

Northwest Cochise County
LONG-RANGE
Transportation Plan

FINAL REPORT



Arizona Department of Transportation • Cochise County • City of Benson



September 2010

Northwest Cochise County
Long-Range Transportation Plan

Final Report

Prepared for:



Arizona Department of Transportation
Cochise County
City of Benson

Prepared by:

URS

September 2010

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	STUDY AREA OVERVIEW	1
1.2	STUDY OBJECTIVES	3
1.3	PUBLIC INVOLVEMENT PROCESS	3
	1.3.1 Technical Advisory Committee	3
	1.3.2 Public Meetings	3
	1.3.3 Stakeholder Input.....	4
1.4	FINAL REPORT ORGANIZATION	4
2.0	CURRENT CONDITIONS	6
2.1	REVIEW OF RELEVANT PREVIOUS STUDIES	6
2.2	EXISTING DEVELOPMENT PATTERNS.....	7
	2.2.1 Existing Socioeconomic Conditions.....	9
	2.2.2 Population and Employment	9
	2.2.3 Minority and Disadvantaged Populations.....	12
2.3	EXISTING TRANSPORTATION SYSTEM.....	13
	2.3.1 Study Area Roadways	13
	2.3.2 Existing Local Traffic Volumes and Levels of Service.....	13
	2.3.3 Crashes.....	15
	2.3.4 Existing Transit Operations	16
	2.3.5 Existing Railroads.....	16
	2.3.6 Existing Bicycle and Walking Conditions.....	16
2.4	EXISTING ENVIRONMENTAL CONDITIONS	17
	2.4.1 Local Natural Resource Features.....	17
	2.4.2 Wildlife Linkages	18
	2.4.3 Conservation Areas.....	18
	2.4.4 Cultural Resources.....	18
2.5	STAKEHOLDER INPUT	19
3.0	FUTURE CONDITIONS	21
3.1	MODEL DEVELOPMENT	21
	3.1.1 Future Land Use	21
	3.1.2 Future Socioeconomic Projections	23
4.0	ALTERNATIVES DEVELOPMENT	26
4.1	GOALS AND OBJECTIVES	26
4.2	NO-BUILD ALTERNATIVE.....	27
4.3	BUILD ALTERNATIVES CONSIDERED	28
4.4	EVALUATION OF POTENTIAL ALTERNATIVES.....	30
4.5	SUMMARY OF RESULTS.....	30
5.0	RECOMMENDED LONG-RANGE PLAN	32
5.1	ROADWAY	32
5.2	TRANSIT	32
5.3	NON-MOTORIZED	33
5.4	ACCESS MANAGEMENT AND SAFETY	33
5.5	THE NATURAL AND PHYSICAL ENVIRONMENT	33
5.6	FINANCIAL CONSTRAINTS.....	33
5.7	NEXT STEPS.....	34

LIST OF TABLES

Table 1	Existing Population and Employment Estimates (2007)	9
Table 2	2000 Demographics	12
Table 3	Disadvantaged Populations.....	12
Table 4	Types of Crashes throughout Northwest Cochise County.....	15
Table 5	Crashes by Roadway.....	15
Table 6	Potential Linkage Zones within Northwest Cochise County.....	18
Table 7	Future Year Growth Projections	23
Table 8	Level of Service Distribution by Mileage in Study Area	27
Table 9	Future Alternatives Considered Summary.....	29
Table 10	Alternatives Evaluation Analysis Summary	31
Table 11	Recommended Improvement Plan.....	35

LIST OF FIGURES

Figure 1	Study Area	2
Figure 2	Land Use	8
Figure 3	2007 Population Density.....	10
Figure 4	2007 Employment Density	11
Figure 5	Existing Street System	14
Figure 6	Stakeholder Identified General Themes.....	20
Figure 7	Future Land Use Plan.....	22
Figure 8	Estimated Future Population Density (2020, 2040).....	24
Figure 9	Estimated Future Employment Density (2020, 2040)	25
Figure 10	Final Recommended Northwest Area 2040 Map.....	36
Figure 11	Level of Service Results for the Final Recommended Alternative.....	37

1.0 INTRODUCTION

The Northwest Cochise County Long-Range Transportation Plan (Plan) provides a guide for future transportation system development in the northwest region of Cochise County. This plan responds to key trends, emerging issues, and community visions and goals. The Plan includes strategies and actions for the years 2020 and 2040 to address identified transportation needs, while being sensitive to possible future funding constraints. This Plan was prepared under the Arizona Department of Transportation (ADOT) Planning Assistance to Rural Arizona Program (PARA) in cooperation with Cochise County and the City of Benson. The planning process was guided by a local Technical Advisory Committee (TAC), which included representatives from local and state agencies.

This Final Report provides an overview of both the study effort and the work products developed throughout the planning process, which forms the basis for the final plan recommendations. The planning process analyzed the existing transportation system, land use and socioeconomic conditions within the study area; conducted in-depth local stakeholder interviews; developed future growth projections; provided opportunities for public input; and included an evaluation of alternative future solutions. The deliverables developed throughout this study were:

- Current Conditions Working Paper;
- Model Development and Future Conditions Working Paper;
- Key Issues, Common Themes and Interview Notes Summary Paper;
- Railroad Crossing Assessment Working Paper;
- Funding Assessment and Impact Fee Planning Working Paper; and
- Evaluation Criteria and Improvement Plan Technical Report.

This planning effort resulted in a final recommended 2020 and 2040 transportation improvement plan for Northwest Cochise County as presented in this Final Report.

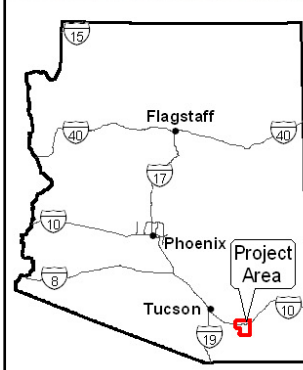
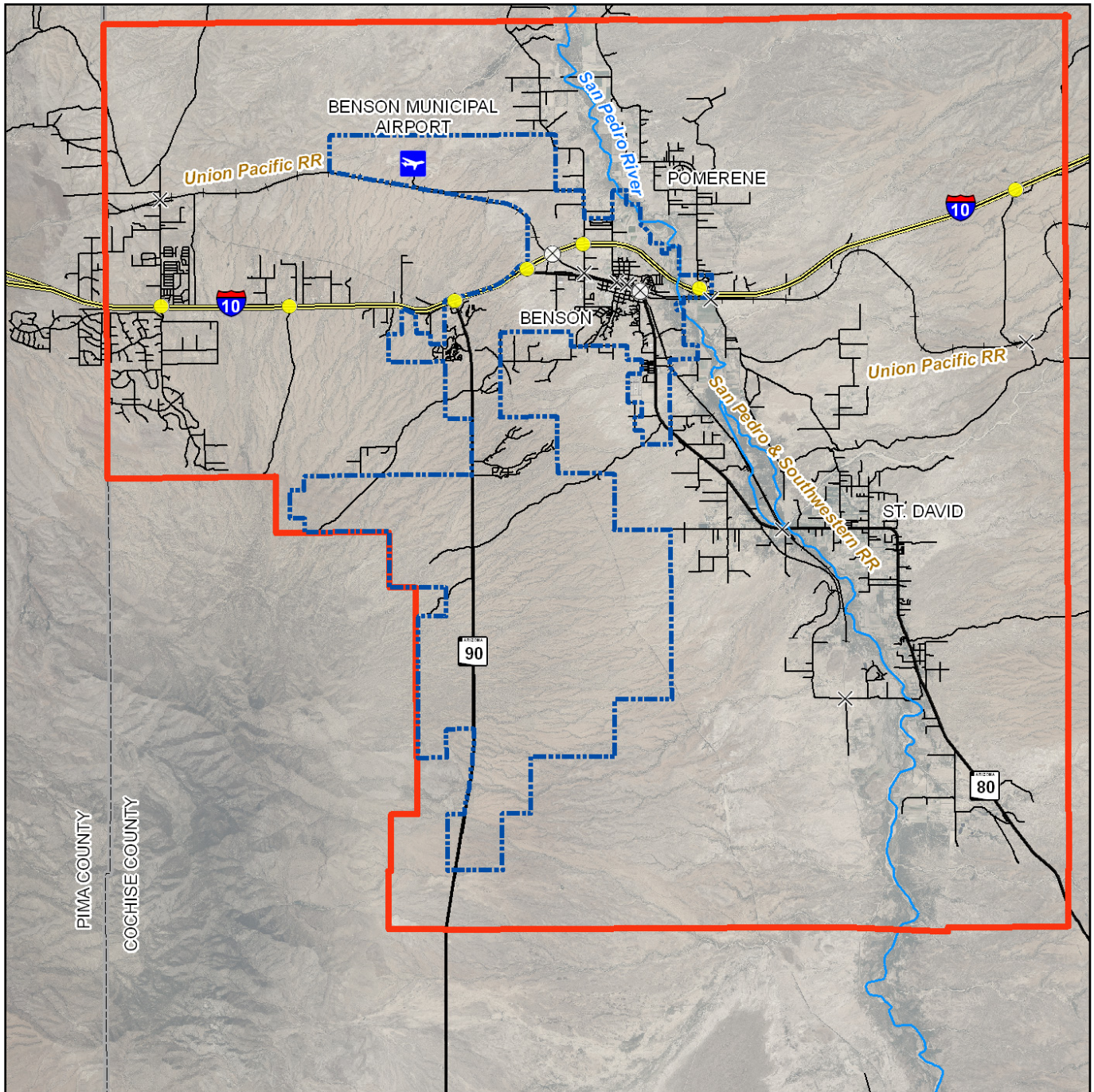
1.1 STUDY AREA OVERVIEW

The study area encompasses 234 square miles in the northwestern corner of Cochise County, which includes the City of Benson and the unincorporated areas of St. David, J-Six/Mescal, and Pomerene, as shown in Figure 1.

The study area includes the junction of three State highway corridors: Interstate 10 (I-10), State Route 80 (SR 80), and State Route 90 (SR 90). These highways provide access to the rest of Cochise County and the Tucson metropolitan area to the west. I-10 is a major interstate corridor and provides access to eastern and western areas of the State. I-10 runs parallel to the Union Pacific Railroad (UPRR) Sunset Route which passes through Northwest Cochise County and the City of Benson as it connects the cities of Los Angeles, California, and El Paso, Texas.

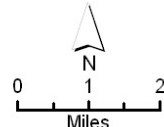
The study area is still experiencing residential and commercial growth, although at a lower rate compared to recent history. With the study area situated between Tucson, Sierra Vista (and Fort Huachuca), and the international ports-of-entry at Douglas and Naco, some workers commute outside the study area for employment. In addition, residents of eastern Pima County tend to shop in the City of Benson. The study area is also a popular destination for Arizona's winter residents and has become a renowned setting for bird watching due to its location in the north-south flyway.

Figure 1 Study Area



LEGEND

- Study Area Boundary
- County Boundary
- City Boundary
- ✈ Airport
- Interstate
- State Route
- Local Road
- ~ River/Stream
- + Railroad
- Traffic Interchange
- × At Grade
- ⊗ Grade Separated



Source:
 Base Map: ADOT 2008, ALRIS 1997-2008,
 BTS 2008, Cochise County 2009
 Study Network: ADOT 2009, Cochise County 2009
 Railroad Crossings: URS 2009
 Imagery: Cochise County 2007

Project Overview
 Northwest Cochise County Long Range Transportation Plan



1.2 STUDY OBJECTIVES

Based on previously identified key issues for Northwest Cochise County and discussions with both ADOT and the TAC, the following objectives were developed for this Long-Range Transportation Plan:

- Prepare a plan that considers the recommendations and proposals of four existing transportation plans: the Northwest Cochise County Transportation Plan, the City of Benson General Plan and Circulation Plan, the Benson Small Area Transportation Study, and the Cochise County Comprehensive Plan;
- Identify solutions to current and projected congestion and transportation system access problems identified on SR 80 and SR 90, and the interchanges along I-10;
- Identify potential alternative transportation facilities, including demand response transit, and bike and pedestrian systems for addressing future alternative transportation needs;
- Evaluate alternative transportation scenarios for years 2020 and 2040 and prepare a transportation improvement plan, including cost estimates for the preferred alternative; and,
- Address special area concerns including railroad/highway crossings, access ramps to I-10 and identify potential financing resources, including impact fees, for completing the recommended transportation plan.

1.3 PUBLIC INVOLVEMENT PROCESS

The public involvement process supported and contributed to the development of this Long-Range Transportation Plan. In any project, both the public and decision makers need to fully understand the problems, opportunities and available options to finding acceptable solutions. Effective public participation facilitates understanding and improves decisions by bringing all issues and perspectives to the table. The public involvement process for this plan included the guidance of the TAC, public meetings and stakeholder interviews.

As the study progressed, the public was provided with information about open houses and plan documents in a variety of ways. Some of these communication methods included press releases, radio slots on local radio stations, updates on the City of Benson website, display advertising in the Benson newspaper, flyers announcing meetings in citizens' water bills, e-mail blasts, posters, and information posted on the ADOT website.

1.3.1 Technical Advisory Committee

At the beginning of the study, the TAC was formed to provide technical input into the development of the plan. Members of the TAC included ADOT representatives, the Study Team, and Cochise County and City of Benson representatives. The kickoff meeting, held on May 21, 2009, established the objectives and direction for the study. Five additional TAC meetings were held throughout the study to share information, develop or modify public outreach strategies and review progress.

1.3.2 Public Meetings

Two public meetings were held over the course of the study. The first meeting was held at the Benson Senior Citizens Center on June 30, 2009. This meeting was held early in the study

process to discuss existing plans, future needs, results of stakeholder interviews, and to gather input from the public. The second public meeting was held on June 8, 2010 at Cochise College – Benson Center. Progress made through various studies was presented and public input was solicited on proposed projects as alternative transportation scenarios were developed.

