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Bullhead City Transportation Plan

Planning Assistance for Rural Arizona

Prepared for:
Arizona Department of Transportation
Bullhead City

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Prepared by: HDR

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1.0 Introduction

The Bullhead City Transportation Plan (the Plan) is a multi-modal plan, addressing improvements to the vehicular road network within Bullhead City in addition to transit, bicycling, and pedestrian facilities. The need for new facilities is predicated on the growth which is occurring within Bullhead City, the unincorporated areas of Mohave County, and the region as a whole. While this growth has slowed considerably as a result of the current economic downturn, the factors that led to this growth remain in place and long-term it is expected that population and employment in Bullhead City and the region will continue to grow.

This study was funded by the Arizona Department of Transportation (ADOT) Multimodal Planning Division's Planning Assistance for Rural Areas (PARA) Program. The PARA program provides federal funds to non-metropolitan communities for the purpose of conducting transportation planning studies.

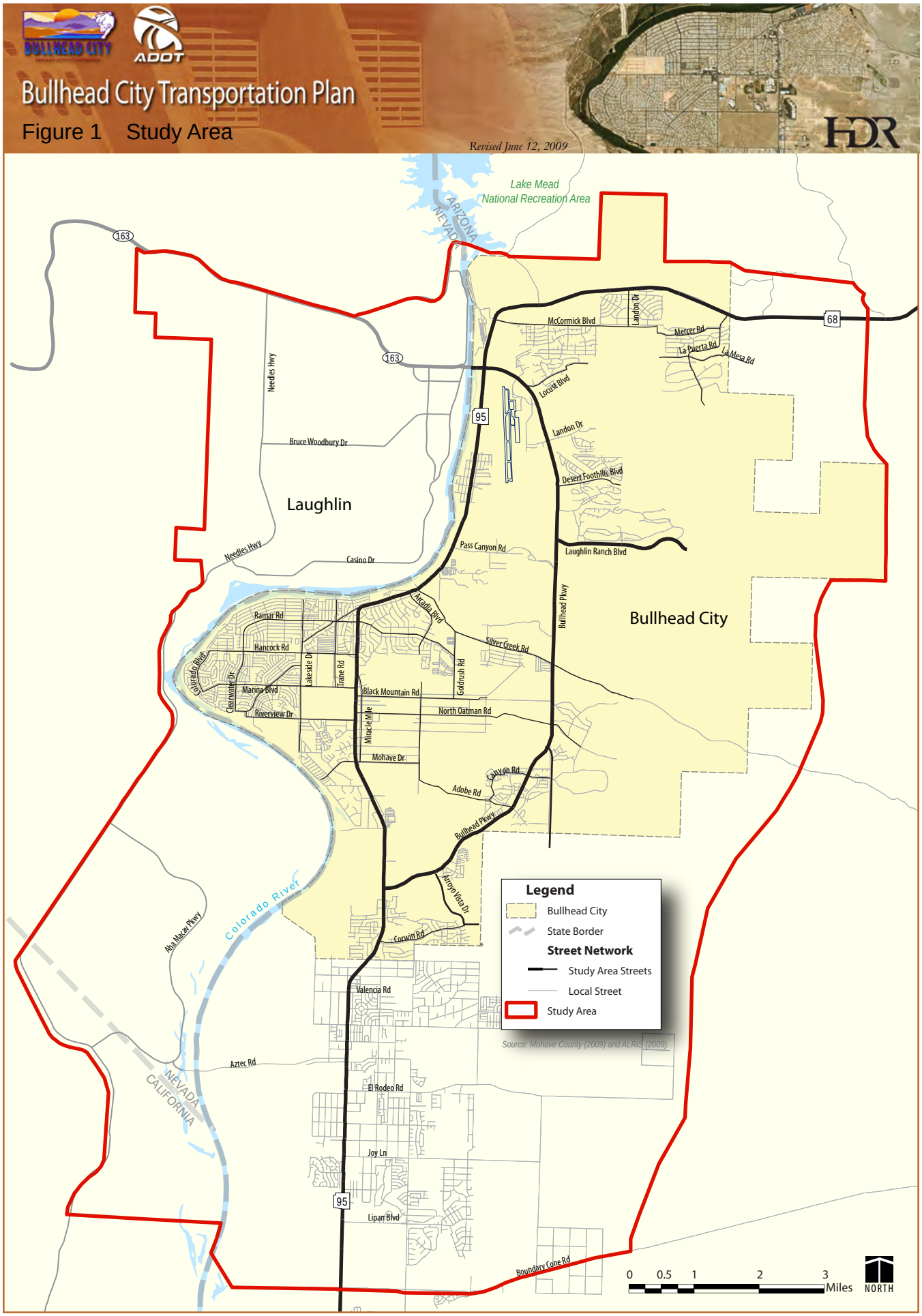
1.1 Study Area

The Bullhead City Transportation Plan study area extends beyond the incorporated area of Bullhead City to include the entire Bullhead City planning area, Laughlin (Nevada), and the high-growth areas immediately to the south of the City limits in unincorporated Mohave County. The study area encompasses all of the incorporated area of Bullhead City and portions of Mohave, Clark (Nevada), and San Bernardino (California) counties. Figure 1 shows the Bullhead City Transportation Plan Study Area.

Bullhead City Transportation Plan

Figure 1 Study Area

Revised June 12, 2009



1.2 Key Topics

This section identifies the key topics addressed in the Plan. Where appropriate, the sections addressing these topics are identified.

Stakeholder and Public Involvement

An important part of this process involved intensive public outreach with stakeholders to establish factors to be considered as the plan is developed. A Technical Advisory Committee (TAC) was established and met regularly throughout the study to assist this process.

Sixty-one stakeholders representing some 33 different entities were invited to participate in stakeholder meetings held May 7–8, 2009 and August 30, 2010. These meetings were held to help the project team identify key issues for consideration in the Plan. A total of 26 people participated in these meetings representing Bullhead City staff and elected city officials; Mohave County; local public school districts and the Mohave County Community College; Bullhead City and Laughlin Chambers of Commerce and business interests; local, federal, and state resource managers; local utilities; and Bullhead City residents. A summary of these stakeholder meetings may be found in Appendix A – Stakeholder Meetings. The *Public Involvement Summary Report*, prepared by the Public Involvement Consortium for this project, may be found under separate cover.

Regional Growth

While growth has slowed considerably since 2007, the City experienced rapid development in the early 2000's. The population went from a reported 33,769 in 2000 (U.S. Census) to an estimated 41,984 in 2009 (HDR, July 1, 2009 estimate), a compounded annual growth rate of 2.4 percent. Over the past five years there have been 37 subdivisions platted in Bullhead City. In addition, there has been significant growth immediately south of Bullhead City in unincorporated Mohave County.

Bullhead City provides extensive services for Laughlin (Nevada) residents as well as housing for its gaming and hospitality employees. Recent examples include Mohave Crossroads, which is anchored by a Target retail store, and the Laughlin Ranch master-planned community. Physical and economic proximity requires Bullhead City and Laughlin to work together to take full advantage of the benefits of their interrelationship.

Population and employment projections developed for the Plan are discussed in the *Land Use and Socioeconomic Conditions* section of this report. Detailed information on the sub-regional projections for population and employment may be found in Appendix B.

Laughlin Bridge

Since 2001, truck traffic across Hoover Dam has been restricted, diverting the bulk of this traffic and an estimated 1,000 additional heavy trucks a day through Bullhead City and Laughlin on its way to and from other destinations. This has resulted in traffic congestion, accidents, and subsequent delays and closures of the single existing bridge connecting the two cities. The Colorado River Bridge (The Mike O'Callaghan – Pat Tillman Memorial Bridge), also referred to as the Hoover Dam Bypass bridge, opened to traffic on October 19, 2010, has normalized the heavy truck traffic to pre-2001 levels.

Within the Bullhead City area, closure of the Laughlin bridge results in a 30-mile detour, adding approximately one hour travel time between Bullhead City and Laughlin. This can result in significant hardship to the estimated 10,000 Bullhead City residents that commute regularly to Laughlin for employment, and have an economic impact on the two communities – so closely tied by the single crossing. In addition, emergency medical, fire, and other services are compromised and public safety is affected when the existing bridge is blocked due to accidents, stalled vehicles or substantial traffic jams. To address this concern, federal, state, and local agencies are working together on the Laughlin-Bullhead City Bridge Project. The project is being led by the Regional Transportation Commission of Southern Nevada (RTC), the transportation planning agency for Southern Nevada.

As part of the Bullhead City Transportation Plan (the Plan), travel demand modeling (TDM) considered various roadway and bridge scenarios including no new bridge (for the model years 2015, 2020, and 2030), a Mid-town bridge alignment (2020 and 2030), a Southern bridge alignment (2020 and 2030), and Mid-town and Southern bridge alignments (2030). The TDM helped the team to evaluate the need for new and or expanded roadways. This information is discussed in the *Recommendations for Roadway Network* within the *Planned Improvements* section of the Plan.

State Route 95

State Route 95 (SR 95) is the major north-south arterial for most vehicular traffic traveling within and through Bullhead City. Recent traffic counts reported an Average Daily Traffic (ADT) volume on SR 95 of 37,000 immediately south of Bullhead Parkway (South). Trucks can represent as much as 17 percent of the traffic on SR 95 through Bullhead City. Although SR 95 was widened in the year 2000, it still functions as a city arterial street with many signalized intersections, numerous unsignalized intersections and driveways, and miles of urban sidewalks.

A realignment study for SR 95 is currently underway that would ultimately define a new route from Interstate 40 (I-40) to State Route 68 (SR 68), between the eastern edge of the Bullhead City limits and the Black Mountains. SR 95 in its current alignment does not directly connect to I-40. Access along the new highway would ultimately be limited to grade-separated interchange locations, spaced approximately 3 to 5 miles apart along the selected corridor route, facilitating regional traffic flow, reducing traffic congestion, and enhancing safe travel.

Access Management

Bullhead Parkway is the only City route with an access management plan. A lack of access management can result in reduced roadway efficiency, increased accidents, as well as collisions involving pedestrians and cyclists - a particular concern for communities such as Bullhead City that wish to support alternative modes of transportation. Access management attempts to reduce and combine access points along major roadways and establish safe and efficient circulation. The result is a street system that functions safer and more efficiently while creating a more attractive and pleasant transportation experience for all users. Access management is addressed in the *Access Management* section of the Plan.

