethany Home (supports Grand Canyon University) – from Phoenix Bike Plan, Priority #17
Bicycle/ Pedestrian	Bicycle/Pedestrian Crossing – I-17/Maryland Ave	Existing bicycle/pedestrian crossing at mid-mile between Bethany Home and Glendale. To remain, or to be replaced if affected by freeway widening.
Bicycle/ Pedestrian	Bicycle/Pedestrian Crossing – I-17/Arizona Canal	Existing bicycle/pedestrian crossing just north of Dunlap. To remain, or to be replaced if affected by freeway widening.
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Northern	Bicycle/pedestrian crash hot spot, solution integrated into traffic interchange reconstruction
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Peoria	Bicycle/pedestrian crash hot spot, solution integrated into traffic interchange modernization
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Thunderbird	From Phoenix Bike Plan, noted as an identified barrier; bicycle/pedestrian crash hot spot, solution integrated into traffic interchange reconstruction
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Greenway	From Phoenix Bike Plan, noted as an identified barrier
Bicycle/ Pedestrian	Bicycle/Pedestrian Crossing – I-17/Paradise Lane-Grandview	From Phoenix Bike Plan, noted as an identified barrier; mid-mile between Greenway and Bell
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Bell Road	From Phoenix Bike Plan, noted as an identified barrier
Bicycle/ Pedestrian	Traffic interchange upgrades - I-17/Union Hills Drive	From Phoenix Bike Plan, Priority #21
Weave	Dual Lane Exit Ramp Conversions	Convert exit ramps with exit only from auxiliary lanes to a two-lane exit (option + drop lane) throughout corridor where feasible.
Weave	I-10; Elliot to Baseline	Extend the US-60 C-D road system south from Baseline Road to Elliot Road to improve the safety of this weave, to provide a barrier-separated roadway for system redundancy where no good arterial redundancy exists today, and to aid in ramp storage length for both of the south side Baseline Road ramps.

Highest Performing Alternative (HPA) 1 – Managed Lane Addition (includes No-Build and Base Build Alternatives)

Special Lanes	I-10, Pecos Stack to US-60	Limit improvements to Alternative 1B (Base Build) only.
Special Lanes	US-60 to Split	Add a second HOV lane (2+ occupancy) each direction, using DHOVs at either end to terminate second HOV lane.
Special Lanes	I-10/I-17 Split Interchange	Add a two-way DHOV connector between I-17 and I-10 to the east.

Figure 4-30. Alternatives and Project Assumptions for Fourth Level Screening

Category	Projects	Notes and Comments
Special Lanes	I-17, Split to Grand Avenue	Alternative 2 + Add an HOV lane (2+ occupancy) on I-17 each direction, but using width design exceptions as appropriate to minimize ROW and Stack interchange impacts from the Durango Curve to Grand Avenue.
Special Lanes	I-10, Sky Harbor Circle North	Add a two-way DHOV connector in the median of I-10 to/from Sky Harbor Circle North to/from the south.
Special Lanes	I-17, Stack	Add a bus ramp to the I-10 median at the Stack interchange from Van Buren via the existing frontage road. The bus ramp will ultimately be used for the light rail transit route planned down the median of I-10.
Special Lanes	I-17, Grand Avenue to Peoria	Alternative 2 + Add a second HOV lane (2+ occupancy) each direction, but using width design exceptions as appropriate to minimize ROW impacts.
Special Lanes	I-17, Grand Avenue	Add a two-way DHOV connector in the median of I-17 to/from Grand Avenue/Thomas Road to/from the north. This is the south terminus of the second HOV lane going north on I-17.
Special Lanes	I-17, Peoria to North Stack	Alternative 2 + Add a second HOV lane (2+ occupancy) each direction.
Special Lanes	I-17, North Stack	Add a two-way DHOV connector between I-17 on the south leg and SR-101L on the west leg. This would be the northern terminus of the second HOV lane on I-17 to the south.