In the case of both public meetings, attendees were encouraged to view and comment on the display boards and to talk with members of the Study Team and the TAC. Large maps were used as visual aids for individuals to provide comments. Comment forms and project handouts were provided and the public was urged to provide their input. Following brief presentations a public question/answer period was held at each of the meetings and Study Team members were available for one-on-one conversations.

1.3.3 Stakeholder Input

Stakeholder input was sought from specific interests within the study area. Stakeholders for this project included people with additional information to add to the process, by virtue of their position, like an elected official, or by virtue of economic interest, (they own commercial or development interest), or by virtue of a direct vested interest, usually because they reside or work in the area. A series of one-on-one interviews were held with stakeholders to identify their concerns and to gather suggestions on possible solutions. The source of these comments were tracked, not to priority rank them but to better understand the frame of reference that those comments reflected. Local neighborhood meetings were also hosted by the J-Six/Mescal CDO and the St. David School throughout the planning process to gather additional input into issues of concern in the Northwest Area. These informal meetings not only included area residents and local business owners but also elected officials and agency staff and provided real-time public input into the Northwest Area Plan development.

1.4 FINAL REPORT ORGANIZATION

The remaining chapters of the Final Northwest Cochise County Long-Range Transportation Plan are organized as follows:

Chapter 2: Current Conditions – Inventories the physical, transportation, natural and cultural resources and describes the current characteristics and constraints of the study area. These characteristics include an analysis of the base year development pattern and transportation system, as well as population and employment estimates for developing future year scenarios.

Chapter 3: Future Conditions – Evaluates 2020 and 2040 population and employment projections and allocates this information to the study area Transportation Analysis Zone (TAZ) system. These projections were input into the County-Wide QRSII Travel Demand Model in an effort to understand future socioeconomic demographic trends.

Chapter 4: Alternatives Development – Analyzes and evaluates the performance of various proposed future transportation alternatives for the years 2020 and 2040.

Chapter 5: Recommended Long-Range Plan – Based on the results of the alternatives evaluation a recommended long-range plan was developed for the study area. These recommendations include:

- Near term projects;
- 2020 projects;
- 2040 projects;
- Project prioritization; and
- Generalized project cost.

The Final Report of the Northwest Cochise County Long-Range Transportation Plan highlights the most important information and major aspects of the plan. For more detailed analysis of specific tasks, refer to the individual working papers completed as part of this study.

2.0 CURRENT CONDITIONS

The analysis of the study area's existing conditions provides an inventory and summary of the physical, natural, socioeconomic, transportation system and travel conditions within Northwest Cochise County. Several transportation plans were previously prepared for portions of the study area, as examined in Working Paper #1. Understanding previous studies helps to determine which of the key components and priorities remain valid and should stay in place.

2.1 REVIEW OF RELEVANT PREVIOUS STUDIES

ADOT, the City of Benson, and Cochise County identified four recent studies that include vision statements, goals and recommendations that are important to understanding the current development patterns and transportation system. The following studies were reviewed during the course of this effort:

- Cochise County Comprehensive Plan, 2006
- City of Benson General Development Plan, 2002
- City of Benson Small Area Transportation Study (SATS), 2007
- Northwest Cochise County Transportation Planning Study, 2005

Cochise County Comprehensive Plan, 2006 – Cochise County adopted their Comprehensive Plan in 1984 and last amended it in 2006. The stated purpose of the Plan was to promote the future growth of Cochise County in an “orderly, well-planned manner.” The Cochise County Comprehensive Plan emphasizes the use of the existing street network; calls for traffic circulation to be compatible with adjacent area use; and directs that development impacts should be adequately addressed “that are reasonably related and roughly proportional to the impact of their use on the public roadway system.”

City of Benson General Development Plan, 2002 – The City of Benson General Development Plan, which was approved in 2002, provides a long-range guide for the future development of the City of Benson. The Circulation chapter of this plan includes goals, objectives, and policies to guide future development of an arterial roadway system. The three main circulation goals are:

- Maintain a safe and efficient transportation network that enhances the flow of goods, commerce, vehicular traffic and people to and through the City of Benson;
- Improve multi-modal transportation coordination; and
- Preserve traffic capacity and efficient flow of SR 90.

City of Benson Small Area Transportation Study (SATS), 2007 –The purpose of the study was to develop a comprehensive multi-modal transportation plan for the Benson area for a 25-year time horizon. To achieve this, the study provided short-, mid- and long-range planning guidance, recommended needed street improvements, and identified the linkages between land use decisions and transportation system development. The study identified a number of transportation issues including; access management, congestion, street network continuity, and funding deficiencies. This study produced a set of recommendations for short-, mid- and long-range projects.

Northwest Cochise County Transportation Planning Study, 2005 – The study developed three system alternatives for improved east-west connectivity that suggested opportunities for an I-10 bypass, the establishment of new north-south connections to I-10, and the extension of existing frontage roads along I-10. These alternatives also recognized the need for better connections to new development and improved recreational access. This study was not formally adopted by Cochise County and many of the development assumptions of this study did not materialize.

In summary, the four studies reviewed provide a basis for the understanding of the development of the study area and its transportation needs. Common themes included:

- Improving safety by investing in and maintaining existing infrastructure;
- Expanding the local roadway network to serve growth areas and provide better circulation with the region;
- Investing in transit, bicycling and walking as well as roadways to promote a multi-modal transportation system; and
- Identifying adequate funding sources to ensure effective implementation.

2.2 EXISTING DEVELOPMENT PATTERNS

The identification of the general development patterns within the study area was based on current land use, existing zoning and open space designations, and socioeconomic characteristics.

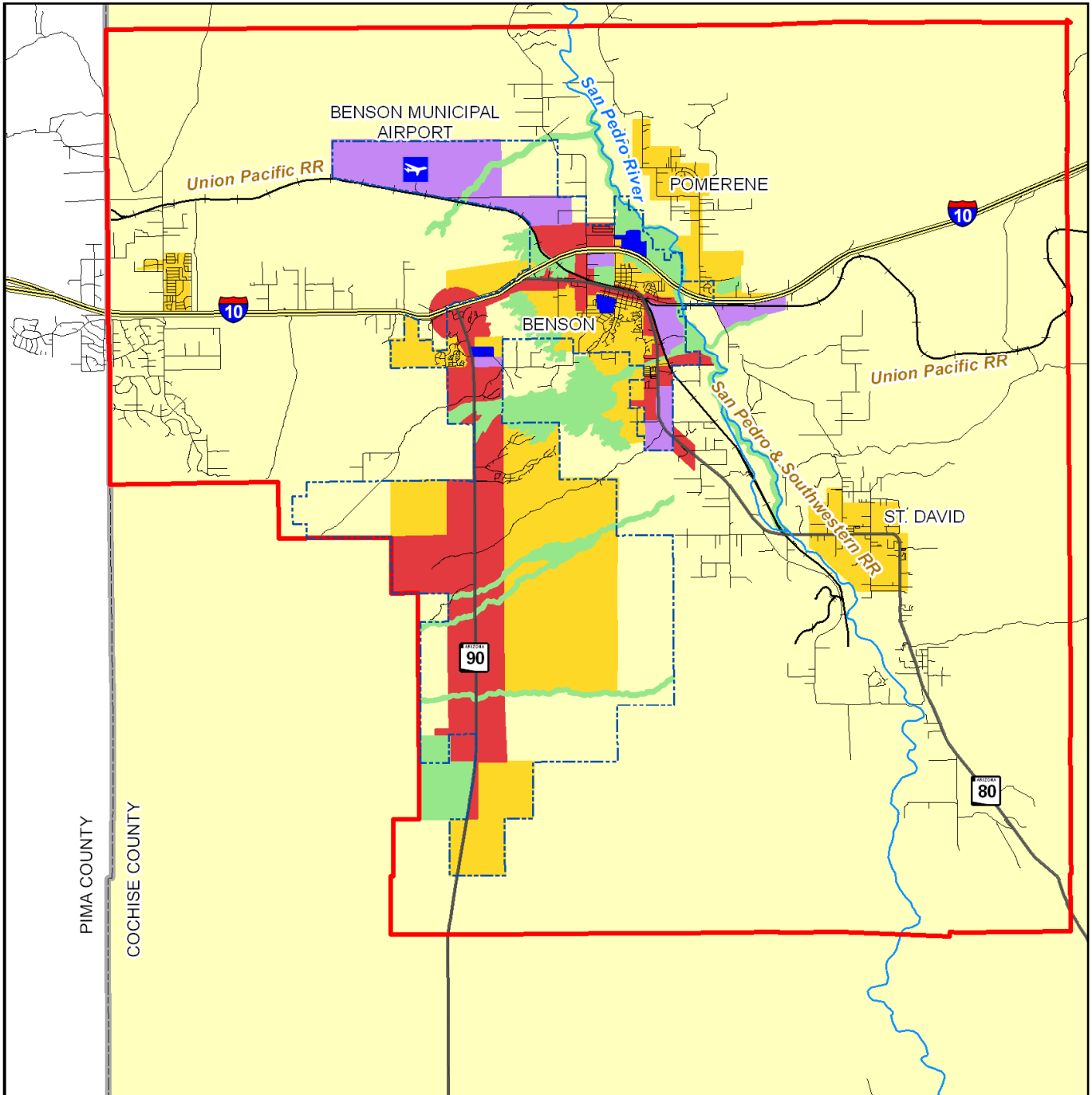
The majority of private and public lands within the study area remain undeveloped. Commercial development is primarily located in Benson along Business 10 (B-10) (4th Street) and SR 80, as well as along SR 90 just south of I-10. Residential development is primarily located within the City of Benson, and clustered in the unincorporated communities of Pomerene, St. David, J-Six and Mescal. Residential development in recent years has occurred along SR 90 in the proposed Whetstone Ranch planned development.

The Benson Municipal Airport is located about 4 miles northwest of Benson city limits. Industrial sites include Ocotillo Road north of I-10, along the railroad tracks east of the downtown and the Apache Nitrogen Plant.

There is also substantial open space within the study area including the San Pedro River corridor, St. David Cienega, Kartchner Caverns State Park, the Coronado National Forest as well as local parks and wildlife corridors.

Figure 2 illustrates the existing planned development pattern for the study area based on Cochise County and City of Benson land use data.

Figure 2 Land Use



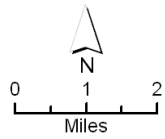
LEGEND

Land Use

- Low Density Residential
- Medium to High Density Residential
- Mixed Use / Commercial
- Business Park / Industrial Park
- Municipal / Public / Institutional
- Open Space

- Study Area Boundary
- County Boundary
- City Boundary
- ✈ Airport
- Interstate Highway
- State Route
- Local Street
- Railroad
- River/Stream

Source:
 Base Map: ADOT 2008, ALRIS 1997-2008,
 BTS 2008, Cochise County 2009
 Land Use: Cochise County 2009, City of Benson 2009



Land Use

*Northwest
 Cochise County
 Transportation Plan*



2.2.1 Existing Socioeconomic Conditions

The study area includes the City of Benson and the Census Designated Communities of Pomerene and St. David. The existing conditions analysis looked at the demographics of Northwest Cochise County. Household and employment figures were organized by TAZs, which represents unique travel-sheds producing and attracting traffic that are typically split along major roadways and significant geographic features.

2.2.2 Population and Employment

Base year population (defined as 2007) was derived from Census 2000 block level data. A growth factor of 2 percent per year was used to increase the population up to 2007 levels. These population totals were verified against Department of Commerce (DOC) official population estimates for 2007, which considered a slightly different geographic area. Population estimates assumed 2.3 persons per household.

Base year employment was derived from data purchased from InfoUSA (a commercial provider of business data) as part of a separate county-wide modeling effort being conducted for Cochise County. The employment figures were compared to the DOC economic report (January 2008) for the Benson area to verify employment totals. The DOC report considers a different geographic area than the study area; however, in general the overall employment estimates were comparable.

Table 1 shows 2007 population and employment estimates for the study area, from both DOC and also based on the InfoUSA and Census data.

Table 1 Existing Population and Employment Estimates (2007)

	DOC	InfoUSA, Census
Population	12,292	12,043
Employment	2,736	3,917

Source: Department of Commerce, 2010, Census 2000, InfoUSA 2009

Figures 3 and Figure 4 show 2007 population and employment density by TAZ, respectively, within the Northwest Cochise County Study Area.

