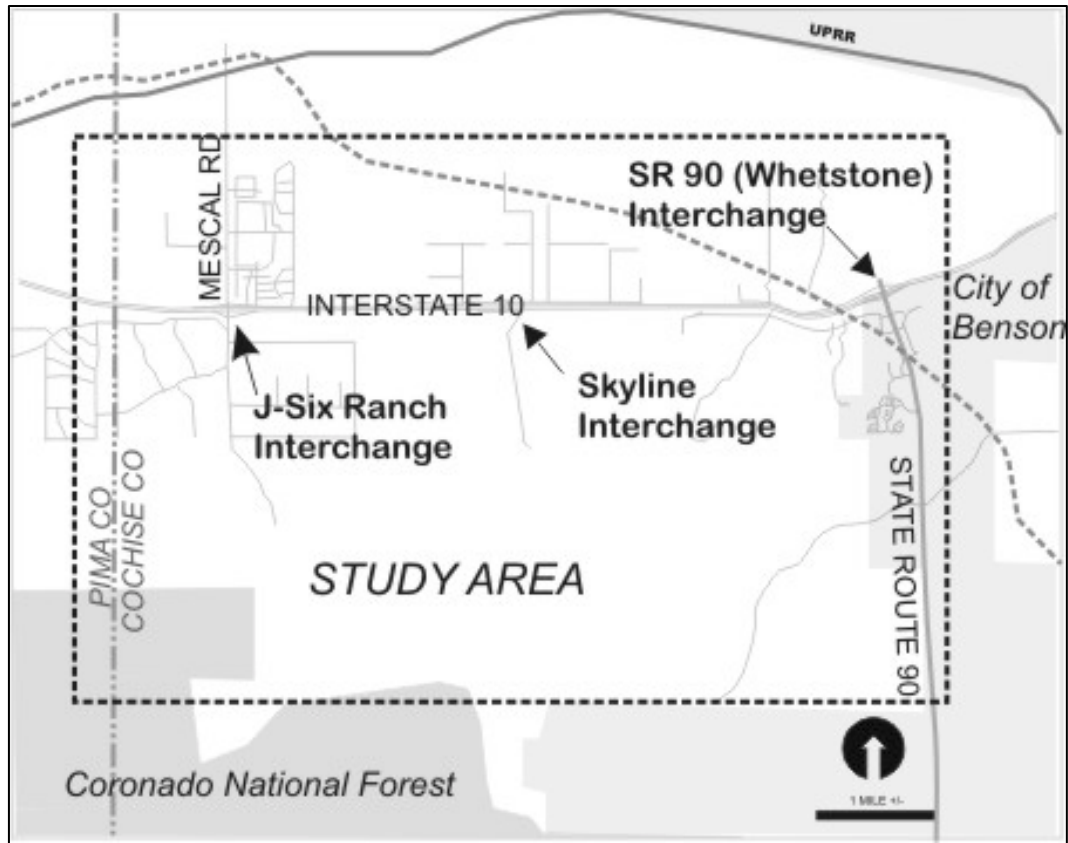


## PENULTIMATE RECOMMENDATIONS



# NORTHWEST COCHISE COUNTY TRANSPORTATION PLANNING STUDY



5460 West Four Barrel Court  
Tucson, AZ 85743

April 15, 2005

**PENULTIMATE RECOMMENDATIONS**

**NORTHWEST COCHISE COUNTY**

**TRANSPORTATION PLANNING STUDY**

Prepared for:

**Cochise County, Arizona**



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**April 15, 2005**

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## 6: Recommendations

### Development of Preferred Alternative

In developing this regional transportation plan, three alternatives were developed and refined for continued analysis and evaluation. The three alternatives considered east-west connectivity, I-10 bypass opportunities, new north-south connections to I-10, connections from major developments to existing communities, the extension of existing I-10 frontage roads and a new road providing access to recreation activities in the Whetstone Mountains.

All of the alternatives included the reconstruction or relocation of the three freeway interchanges due to current deficiencies and in anticipation of the need for higher capacity facilities meeting contemporary design standards. The off-ramp/cross road intersections will likely need to be signalized or be reconstructed as roundabouts. These interchange projects could cost about \$10 million each, and take up to eight years to implement, assuming funding will be available for construction.

All of the alternatives included interconnectivity between the freeway interchanges either via frontage roads or east-west collector roadways tying in to current and proposed north-south routes. This provides alternatives for travel on the freeway for shorter trips, and would permit safer use of bicycles and walking for shorter trips.

A "hybrid" alternative, Hybrid 1, incorporating the best elements of the three was established. Following public and agency review, modifications to the Hybrid 1 alternative were made and the final alternative, Hybrid 2, was established as the preferred alternative. A description of the two Hybrid alternatives follows.