Highest Performing Alternative (HPA) 2 – Same as HPA1, but with the following modifications

Special Lanes	I-10, Pecos Stack to US-60	Same as HPA1
Special Lanes	US-60 to Split	In addition to HPA1, add one additional general purpose lane each direction, creating a 6+2+Auxiliary section.
Special Lanes	I-10/I-17 Split Interchange	Same as HPA1
Special Lanes	I-17, Split to Grand Avenue	Same as HPA1, except that a reverse ramp configuration will be considered between 16th and 7th Streets, and between 7th and 19th Avenues.
Special Lanes	I-17, 7th Street	Add a two-way DHOV connector in the median of I-17 to/from 7th Street to/from the east.
Special Lanes	I-10, Sky Harbor Circle North	No DHOV connector at Sky Harbor Circle North is included in HPA2.
Special Lanes	I-17, Stack	Add a bus ramp to the I-10 median at the Stack interchange from Van Buren via the existing frontage road. The bus ramp will ultimately be used for the light rail transit route planned down the median of I-10.
Special Lanes	I-17, Grand Avenue to Peoria	Same as HPA1
Special Lanes	I-17, Grand Avenue	Same as HPA1
Special Lanes	I-17, Peoria to North Stack	Same as HPA1
Special Lanes	I-17, North Stack	Same as HPA1

4.5.3 Level 4 Screening Criteria

The Level 4 screening consisted of the same criteria as Level 3: infrastructure, safety, operations and cost. See Figures 4-31 to 4-35 for a summary of the Level 4 HPA results for infrastructure, operations and cost, and see Figure 4-36 for a summary of the Level 4 safety analysis.

Environmental impacts were also analyzed in the Level 4 screening. The environmental analysis of the HPA alternative identified any impacts to the priority resources identified in the NAR as well as impacts to both commercial and residential properties. These impacts were quantified by overlaying the new ROW shapes for HPA1 and HPA2 on the priority resource layers as well as the commercial and residential property layers in GIS and calculating the area/number of impacts. Figure 4-37 summarizes the environmental impacts for HPA1 and HPA2.

4.5.4 Level 4 Screening Results

The results of the Level 4 screening were presented at the December 2, 2016, AEP meeting, and general consensus was reached to move forward with preliminarily recommending a variation of HPA2. The additional general purpose lane between US-60 and the I-10/I-17 Split and the reversed ramp configuration between the I-10/I-17 Split and the Durango Curve provided additional benefit and value, such that the AEP decided it was worth the additional cost. Traffic models showed that the DHOV at North Sky Harbor Circle did not attract the anticipated demand, so it was removed from the recommended alternative and was replaced with the DHOV at 7th Street on I-17. The final alternative that emerged from the Level 4 screening is referred to as the preliminary recommended alternative.

4.5.5 Conclusions

Once the Level 4 screening was completed and a preliminary recommended alternative was identified, the Level 4 screening results and the subsequent documentation from Level 1 through Level 4 were taken to the public to review. Four public meetings were held throughout the Spine corridor over a period of 8 days. Chapter 5 documents the public outreach and public meetings held to inform the public of the Spine recommendation and of the alternatives screening process. Chapter 6 documents the final Spine recommended alternative.

Figure 4-31. Level 4 Screening Summary of Findings: Freeway Segment I-10, SR-202L to Southern Avenue

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	N/A	Yes	911,139	40.7%	26,216	45.6%	34.8	5.74	4.09	29,782	0.71	0.35	3.3
Today	Southbound/Eastbound	\$0.0	0.0	5.00	N/A	Yes						10.13	5.49	38,896	1.02	0.51	2.5
No-Build	Northbound/Westbound	\$0.0	0.0	5.86	N/A	Yes	1,103,239	38.6%	32,110	45.3%	34.4	5.25	4.28	32,195	0.76	0.40	0.5
No-Build	Southbound/Eastbound	\$0.0	0.0	5.86	N/A	Yes						7.71	5.87	43,078	1.11	0.53	0.0
HPA1	Northbound/Westbound	\$188.3	2.2	6.00	N/A	Yes	1,125,373	34.0%	32,155	42.1%	35.0	4.79	4.41	29,365	0.83	0.47	0.0
HPA1	Southbound/Eastbound	\$198.1	5.4	6.00	N/A	Yes						7.24	6.10	39,191	1.12	0.58	0.0
HPA2	Northbound/Westbound	\$188.3	2.2	6.00	N/A	Yes	1,132,320	34.0%	32,437	42.2%	34.9	4.84	4.41	29,753	0.84	0.46	0.0
HPA2	Southbound/Eastbound	\$198.1	5.4	6.00	N/A	Yes						7.32	6.15	39,562	1.12	0.59	0.0