Figure 3 2007 Population Density

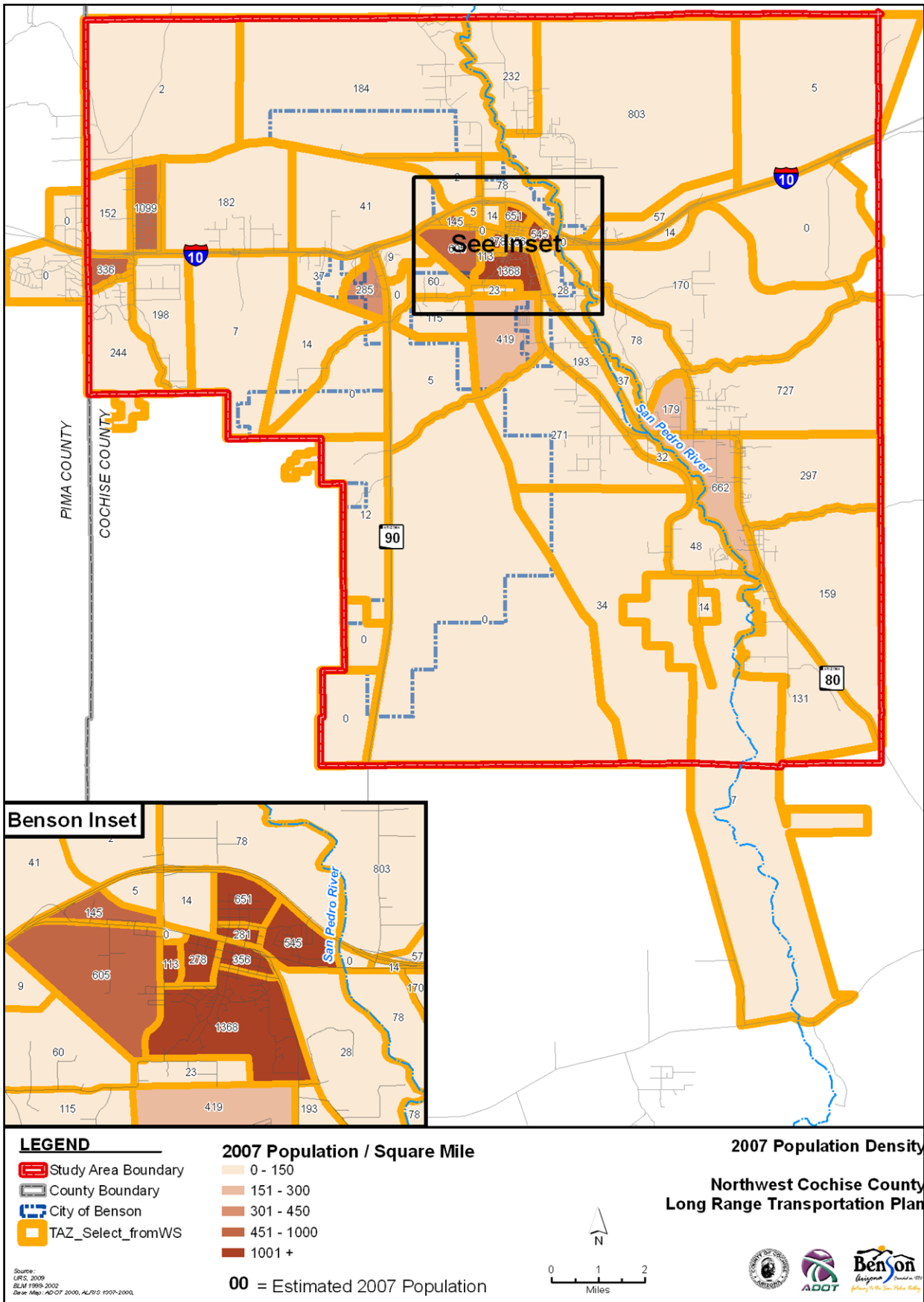
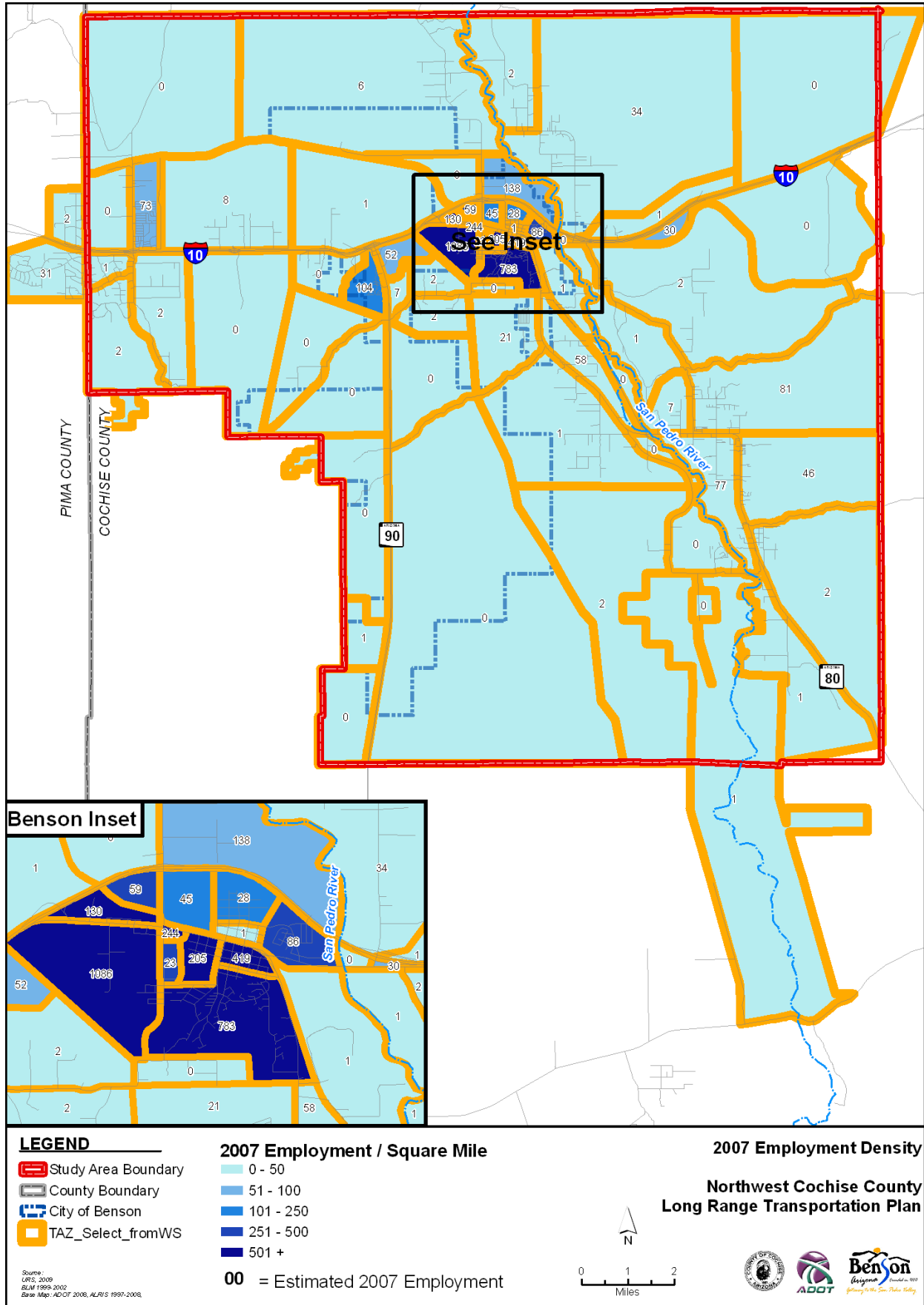


Figure 4 2007 Employment Density



2.2.3 Minority and Disadvantaged Populations

County-wide the average minority population, as reported in the 2000 Census was 42 percent. For the study area, the minority population comprises about 4 percent of the total population. Minority populations, as defined for the purposes of this study, and for transportation planning purposes includes residents who are not reported as White/Non-Hispanic in the Census. According to the 2000 US Census data, 84 percent of the residents living in Northwest Cochise County were of White descent with 14 percent defined as Hispanic, as shown in Table 2.

Table 2 2000 Demographics

	White	African American	Native American	Asian	Hawaiian/Pacific Islander	Other Race	Multi-Race	Hispanic
Arizona	3,873,611	158,873	255,879	92,236	6,733	596,774	146,526	1,295,617
Cochise County	90,269	5,321	1,350	1,942	301	14,193	4,379	36,134
NW Cochise County (study area) *	8,452	63	136	43	10	20	16	1,426
Unincorporated NW Cochise County *	4,789	27	74	19	4	6	13	523
City of Benson	3,663	36	62	24	6	14	3	903

Source: US Census Bureau, 2000

*Figures estimated from underlying census blocks

Disadvantaged populations include persons with a disability, person over the age of 65, or persons below the poverty level. The disabled population includes those who suffer from blindness, deafness, severe vision/hearing impairments and/or limited mobility. According to the 2000 Census, 29 percent of the population in the study area reported as disabled, which is higher than the 14 percent average for Cochise County. Those over the age of 65 comprise a much larger portion of the study area, 24 percent, than the County at large, which was about 11 percent. About 9 percent of the population is living below the poverty rate which is lower than the average county rate of approximately 13 percent. Table 3 summarizes the Census 2000 reporting on disabled, the elderly and populations below the poverty level.

Table 3 Disadvantaged Populations

	Disability	Age 65 or older	Below Poverty Level
Arizona	902,252	667,839	698,669
Cochise County	22,467	17,365	19,772
NW Cochise County (study area) *	3,042	2,449	939
Unincorporated NW Cochise County *	1,766	1,049	295
City of Benson	1,276	1,400	644

Source: US Census Bureau, 2000

*Figures estimated from underlying census blocks

The implications of this data for the study area are that there are few Title VI and Environmental Justice issues of concern but more needs related to Americans' with Disability Act (ADA) and elderly mobility.

2.3 EXISTING TRANSPORTATION SYSTEM

An inventory of the existing transportation system in Northwest Cochise County was conducted to understand the existing travel conditions and to identify the study area's current needs. The roadway system infrastructure was examined along with the roadway level of service, and operating characteristics. In addition to the roadway system, the inventory also included public transit, railroad, bicycle, pedestrian and aviation elements.

2.3.1 Study Area Roadways

The primary highway corridor in the study area is I-10, traveling east to west through Cochise County. I-10 has two travel lanes in each direction and is characterized by steep grades as it passes through the San Pedro Valley. FHWA has indicated that they have restricted access points in the northwest area with one-foot no access easements along frontage roads in the area (although these easements have not been recorded with Cochise County as of the date of this study). I-10 also serves as a local connector throughout the study area linking the J-Six/Mescal community to Benson. Local traffic congestion can reduce capacity on I-10 particularly between the SR 90 and SR 80 traffic interchanges. State Routes 80 and 90 serve as the study area's main north-south arterials and provide access to the other major cities and recreation/tourist sites in and around Cochise County, including Tombstone, Sierra Vista, Kartchner Caverns, Coronado National Forest, Bisbee and Mexico.

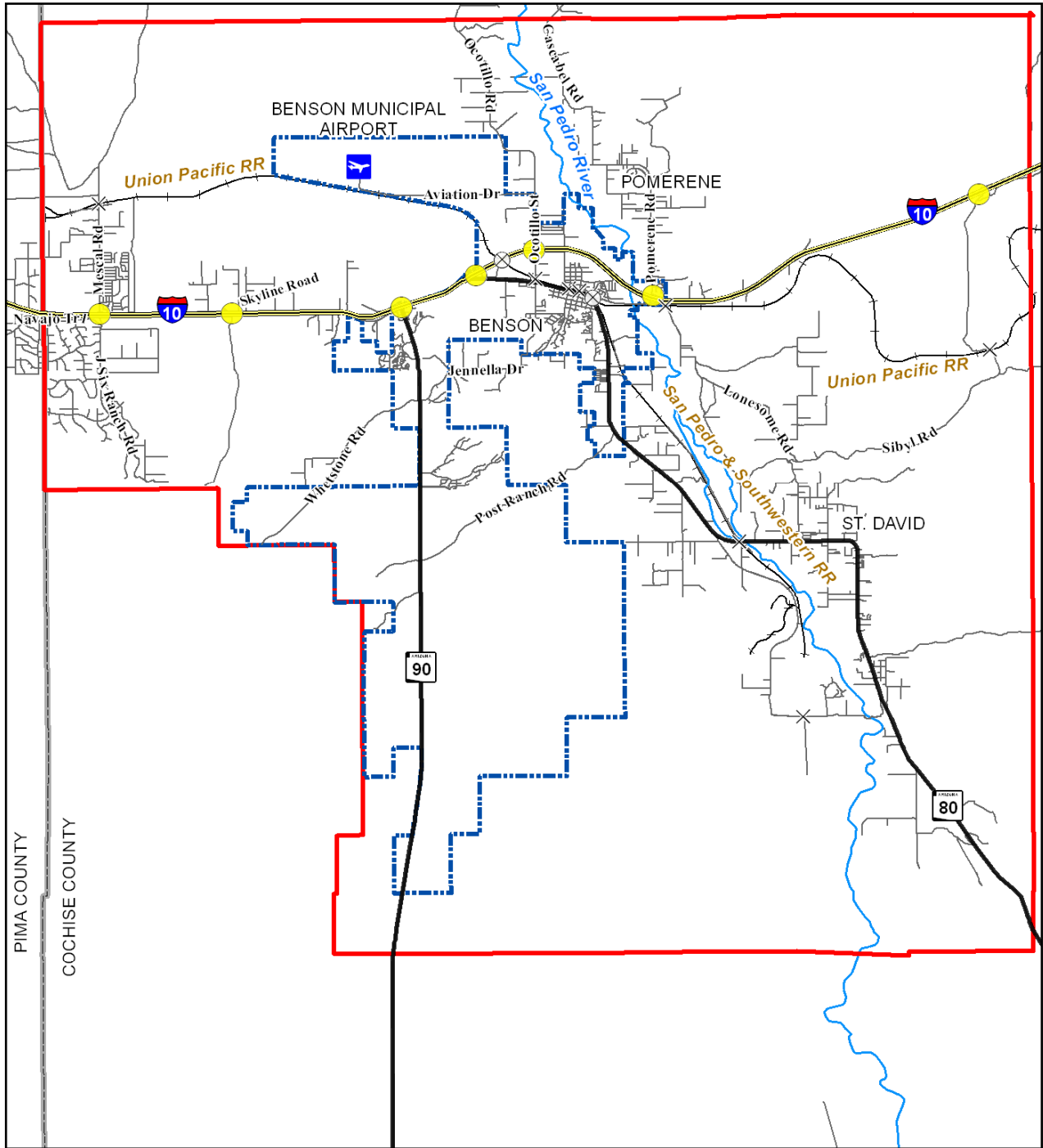
At the local level, 4th Street, which is also designated as B-10, bisects the City of Benson and serves as the main connection between I-10 and SR 80. In addition to SR 80 and 90, the study area is served by a number of County roads. These are typically two lane low-speed, low-volume roadways that provide connections to or between the state routes. The study area also includes a number of unmaintained or primitive dirt roads. These roads were included in this study as they may serve as future improved alignments. Figure 5 identifies the existing roadway network within Northwest Cochise County.