### Hybrid 1 Alternative

Following agency review of the three alternatives the Hybrid 1 alternative was developed that included the following major elements,

- 1) A new east-west route on the north side of I-10 that that would provide a connection between Mescal Road and an extension of SR 90 to the north,
- 2) Another new east-west route that would connect J-Six Ranch Road through the proposed Smith Ranch development to SR 90,
- 3) A potential third connection that would extend J-Six Ranch Road to the southeast and intersect with SR 90 along the Post Road alignment.
- 4) A new north-south roadway that would connect the new east-west roadways closest to I-10 through a reconstructed or relocated Skyline Interchange.
- 5) An extension of the frontage road on the south side of I-10 from SR 90 east to SR 80.
- 6) The widening of SR 90 to six lanes from I-10 to south of Post Road.
- 7) The reconstruction of the J-Six Ranch/Mescal, Skyline and SR 90 interchanges at I-10.

Additional elements include the signalization of arterial-arterial and arterial-collector intersections where warranted (in the future) and planning studies (location reports, change of access analysis and other traffic studies) that would prepare for the specific improvements suggested in the Hybrid alternative. The City of Benson is preparing to manage its first city transportation study to identify project needs over a

future period. This study is included in the list of projects recommended for this planning study. The collector/collector intersections may need signalization, but they could also be designed as modern roundabouts to negate the expense and delay associated with traffic signals. Signals should only be installed and activated when warrants contained in the *Manual on Uniform Traffic Control Devices* are met, and an engineering analysis demonstrates their need.

The Hybrid 1 alternative did not include direct access by new development to Titan Road, nor were new frontage roads included in the Hybrid 1 Alternative.

#### Hybrid 2 Alternative (Preferred)

Following the receipt of public comments and another agency review period, a final and preferred alternative, Hybrid 2, was developed. This alternative is very close in concept to the Hybrid 1 alternative. Two significant modifications were made: the east-west connector north of I-10 is now envisioned to be more northern and the direct east-west connection from Smith Ranch to J-Six Ranch Road was removed. Both of these adjustments were made based on public and agency concerns about the impacts of future roads through existing rural neighborhoods, and incorporation of the zoning stipulations for the approved Smith Ranch Master Development Plan. The eastern connection from Smith Ranch Road was also realigned to intersect SR 90 at a location about ½-mile north of the concept shown in the Hybrid 1 Alternative. This eastern roadway is tentatively named Nueva Jenella Road.

The roadway alignments identified in the Hybrid 2 alternative should be considered very conceptual. Prior to implementation, additional alignment, right-of-way, environmental, and design studies will be needed. The new roadways could take three or more years to fund and construct. Exhibit 1 illustrates the Hybrid 2 alternative.