^a Person-trips includes HOV, general purpose and transit trips.

Figure 4-32. Level 4 Screening Summary of Findings: Freeway Segment I-10, Southern Avenue to 24th Street

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,323,101	42.1%	40,440	43.8%	32.7	8.24	6.57	51,547	0.94	0.57	4.3
Today	Southbound/Eastbound	\$0.0	0.0	5.00	No	Yes						10.27	7.86	48,585	1.10	0.67	4.3
No-Build	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,476,599	55.5%	54,810	58.1%	26.9	8.83	6.79	58,490	0.95	0.56	9.0
No-Build	Southbound/Eastbound	\$0.0	0.0	5.61	No	No						9.02	7.46	51,086	1.01	0.64	11.3
HPA1	Northbound/Westbound	\$219.9	8.4	6.14	Yes	Yes	1,514,956	53.5%	55,056	57.6%	27.5	6.40	3.63	62,794	0.95	0.51	6.8
HPA1	Southbound/Eastbound	\$219.0	0.0	6.56	Yes	Yes						6.16	4.02	53,245	1.02	0.48	1.8
HPA2	Northbound/Westbound	\$222.8	8.5	6.32	Yes	Yes	1,531,734	49.0%	54,615	54.8%	28.0	5.60	3.62	64,703	0.93	0.51	3.5
HPA2	Southbound/Eastbound	\$219.1	0.0	6.74	Yes	Yes						5.69	4.01	55,365	0.94	0.47	0.5

^a Person-trips includes HOV, general purpose and transit trips.

Figure 4-33. Level 4 Screening Summary of Findings: Freeway Segment I-17, 24th Street to McDowell Road

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,345,668	39.1%	46,077	38.5%	29.2	13.87	10.50	25,609	1.14	N/A	4.3
Today	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						9.40	9.13	17,072	0.84	N/A	4.5
No-Build	Northbound/Westbound	\$0.0	0.0	5.00	No	No	1,585,619	53.4%	66,877	57.2%	23.7	17.89	13.99	26,549	1.09	N/A	6.8
No-Build	Southbound/Eastbound	\$0.0	0.0	5.00	No	No						10.40	10.40	19,005	0.74	N/A	6.0
HPA1	Northbound/Westbound	\$264.0	10.4	5.65	Yes	Yes	1,615,075	51.0%	66,054	55.3%	24.5	17.26	7.87	29,039	1.07	0.71	6.0
HPA1	Southbound/Eastbound	\$294.3	5.7	5.46	Yes	Yes						8.80	5.73	21,082	0.74	0.39	5.5
HPA2	Northbound/Westbound	\$276.5	6.2	5.77	Yes	Yes	1,614,787	50.4%	66,174	54.8%	24.4	17.12	7.69	30,540	1.11	0.68	0.0
HPA2	Southbound/Eastbound	\$307.7	11.2	5.58	Yes	Yes						8.70	5.70	22,273	0.77	0.36	5.8

^a Person-trips includes HOV, general purpose and transit trips.