2.3.2 Existing Local Traffic Volumes and Levels of Service

I-10 is a major national transportation and freight corridor with daily traffic volumes that range from 16,000 vehicles per day (vpd) east of Benson/SR 80, to about 30,000 vpd west of SR 90 (ADOT Traffic Count Database System, 2007). Truck traffic accounts for 45 percent of traffic on this section of I-10. Daily traffic volumes on SR 90 are between 9,500 and 10,000 vpd. Volumes for SR 80 range from 3,800 vpd south of Benson to nearly 11,000 vpd as they approach the City. B-10/4th Street, has just over 16,500 vpd as it travels through the City of Benson. Most of the other study area roadways have very low daily traffic volumes, typically less than 1,000 vpd. Exceptions include J Six Ranch Road/Mescal Road and Pomerene Road, which have daily traffic volumes between 2,000 and 3,000 vpd respectively. These two arterials connect with I-10 and serve residential areas.

Existing Level of Service (LOS) is a function of the roadway capacity and existing traffic volumes. Level of Service A is a roadway with little or no delay, whereas LOS F is considered gridlock. Level of Service D is considered the accepted minimum for urban areas, and LOS C is the accepted minimum for rural areas. Currently most of the study area roadways are functioning at a LOS B or better. The section of B-10/4th Street through the City of Benson has the worst existing LOS, operating at LOS C and D. This low level of service on Business 10/4th Street is only at the peak times and also associated with the seasonal influx of winter visitors.

Figure 5 Existing Street System



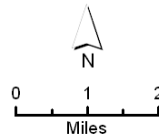
LEGEND

- Study Area Boundary
- County Boundary
- City Boundary
- Interstate Highway
- State Route
- Local Street
- Railroad
- ~ River/Stream
- ✈ Airport
- Traffic Interchange
- Railroad Crossings**
- × At Grade
- ⊗ Grade Separated

Existing Street System

Northwest Cochise County Long Range Transportation Plan

Source:
 Base Map: ADOT 2008, ALRIS 1997-2008,
 BTS 2008, Cochise County 2009
 Study Network: ADOT 2009, Cochise County 2009
 Railroad Crossings: URS 2009
 Imagery: Cochise County 2007



2.3.3 Crashes

Crash data for the five-year period from January 2003 to December 2007 were provided by ADOT. The data were analyzed and summarized for location, type, and severity of crashes. There were a total of 1,056 crashes during this period of time across the roadway network within the study area. There were 36 fatality crashes (3 percent) involving 1,576 vehicles, 525 injury crashes (50 percent), and 495 property damage only crashes (47 percent). The total number of crashes grew about 3 percent annually between 2003 and 2005. In 2006, the total number of crashes dropped by 7 percent from 2005. 2007 experienced a higher than normal increase; however, the number of fatalities dropped from 2005 to 2007. Table 4 summarizes the type of crashes by year between 2003 and 2007.

Table 4 Types of Crashes throughout Northwest Cochise County

Type of Crash	2003	2004	2005	2006	2007	Total
Injury	108	121	101	92	103	525
Fatal	6	10	10	6	4	36
Property Damage Only	86	75	101	107	126	495
Total Crashes	200	206	212	205	233	1,056

Source: ADOT, 2009

Crashes were also analyzed with respect to the major roadways in the study area. As shown in Table 5, 52 percent of all crashes in the study area occurred on I-10. SR 80 and SR 90 had 12 percent and 10 percent of all the crashes, respectively. B-10/4th Street, within Benson, accounted for 10 percent of crashes and the remaining 16 percent occurred on county and local roads.

Table 5 Crashes by Roadway

Roadway	2003	2004	2005	2006	2007	Total	Percent
I-10	105	112	104	99	125	545	52%
SR 80	23	24	32	22	26	127	12%
SR 90	21	17	21	25	22	106	10%
B-10/4th Street	13	24	17	25	24	103	10%
Other Roads	38	29	38	34	36	175	16%
Total	200	206	212	205	233	1,056	100%

Source: ADOT, 2009

Percentage of fatalities in the study area was analyzed with respect to the County roadway network. 64 percent of all fatalities resulted from crashes on I-10. State Route 80 had 19 percent and SR 90 had about 9 percent. Approximately 3 percent of fatalities occurred on B-10/4th Street with the remaining fatalities occurring on other roads within the study area.

2.3.4 Existing Transit Operations

Transit service is limited within the study area to on-demand service for elderly and persons with disabilities funded through ADOT's Section 5310 program. This service, formerly run by Catholic Community Services but now run by the City of Benson under the Benson Area Transit system, provides a demand response service available five days a week for eight hours a day. For residents of Benson, non-emergency medical transport is available in cooperation with Cochise Health Systems. Trips are provided six days a week on an as-needed basis with seven vehicles assigned in the study area.

Southeastern Arizona Behavioral Health Services, Inc. (SEABHS, Inc) offers rides between the client's home and outpatient health services in Benson and unincorporated areas within Cochise County for intercity service. The Quiburi Mission Good Samaritan is also a Section 5310 grant recipient providing transportation services to the Quiburi Mission clients throughout the Benson area. Benson Station is the one Greyhound stop in the study area. From this station riders may travel west to Tucson, Phoenix or further west or east toward El Paso, Texas by way of Willcox and Las Cruces, New Mexico.

2.3.5 Existing Railroads

Two railroad lines currently exist within the study area, UPRR and San Pedro & Southwestern Railroad (SPSR).

UPRR is a double-tracked line with ten at-grade crossings and two grade-separated crossings within the study area, two of which cross private roads. According to the State of Arizona 2007 Railroad Inventory and Assessment and UPRR data, traffic on this section of the UPRR varies from 44 to 49 freight trains per day. Approximately 20 percent of the national UPRR system volume passes through the study area, and recent double tracking improvements could potentially increase traffic volume to 80 to 100 trains per day in the future. The Sunset Limited Route provides passenger service between New Orleans and Los Angeles with stops in Benson three days a week at the Amtrak station located on 4th Street, just west of San Pedro Street.

SPSR is a short line single-track railroad that begins at a junction with UPRR near the intersection of SR 80 and West 4th Street in the City of Benson and continues south approximately 7.5 miles. Three at-grade crossings exist in this corridor, two of which cross private roads. There are no grade-separated intersections along SPSR. SPSR provides service to one customer, the Apache Nitrogen Plant, three days a week in the southern portion of the study area.

The UPRR tracks operate directly through the City of Benson, separating the north and south portions of the city. The developed areas north of the railroad are predominantly residential while the commercial strip of the city is centered along 4th Street, just south of the rail line.

2.3.6 Existing Bicycle and Walking Conditions

The study area has few existing sidewalks except for areas within the old town portion of the City of Benson. Pedestrian activity associated with the State Highway System occurs primarily within the developed areas of Benson, St. David, SR 80, and the I-10/SR 90 business area. These state routes do not provide good walking conditions for pedestrians. Within urbanized areas such as Benson, sidewalks are located at the back of the curb and pedestrians are immediately adjacent to wide, high-volume, relatively high-speed roadways. Pedestrian activity is also

common on roadway shoulders in areas like St. David, along SR 80. The frequency of curb cuts is also of particular concern as many crashes involving pedestrians occur at driveway locations.

State routes with wide right shoulders (>4 feet), low volumes, and acceptable grades are typically considered acceptable for bicycling. State routes within the study area do have wide shoulders but can have higher traffic volumes, in particular during peak hours. B-10/4th Street through Benson is narrow with little or no shoulders and a consistently higher level of traffic making this segment of the state system undesirable for bicycling.

In 2009, ADOT completed a Statewide Pedestrian Safety Plan which addressed some of the policy and engineering issues for improving pedestrian conditions along State Highways. In 2008, St. David Unified School District, ADOT and Cochise County applied for and received transportation enhancement funds to construct a pedestrian pathway on the south side of SR 80 between Mission Lane and Lee Street. The pathway will replace informal paths and provide access to the St. David School, Post Office and the community core area.

The study area has a number of wildlife trails areas, including trails in Kartchner Caverns State Park and the Saint David Monastery on the San Pedro River. Historic transportation routes within the study area have been identified by the Arizona State Parks Subcommittee on Historic Trails. Northwest area residents also indicated that a number of equestrian trails and equestrian easements exist in the study area.

2.4 EXISTING ENVIRONMENTAL CONDITIONS

An environmental evaluation identified natural, cultural, and physical resources located in the study area. The purpose of this overview was to identify those resources or areas that would need consideration in planning future transportation projects.

2.4.1 Local Natural Resource Features

The study area includes a number of natural resource features unique to Cochise County and Arizona. These include:

- **Kartchner Caverns State Park** – Kartchner Caverns State Park is located within the study area and is a major tourist destination. The Park has been preserved by the State because it is a wet living cave. According to the Benson Economic Outlook 2008 Report, the park had an average of over 180,000 visitors per year between 2003 and 2007.
- **San Pedro River Valley** – The San Pedro River is a unique riparian corridor originating in Mexico and flowing from south to north through the study area. The San Pedro corridor is home to numerous wildlife species, including 83 mammals, 43 reptiles and over 380 bird species. The San Pedro is one of the last remaining nesting sites for the southwestern willow flycatcher and western yellow billed cuckoo.
- **U.S. Forest Service Whetstone Mountains** – The Whetstone Mountains, located adjacent to the study area, are a significant 45,000 acre resource for outdoor activities including hunting, hiking, equestrian riding, mountain biking, wildlife viewing, and backcountry touring. Additional population growth will increase demand for outdoor recreation in the Mountains. Currently, there are no legal motorized public access routes within the study area to the east or north side of the Whetstones.

2.4.2 Wildlife Linkages

ADOT and its partners in the Arizona Wildlife Linkages Workgroup, has identified potential wildlife linkage zones across Arizona utilizing local expertise, vehicle/wildlife collision records (see Arizona’s Wildlife Linkages Assessment 2006), and other pertinent data. Identification and mitigation of these potential linkage zones (PLZ) during the planning of transportation projects, helps maintain the connectivity of wildlife populations and minimizes human injuries/property damage and deaths from vehicle collisions. Three PLZs have been identified within the study area and are described in Table 6.

Table 6 Potential Linkage Zones within Northwest Cochise County

Name	PLZ Number	Area (sq mi)	Ecoregion(s)	Predominant Biotic Community
Rincon – Whetstone – Santa Rita ¹	94	263	Sky Island	Semidesert grassland
Whetstone – San Pedro River	97	46	Sky Island	Semidesert grassland
Dragoon – San Pedro River	99	96	Sky Island	Chihuahuan desertscrub Semidesert grassland

¹ The Rincon-Whetstone-Santa Rita corridor was identified as a Top Priority PLZ in the 2006 Arizona Wildlife Linkages Assessment.

Sources: Arizona Department of Transportation 2008a, 2008b; Bailey 1995

Notes: AZ/NM = Arizona/New Mexico, I-17 = Interstate 17, PLZ = Potential Linkage Zone, SR = State Route

2.4.3 Conservation Areas

Conservation areas protect a small fraction of wildlife linkage zones and habitat in the study area. Almost half of the land within the project study area is Arizona State Trust land, which provides little or no long-term protection to special status species or their habitat. The San Pedro Riparian National Conservation Area (RNCA) is approximately 57,000 acres and its primary purpose “to protect and enhance the desert riparian ecosystem, a rare remnant of what was once an extensive network of similar riparian systems throughout the American Southwest” (BLM 2008b).

2.4.4 Cultural Resources

Cultural resources include archaeological sites, historical buildings and structures, and places that have significance for traditional groups with cultural affiliations with the study area. Potential effects on cultural resources will need to be considered as future upgrades and modifications of the state highway system in the study area are planned and implemented.

Cultural resource surveys have been completed along most of the three major highways in the study area (I-10, SR 80 and SR 90). Twelve archaeological and historical resources have been recorded along those highways and impacts on those sites would need to be addressed as part of any future project. New roadway corridors would be required to obtain a cultural resource survey as part of any preliminary design work. The San Pedro River corridor is known to have a high density of archeological sites as well as a number of known and yet undiscovered burial grounds, some of which are associated with Native American tribes historically affiliated with this area. St. David cemetery, associated with the long-standing Church of Jesus Christ of Latter-Day Saints community, is currently located immediately adjacent to SR 80 and could constrain future widening of this highway in the future.