Multi-Modal

Bullhead City currently has a network of various forms of transportation types other than vehicular modes such as: walking, bicycling, transit, and equestrian. The City has long encouraged pedestrian and bicycle transportation modes through the General Plan, subdivision regulations, and individual programs. The Bullhead Area Transit System (BATS) serves more than 14,000 riders each month. BATS offers curb-to-curb, fixed, and deviated fixed route services. The Colorado River Heritage Greenway Trail Master Plan provides the City with a blueprint for developing a non-motorized trail system linking recreation and other destinations within the City.

As Bullhead City's and the region's population increases, so will the demands on its transportation infrastructure. Growth will stress the existing systems and require improvements of existing facilities and development of new facilities. Transit and non-motorized modes and plans for improvements are discussed in Section 5.0, Transit and Non-Motorized Transportation, within the Planned Improvements section of the Plan.

2.0 Goals and Objectives

The proposed Transportation Plan Goals and Objectives are derived from and build upon the planning considerations, goals, objectives, and policies of the 2002 Bullhead City General Plan, Circulation Element (Bullhead City, 2002, as amended 2005).

2.1 Planning Considerations

- Any shift of access through the City from SR 95 will have an effect on land use and development patterns.
- The addition of north/south routes will alleviate congestion on SR 95 and Bullhead Parkway.
- Additional east/west connections will improve access to SR 95 from the Bullhead Parkway area and encourage commercial uses at the intersection of these connections and SR 95; and may also spur the redevelopment of some areas of SR 95.
- The addition of a second bridge will alleviate congestion on SR 95 and encourage additional commercial development along this route.
- As the City continues to grow, the need and demand for public transportation will increase. This service is important to the City's lower income and elderly residents.
- Construction of the Colorado River Greenway Heritage Trail will provide an important non-motorized transportation route. Additional connections should be examined.

Picture of SR 95 in Olde Town Bullhead City near 2nd Street taken in Spring of 2010.
(Source: Bullhead City)

2.2 Goals, Objectives, and Policies

Goal 1. Improve and enhance traffic circulation in and through the City.

Objective: Construct and maintain a functional system of arterial, collector and local streets.

Policy: Use a hierarchy of arterial, collector and local streets to provide adequate levels of access and mobility within the community.

Policy: Design traffic control devices in accordance with adopted standards.

Policy: Use a pavement preservation or pavement management system to maintain the street system.

Policy: Reconcile the Federal Street Functional Classification System with the Bullhead City Street Functional Classification System.

Policy: Encourage development of neighborhood street patterns and circulation systems that preserve neighborhood integrity and serve local traffic.

Policy: Establish street design criteria that will result in the preservation of adequate rights-of-way for future transportation system needs with minimal displacement of existing land uses.

Objective: Develop Landon Drive to provide through access between SR 68 and the Bullhead Parkway.

Objective: Support the expansion of the Laughlin-Bullhead International Airport facilities.

Policy: Coordinate with the Laughlin-Bullhead International Airport to implement the Laughlin Bullhead Airport Master Plan.

Policy: Support continued and increased air passenger service.

Goal 2. Improve north/south access through the City.

Objective: Investigate additional north/south routes through the City.

Policy: Encourage and support development of north/south routes between SR 95 and Bullhead Parkway.

Policy: Encourage public/private partnerships to develop these north/south routes.

Objective: Continue to plan for the realignment and continuation of Vanderslice Road north to Bullhead Parkway.

Objective: Continue to plan for the SR 95 realignment along the City's eastern border.

Goal 3. Improve access between SR 95 and the Bullhead Parkway.

Objective: Prioritize planned east/west connections between SR 95 and Bullhead Parkway.

Policy: Encourage and support development along east/west connections between SR 95 and Bullhead Parkway.

Policy: Encourage public/private partnerships to develop the east/west routes.

Goal 4. Provide transportation options for Bullhead City residents and visitors.

Objective: Promote long-term public transit service and routes within Bullhead City and between Bullhead City and Laughlin.

Policy: Monitor the intergovernmental agreement between Bullhead City and the Town of Laughlin for public transit coordination between the BATS and Silver Rider (Laughlin, NV) public transportation systems.

Policy: Continue to pursue grant funding to ensure financial support of the transit system.

Policy: Evaluate options for future transit facilities.

Objective: Continue to evaluate the expansion of transit services to meet regional need (e.g., Fort Mohave/Mohave Valley area)

Objective: Encourage the use of bicycles or walking instead of single occupancy vehicles for short trips.

Policy: Include improvements to pedestrian facilities as part of transportation improvement projects.

Policy: Provide safe pedestrian and bicycle paths and crossings.

Policy: Prioritize building sidewalks within walking distance (1/2 mile) of schools throughout City.

Policy: Encourage public/private partnerships to develop the Colorado River Heritage Greenway Trail.

Objective: Identify gaps and deficiencies in the City's existing pedestrian network and develop strategies to rectify them.

Policy: Prepare sidewalk inventory for City.

Policy: Encourage bicycle and pedestrian facilities to be provided as a part of all new development.

Objective: Encourage the redevelopment of SR 95 through Old Bullhead with enhanced pedestrian amenities.

Goal 5. Improve access between Bullhead City, Arizona and Laughlin, Nevada.

Objective: Encourage the design and construction of an additional bridge crossing over the Colorado River to connect Bullhead City and the Town of Laughlin.

Policy: Coordinate with Clark County in studying the feasibility and identifying the appropriate location for Colorado River bridge crossings.

Policy: Recommend Bullhead City Council enters into intergovernmental agreements with the Town of Laughlin, Clark County, and Nevada Department of Transportation (NDOT) as appropriate to facilitate interstate coordination and construction of a new bridge crossing.

Goal 6. Require roadway right-of-way cross sections that are consistent with the General Plan corridor widths.

Objective: Evaluate existing General Plan cross sections for consistency with Bullhead City existing right-of-way and proposed General Plan corridor widths.

Policy: Establish General Plan corridor widths for each roadway classification with consideration given to existing right-of-way widths.

Policy: Update typical cross sections for each of the transportation corridor widths included in the General Plan Update.

Policy: Continually assess existing roadway cross sections for unique circumstances that could require modification of the accepted right-of-way widths.

3.0 Land Use and Socioeconomic Conditions

Land use in Bullhead City is guided by the Bullhead City General Plan, as amended with the Laughlin Ranch land use plan.

3.1 Land Administration

State and federal agencies administer approximately one-quarter of the incorporated area of Bullhead City. The major landowners or land administrators in Bullhead City are shown in Table 1 and further described in Appendix C.

Table 1 Public Land Administrators in Bullhead City

Owner	Acres	Percent (%)
Private	28,752	76
State Trust[a]	4,297	11
Bureau of Land Management	3,139	8
Lake Mead National Recreation Area	1,575	4
Arizona Game and Fish	136	<1
Total	37,899	100

Source: Arizona Land Resource Information System (2009)

Note: a. State Trust land includes sovereign lands. Sovereign lands are those lands lying in the beds of navigable waterways, specifically, the Colorado River. They are held in trust by the State in order to provide public access to those waterways for the purposes of fishing, commerce, and navigation.

3.2 Demographics

Bullhead City is located between Phoenix (220 miles to the southeast); Las Vegas, Nevada (100 miles to the northwest); and, Los Angeles, California (280 miles to the southwest). Bullhead City is located directly across the Colorado River from Laughlin, Nevada, approximately 60 miles north of Lake Havasu City and approximately 40 miles west of Kingman. Its central location attracts residents and visitors from Arizona, California, and Nevada.

Much of the new development that has occurred in Bullhead City has occurred since 2000. However, the demographic information used in the analysis is from the 2000 Census. While this information is nearly ten years old, the 2000 Census remains the most comprehensive source of demographic data available. When appropriate and available, other more recent socioeconomic information is cited.

The 2000 Census reports that the median age in Bullhead City 41.8, much greater than Arizona as a whole (34.2), but lower than Mohave County (42.9), Lake Havasu City (47.5), and Laughlin, Nevada (46.5). An estimate for 2009 shows the Bullhead City median age largely unchanged at 41.9 (Claritas, 2007).

Almost one-fifth of the Bullhead City population is age 65 and older. This segment of the population is expected to increase as more people move to retire in the City.

The Riviera area (the area west of SR 95 and north of Riverview Drive) is currently the densest area of the City with nearly 5,000 people per square mile (overall City density is approximately 700 people per square mile).

Title VI and Environmental Justice

Environmental Protection Agency (EPA) and Federal Highway Administration (FHWA) define environmental justice as the "fair treatment for people of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies." Environmental justice principles and procedures are followed to improve all levels of transportation decision making. Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin. The 1994 Executive Order 12898 on environmental justice addresses minority and low-income populations. The rights of women, the elderly, and the disabled are protected under related statutes. These Presidential Executive Orders and other related statutes fall under the umbrella of Title VI.

There are three fundamental environmental justice principles applicable to the transportation project development process:

- to avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- to ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- to prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

Effective transportation decision making depends on understanding and properly addressing the unique needs of different socioeconomic groups. Properly implemented, environmental justice principles and procedures improve all levels of transportation decision making.

The five minority groups addressed by Title VI and Executive Order 12898, Environmental Justice, are:

- Hispanic or Latino (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race)
- Black or African American (a person having origins in any of the black racial groups of Africa)
- American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition)
- Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands)
- Some other race, or persons of more than one race

A member of the low-income population is defined as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines." The Department of Health and Human Services poverty guidelines state that the poverty level for a family of four in 2009 is $22,050 (note, however, that this income level cannot be compared directly with current income levels because the value of money changes year to year).

Other protected populations include concentrations of elderly, the disabled, and female heads of households. These populations for the study area, Bullhead City, and surrounding jurisdictions are shown in Table 2.