#### Plan Implementation

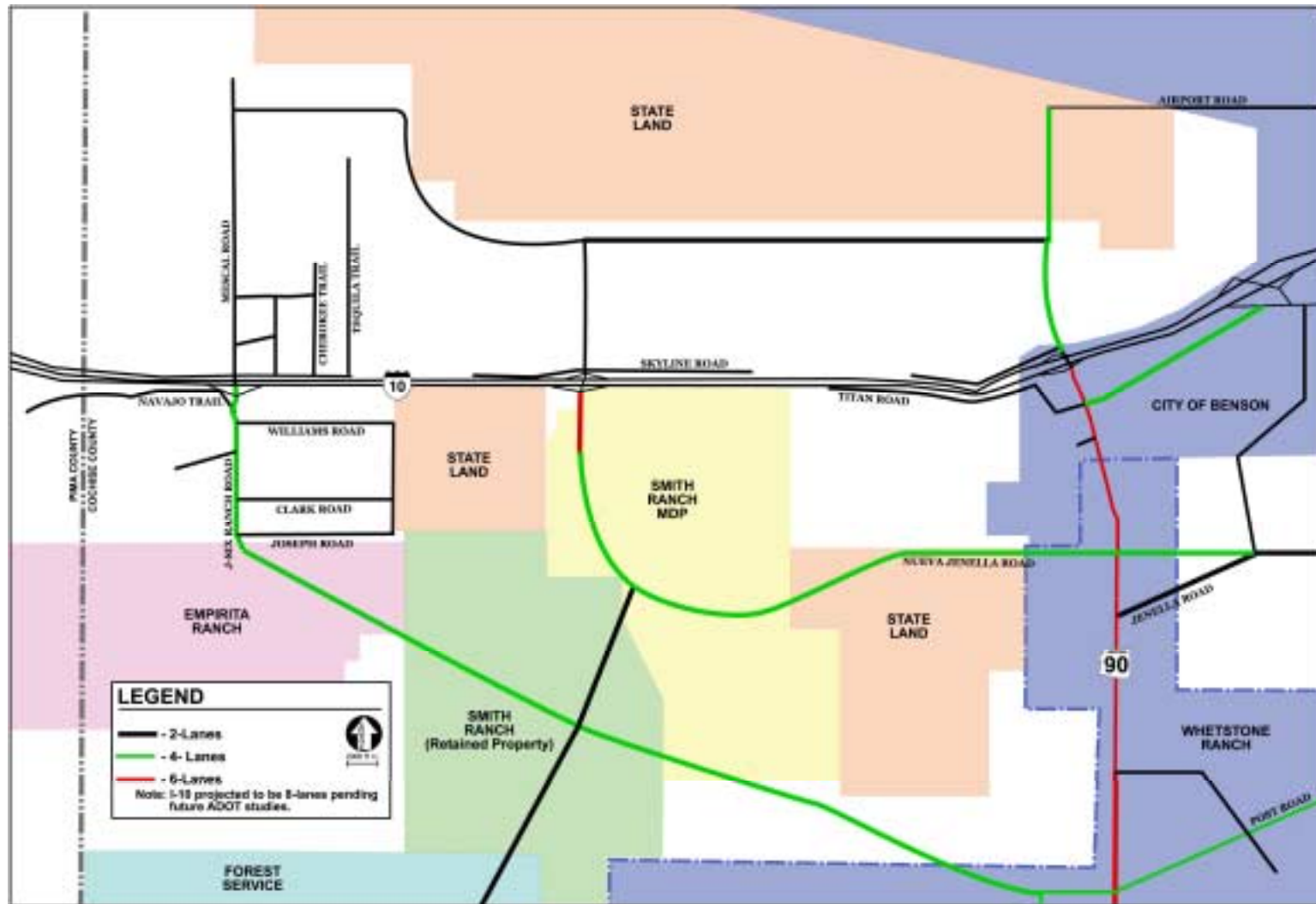
The projects associated with the recommended Hybrid 2 alternative will have wide ranging costs, opportunities for cost sharing, and varying implementation lead times. The most complex projects will be those related to I-10 because of the Federal and State environmental requirements and access control regulations of the Federal Highway Administration. These will also be among the most expensive projects. Lead times could be eight years or more for new interchanges, assuming funds are committed and made available in a timely manner.

The easier improvements will likely be those along existing rights-of-way or across easily attainable rights-of-way. For instance, access across State land should be attainable if the State Land Department sees a benefit to the State Trust. Private land owners may dedicate land free, if access to their property (and therefore value) is enhanced.

Planning studies will be required for most improvements that are recommended. Locations studies will be necessary to identify specific alignments for new roadways. These studies will require environmental documentation and permitting, design concepts and public involvement. Pre-design efforts may require up to two years before actual design and construction occurs.

ADOT should aggressively pursue its planning and design concepts for I-10 into Cochise County. The studies currently stop at the Cochise/Pima County line. Digital orthophotography will be available in calendar year 2005 from the Pima Association of Governments, which should be suitable for planning and preliminary design purposes.

Exhibit 1 Hybrid 2 Alternative



New funding sources dedicated to improvements of the existing roadways and network expansion will be needed. This report recommends using a new Cochise County roadway impact fee and the recently adopted City of Benson construction sales tax for these purposes, in addition to traditional sources like the Highway User Revenue Fund. Most of the revenue generated by these two sources will come from new development, and will be used for new roadways and capacity improvements.

It is anticipated that the projects identified in this study will take at least 25 years, possibly as long as 35 years, to fully implement. The status of development in the area, and the roadways needed to serve the development, should be monitored regularly by local and state agencies. This study should be updated periodically, perhaps every five years.

The cost of plan implementation should include expansion of Cochise County staff to oversee the effective completion of recommended projects. It is reasonable to expect the need for additional staff to manage, monitor and inspect the proposed plan.

### Plan Phasing

The phasing of the roadway network improvements within the project area was based on two specific horizon years and a "Build out" year. The two horizon years, 2015 and 2025, represent periods when expected additions and improvements to the northwest Cochise County roadway system should be in place to accommodate anticipated growth and development, and so that the roadway network performance is satisfactory at different stages of area development.

Inadequate roadway development supporting fast growing areas is a challenge. It is difficult to implement projects in areas where the existing traffic exceeds the capacity of the roadways, and public demand for short term solutions is high. However, short term solutions may be both costly and counterproductive in the implementation of permanent solutions. Therefore, Cochise County must monitor its infrastructure needs continually to ensure that projects are programmed and funding is identified prior to infrastructure elements exceeding their capacities.