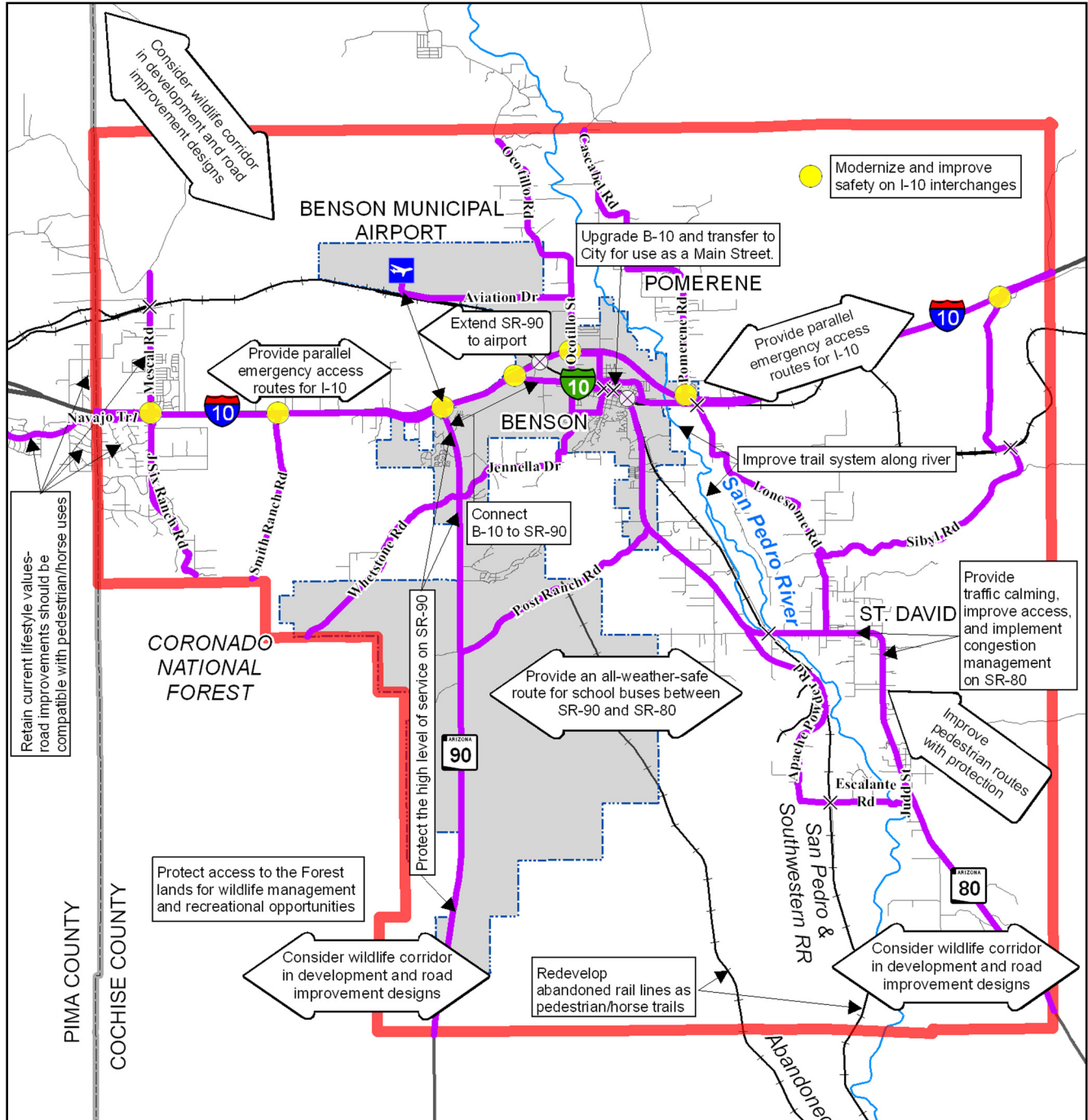
2.5 STAKEHOLDER INPUT

ADOT and the Study Team met with northwest area stakeholders/community members throughout the planning process to identify trends, visions and issues for Northwest Cochise County. One of the goals was to define the transportation needs as seen from the community's perspective and to gain understanding of emerging trends, area characteristics, community and investor plans, and local perspectives of how the study area might change and grow in the future.

Thirty in-depth and focused interviews were conducted with specific stakeholders during the months of June, July, and August 2009. The stakeholders were selected by ADOT, the City of Benson and Cochise County and were a representative sample of the land and business owners, elected officials, transportation system operators, planners and public works managers, school district officials, and emergency responders serving the study area. Based on these interviews and community input, several predominate themes were recognized and are summarized below and in Figure 6.

- The City would like to locate additional traffic signals on B-10 (4th Street) to better manage traffic in the area, but this is counter to ADOT's mandate to facilitate through traffic. The City and business representatives are interested in the "Complete Streets" approach to modernizing 4th Street.
- New residential development will likely take place first along I-10 starting at the Skyline interchange and preceding east to the SR 90/I-10 interchange. This would include the North Whetstone Ranch development.
- Address the safety issue related to the current practice of routing St. David school buses in a manner that requires them to travel great distances in order to remain on paved roads. This practice increases the daily trip lengths and the potential safety issues due to having to enter and exit I-10.
- Develop an east/west connection between SR90 and SR80 through the center of the study area. An alignment using Post Ranch Road was most often referenced.
- Locate an alternative route which parallels I-10 from SR90/I-10 interchange west to the J-Six/Mescal interchange. This alternative is needed to address emergency responder access needs for I-10 and to provide a bypass when I-10 is shut down due to an accident, construction or other events.
- Upgrade and pave a second alternative route using Sybil Road, thereby providing emergency vehicle access to I-10 from the I-10/Sibyl interchange and the I-10/Pomerene interchange. This route would serve as a bypass when I-10 is closed.
- Consider a wildlife crossing for deer, antelope and other big game animals as future improvements to I-10 are planned. The Arizona Game and Fish Department, in cooperation with US Game and Fish, ADOT and other federal and state agencies, designated a wildlife corridor between the Rincon and Whetstone Mountains. This corridor passes between the J-Six/Mescal and the SR90 interchanges on I-10. Two additional corridors have been identified but do not have detailed studies; Dragoon – San Pedro River and Whetstone – San Pedro River. They should be noted for future planning purposes.
- Desire to preserve riparian area, especially the San Pedro River corridor.

Figure 6 Stakeholder Identified General Themes



LEGEND

 Study Area Boundary	 Study Network	Airport
 County Boundary	 Interstate Highway	 Traffic Interchange
 City Boundary	 State Route	Railroad Crossings
 Bureau of Land Management	 Local Street	× At Grade
 U.S. Forest Service	 Railroad	⊗ Grade Separated
 State Trust Land	 River/Stream	
 Local or State Parks		

Summary of Transportation Improvements from Stakeholder Interviews and Public Comments

Northwest Cochise County Long Range Transportation Plan

Source:
 Base Map: ADOT 2008, ALRIS 1997-2008, BTS 2008, Cochise County 2009
 Study Network:
 ADOT 2009, Cochise County 2009
 Railroad Crossings: URS 2009

3.0 FUTURE CONDITIONS

An analysis of future population and employment projections as well as future land use plans provided an overview of inputs for long-range travel forecasting to support the development of future year transportation improvements within Northwest Cochise County. This study effort included population projections for 2020 and 2040, utilizing an annual growth rate of 2 percent established through local guidance, and based on historical trends.

3.1 MODEL DEVELOPMENT

ADOT and Cochise County established a coordinated approach for the projection of future travel demand in the study area. To ensure consistency between the Cochise County-wide Travel Demand Model and the Northwest Cochise County Long-Range Transportation Plan, ADOT and Cochise County agreed to coordinate the system configuration and socioeconomic data input and share results of the output analyses.

3.1.1 Future Land Use

The City of Benson General Plan (2002) and the Cochise County Comprehensive Plan (2006) were reviewed to understand future land use trends within the study area. The City of Benson General Plan provided the most detailed land use guide, whereas the County Comprehensive Plan indicates general growth areas and planning areas. The City of Benson General Plan identifies an extensive planning area, encompassing a large area south of I-10 along SR 90. Most of the land within the Benson planning boundary is zoned as low density residential. Along SR 90 more intense uses are envisioned including a commercial core near I-10 and the Benson Airport and mixed use on either side of SR 90 to the south. The Benson General Plan also shows growth to the south of the established parts of the city, with a mixture of medium density residential and commercial uses.

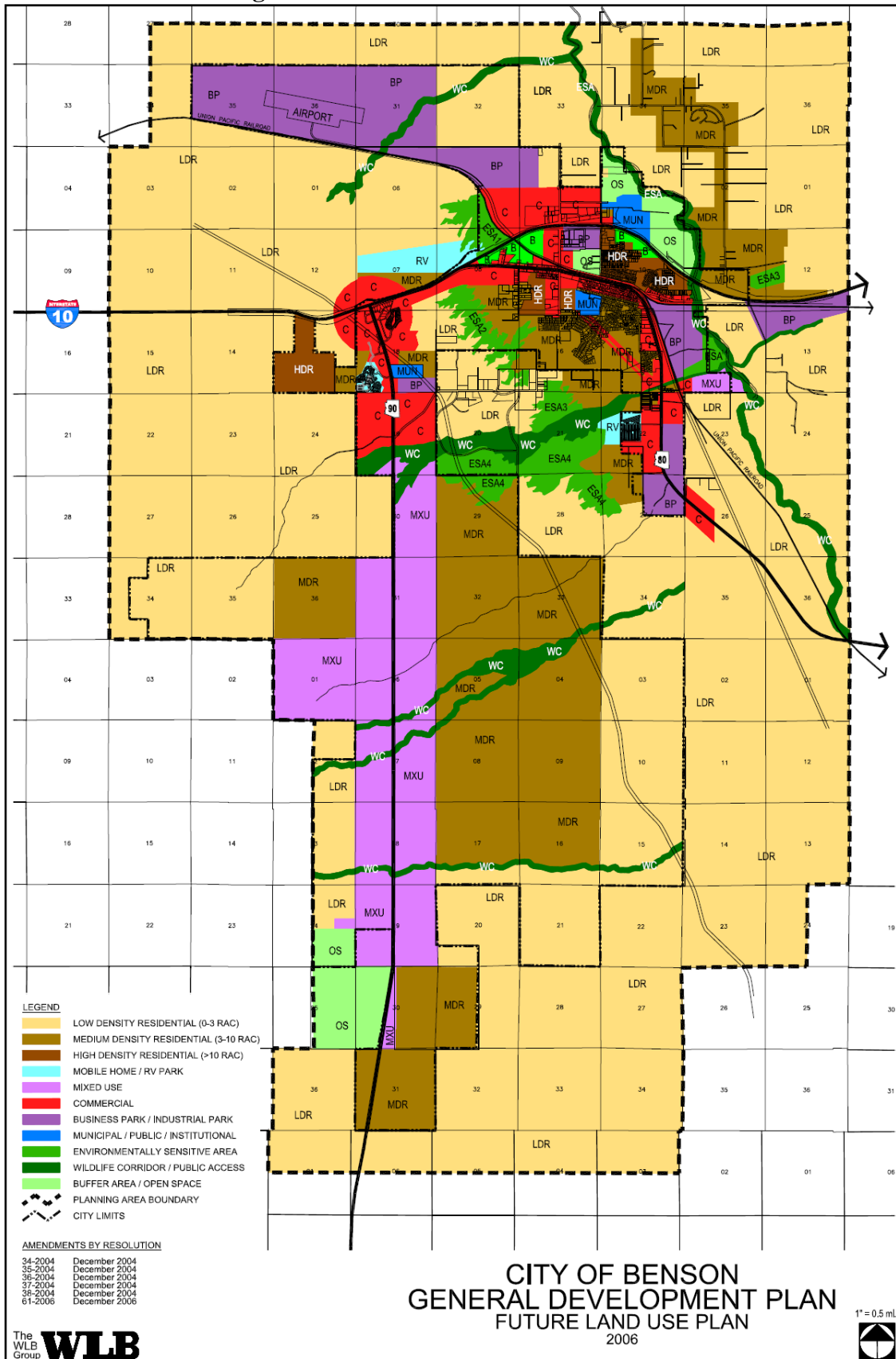
The Cochise County Comprehensive Plan identifies a number of growth areas within the Northwest study area. The Comprehensive Plan establishes four growth area categories which include:

- Category A (Intensive Growth) Areas;
- Category B (Urban Growth) Areas;
- Category C (Rural Growth) Areas; and
- Category D (Rural) Areas.

Commercial growth is focused within the City of Benson. The Benson General Plan identifies three major commercial centers, downtown Benson, the I-10 and SR 90 interchange area, and north of I-10 along Ocotillo Road as prospective commercial development sites. Downtown Benson is the traditional commercial center of the northwest region. The I-10/SR 90 interchange area has been a recent commercial growth area, with the development of new hotels, restaurants and service stations.

Figure 7 shows the future land use plan as identified in the City of Benson General Plan. It should be noted that areas outside the City of Benson limits shown as Low Density Residential (LDR) are identified in the County Comprehensive Plan as Rural.

Figure 7 Future Land Use Plan



3.1.2 Future Socioeconomic Projections

Future year forecasts were developed for population and employment for year 2020 and 2040 as part of the county-wide model effort. Growth rates were applied to current year (2007) data to derive the future year estimates. The growth rates were developed using DOC population estimates and historical growth patterns.

According to the Census 2000 block data, the population for the study area was approximately 10,166 people in 2000. The current (2007) population for the study area is estimated at 12,043 people. This calculates to an actual growth rate from 2000 to 2007 of about 2.8 percent annually for the study area. The TAC identified 2 percent as the preferred growth rate for use in this study. This growth rate is consistent with historical growth rates observed for Cochise County.

Table 7 identifies growth projections for the total number of households, employment, and population for the study area for 2020 and 2040. Population projections assumed 2.3 persons per household, which is consistent with study area census data. The population within the study area is projected to double between 2007 and 2040, from about 12,000 to over 24,000 people (assuming a steady 2 percent annual growth rate). Employment is expected to grow at a similar rate, and remain at a consistent ratio of about three residents per employee, growing from almost 4,000 employees in 2007 to just under 10,000 employees by 2040.

Table 7 Future Year Growth Projections

Year	Households	Employment	Population*
2007	5,236	3,917	12,043
2020	7,133	5,376	16,406
2040	10,600	9,691	24,380

*Population projection assumes 2.3 people per household

Household and employment numbers were distributed throughout the study area. The distributions of these forecasts are based on City of Benson and Cochise County land use plans and local knowledge of development patterns with input from the TAC. The county and city provided detailed feedback on the distribution of 2040 households. Similar distributions were assumed for 2020 based on the concept that current future land use plans and growth patterns for 2020 will continue for this area into 2040. The county and city also provided some specific locations that would develop more rapidly than others as well as identified areas with known constraints to higher density growth. These distributions were checked against the 2007 existing data, future land use plans and the 2 percent growth rate control totals to ensure reasonable patterns. Growth is expected to be primarily within and adjacent to the City of Benson. The SR 90 corridor is also a projected growth area with new growth starting near the I-10 interchange and progressing south.

Figure 8 and Figure 9 show estimated population and employment density for years 2020 and 2040, respectively.