Table 2 Title VI and Environmental Justice Population Percentages, Study Area, and Affected Jurisdictions

Minority	Arizona	Mohave County	Bullhead City	Laughlin, NV	Study Area
Hispanic or Latino	25.3	11.1	20.2	10.6	16.3
Black or African American	2.9	0.5	0.9	2.8	1.3
American Indian or Alaskan Native	4.5	2.1	1.0	0.6	1.4
Asian	1.7	0.7	0.9	2.3	1.1
Native Hawaiian or Other Pacific Islander	0.1	0.1	0.1	0.2	0.1
Some Other Race	0.1	0.1	0.1	2.3	0.1
More than One Race	1.5	1.4	1.5	2.3	2.0
Persons Living Below the Poverty Level	13.6	13.7	15.0	9.6	13.5
Disabled	19.3	26.1	29.2	25.1	28.7
Age 65 and Older	13.0	20.5	19.2	18.6	19.1
Female Heads of Household	6.8	5.6	7.0	6.6	6.4

Source: US Census (2000)

Bullhead City's age 65 and over population is nearly 50 percent greater than that of Arizona, and the number of people with a disability is more than 50 percent greater than that of Arizona. While the 2000 Census median household income in Bullhead City ($30,221) was 25 percent less than that of Arizona ($40,558), the percentage of persons living in poverty was only ten percent greater than that of the State.

In the Riviera area, while the 65 and over population is lower than the rest of the City, 25 percent of the population is under 18 years of age. This area also has 25 percent more people living in poverty (19 percent) than the City as a whole (15 percent).

The transportation improvements proposed as part of this plan would help to serve these communities by providing greater access throughout the City. Each of these populations (the elderly, disabled, and low-income) benefit from transit services. The recommendation of this Plan is to continue the transit services offered by the City. At

which time funding is available, it is recommended that the tri-city service described in the Western Arizona Council of Governments (WACOG) transit feasibility plan be implemented. This service would provide residents greater access to the medical, employment, and shopping found in the Kingman area.

The development of a second Colorado River Bridge would allow Bullhead City residents greater access to Laughlin, an important employer in the region. A majority of the Bullhead City residents who work in Laughlin reside in the Riviera neighborhood.

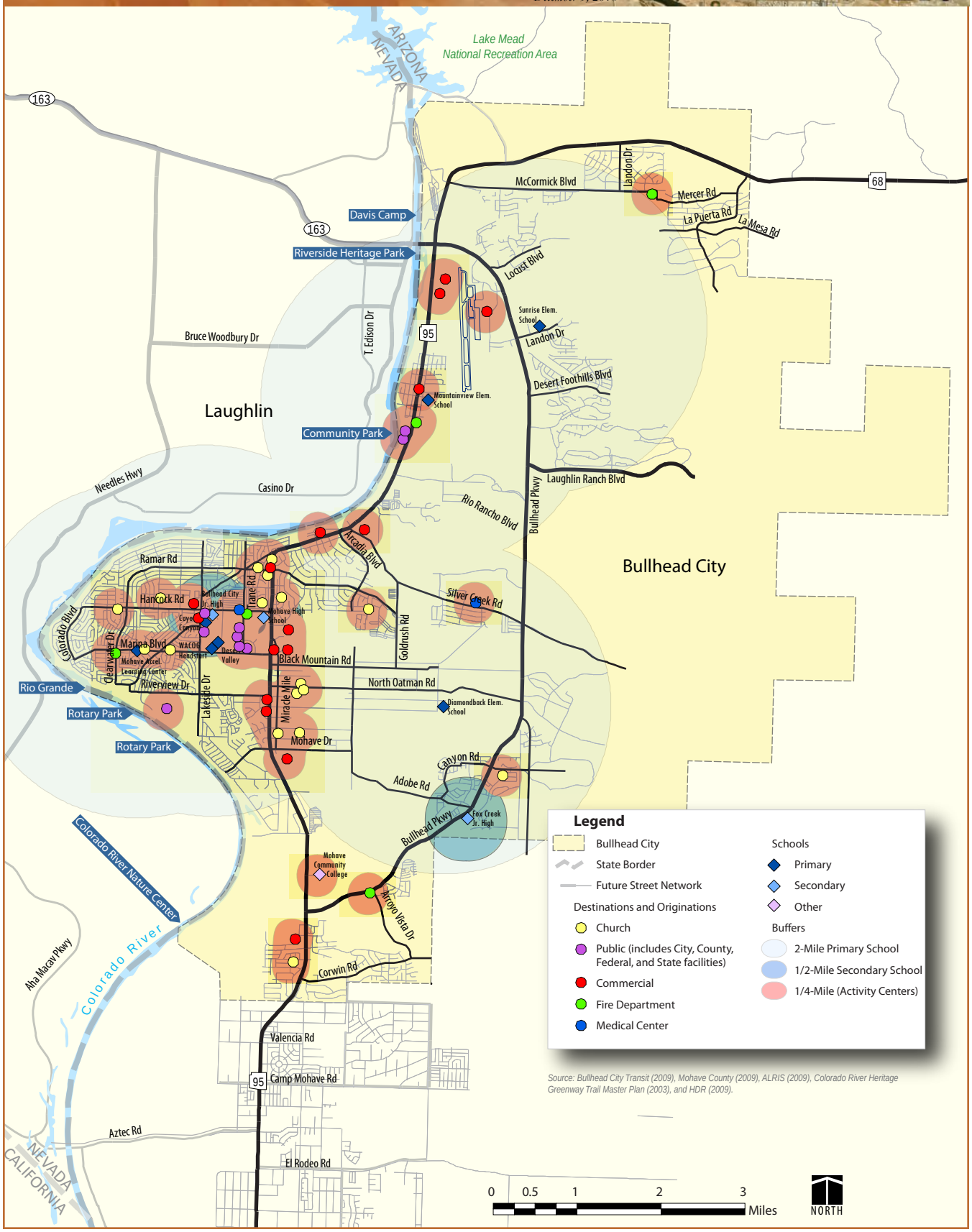
Figure 2 shows the location of major activity centers within Bullhead City. Public schools are shown with buffers surrounding them; primary schools are shown with a two-mile buffer and the middle schools and high school are shown with a half-mile buffer. Other destinations include commercial, medical and civic locations, all of which are shown with a quarter-mile buffer.

These locations represent some of the major destinations for pedestrians. Ideally, a pedestrian network consisting of sidewalks, multi-modal paths and trails connecting these locations would provide an off-street system for pedestrians. The Plan provides a framework for that process by identifying projects to address this goal.

Bullhead City Transportation Plan

Figure 2 Bullhead City Major Activity Centers

December 3, 2010



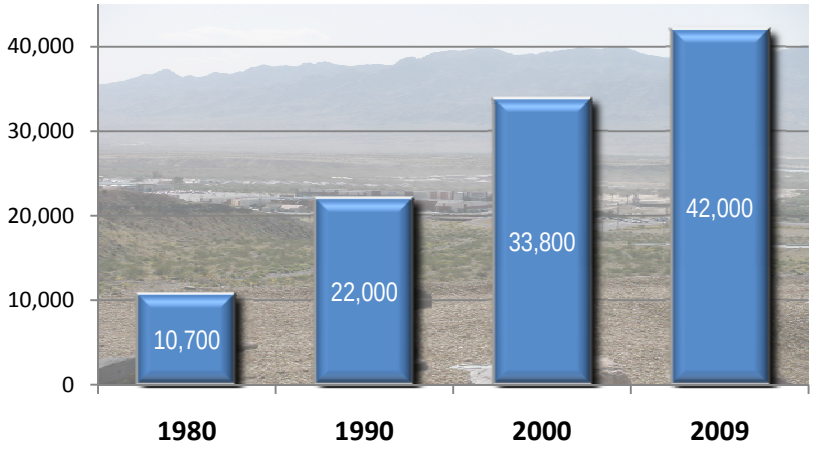
3.3 Future Land Use and Socioeconomic Data for 2015, 2020, and 2030

The projected land use and socioeconomic data was developed based on available documents and coordination with Laughlin, Bullhead City, Clark County, and Mohave County. Data sources included the following:

- Bullhead City General Plan, June 2002, as amended by the Laughlin Ranch General Plan Amendment (October 2005)
- Town of Laughlin Land Use Plan and Economic Strategic Plan (2007)
- Las Vegas Convention and Visitor's Authority
- Clark County Regional Flood Control District Master Plan Update 2009 Outlying Areas: Laughlin (January 2009)
- SR 95 Realignment Study (April 2005)

The population in Bullhead City grew from 10,719 in 1980 to an estimated 2009 population of 41,984, a compounded annual growth rate for period of 4.8 percent; considerably greater than the 2.6 compounded annual growth rate projected through the planning horizon of 2030.

Bullhead City Population Estimates 1980 – 2009



The above chart shows the Bullhead City population estimates for the period 1980 – 2009 (values shown rounded to nearest 000). The compounded annual growth rate for the City over this period averaged 4.8%. (Source: Bullhead City Web Site: Fast Facts, http://www.bullheadcity.com)

Population Projections

The study team worked closely with City staff and the TAC to develop population projections. Published projections (including Arizona Department of Economic Security and Town of Laughlin planning documents) were used as a starting point. In addition, representatives of Mohave County, the Town of Laughlin and Clark County, Nevada were consulted.

As part of the TDM the study area was divided into subareas referred to as Traffic Analysis Zones (TAZ). The projected population growth was allocated to TAZ based on a systematic analysis of the study area using aerial photography, platted developments, adopted development plans, and the respective jurisdictions land use plans.

Employment Projections

Employment projections were also developed in consultation with City staff and the TAC. Future areas of employment were identified through a review of land use plans for Bullhead City and the Town of Laughlin. In instances where employment growth projections have been developed (example Mohave Community College) these were incorporated.

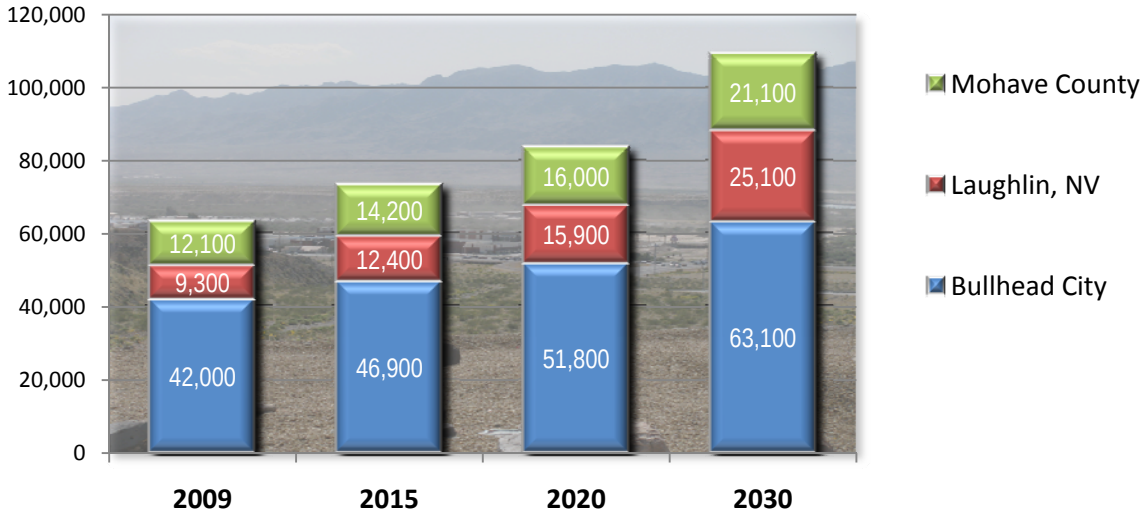
Socioeconomic Projection Assumptions

The following land use and socioeconomic projection assumptions were utilized in developing the interim and planning horizon 2030 forecasts.