### Implementation Costs

A preliminary work-up of project costs was developed from a basic set of unit costs for each type of facility construction or improvement. The typical unit costs which jurisdictions within the project area can expect to pay are consistent with current improvement costs experienced in nearby jurisdictions. These average costs presented in current year (2005) dollars include:

### Exhibit 2 Approximate Unit Costs

3 lane collector	\$2,500,000/Mile
4 lane divided arterial	\$4,500,000/Mile
6 lane divided arterial	\$6,500,000/Mile
Upgrade 2 lane divided to 4 lane divided	\$3,500,000/Mile
Upgrade 4 lane divided to 6 lane divided	\$5,000,000/Mile
Interchange	\$10,000,000/Each



The above arterial and collector improvement costs include the cost of right of way, together with standard costs for drainage and utility improvements. It is expected that interchange improvements would occur within existing ADOT right of way.

The costs for local roads (most collectors, residential streets, alleys, etc) are not included in the costs in the table because these roads are generally constructed by the land developer.

#### Phasing by Horizon Year

The following section identifies the recommended projects that should be in place by the horizon year (2015, 2025, Build Out). A list of projects with a map key and a map showing the location and type of project is shown for each horizon year.

##### Between 2005 and Year 2015

Major projects through the year 2015 include a new road from the Smith Ranch development to SR 90. This road, tentatively name Nueva Jenella Road would intersect at SR 90 along an existing County section line. Nueva Jenella Road would continue east toward the City of Benson where it would tie into the existing City roadway system, thus providing a direct connection from the Smith Ranch development to the existing Benson area. Also, based on expected growth within Smith Ranch and along SR 90, the acceptable capacity of SR 90 is projected to be exceeded and SR 90 should be widened to a six-lane cross section north of the Nueva Jenella Road intersection. An extension of the frontage road south of I-10 from SR 90 east to Benson is included in these projects to be completed by 2015. Exhibit 3 is a table that describes the projects that are recommended to be in place by 2015 and the costs of implementation. Exhibit X illustrates the projects. The cost of the projects listed and shown is approximately \$54 million in current (2005) year dollars.

##### Between 2016 and Year 2025

By the year 2025, recommended projects include a new east-west roadway from Mescal Road north of I-10 to a new roadway extending northward from a reconstructed or relocated Skyline interchange. Growth along SR 90 will increase, potentially requiring its widening to a six lane cross section south of Nueva Jenella Road. Exhibit 4 is a table that describes the projects that are recommended to be in place by 2025. Exhibit 5 illustrates the projects. The estimated cost of the projects listed and shown is approximately \$27 million in current (2005) year dollars. The total cost of plan implementation through the year 2025 is about \$81 million.

##### Build Out – After 2006

Projects forecast for the build out year include an extension of the new east-west roadway north of I-10 to SR 90. If a regional need for an additional southern east-west roadway develops, a new four-lane roadway would potentially extend from J-Six Ranch Road southeasterly and intersect with SR 90 at Post Road. SR 90 would also be widened south to Post Road. An extension of SR 90 north of I-10 to provide access to the Benson Airport is included in the project list. Exhibit 6 shows the roadway network at build out. The total cost of plan implementation through build out is about \$166 million.