Figure 8 Estimated Future Population Density (2020, 2040)

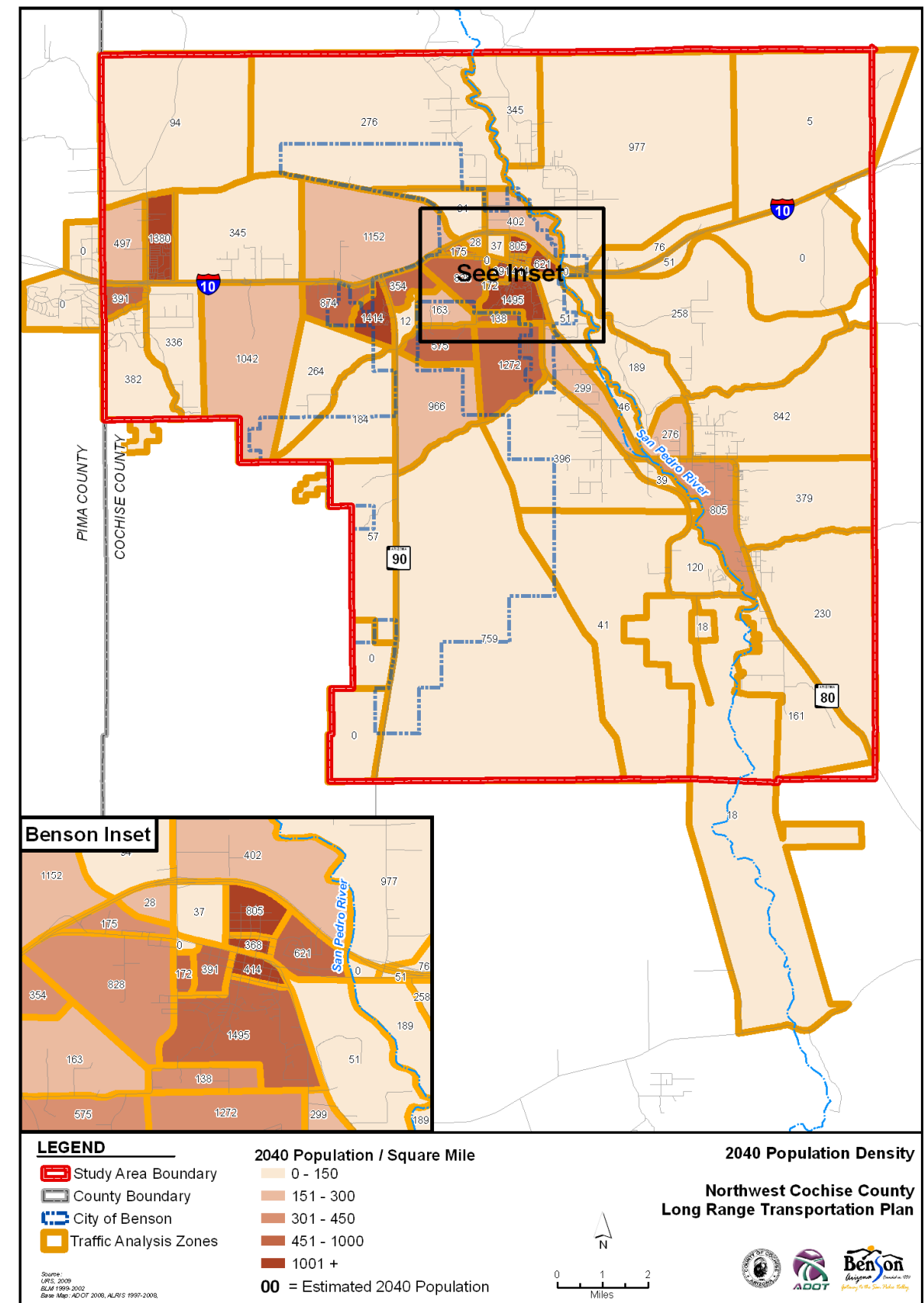
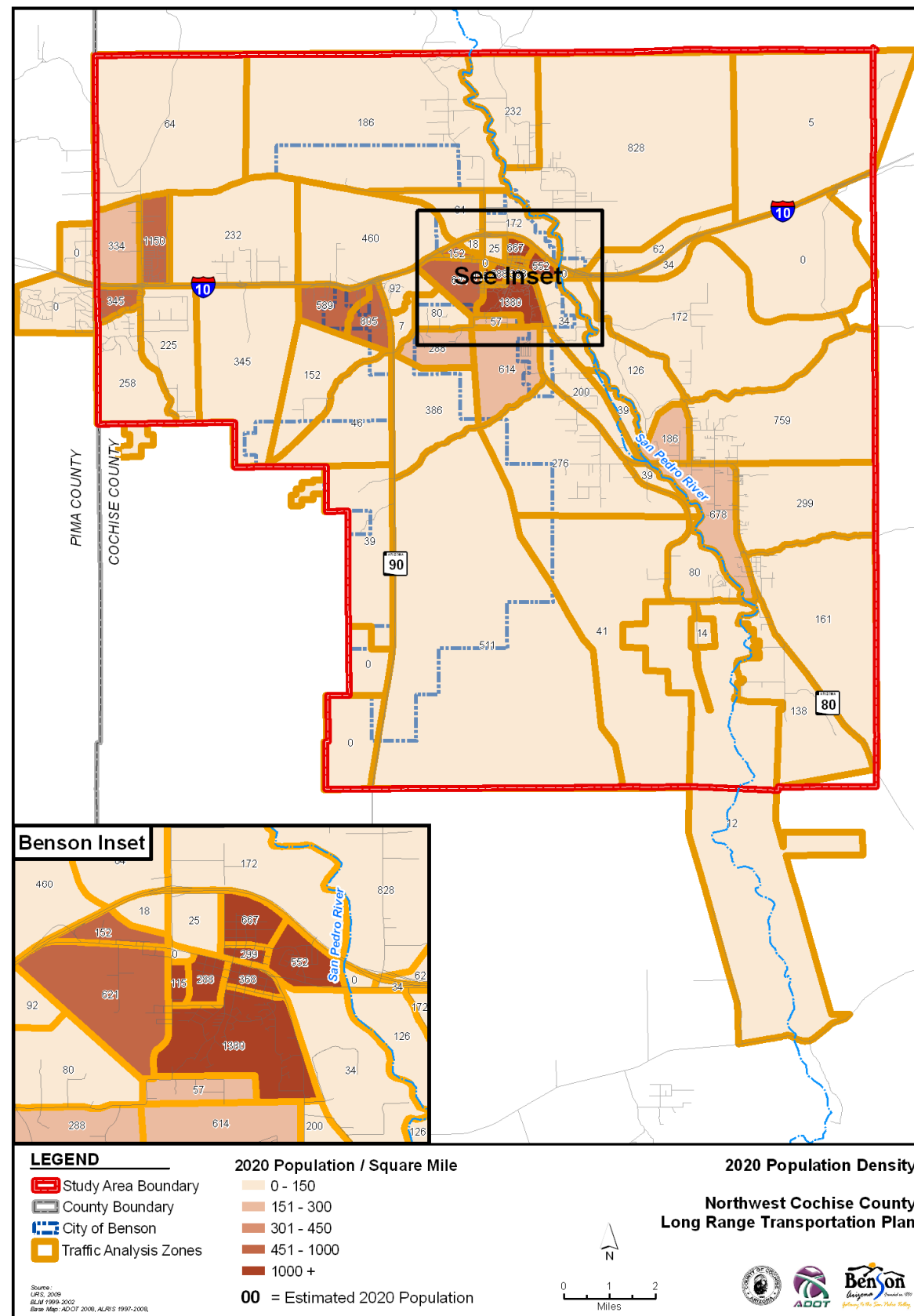
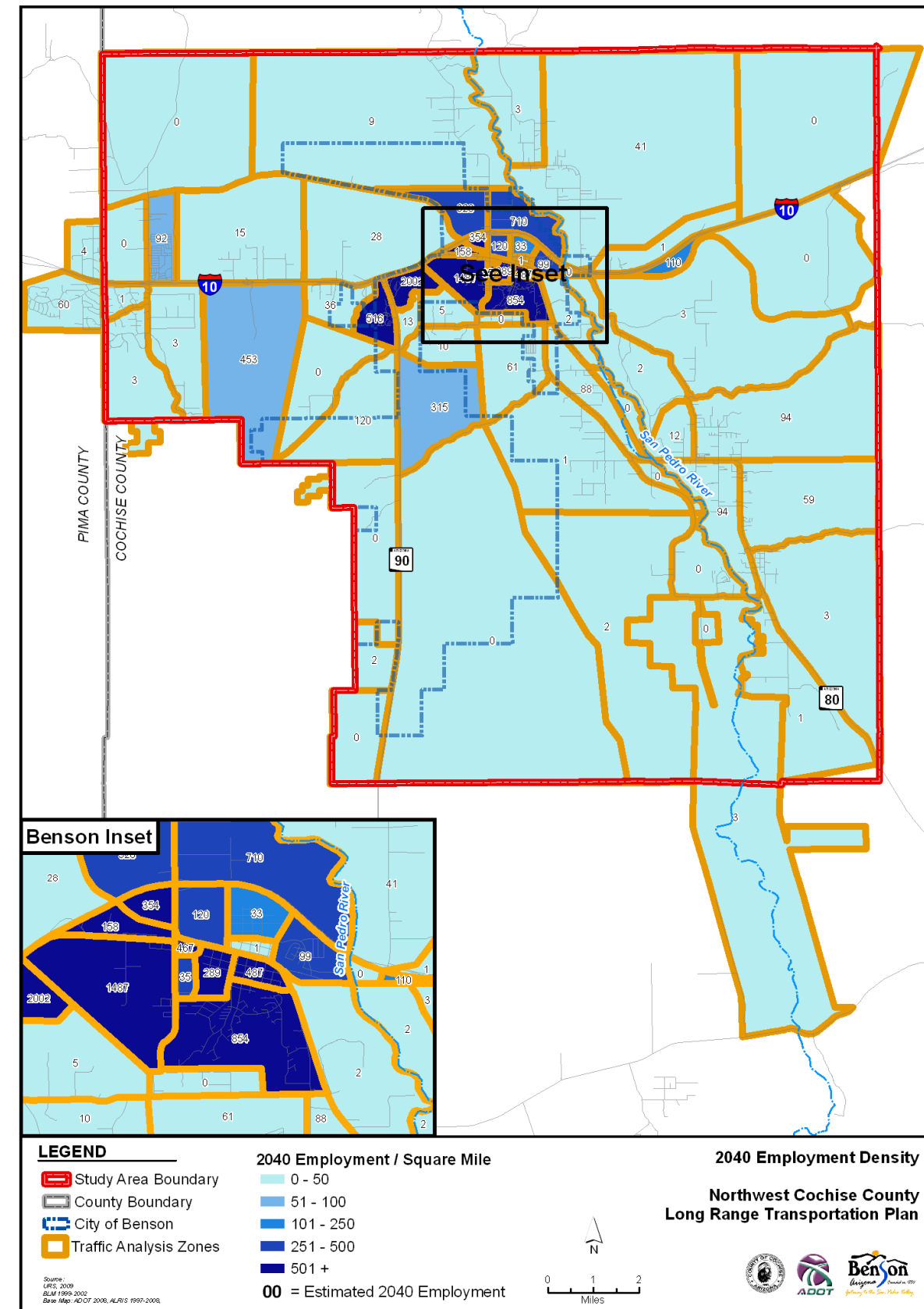
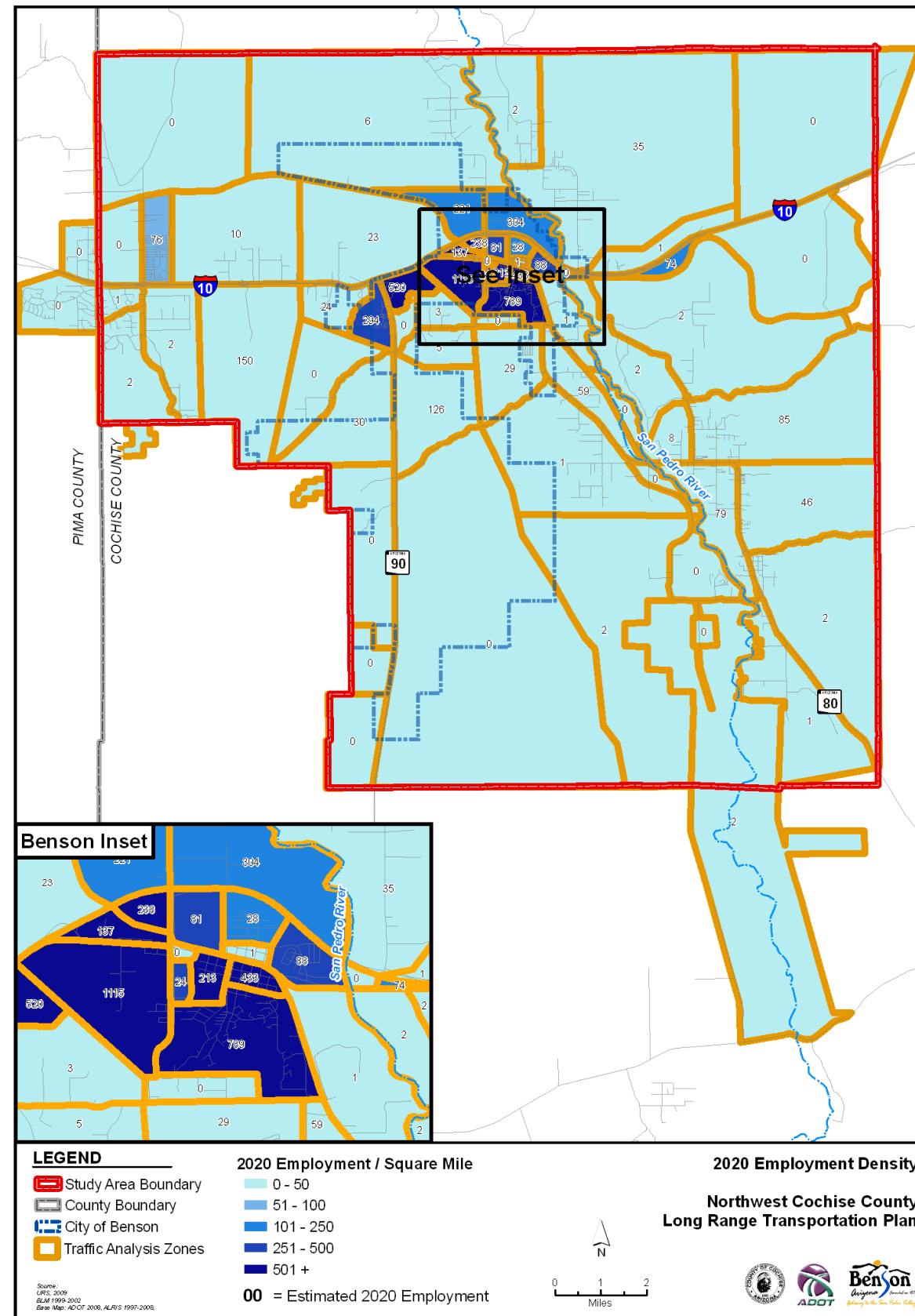


Figure 9 Estimated Future Employment Density (2020, 2040)



4.0 ALTERNATIVES DEVELOPMENT

The alternative development process was based on findings from the review of existing conditions, stakeholder interviews and public meetings. A 2020 alternative and three 2040 alternatives were developed to respond to the goals and objectives for this project, specific comments from stakeholders and the public and deficiencies identified through the no-build travel demand modeling.