- Five percent annual growth in Laughlin
- Casino employment increases 60 percent by 2030
- Three percent annual growth in Mohave County that is represented in the study area
- Two percent annual growth in Bullhead City, and
- Laughlin Ranch is only partially built-out by 2030

The population and dwelling unit (households) and employment projections for 2009, 2015, 2020, and 2030 within the study area are summarized in Table 3 and 4. A summary of the socioeconomic estimates (population and total employment), allocated by TAZ, are listed in Appendix B. Also included in Appendix B are figures representing the socioeconomic projections for population and employment for years 2009, 2015, 2020, and 2030 (refer to Appendix B, Figure B1 through Figure B8).

Population Projections for the Study Area 2009 - 2030



The above chart shows population projections for the region (values shown rounded to nearest 000). While Bullhead City's growth has slowed, the Plan anticipates steady growth (2.63% compounded annual growth rate) through the 2030 planning horizon.

Table 3 Year 2009, 2015, 2020, and 2030 Population Projections for Bullhead City and Study Area

	2009		2015		2020		2030	
	Households	Population	Households	Population	Households	Population	Households	Population
Bullhead City	22,991	41,984	24,237	46,914	25,186	51,800	30,701	63,140
Laughlin, NV	4,442	9,284	5,954	12,445	7,599	15,885	12,026	25,134
Mohave County[a]	6,241	12,123	7,248	14,208	7,663	15,959	10,126	21,085
Total	33,674	63,391	37,439	73,567	40,448	83,644	52,853	109,359

Source: Arizona Department of Economic Security (2006); Laughlin, Nevada Economic Strategic Plan (2007); and HDR (2009).
Notes: [a] The totals for Mohave County represent that portion of the County in the study area.
The 2010 population, as recently reported by the U.S. Census Bureau, is 39,540.

Table 4 Year 2009, 2015, 2020, and 2030 Employment Projections for Bullhead City and Study Area

	2009	2015	2020	2030
Bullhead City	11,570	12,656	14,166	16,229
Laughlin, NV	13,830	15,459	17,149	24,602
Mohave County[a]	2,755	3,432	3,903	5,082
Total	28,155	31,547	35,218	45,913

Source: Laughlin, Nevada Economic Strategic Plan (2007); and HDR (2009).
Notes: [a] The totals for Mohave County represent that portion of the County in the study area.

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4.0 Planned Improvements

Successful long-range transportation plans and economic development are based on the interaction between roadway infrastructure and land use, as well as the role of alternative modes including transit and multi-use trail systems.

The Plan presented in this section developed from extensive research and analysis of existing conditions in the study area. Information on existing conditions is included in Appendix D – Existing Transportation System Conditions. In addition, future conditions were evaluated based upon the socioeconomic projections identified in the *Land Use and Socioeconomic Condition* section of this Plan.

4.1 Recommendations for Roadway Network

The following discussion provides background and context on a number of the improvements shown in the model network for the interim and planning horizon years.

Second Bridge - Colorado River Crossing

Today, a single bridge over the Colorado River provides the only major link between Laughlin and Bullhead City. The two communities complement one another in residential and employment opportunities with Bullhead City providing a large portion of Laughlin's workforce. Vehicle crashes interfere with traffic flow across the bridge and often result in closures and lengthy delays. Occasional closures of the Bridge have resulted in traffic being rerouted through Bullhead City to the Aha Macav Bridge on tribal lands at the northern limits of Mohave Valley. This alternate route adds approximately 30 miles and considerable time to a one-way trip between Bullhead City and Laughlin. Emergency medical, fire, and other services are compromised and public safety is affected when the existing bridge is blocked due to accidents, stalled vehicles or substantial traffic jams.

Federal, state and local agencies are working together on the project and comprise the Interdisciplinary Team (IDT). The IDT includes members from the Nevada and Arizona offices of the FHWA; NDOT; ADOT; RTC; Town of Laughlin; Clark County, Nevada; Mohave County; and Bullhead City.

The 2001 closure of the Hoover Dam to truck traffic resulted in this truck traffic being diverted through Bullhead City. The new Hoover Dam Bypass bridge is expected to be open by late 2010.

The Second bridge project, currently undergoing National Environmental Policy Act (NEPA) evaluation, is in the alternatives evaluation phase. All alternatives include four travel-lanes, Americans with Disabilities Act (ADA)-compliant sidewalks, and a paved multi-use pathway.

The IDT had originally identified the Riverview Build Alternative as the recommended Preferred Alternative because it was determined it best fulfilled the Project's Purpose and Need. However, on January 13, 2010, the FHWA issued a letter to the NDOT that

denied a request for a finding of Section 4(f) De Minimis for use of Rotary Park in Bullhead City as part of the Riverview Build Alternative.

Based on the FHWA's determination, the proposed Riverview Alternative will no longer be considered as the Preferred Alternative in the Environmental Assessment. The IDT has reconsidered the previous screening of alternatives and will recommend Bullhead Parkway as the new Preferred Alternative in order to achieve the Project's Purpose and Need. All proposed Build Alternatives, along with the No-Build Alternative have been considered equally throughout the environmental process.

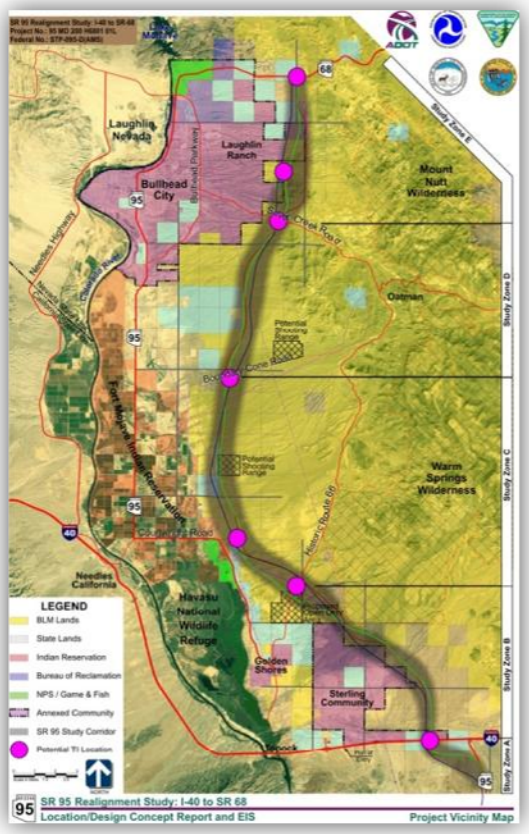
The proposed Bullhead Parkway Alternative was supported with resolutions from the Bullhead City Council on July 20, 2010 and Clark County On July 13, 2010. The October 2010 Environmental Assessment formally identified the Bullhead Parkway Alternative as the Preferred Alternative. Following the public comment period, the project team will request a decision from the FHWA on the Environmental Assessment.

In order for the Bullhead City Transportation Plan to move forward, the Bullhead City Transportation Plan Team decided not to include a recommended alternative in the 2015 Plan for improvements. Instead, two new Colorado River bridge crossings contemplated for 2020 (a Southern Option and a Mid-town Option) are shown on the 2030 Plan, reflecting the need to provide alternative crossings for the projected regional growth and development.

SR 95 Realignment

A realignment study for SR 95 is currently underway that would ultimately define a new route from I-40 to SR 68, between the eastern edge of the Bullhead City limits and the Black Mountains.

ADOT is the lead agency on the project with Mohave County and the City as participants. Access along the new expressway would be limited to several grade-separated interchange locations along the selected corridor route, facilitating regional traffic flow, reducing traffic congestion, and enhancing safe travel for the traveling public. Current access locations being considered for the study area include Boundary Cone Road, Silver Creek Road, and Laughlin Ranch Road, with the route terminating at SR 68. It is anticipated the new route will not be completed until 2030.



The proposed SR 95 Realignment Study Corridor showing traffic interchange locations (indicated by pink circles). Source: http://95realignment.com/Highways/Projects/SR95/SR95

Vanderslice Road

Mohave County is examining ways to improve traffic circulation throughout greater Mohave Valley. As part of this effort the County is studying the Vanderslice Road corridor (between Bullhead Parkway and Courtwright Road) as an area for potential future transportation improvements. Funds are not yet identified to design the roadway or to acquire rights-of-way. At this time, Vanderslice Road is not envisioned to connect to Bullhead Parkway until sometime after 2020.

4.2 2015, 2020, and 2030 Forecast Results

A TDM for the Bullhead City/Laughlin, Nevada area was developed to evaluate the traffic impacts of a proposed bridge across the Colorado River. This transportation planning model is a representation of the Bullhead City/Laughlin, Nevada, area roadway facilities and the travel patterns associated with these facilities. The Bullhead City-Laughlin TDM was developed with the most recent release of TransCAD 5.0 (Build 1705) travel demand software program. The TDM analysis evaluated the base year (2009) conditions, as well as those of the 2015, 2020, and 2030 planning horizons.

Travel Demand Modeling Process

The TDM utilizes socioeconomic data to estimate the roadway system travel demand and represent the transportation network. Together with the socioeconomic data, simulated roadway network, and other mathematical travel parameters, the model is calibrated and validated to replicate the base year travel patterns, making it possible to project traffic flow.