## Exhibit 3 List of Year 2015 Projects and Costs

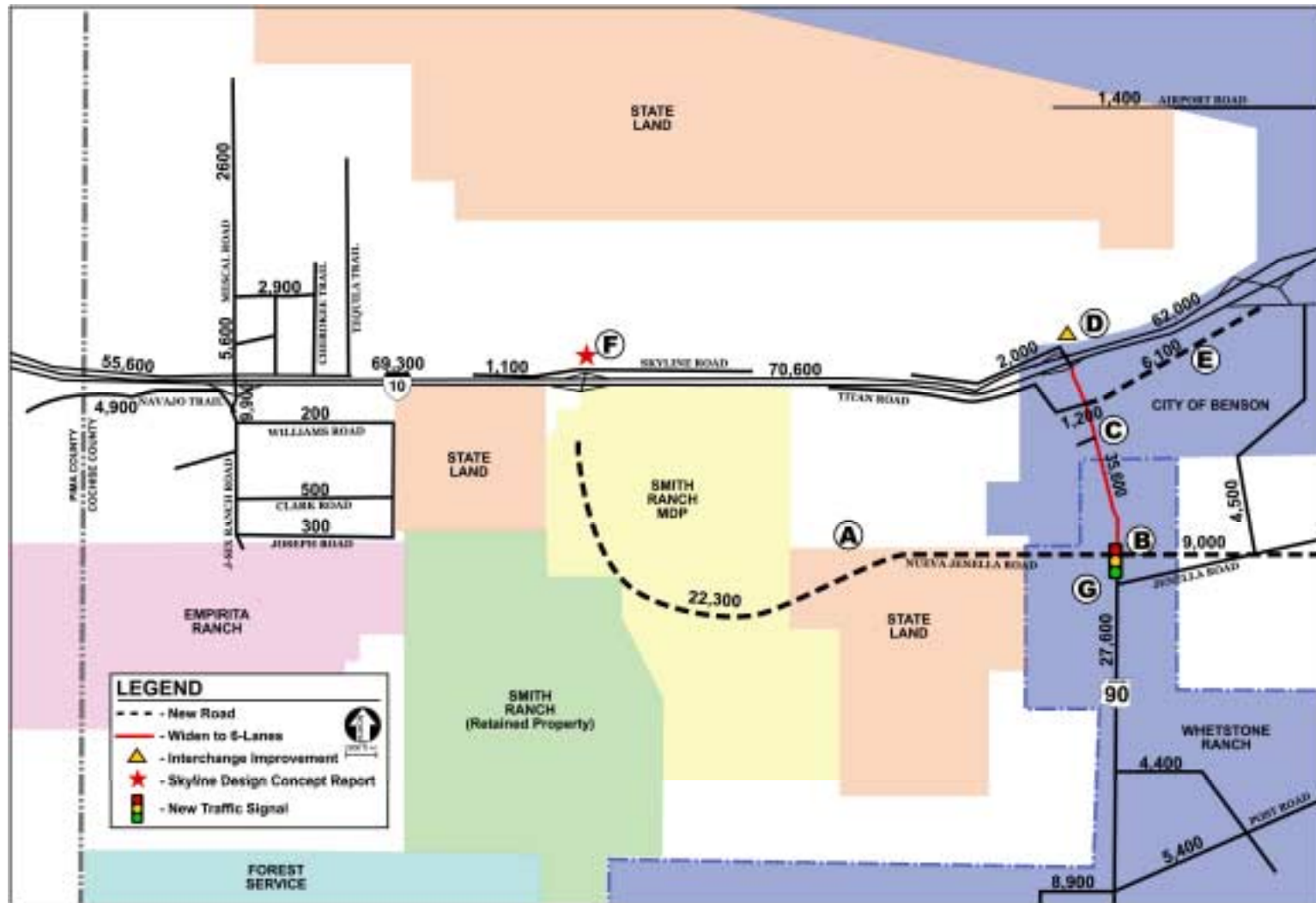
Proposed Roadway Network by 2015							Studies Needed**		Design/ Construction	Potential Funding Sources					Comments
Map Key*	Project Description	Project Limits	Length (Miles)	Ultimate Functional Class	Existing Lanes	Estimated Cost (\$M)	Advanced Planning	Location Study		Federal	State	County (1)	City (2)	Private (3)	
A	New Jennella/ Whetstone Connection - 4 Lanes	SR 90 - Smith Ranch	4.2	Arterial	N/A	\$ 18.90	X	X	X			X		X	
B	Construct/Improve 3-lane Jennella Whetstone Connection	SR 90 to Benson	1.4	Arterial	2, Partial	\$ 3.50	X	X	X				X	X	Included in Benson General Plan and Circulation Element
C	Widen SR 90 to 6 lanes	I-10 to Jennella	3.0	Arterial	4	\$ 15.00	X		X						
D	Reconstruct SR-90 Interchange	Interchange Area	N/A	Interchange	N/A	\$ 10.00	X		X	X	X				Previously identified as deficient by ADOT.
E	Construct South Side Frontage Road Connector	SR 90 east to City of Benson	1.5	Collector	N/A	\$ 3.75	X	X	X				X		
F	Skyline Interchange Design Concept Report	Skyline Interchange Area	N/A	N/A	N/A	\$ 0.15	X	X						X	This design concept report will address interchange design, location, and interstate access control issues.
G	Traffic Signal - Nueva Jennella/ SR 90	Intersection	N/A	N/A	N/A	\$ 0.15	X		X	X	X			X	
N/A	Benson Transportation Study	Benson Sphere of influence	N/A	N/A	N/A	\$ 0.15					X		X		Conduct traffic engineering and transportation planning study for City of Benson under ADOT's Small Area Transportation Study Program
N/A	I-10 Corridor Study	Pima - Pinal County Line to Benson	N/A	N/A	N/A	\$ 0.20				X	X				This is a continuation of an ongoing study in Pima County (I-10 from I- 19 to County line.)
N/A	Advance Planning, Location and Traffic Reports**	Improved or New Routes/ Facilities	N/A	N/A	N/A	\$ 2.00	X	X		X	X	X	X		
<b>Costs (\$M) by 2015</b>						<b>\$ 53.80</b>									

\*See Exhibit X

\*\* All advance planning for projects through buildout to be conducted before the year 2015 horizon.