4.1 GOALS AND OBJECTIVES

Goals and objectives were developed during the project process based on feedback from stakeholders, through the interviews conducted early-on in the project, direction from the TAC and from comments received during public meetings. These goals and objectives served to guide development of alternatives.

Goal A: Develop a safe and efficient roadway network to accommodate future traffic demands. The objectives to achieve this goal include:

- Maintain efficient traffic flow on SR 90, SR 80, and I-10.
- Develop additional east/west roadway connections.
- Improve traffic flow and safety through downtown Benson.
- Improve circulation at traffic interchanges with I-10.

Goal B: Improve conditions for bicycling and walking within the Northwest Cochise County study area. The objectives to achieve this goal include:

- Create a network of bicycle facilities that includes bicycle lanes, routes and paths.
- Identify critical gaps in the sidewalk system to program improvements.
- Identify opportunities to create pedestrian connections to trails, parks or schools.

Goal C: Create more travel choices within the region through the enhancement or implementation of transit services. The objectives to achieve this goal include:

- Maintain the existing level of para-transit service within the region.
- Identify a structure for initiating a local transit service serving the region.

Goal D: Develop a transportation system that evaluates impacts to environmentally sensitive areas and special status wildlife species, and as necessary incorporate mitigation measures. The objectives to achieve this goal include:

- Include accommodations for wildlife crossings at appropriate locations when roadway improvements occur.
- Identify and mitigate potential impacts to the San Pedro River when developing roadway or other circulation infrastructure plans.
- Initiate research early in the planning process to refine the location of wildlife corridors in the Northwest Cochise County planning area.
- Identify and obtain funding to support the wildlife corridor research.

Goal E: Support economic development through the development of the transportation system. The objectives to achieve this goal include:

- Develop concepts for improving 4th Street/Business 10 through downtown Benson to create a more attractive corridor for visitors and businesses.
- Identify locations where future commercial development will be located along I-10, SR 90 and SR 80 to understand and address access requirements.

4.2 NO-BUILD ALTERNATIVE

In addition to the goals and objectives, the development of alternatives was structured to respond to deficiencies identified under no-build conditions. This assumes that the current roadway, transit and non-motorized conditions that exist today persist into the future. This provides a baseline of how the system would operate given the expected population and employment growth, if no improvements were made to the transportation system.

In 2020, the no-build analysis indicates capacity issues on SR 90 just south of I-10, SR 80 south of Benson, and on B-10/4th Street within Benson (B-10/4th Street was modeled as a continuous 4 lane roadway, even though in certain sections within downtown Benson B-10/4th Street is a 3 or 2 lane configuration). By 2040, under no-build conditions capacity issues are more widespread with deficiencies further south on SR 90, worsening LOS on SR 80, deficiencies on I-10 between the J-Six/Mescal interchange and the B-10/4th Street interchange, and poor LOS on Ocotillo Road and J-Six/Mescal Road.

Table 8 shows the mileage by LOS for both 2020 and 2040. In 2020, 96 percent of the study area roadway mileage is LOS C or better. In comparison by 2040 only 87 percent of the study area mileage is LOS C or better.

Table 8 Level of Service Distribution by Mileage in Study Area

LOS	2020 Mileage (miles)	2020 Percentage	2040 Mileage (miles)	2040 Percentage	Change in Miles from 2020 to 2040	Percent Change from 2020 to 2040
A	129	67%	79	41%	-50	-26%
B	46	24%	50	26%	4	2%
C	11	5%	38	20%	27	14%
D	5	3%	15	8%	10	5%
E	1	<1%	3	2%	2	1%
F	0	0%	7	3%	7	3%
Total	192	100%	192	100%		

The 2009 City of Benson Transit Feasibility Review and Implementation Plan indicated that current dial-a-ride transit service (the only current transit service available in the study area), provides about 7,600 annual rides and is not meeting the total potential transit need. The 2009 study estimated a potential need of around 27,000 rides, more than three times the current level of transit service. Under no-build conditions this unmet transit need will persist and likely grow worse as population and employment grow.

Non-motorized travel conditions are currently limited within the study area, and would continue to be limited under a no-build alternative.

4.3 BUILD ALTERNATIVES CONSIDERED

Based on the findings from the no-build alternative analysis, as well as the guidance of the goals and objectives, one 2020 alternative and three 2040 transportation alternatives (A, B, and C) were developed. The 2020 alternative addressed mid-term needs, with projects focused primarily on adding capacity to the state system. The 2040 alternatives were structured to address long-term needs and test a combination of roadway widening projects as well as developing new roadways. The distinguishing features of the alternatives were as follows:

2020 Alternative: The 2020 alternative is structured to address roadway deficiencies as identified in the no-build analysis and includes three road widening projects along SR 80, SR 90 and B-10/4th Street. This alternative includes the implementation of transit service within the City of Benson. Non-motorized improvements would be included as part of the roadway projects.

2040 Alternative A: This 2040 alternative adds capacity to most state highways in the study area and includes the development of a **new east/west county roadway** between the J-Six/Mescal area and Benson. Includes the implementation of regional transit service serving the study area, and also integrates non-motorized improvements into roadway projects.

2040 Alternative B: This 2040 alternative adds capacity to most state highways in the study area and the development of a **new Traffic Interchange (TI)** to replace the Skyline TI with two **new one-way frontage roads** providing local access. Alternative B also includes a new roadway connection between St. David and I-10, and upgrading Post Ranch Road to a paved two-lane roadway between SR 90 and SR 80. Includes the implementation of regional transit service serving the study area, and also integrates non-motorized improvements into roadway projects while recommending expansion of the trail system.

2040 Alternative C: Adds capacity to most state highways in the study area and the development of a **new TI** to replace the Skyline TI with a **new two-lane frontage road** providing local access. Alternative C also includes a new roadway connection between St. David and I-10 and upgrading Post Ranch Road to a paved two-lane roadway between SR 90 and SR 80. Includes the implementation of regional transit service serving the study area, and also integrates non-motorized improvements into roadway projects while recommending expansion of the trail system.

Table 9 summarizes the elements of each of the alternatives, including proposed roadway, transit and non-motorized projects.

Table 9 Future Alternatives Considered Summary

Alternative	Project	Location	Length (approx)	Improvement
2020	SR 80	B-10/SR 80 split in Benson to south to Judd Road (approximately MP 293 to MP 303.5)	10 miles	Widen to 4 lanes
	SR 90	I-10/SR 90 TI south to Whetstone Ranch Road (approximately MP 289 to MP 293)	3 miles	Widen to 6 lanes
	B-10/4th St.	Ocotillo Road to the SR 80 split in Benson	0.9 miles	Widen to 6 lanes
	Mescal Road	North of the J-Six/Mescal I-10 traffic interchange	1 mile	Widen to 4 lanes
	Transit	Deviated fixed route service within Benson and continue the dial-a-ride service	N/A	N/A
	Non-Motorized	Include bicycle and pedestrian facilities as part of the roadway projects	N/A	N/A
2040 A	E/W Connector	Mescal Road to B-10/4th Street north of I-10	6 miles	New 2-lane road
	SR 90 Extension	I-10 to new E/W Connector	1 miles	New 4-lane road
	I-10	Cochise/Pima County line to B-10/4th Street Exit (approximately MP 296 to MP 303)	7 miles	Widen to 6 lanes
	SR 90	Whetstone Ranch Road to study area boundary (approximately MP 293 to 301)	8 miles	Widen to 6 lanes
	SR 80	Judd Road to study area boundary (approximately MP 303.5 to MP 308)	4.8 miles	Widen to 4 lanes
	B-10/4th Street	I-10 to Ocotillo Road	1.2 miles	Widen to 6 lanes
	Ocotillo Road	North of I-10 to B-10/4th Street	1.3	Widen to 4 lanes
	Transit	Expand deviated fixed route service to region and continue the dial-a-ride service	N/A	N/A
	Non-Motorized	Include bicycle and pedestrian facilities as part of the roadway projects	N/A	N/A
2040 B	Skyline Road TI	Remove existing Skyline TI and replace (between MP 298 and MP 299)	N/A	New TI
	North Frontage Rd	J-Six/Mescal to SR 90 (one-way road)	5 miles	New 1-lane frontage road
	South Frontage Rd	J-Six/Mescal to SR 90 (one-way road)	5 miles	New 1-lane frontage road
	St. David Connector	From SR 80 near Dragoon Vista Road north to I-10 at the Sibyl Road TI	7 miles	New 2-lane road and UPRR crossing
	Post Ranch Road	Connection between SR 90 (MP 294) and SR 80 (MP 296)	4 miles	Improve to paved 2-lane road
	Transit	Expand deviated fixed route service to region and continue the dial-a-ride service	N/A	N/A
	Non-Motorized	Include bicycle and pedestrian facilities as part of the roadway projects, expand trail system	N/A	N/A

Alternative	Project	Location	Length (approx)	Improvement
2040 C	Skyline Road TI	Remove existing Skyline TI and replace (between MP 298 and MP 299)	N/A	New TI
	Frontage Road	J-Six/Mescal to SR 90	5 miles	New 2-lane frontage road
	St. David Connector	From SR 80 near Dragoon Vista Road north to I-10 at the Sibyl Road TI	7 miles	New 2-lane road and UPRR crossing
	Post Ranch Road	Connection between SR 90 (MP 294) and SR 80 (MP 296)	4 miles	Improve to paved 2-lane road
	Transit	Expand deviated fixed route service to region and continue the dial-a-ride service	N/A	N/A
	Non-Motorized	Include bicycle and pedestrian facilities as part of the roadway projects, expand trail system	N/A	N/A

4.4 EVALUATION OF POTENTIAL ALTERNATIVES

The evaluation criteria to assess these alternatives were developed to provide an objective and structured approach to screening a range of alternatives to identify a preferred improvement strategy.

Each alternative was evaluated based on a set of criteria which relate to the goals and objectives of this study. Each conceptual alternative was compared against one another using qualitative evaluation criteria to determine which of the alternatives performed favorably based on certain issues. A ranking of “Good,” “Fair” and “Poor” was used to indicate the relative performance of the alternative to the specific criterion.

The criteria that were selected for the evaluation of project alternatives include:

- Traffic Safety Impacts;
- Traffic Congestion/Operations;
- Non-Motorized Improvements;
- Natural, Physical, and Cultural Resources;
- Consistency with Local Plans;
- Cost and Funding Potential.

4.5 SUMMARY OF RESULTS

The evaluation analysis showed that the 2020 alternative provides near term improvements to improve the roadway system to LOS C or better throughout the study area. The evaluation analysis for the 2040 alternatives generally favors Alternatives B and C, with the new service interchange on I-10 and additional regional connectivity with the St. David connector and improving Post Ranch Road between SR 90 and SR 80. Alternatives B and C also are more effective in improving traffic congestion, include non-motorized improvements and are more in line with the communities desires. The main difference between Alternative B and C is the configuration of the frontage roads along I-10. The configuration under Alternative C, which is the two-lane frontage road north of I-10, appears to function better than two one way frontage

roads on either side of I-10. The two-lane frontage road is similar in many ways to the proposed east/west roadway in Alternative A.

Table 10 provides the results of the evaluation of each of the four alternatives based on the screening criteria and analysis.

Table 10 Alternatives Evaluation Analysis Summary

EVALUATION CRITERIA	ALTERNATIVES			
	2020	2040 A	2040 B	2040 C
Safety				
Safety related projects	○	●	●	●
Traffic calming measures	○	●	●	●
Access management elements	○	●	●	●
Traffic Congestion/Operations				
Provides additional capacity	●	●	●	●
Regional connectivity	○	●	●	●
Transit improvements	●	●	●	●
Non-motorized Improvements				
Includes pedestrian projects	○	○	●	●
Includes bicycle facilities	○	○	●	●
Integrates non-motorized facilities	●	●	●	●
Impacts to the San Pedro River, Wildlife Connectivity, and Right-of-Ways				
Impacts to the San Pedro River	○	●	●	●
Impacts to wildlife connectivity	●	○	●	●
Right of Way impacts	●	○	●	●
Consistency with Local Plans				
City of Benson	●	○	●	●
Cochise County	●	○	●	●
Cost and Funding Potential				
Capital cost	●	○	●	●
Funding availability	●	○	○	○

Legend:

- – Poor
- – Fair
- – Good

5.0 RECOMMENDED LONG-RANGE PLAN

The recommended long range plan for Northwest Cochise County includes projects to address future deficiencies on the state highway system, projects to provide better connectivity within the study area, projects to improve access to transit service and strategies to improve travel conditions for non-motorized modes. The implementation of this plan should consider impacts to the natural and physical environment by addressing potential impacts early during project development.