The first step in developing the TDM is determining the area to be modeled. The model area is larger than the study area in order to encompass a buffer and account for outside influences that would directly impact travel demand. Figure 1 represents the model network and boundary limits, which are outlined below:

- SR 163/ SR 68 – Northern Area Boundary
- Needles Highway – Western Area Boundary
- Proposed SR 95 Realignment – Eastern Area Boundary
- Boundary Cone Road – Southern Area Boundary

2009 Base Year Model

Before traffic forecasts can be derived, the base year (2009) model is calibrated and validated to simulate existing travel patterns and traffic flow on the roadway network.

The model base year is reflective of the 2009 spring daily traffic conditions. Traffic forecasts were derived for 2015, 2020, and 2030 horizon planning years. Model data collected for this time period includes socioeconomic data, traffic counts, and other roadway network data such as number of lanes and speeds.

All available traffic counts were requested and obtained from Bullhead City, ADOT, NDOT, Clark County, Mohave County, and the Town of Laughlin. Additional traffic counts were collected in the week of March 10, 2009 and supplemented with current available traffic count data. Weekday turning movement counts were also conducted for the AM and PM peak periods in March 11, 2009 at the intersection of Arizona SR 95 and SR 68, Nevada SR 163, and Bullhead Parkway. Appendix D – Existing Transportation System Conditions describes base year (2009) traffic conditions. Generally speaking, there has been an overall decrease in traffic volumes throughout the study area since 2004. From 2004 to 2009 traffic volume across the bridge dropped approximately 22 percent.

Roadway Network

The transportation model network was developed to simulate daily travel on the roadway network in the Bullhead City/Laughlin area, with data captured to reflect a 2009 base year. All necessary model data was collected to effectively reflect this condition. Table 5 presents the primary network database that was developed as part of the model. Seven forecast alternatives were developed using the 2009, 2015, 2020, and 2030 'base' condition, which also included a No-Build bridge scenario. The forecast traffic flow is significant with an additional bridge. Generally, as the additional bridge is located further south of the existing Laughlin Bridge, the amount of traffic decreases. However, traffic volumes for any of the bridge locations are quite significant, particularly in the long range forecasts. Furthermore, with two additional bridges, the cross river traffic flow is higher. This is most likely due to latent demand for a bridge crossing. Conversely, with no additional bridge demand is constrained.

Table 5 Daily Traffic Flow

Scenario	Vehicles per Day		
	Laughlin Bridge	New Bridge	Total Bridge Crossings
2009 (Existing)	32,200	-	32,200
2015 No Additional Bridge	43,600	-	43,600
2020 No Additional Bridge	55,400		55,400
2020 Mid-town Bridge Option	35,900	30,400	66,300
2020 Southern Bridge Option	41,100	9,900	51,000
2030 No Additional Bridge	74,800	-	74,800
2030 Mid-town and Southern Option Bridges	49,100	33,000 (Mid-town) 14,400 (Southern)	96,500

Origin-Destination Study

The TDM took information from the Origin-Destination (O-D) Study into account (the O-D study was conducted concurrently with the traffic counts on March 10, 2009). The BHC TDM has 7 external stations for interaction between the City and the surrounding cities such as Kingman; Laughlin, Nevada; and Needles, California. Part of the TDM development requires estimating external trips (trips begin and end outside the model area) among the external stations. Results from O-D study were critical estimating the external trips among the stations.

O-D study estimated elapsed travel time among O-D stations during morning, mid-day and afternoon peak travel period. Travel time among the O-D stations was used as a guiding tool validating the existing scenario model. The travel time from the O-D study results were compared with the model computed travel time as part of the model validation process.

Truck traffic volume and their percentages with respect to total traffic near or at the O-D stations were counted. Results from the O-D study were useful estimating the proportion of trucks vs. passenger cars travelling in and out of the model area. This information is helpful to develop a TDM considering both passenger car and freight traffic. Truck traffic was not considered in BHC TDM, therefore, this particular finding from the O-D study was not utilized. Additional information on the O-D Study may be found in Appendix E, Origination Destination Study.

Level of Service

The Level of Service (LOS) grading system qualitatively characterizes traffic conditions associated with varying levels of traffic. LOS ranges from LOS A – representing free-flow traffic conditions with little or no delay experienced by motorists, to LOS F - describing congested conditions where traffic flows exceed design capacity, resulting in long queues and delays. LOS A, B, and C are generally considered to be satisfactory service levels, while the influence of congestion becomes more noticeable at LOS D. LOS E is undesirable and is considered by most agencies to be the limit of acceptable delay, and LOS F conditions are considered to be unacceptable to most drivers. Most jurisdictions strive to attain a LOS of at least D or better on all roadways and signalized intersections in urban areas, and LOS C is targeted for rural conditions.

LOS Analysis Methodology

Transportation system performance is commonly measured using planning level capacity analysis techniques using volume to capacity ratio (v/c) for roadway segments.

Roadway LOS was performed on segments based on the daily traffic flows, roadway capacity area type, and functional classification. The stratification of roadway LOS using volume over capacity (v/c) ratios was derived using the threshold values presented in Table 6.

Table 6 Roadway Level of Service

Roadway LOS	Volume Over Capacity (V/C) Ratio
LOS A – LOS C (Under Capacity)	< 0.80
LOS D (Near Capacity)	0.81 – 0.90
LOS E (At Capacity)	0.91 – 1.00
LOS F (Over Capacity)	> 1.00

Source: Transportation Research Board, Highway Capacity Manual, 2000

The result of the model runs for the base year (2009), interim years (2015 and 2020), and planning horizon (2030) are shown in Figure 3 through Figure 9. Improvements in the following figures are color-coded based on the year they are incorporated into the model network. Line weights represent the number of lanes assumed for the new roadway sections.

2009 Daily Volume and Level of Service

Figure 3 represents the modeled network in 2009 (base year). This figure illustrates that based on the model run, which is calibrated to recent traffic counts (refer to Appendix D – Existing Transportation System Conditions for additional information on traffic counts). The roadway network is operating at a LOS D or better.

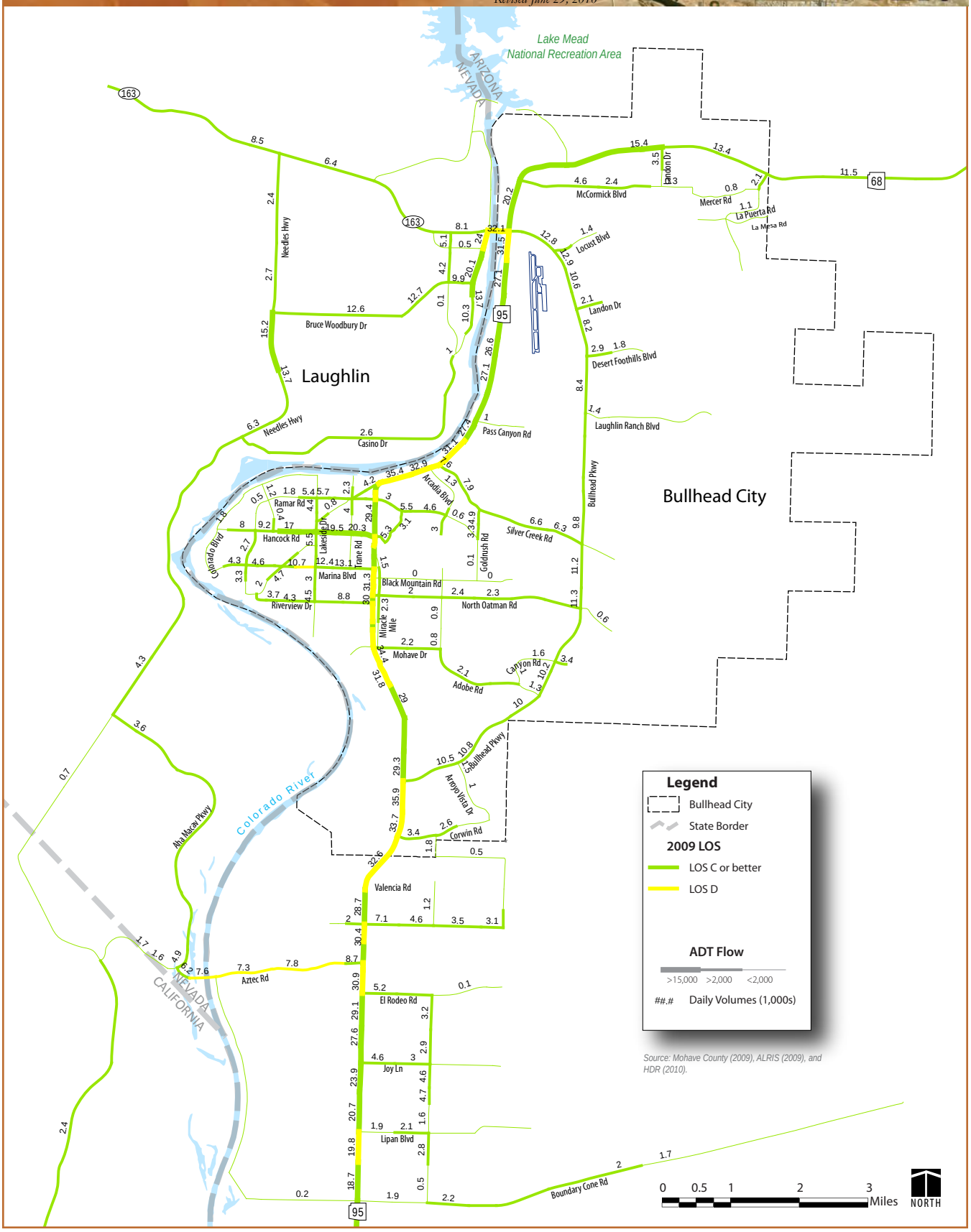
Roadway segments operating at LOS D are primarily along SR 95; in the vicinity of the Laughlin Bridge, north of the curve and Ramar Road, south of Marina Boulevard, south of Bullhead Parkway (South); south of the city limits, as well as on Marina Boulevard west of Lakeside Drive and segments south of the Bullhead City incorporated area.

The segments that were operating at LOS D in 2009 are anticipated to operate at a lower LOS in 2015. The Laughlin Bridge and the portion of SR 95 immediately south of Bullhead Parkway (South) operate at LOS F, with most of the remainder of SR 95 south to, and including Aztec Road and the Aha Macav Bridge, operating at LOS E.