Figure 4-34. Level 4 Screening Summary of Findings: Freeway Segment I-17, McDowell Road to Dunlap Avenue

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound	\$0.0	0.0	5.00	No	No	1,151,262	49.3%	38,737	51.2%	29.7	12.17	6.74	35,467	1.18	0.57	3.8
Today	Southbound	\$0.0	0.0	5.00	No	No						8.31	6.20	21,188	0.96	0.42	3.8
No-Build	Northbound	\$0.0	0.0	5.00	No	No	1,320,490	65.3%	56,416	69.4%	23.4	15.44	7.78	38,525	1.46	0.75	5.5
No-Build	Southbound	\$0.0	0.0	5.00	No	No						10.16	7.01	28,615	1.09	0.54	3.3
HPA1	Northbound/Westbound	\$313.8	26.3	5.38	Yes	Yes	1,368,074	60.0%	56,601	66.6%	24.2	15.24	6.75	45,175	1.43	0.59	4.0
HPA1	Southbound/Eastbound	\$318.3	30.8	5.38	Yes	Yes						10.10	6.00	26,496	1.09	0.38	1.0
HPA2	Northbound/Westbound	\$313.8	26.3	5.38	Yes	Yes	1,367,523	60.0%	56,535	66.5%	24.2	15.24	6.73	45,098	1.43	0.59	4.0
HPA2	Southbound/Eastbound	\$318.3	30.8	5.38	Yes	Yes						10.13	6.00	26,540	1.09	0.37	1.0

^a Person-trips includes HOV, general purpose and transit trips.

Figure 4-35. Level 4 Screening Summary of Findings: Freeway Segment I-17, Dunlap Avenue to SR-101L

Alternative		Cost Opinion (2016 \$M)	Net New ROW (Acres)	Public Input Score	Replaces Old Infrastructure	Full Design Standards	VMT	% VMT Congested	VHT	% VHT Congested	VMT/VHT (mph)	General Purpose Travel Time (Minutes, 2-6pm Peak)	HOV Travel Time (Minutes, 2-6pm Peak)	Person-Trips ^a	Avg. General Purpose v/c	Avg. HOV v/c	Freeway Duration of Congestion (Hours)
Today	Northbound	\$0.0	0.0	5.00	No	No	1,003,857	31.5%	28,573	31.7%	35.1	11.81	7.69	35,783	1.02	0.47	2.3
Today	Southbound	\$0.0	0.0	5.00	No	No						7.02	5.46	27,394	0.87	0.36	2.5
No-Build	Northbound	\$0.0	0.0	5.00	No	No	1,213,005	45.0%	40,251	49.0%	30.1	16.21	10.55	41,260	1.27	0.69	5.3
No-Build	Southbound	\$0.0	0.0	5.00	No	No						8.37	6.26	31,309	1.07	0.50	4.8
HPA1	Northbound/Westbound	\$346.5	14.3	5.38	Yes	Yes	1,244,817	43.7%	40,278	48.5%	30.9	16.16	7.99	46,178	1.22	0.61	4.5
HPA1	Southbound/Eastbound	\$301.5	6.4	5.38	Yes	Yes						8.41	5.48	34,024	1.07	0.40	4.0
HPA2	Northbound/Westbound	\$346.5	14.3	5.38	Yes	Yes	1,245,486	43.7%	40,320	48.5%	30.9	16.18	7.99	46,208	1.22	0.61	4.5
HPA2	Southbound/Eastbound	\$301.5	6.4	5.38	Yes	Yes						8.43	5.48	34,055	1.07	0.40	4.0

^a Person-trips includes HOV, general purpose and transit trips.