(1) Includes Impact Fees, (2) Includes Construction Sales Tax, (3) Includes Right-of-Way dedications, exactions, contributions and "in-lieu" fees

Exhibit 4 Year 2015 Projects



## Exhibit 5 List of Year 2025 Projects and Costs

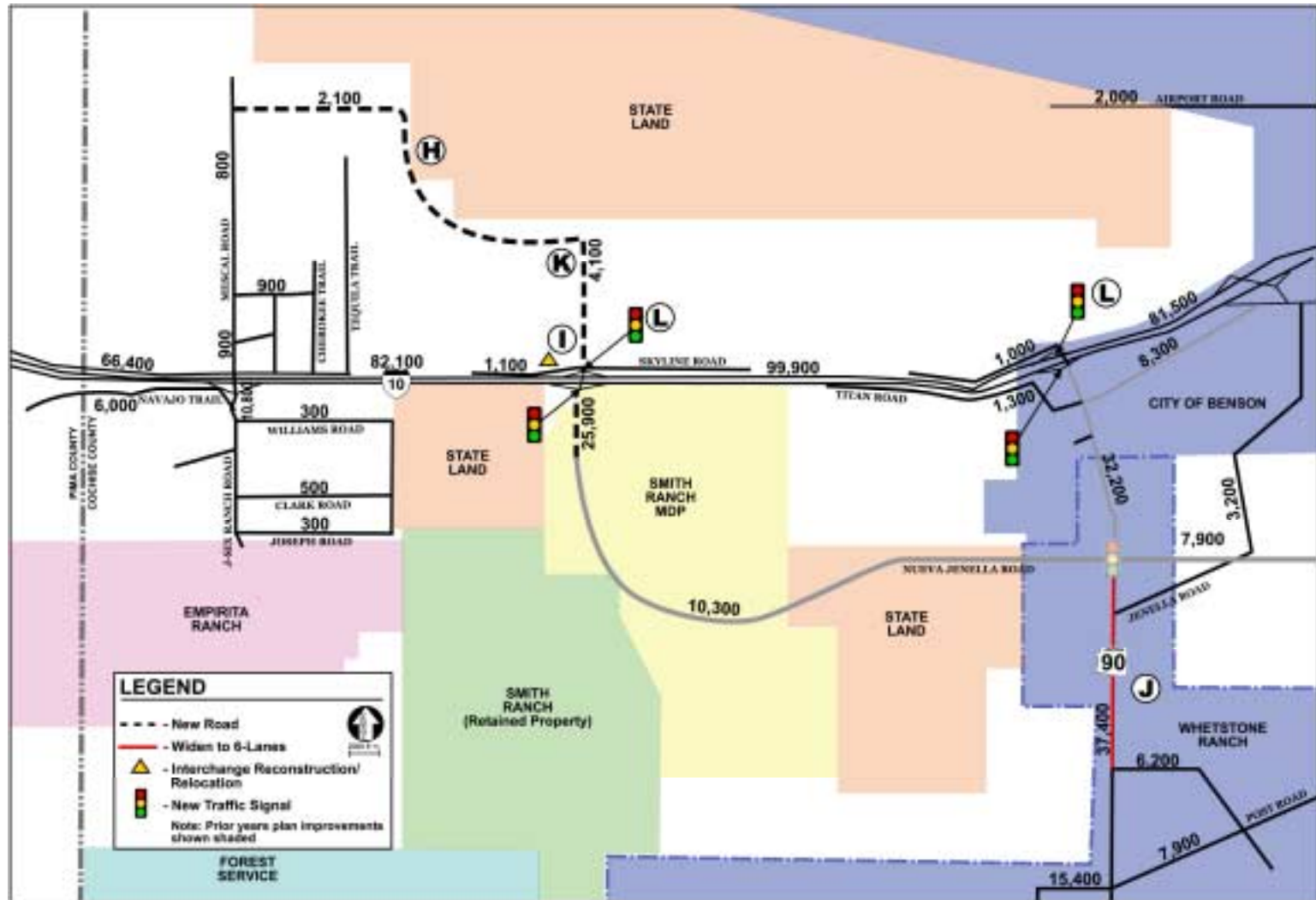
Proposed Roadway Network by 2025							Studies Needed**			Potential Funding Sources					Comments
Map Key*	Project Description	Project Limits	Length (Miles)	Ultimate Functional Class	Existing Lanes	Estimated Cost (\$M)	Advanced Planning	Location Study	Design/ Construction	Federal	State	County (1)	City (2)	Private (3)	
H	Construct North Side Connector	Mescal Road to Skyline Extension	2.5	Collector	N/A	\$ 6.25	X	X	X			X		X	
I	Reconstruct or Relocate Skyline Interchange	Interchange Area	N/A	Interchange	N/A	\$ 10.00	X	X	X	X	X	X		X	Developer to fund design concept report and location study. Previously identified as deficient by ADOT
J	Widen SR 90 to 6 lanes	Jennella to Connector Road	1.5	Arterial	4	\$ 7.50	X		X	X	X	X			
K	North-South Interconnect	Skyline Interchange to new East West Connector north of I-10	1.2	Collector	N/A	\$ 3.00	X	X	X			X		X	Location to be evaluated concurrent with Skyline Design Concept Report
L	Traffic Signals - SR 90 and Skyline Interchanges	Interchanges	N/A	N/A	N/A	\$ 0.60	X		X	X	X	X			
<b>Costs (\$M) by 2025 - Includes 2015 Projects</b>						<b>\$ 81.15</b>									