Bullhead City Transportation Plan

Figure 3 2009 Daily Volume and Level of Service

Revised June 29, 2010



2015 Daily Volume and Level of Service

Figure 4 represents the modeled network in 2015. This model run does not include a second bridge. The segments that were operating at LOS D in 2009 are anticipated to operate at a lower LOS in 2015. The Laughlin Bridge and the portion of SR 95 immediately south of Bullhead Parkway (South) operate at LOS F, with most of the remainder of SR 95, south to, and including Aztec Road and the Aha Macav Bridge, operating at LOS E.

The 2015 TDM run shows Locust Boulevard completed between Pegasus Ranch Road and La Mesa Road.

In 2015 the TDM shows the Laughlin Bridge carrying 36 percent more traffic than the base year (2009). As will be seen with the 2020 TDM results, even with an overall increase in traffic, the Southern Option bridge alleviates some of the volume on the Laughlin Bridge. A Mid-town Option bridge, also modeled for 2020, shows even more improvement in volumes on the Laughlin Bridge.

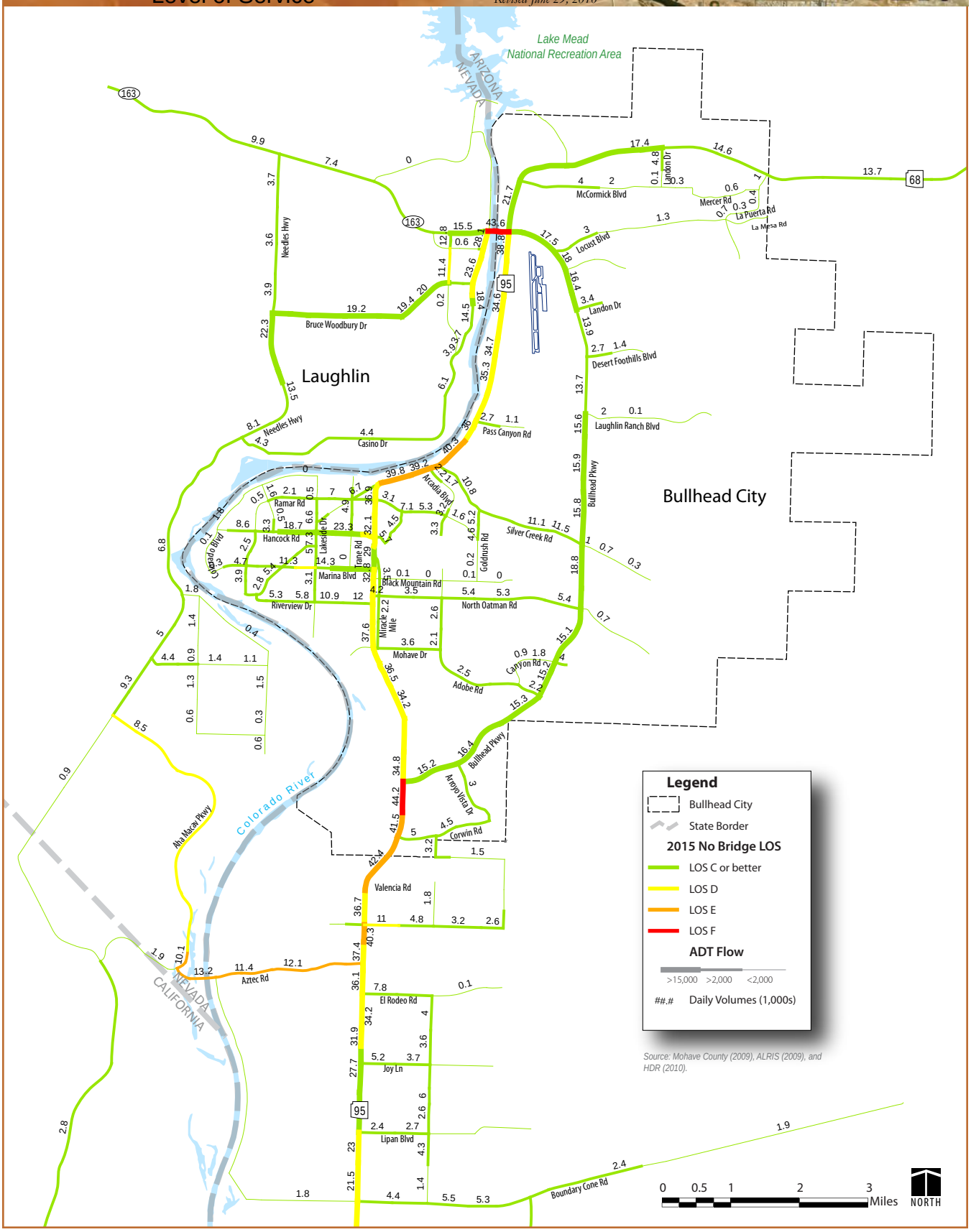
Without an additional north-south route in southern Bullhead City the congestion along SR 95 increases in 2015 with LOS F for the segment immediately south of the Bullhead Parkway (South). LOS E extends south beyond Corwin Road to Valencia Road and along Aztec Road leading up to and across the Aha Macav Bridge. As will be seen with the 2020 TDM results, this congestion continues to worsen without the addition of a second bridge.

In 2015 SR 95 is operating at LOS E for a segment of the road north of Ramar Road to north of Silver Creek Road.

Bullhead City Transportation Plan

Figure 4 2015 No Bridge Daily Volume and Level of Service

Revised June 29, 2010



2020 Daily Volume and Level of Service

Three scenarios were modeled for the year 2020: No Bridge (Figure 5), Mid-town Option Bridge (Figure 6), and a Southern Option Bridge (Figure 7).

All scenarios include the following network improvements: Landon Drive completed between Bullhead Parkway and SR 68; the extension of Laughlin Ranch Road from Bullhead Parkway to SR 95; and, Arcadia Boulevard completed between SR 95 and Adobe Road.

Landon Drive, while operating at an acceptable LOS, is shown to carry a considerable amount of traffic between SR 68 and the Bullhead Parkway.

For the 2020 scenario without the addition of a second bridge, the areas that were showing LOS D and E in 2015 show reduced LOS. The extension of Laughlin Ranch Road appears to stop the degradation of LOS on SR 95 north of the intersection, however, to the south segments of SR 95 are forecast to operate at LOS E and F. While the model shows modest increase in traffic on Arcadia Boulevard, the additional traffic here and along SR 95 result in the segment of SR 95 at the intersection of Arcadia Boulevard with LOS F. Much of the segment of SR 95 between Bullhead Parkway (South) and Aztec Road is also projected to operate at LOS F.

In 2020, without the addition of a second bridge, the Laughlin Bridge shows a 27 percent increase in traffic from 2015. In addition to the bridge having a LOS F, the segments of SR 95 and South Casino Drive (Laughlin, NV) immediately south of the Laughlin Bridge are projected to operate at LOS D. Hancock Road also begins to operate at a LOS D.

With the addition of a second bridge (either at the Southern or Mid-town location) SR 95 north of Bullhead Parkway (South) operates at LOS E or better (including the Laughlin Bridge). Either bridge option shows an improvement in the congestion identified previously along SR 95 at Arcadia Boulevard; although the Southern Option results in the segment between Arcadia Boulevard and Silver Creek Road operating at LOS E.

SR 95 south of Bullhead Parkway (South) operates at LOS F even with the addition of the second bridge. The volumes shown on this section of roadway with the 2020 Southern Option are higher, and the resulting LOS F segments are longer compared to that of the Mid-town Option.

The 2020 Mid-town Option bridge scenario improves the LOS to the south of Hancock Road by approximately 10 percent, but the segment of SR 95 immediately south of Bullhead Parkway continues to operate at LOS F. With this crossing, volumes along Hancock Road approach 30,000 vehicles per day, reaching LOS E at the Colorado River crossing.

A Southern Option alignment bridge crossing of the Colorado River in 2020 shows this second bridge location serving approximately one third of the trips served by the more northerly Mid-town Option crossing. Congestion to the north is less than the model showing no bridge; however, it is slightly higher than the Mid-town Option.

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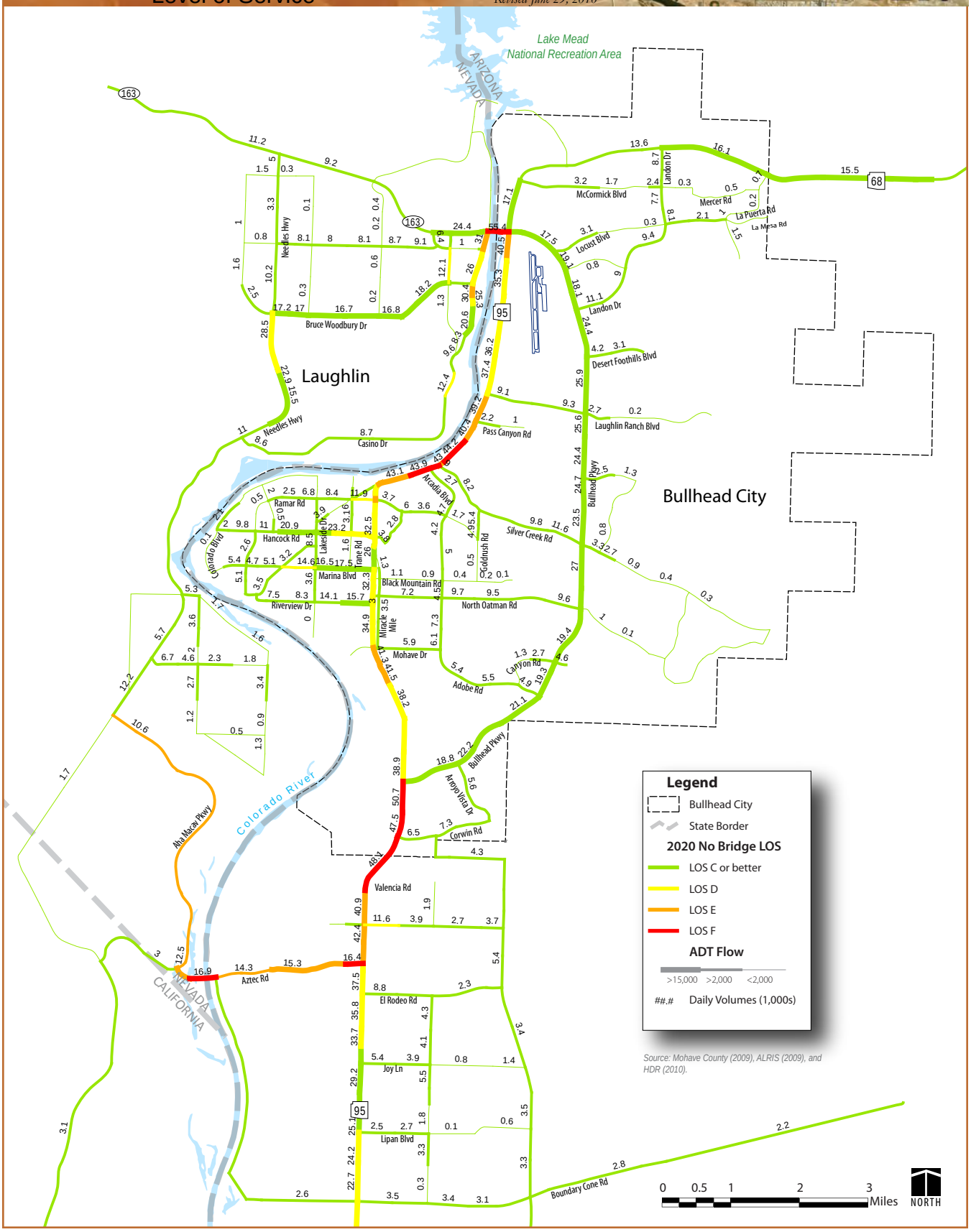
Figure 5 2020 No Bridge Daily Volume and Level of Service