Figure 4-36. Level 4 Safety Analysis

Improvement	CMF ^a	Crash Reduction %	Study Alternatives											
			HPA1					HPA2						
			1	2	3	4	5	1	2	3	4	0		
Segments														
Widen lane	1	0%		X	X	X	X		X	X	X	X	X	
Widen shoulder (≥4 feet)	0.64	36%		X	X	X	X		X	X	X	X	X	
Rehabilitate shoulder	0.72	28%		X	X	X	X		X	X	X	X	X	
Rehabilitate pavement	0.7	30%		X	X	X	X		X	X	X	X	X	
Rehabilitate bridge	0.95	5%		X	X	X	X		X	X	X	X	X	
Construct auxiliary lanes	0.78	22%			X					X				
Construct HOV lane	0.95	5%		X	X	X	X		X	X	X	X	X	
Construct new general purpose lane	0.9	10%	X					X	X					
Add freeway C-D roads	0.9	10%	X	X				X	X					
Widen and modify entry/exit ramps	0.21	79%	X	X	X	X	X	X	X	X	X	X	X	
Convert continuous access HOV to limited access	1.54	-54%	N	N	N	N	N	N	N	N	N	N	N	
Convert HOV lanes to HOT lanes	0.95	5%												
Increase lane width from 11 to 12 feet	0.95	5%			X	X				X	X			
DHOV (eliminates weave and reduces conflict points)		+	X	X	X	X	X	X	X	X	X	X	X	
ITS for ATM	0.8	20%	X	X	X	X	X	X	X	X	X	X	X	
ITS for incident management	0.85	15%	X	X	X	X	X	X	X	X	X	X	X	
Install pedestrian bridge ^b	0.1	90%	X	X		X	X	X	X		X	X	X	

Sources: CMFs developed for ADOT Corridor Profile Studies, HSM, CMF Clearinghouse, and other state and national resources

^a Crash Modification Factor – multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure

^b Pedestrian-only crash benefit

Segment Definition

- I-10, Pecos Stack to Southern Avenue
- I-10, Southern Avenue to Split
- I-17, Split to Grand Avenue
- I-17, Grand Avenue to Dunlap Avenue
- I-17, Dunlap Avenue to North Stack

Figure 4-37. Environmental Impacts Summary

Limits	Name	Hazardous Waste Site (Resource Conservation and Recovery Act)		Leaking Underground Storage Tanks		Priority One Underground Storage Tanks		Underground Storage Tanks		Section 4(f) Schools		Section 4(f) Parks (Green Valley Park, Acres)		Section 4(f) Historic Properties (Acres)		Section 6(f) Properties (Acres)	
		HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2
Segment 1	Pecos Stack to Southern Avenue																
Segment 2	Southern Avenue to 24th Street																
Segment 3	24th Street to I-10/I-17 Stack	1	1		1		1		1				0.04	0.03	0.53		
Segment 4.1	I-10/I-17 Stack to Indian School	2	2	4	4			6	6					0.38	0.39		
Segment 4.2	Indian School to Dunlap Avenue	1	1	3	3	1	1	3	3					0.18	0.18		
Segment 5	Dunlap Avenue to North Stack	1	1														
Total		5	5	7	8	1	2	9	10	0	0	0.00	0.04	0.59	1.10	0.00	0.00

Limits	Name	Water Resource		Minority Population 50-100% (Acres)		Below Poverty Population 40-100% (Acres)		Commercial – Office (Acres)		Commercial – Retail (Acres)		Residential (Acres)		Commercial – Office (Number of Parcels)		Commercial – Retail (Number of Parcels)		Residential (Number of Parcels)	
		HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2	HPA1	HPA2
Segment 1	Pecos Stack to Southern Avenue			0.45	0.45			0.53	0.53	2.80	2.80			3	3	10	10		
Segment 2	Southern Avenue to 24th Street			0.08	0.10	5.64	5.78	0.24	0.24	0.28	0.28			4	5	3	3		
Segment 3	24th Street to I-10/I-17 Stack			3.21	4.50	6.46	12.87	0.05	0.01	2.12	2.20	0.39	0.57	2	1	22	29	15	26
Segment 4.1	I-10/I-17 Stack to Indian School			10.40	10.76	11.59	11.95	1.51	1.51	2.14	2.15	5.86	5.80	8	8	19	23	41	41
Segment 4.2	Indian School to Dunlap Avenue			30.98	30.98	20.06	20.06	3.60	3.60	10.40	10.40	17.17	17.17	35	35	104	104	146	146
Segment 5	Dunlap Avenue to North Stack			0.77	0.77			1.34	1.34	2.89	2.89	3.72	3.72	15	15	38	38	90	90
Total		0.00	0.00	45.90	47.56	43.75	50.65	7.26	7.23	20.62	20.72	27.14	27.26	67	67	196	207	292	303

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