\* See Exhibit X

\*\* All advance planning for projects through buildout to be conducted before the year 2015 horizon.

(1) Includes Impact Fees, (2) Includes Construction Sales Tax, (3) Includes Right-of-Way dedications, exactions, contributions and "in-lieu" fees

# Exhibit 6 Year 2025 Projects



## Exhibit 7 List of Build Out Projects and Costs

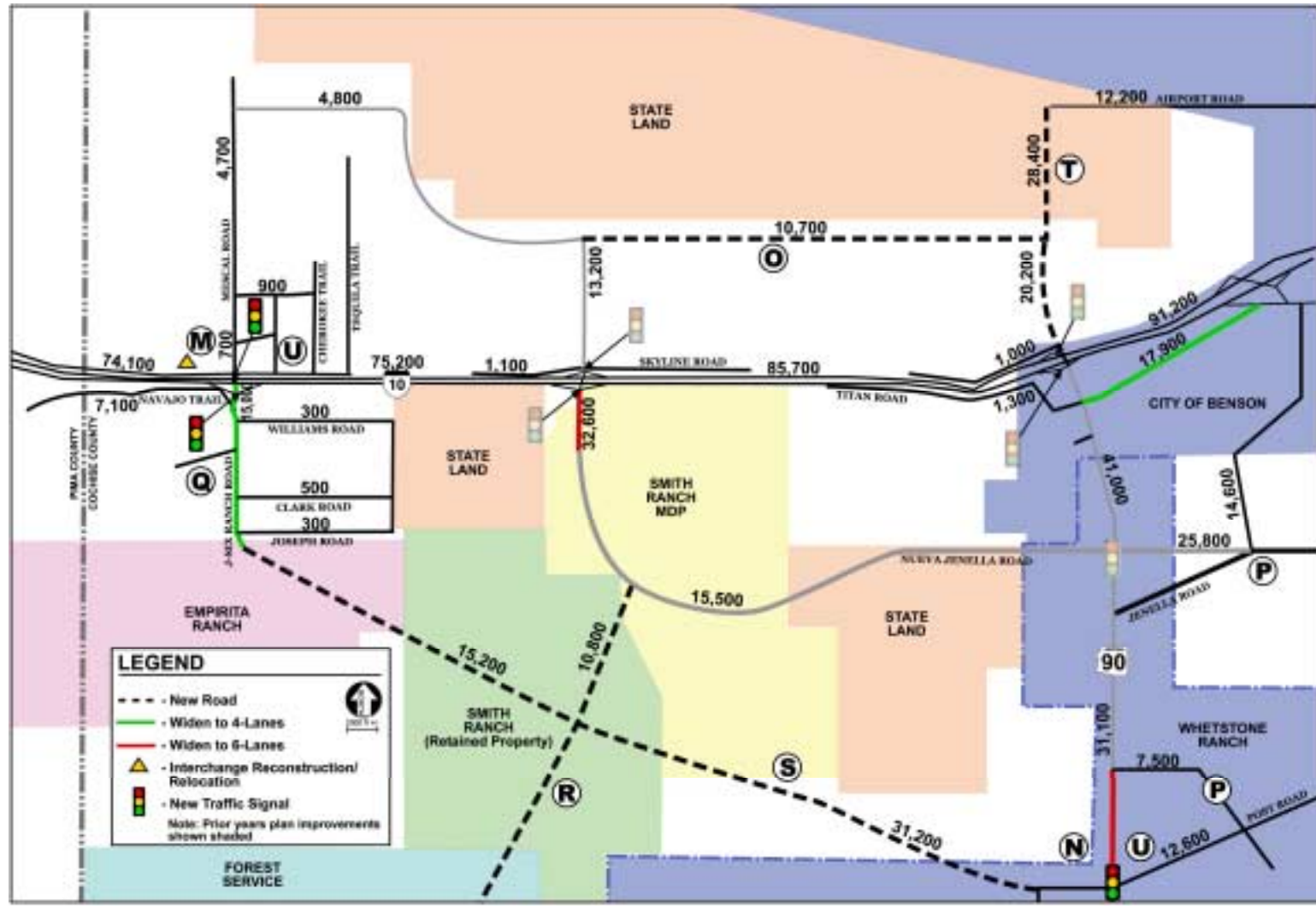
Proposed Roadway Network by Buildout							Studies Needed**		Design/ Construction	Potential Funding Sources					Comments
Map Key*	Project Description	Project Limits	Length (Miles)	Ultimate Functional Class	Existing Lanes	Estimated Cost (\$M)	Advanced Planning	Location Study		Federal	State	County (1)	City (2)	Private (3)	
M	Reconstruct Mescal/J-Six Interchange	Interchange Area	N/A	Interchange	N/A	\$ 10.00	X		X	X	X				Previously identified as deficient by ADOT
N	Widen SR 90 to 6 lanes	I-10 to North of Connector Road to South of Post Road	2.6	Arterial	4	\$ 13.00	X		X	X	X	X			
O	Construct North Side Connector	Skyline Extension Road to SR 90 Extension	3.4	Collector	N/A	\$ 8.50	X	X	X			X		X	
P	Widen Jennella Road to 4 lanes	SR 90 to Prickly Pear (Benson)	1.5	Collector	2	\$ 5.25	X		X				X	X	
Q	Widen J-Six Ranch Road to 4 lanes	I-10 to New Southern East/West Connector	1.1	Collector	2	\$ 3.85	X		X			X			Build only if warranted; relates to east-west connections
R	Whetstone Mountains Recreational Access	Jennella Extension to Forest Boundary	1.5	Collector	N/A	\$ 3.75	X	X	X	X		X		X	Project coordination with USFS; possible Federal co-funding opportunity
S	Southern East- West Connector - 4 Lanes	J-Six Ranch Road to SR 90/Post Road	7.3	Arterial	N/A	\$ 32.85	X	X	X			X	X	X	To be constructed only when a regional need is demonstrated. Will not use Joseph or other existing road alignments. Connects to Post Road, then to SR 80.
T	State Route 90 Corridor Extension	I-10 to Airport Road	1.7	Arterial	N/A	\$ 7.65	X	X	X	X	X		X	X	Enhances access to airport and future employment center.
U	Traffic Signals - Mescal, J-Six TIs, SR90/Post Road	Interchanges	N/A	N/A	N/A	\$ 0.45	X		X	X	X	X	X	X	
<b>Costs (\$M) by Build Out - Includes 2015, 2025 Proj</b>						<b>\$ 166.45</b>									