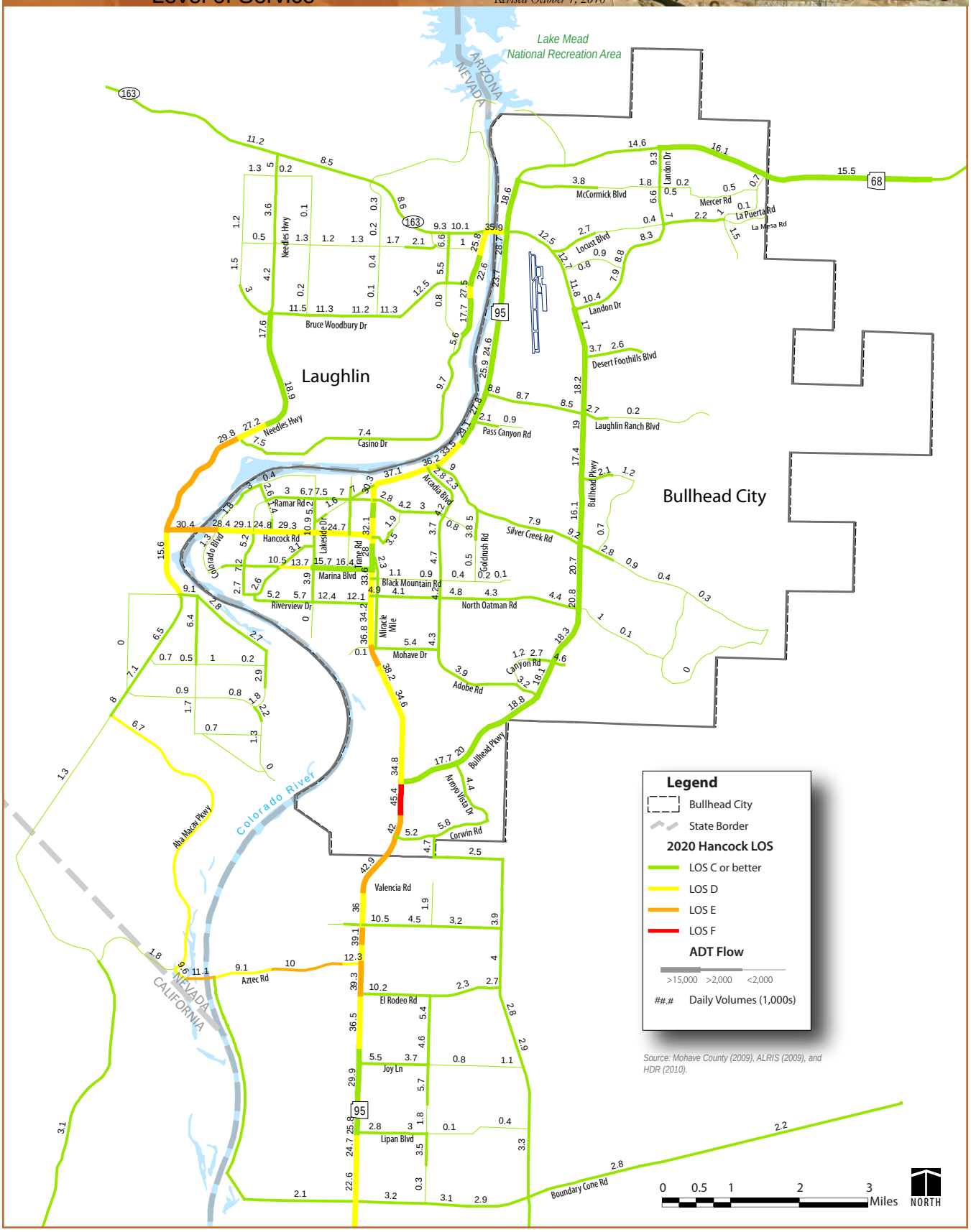
Revised June 29, 2010



Bullhead City Transportation Plan

Figure 6 2020 Mid-Town Option Daily Volume and Level of Service

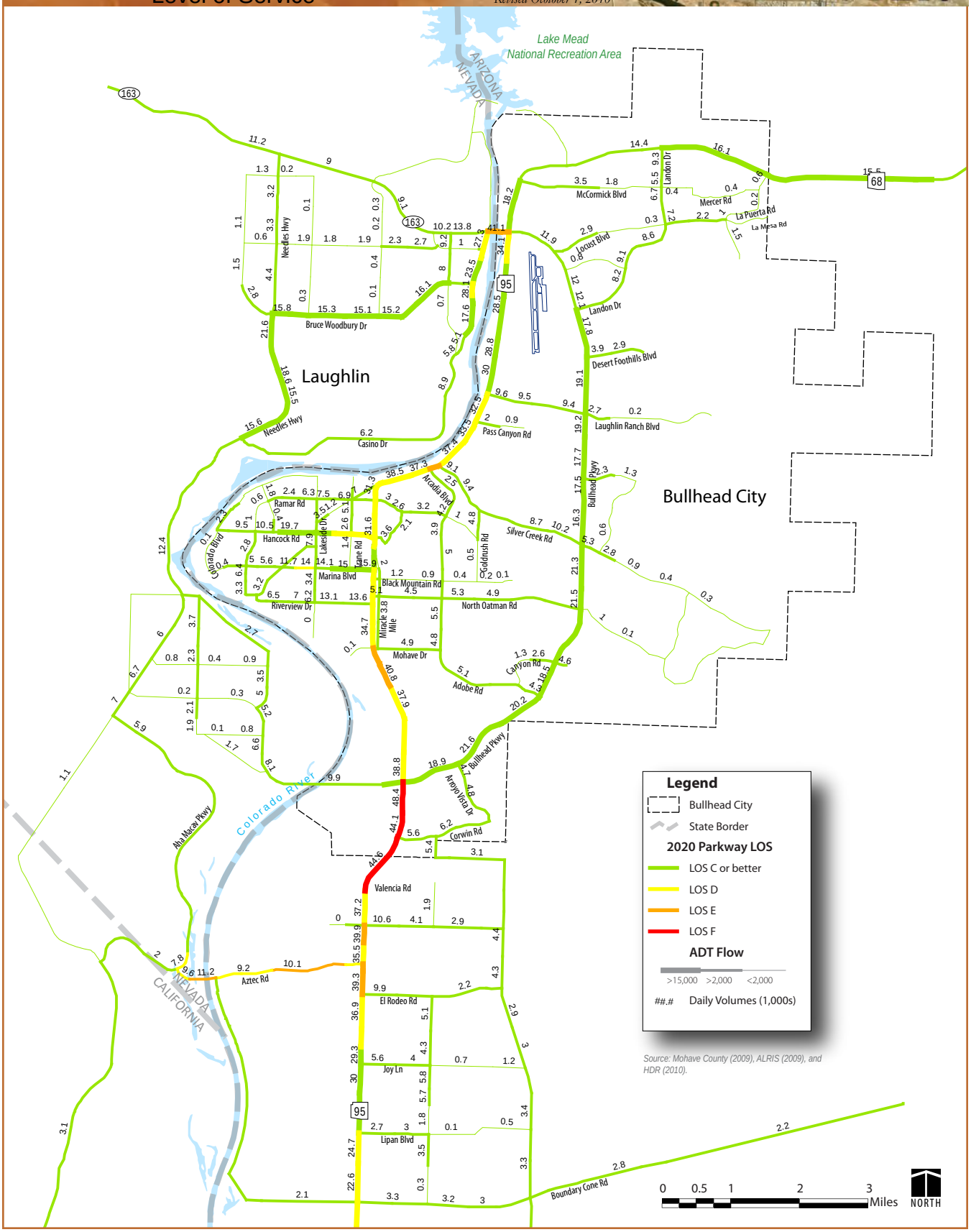
Revised October 1, 2010



Bullhead City Transportation Plan

Figure 7 2020 Southern Option Daily Volume and Level of Service

Revised October 1, 2010



Source: Mohave County (2009), ALRIS (2009), and HDR (2010).

2030 Daily Volume and Level of Service

Two scenarios were modeled for the year 2030; one with no additional bridge (Figure 8), and one with two additional bridges (Figure 9).

Both scenarios include the following network improvements (in addition to the improvements described for 2015 and 2020): Tesota Way is built from Pass Canyon Road to Bullhead Parkway (South) and then continuing south as Vanderslice Road; Black Mountain Road is completed through from SR 95 to Bullhead Parkway; and, connections are shown between Bullhead Parkway and the SR 95 Bypass highway (which is also modeled) on Silver Creek Road and Laughlin Ranch Boulevard.