The recommended projects for 2020 are as detailed in section 4.3 and include adding capacity on heavily used state highways, integrating bicycle and pedestrian features within those improvements, and implementing expanded transit service within the City of Benson. The final recommended 2040 plan is a hybrid of the three alternatives, with elements of each that worked best to satisfy the long range transportation needs for the study area.

The recommended improvement plan is detailed in Table 11 and shown in Figure 10. Figure 11 shows the predicted 2040 level of service based on the recommended long range plan.

5.1 ROADWAY

Recommended roadway improvements include adding capacity to the region's main corridors and adding additional local connectivity. The recommended roadway improvements include:

- Widening I-10, SR 90, SR 80
- Widening Mescal Road and Ocotillo Road
- Improving Post Ranch Road between SR 90 and SR 80
- Creating a new road connecting I-10 and SR 80 in the St. David area
- Replacing the Skyline traffic interchange on I-10
- Creating a new frontage road system along I-10 to connect from the J-Six/Mescal area to the new Skyline TI and to SR 90
- Improve B-10/4th Street through the City of Benson as a 4 lane facility with access management techniques such as dedicated turn lanes, installation of a landscaped median to control turning movements, and possibly consolidating driveways to reduce conflicts

The estimated timeframe and cost of these improvements are shown in Table 11.

5.2 TRANSIT

The 2009 City of Benson Transit Feasibility Review and Implementation Plan showed a clear existing need for additional transit within the Northwest Cochise County study area. At a minimum, it is recommended that the transit service detailed in that plan would be implemented by 2020 to provide deviated fixed route service within Benson. The plan also describes a regional service option that would serve the entire study area including the J-Six/Mescal area, Pomerene and St. David. Given expected population growth, and the projected aging population, the area will need this type of regional service by 2040, if not before. The City of Benson is currently working on the establishment of a fixed route system that would service Benson, Pomerene, J-Six/Mescal, and St. David.

5.3 NON-MOTORIZED

Integrating bicycle and pedestrian facilities into roadway projects is a cost-effective way to add facilities. The recommendation from this study is to integrate bicycle and walking into any future roadway project. For rural roadways this would include providing wide paved shoulders (minimum of 4 feet), whereas within more urban settings like Benson, this would include adding bike lanes and sidewalks. The implementation of a comprehensive trail system within the study area is desired by the community; a yearly program to add trails, paths and bike lanes is recommended. Equestrian crossings and trails are also desired by the community and should be considered when developing future roadway corridors. Additionally it is recommended that the City of Benson and Cochise County partner with the Cochise Trails Association to develop a comprehensive trails plan for the area, which would identify corridors and priorities.

5.4 ACCESS MANAGEMENT AND SAFETY

Within the study area there are a number of safety or access management improvements that are needed within the next ten years. Examples of these types of projects include improvements to the J-Six/Mescal traffic interchange with I-10, sight distance improvements to Meadowlark Lane and traffic control on B10/4th Street. B10/4th Street is currently a mixture of a four lane and two lane configurations through Benson. It is recommended that ADOT and the City of Benson study the implementation of access management techniques on B10/4th Street to improve traffic flow and handle future capacity issues. This could include intersection improvement such as dedicated turn lanes, installation of a landscaped median to control turning movements, and possibly consolidating driveways to reduce conflicts. Access management techniques have been shown to be effective in improving safety and capacity on corridors similar to B10/4th Street.

5.5 THE NATURAL AND PHYSICAL ENVIRONMENT

It is recommended to initiate research to refine the locations of the three known wildlife corridors in the study area, and provide recommendations for crossing structures that minimize vehicle/wildlife collisions, prior to the development of new roadway projects. Impacts to the natural and physical environment should be considered in the implementation of this plan including:

- Minimizing and mitigating negative impacts to the San Pedro River;
- Minimizing and mitigating negative impacts on wildlife utilizing the three wildlife corridors in the study area; and
- Implementing corridor research to help refine the boundaries of the three known wildlife corridors in the study area, and provide recommendations for crossing structures that minimize vehicle/wildlife collisions.

5.6 FINANCIAL CONSTRAINTS

The cost estimates shown below in Table 14 are not financially constrained. Annualized over the time frame of this study, implementation of the proposed projects would cost an estimated \$5 to \$10 million per year for 30 years. Most of the recommended projects are on the state highway system, and would require state or federal funding. Surface Transportation Program (STP) funding is available for state, local and county jurisdictions on any Federal-aid highway, bridge

project, public road, transit capital project, and bus terminals and facilities. STP funding is distributed to Metropolitan Planning Organizations (MPOs) and Councils of Governments (COGs) on an annual basis. Cochise County must compete for its share of STP funding through the Southeastern Arizona Governments Organization (SEAGO) during its annual programming of STP funding.

Local transportation projects for Cochise County of the City of Benson rely heavily on the Highway User Revenue Fund (HURF). In 2009 Cochise County received \$7.7 million in HURF funds, and the City of Benson received \$351,255 of HURF funds (it should be noted that while the study area includes the entire City of Benson it only reflects 3.7 percent of the Cochise County area of roadway infrastructure responsibility). The local projects recommend are estimated to cost in the range of \$19 to \$25 million. Annualized this would be \$650,000 to \$833,000 per year to implement over the 30-year time frame.

5.7 NEXT STEPS

Implementation of this plan requires a number of near term and long term steps. In the near term, ADOT has identified the need to study a number of the state highway corridors including SR 80, SR 90 and I-10. A Design Concept Report (DCR) for I-10 from Tucson to SR 90 was started in August 2010. This DCR was originally scoped as covering the stretch of I-10 from I-19 to the Empiritia TI but FHWA and ADOT agreed to extend the extent of the DCR to SR90 based in part on the preliminary recommendations of this study.

To further the recommendations of this study Cochise County and the City of Benson will work to incorporate the findings and recommendations into the following:

- Cochise County Roads and Streets Map
- The Cochise County Comprehensive Plan
- City of Benson General Plan

It will also be important to prioritize and develop phasing for projects while looking for opportunities to implement high priority projects. Corridor Studies and roadway assessments will be needed to refine and finalize future alignments for new roads. The final recommended 2020 and 2040 long-range plan focuses on the major capacity projects to meet needs into the future. Roadway improvements in the Northwest Area will also include improvements already funded, such as the SR90 interchange and Dark Star re-alignment as well as safety and enhancement projects, such as improving the J-Six/Mescal Traffic Interchange intersection and reconstructing B-10/4th through Benson. Routine replacement and upgrades of signing and striping include the replacement of virtually all of the warning and regulatory sign faces for improved visibility at night in the next few years.

As growth occurs over time, local connections to serve new commercial and residential areas are likely to be developed. Two such connections could be an extension of SR90 northbound towards the Benson Airport area and from Sybil in the St. David area northbound towards Airport Rd roughly along the Lonesome Rd. alignment. On-going maintenance as well as roadway surface treatments will also continue to play a significant role in meeting the transportation needs of the northwest area into the future.

Table 11 Recommended Improvement Plan

2020 Improvement Plan	Location	Length (approx.)	Cost Range (Rounded)
2020 State Projects			
Widen SR 80 to 4 lanes, with bicycle and pedestrian improvements integrated	B-10/SR 80 split in Benson to Judd Road (approximately MP 293 to MP 303.5)	10 miles	\$30m - \$50m
Widen SR 90 to 6 lanes, with bicycle and pedestrian improvements integrated	I-10/SR 90 TI to Post Ranch Road (approximately MP 289 to MP 294)	4 miles	\$8m - \$12m
Implement access management improvements to B-10/4th Street and reconstruct roadway with 4 lanes.	I-10 to the SR 80 split	2 miles	\$1.5m - \$2m
2020 State Improvements Total			\$39.5m - \$64m
2020 Local Projects			
Widen Mescal Road to 4 lanes	North of the J-Six/Mescal I-10 traffic interchange	1 mile	\$3m - \$5m
Fixed Transit Service	Serving City of Benson	N/A	\$275k
2020 Local Improvements Total			\$3.2m - \$5.2m
2040 Improvement Plan	Location	Length (approx.)	Cost Range (Rounded)
2040 State Projects			
New I-10 service interchange to replace the existing Skyline TI	Remove existing Skyline TI and replace (between MP 298 and MP 299)	N/A	\$20m - \$30m
New 2 lane frontage road north of I-10, with bicycle improvements	J-Six/Mescal to SR 90 (two way road)	5 miles	\$10m - \$25m
Widen I-10 to 6 lanes	Cochise/Pima County line to B-10/4th Exit (approximately MP 296 to MP 303)	7 miles	\$70m - \$140m
2040 State Improvements Total			\$100m - \$195m
2040 Local Projects			
New 2 lane road connecting to I-10 and UPRR crossing	From SR 80 near Dragoon Vista north to I-10 at the Sibyl TI	7 miles	\$9m - \$11m
Improve Post Ranch Road to paved 2 lane road	Connection between SR 90 (MP 294) and SR 80 (MP 296)	4 miles	\$2.5m - \$3.5m
Widen Ocotillo Road to 4 lanes, with integrated bicycle and pedestrian improvements	North of I-10 to B-10/4th Street	1.3 miles	\$6.5m - \$9m
Fixed Transit Service	Expanded regional service	N/A	\$415k
Expanded bicycle system	Yearly program to add facilities	3-5 miles/year	\$250k - \$500k
2040 Local Improvements Total			\$18.6m - \$24.4m
2020 Total			\$42m - \$69m
2040 Total			\$119m - \$220m
Total Improvement Plan			\$161m - \$289m

Source: URS, 2010

Figure 10 Final Recommended Northwest Area 2040 Map

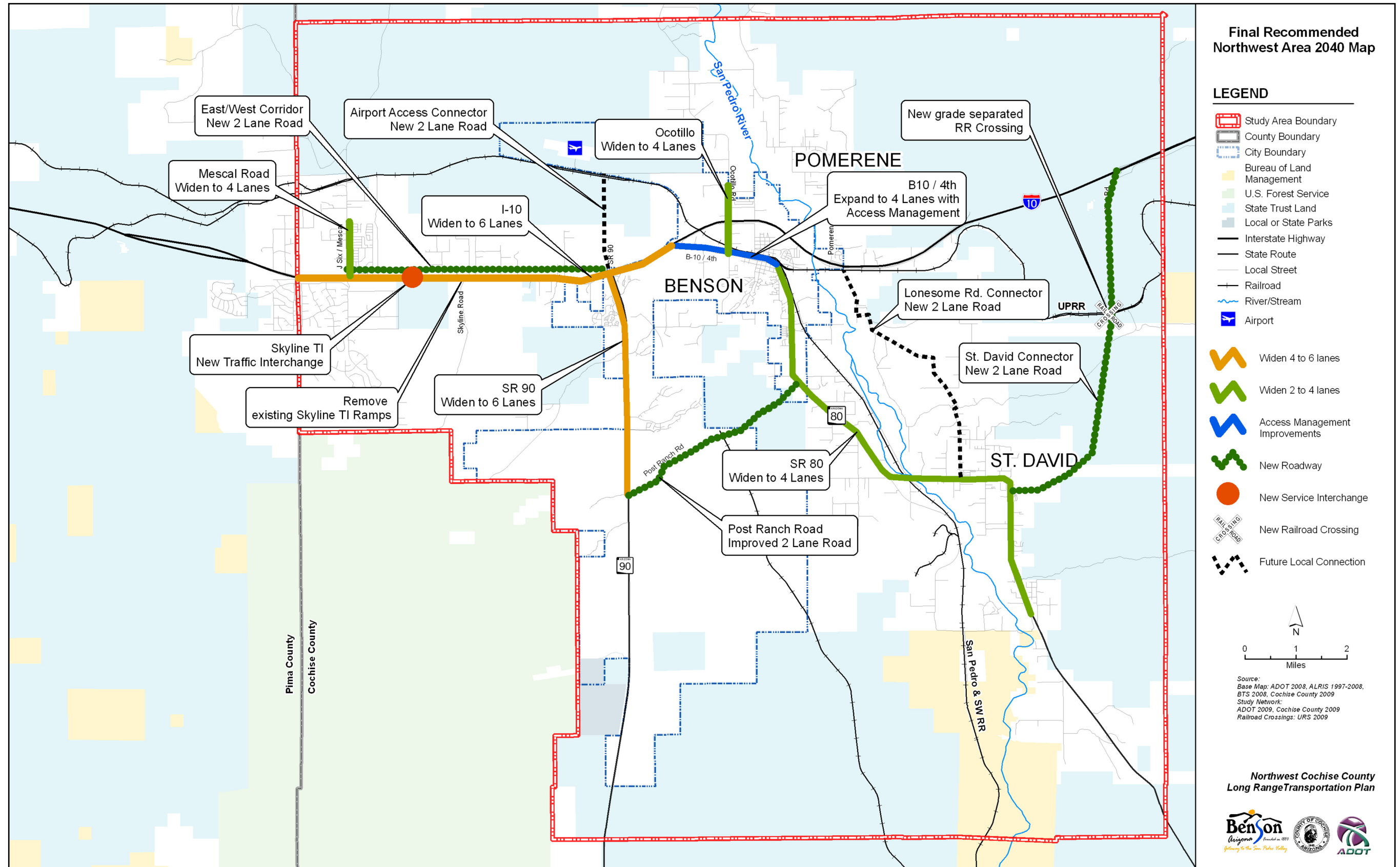


Figure 11 Level of Service Results for the Final Recommended Alternative