\* See Exhibit X

\*\* All advance planning for projects through buildout to be conducted before the year 2015 horizon.

(1) Includes Impact Fees, (2) Includes Construction Sales Tax, (3) Includes Right-of-Way dedications, exactions, contributions and "in-lieu" fees

# Exhibit 8 Build Out Projects



Freeway volumes in the vicinity of the study area are projected to exceed the current capacity of I-10. In general, when daily volumes on a 4-lane freeway exceed 50,000 vehicles per day (vpd), the acceptable capacity of the freeway is reached. As can be seen by the table below, by 2015, I-10 will exceed this threshold. In fact, the acceptable capacity of a six-lane freeway is approximately 80,000 vpd, and most segments may be over this threshold by 2025. The provision of alternate east-west corridors within the project vicinity will alleviate some of the congestion at build out. However, the Arizona Department of Transportation must monitor traffic volumes on I-10 to plan for future widening and system improvement needs. Accordingly, this study further recommends that ADOT aggressively pursue its planning and design concepts for I-10 into Cochise County. The studies currently stop at the Cochise/Pima County line. Digital orthophotography will be available in calendar year 2005 from the Pima Association of Governments, which should be suitable for planning and preliminary design purposes.

### Exhibit 9 Future I-10 Volumes

Segment	2015			2025			BUILDOUT		
	EB	WB	Total	EB	WB	Total	EB	WB	Total
West of Mescal	27,800	27,800	55,600	33,400	33,000	66,400	37,100	37,000	74,100
Mescal to Skyline	34,600	34,700	69,300	41,100	41,000	82,100	40,600	34,600	75,200
Skyline to SR 90	35,300	35,300	70,600	50,300	49,600	99,900	44,400	41,300	85,700
East of SR 90	31,200	30,800	62,000	40,500	41,000	81,500	44,300	46,900	91,200