For the 2030 scenario without the addition of a second bridge, almost the entire segment of SR 95 within the City limits is operating at LOS E, with areas of LOS F south of Bullhead Parkway (South), north of Ramar Road, and in the vicinity of the Laughlin Bridge. The exception is that portion between Riverview Drive and Ramar Road which operates at LOS D or better. Hancock Road is projected to be at LOS D in 2030 due to the high AADT of this segment and its role as a major commercial roadway. Other east-west routes in the Riviera area such as Ramar Road and Marina Boulevard are also beginning to exhibit areas of LOS D.

By 2030, without the addition of a second bridge, the Bullhead Parkway is carrying significantly more traffic than in 2020. This is a result of the growth in population and employment, and the congestion shown on SR 95 and at the Laughlin Bridge. Without a second bridge, daily traffic flow on the Laughlin Bridge in 2030 is projected to be 35 percent greater than what was modeled in 2020 (which, without a second bridge, was already operating at LOS F). Roadways such as Adobe Road also begin to show LOS D due to the increasing demand for east-west connectivity in the City.

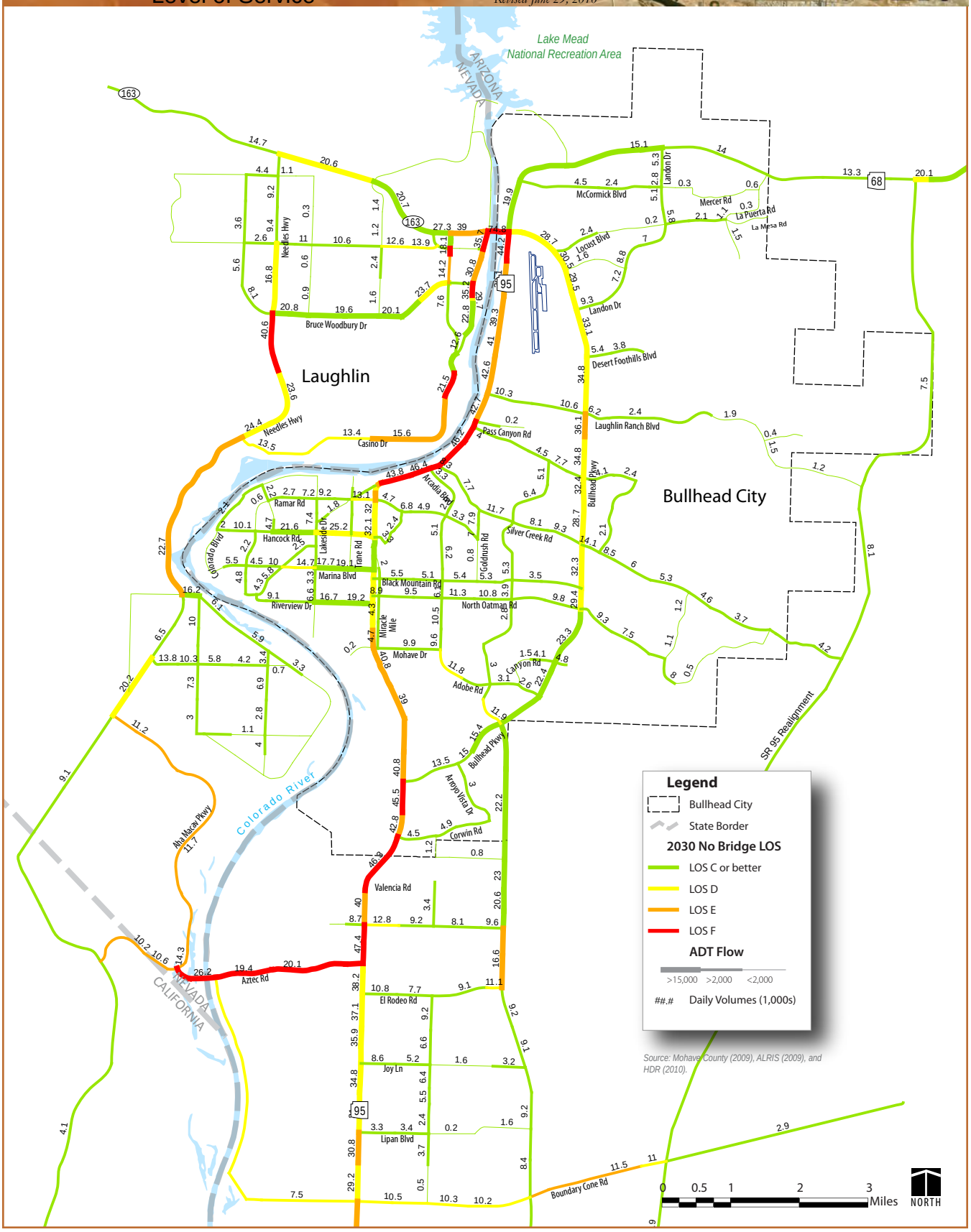
The 2030 model showing two additional bridges (Southern and Mid-town options) demonstrates the need by the planning horizon for both a second and third Colorado River crossing within the City. With this scenario, SR 95 is operating at an acceptable LOS for most of its length. The congestion noted on Bullhead Parkway in the 2030 model network without a second bridge crossing of the Colorado River is eliminated with the two bridges shown in this scenario.

Even with the addition of two bridges, SR 95 south of Bullhead Parkway (South) is still projected to operate at LOS F, with most of the rest of this segment to Aztec Road (and beyond) operating at LOS E.

Bullhead City Transportation Plan

Figure 8 2030 No Bridge Daily Volume and Level of Service

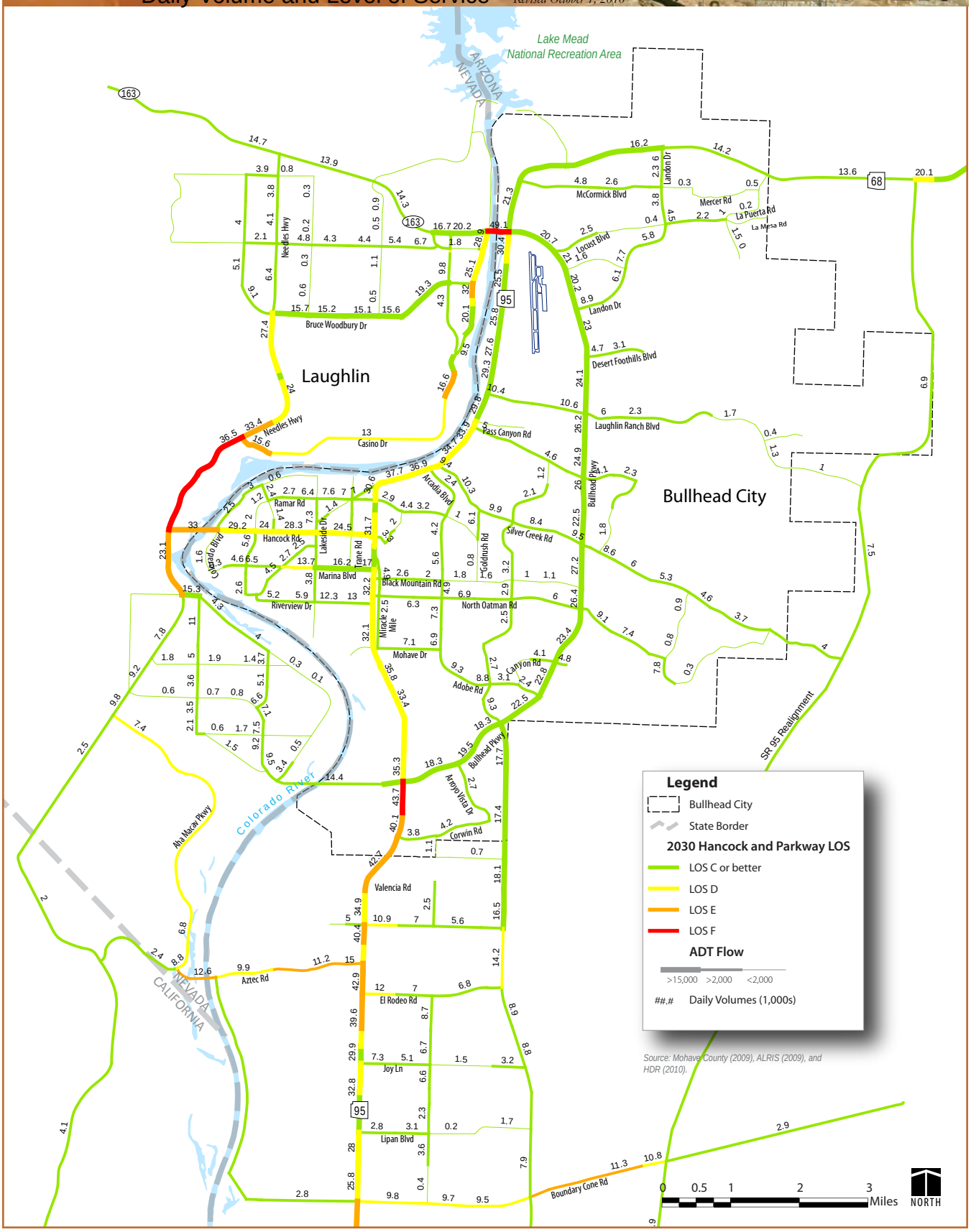
Revised June 29, 2010



Bullhead City Transportation Plan

Figure 9 2030 Mid-Town and Southern Option
Daily Volume and Level of Service

Revised October 1, 2010



4.3 Functional Classification

Functional street classifications encompass both the design characteristics of streets and the character of service the streets are intended to provide. Traditionally, functional classifications form a hierarchy of streets ranging from those that are primarily for travel mobility (arterials) to those primarily for access to property (local streets). The functional classification system is developed with the recognition that individual streets do not act independent of each other but form a network of streets that work together to serve travel needs on a local, citywide, and regional level.

The federal government, state and local agencies, and national organizations such as the American Association of State Highway and Transportation Officials and the Institute of Transportation Engineers all recognize the traditional functional street classification system comprised of arterials, collectors, and local streets. These classifications guide design standards, levels of access, traffic control, law enforcement, and the provision for federal, state, and regional transportation funding.

ADOT has guidelines to request reclassification of roadways which can be accessed from their website. Coordination for reclassification of roads must be submitted to ADOT through WACOG, roadway classification will be forwarded to the FHWA for final approval.

Functional Classification System Characteristics

The Bullhead City Transportation Plan recognizes and retains the City's existing classification system of arterials, collectors, and local streets. The following section describes the purpose of the various facilities.

Major Arterial Streets

Major arterial streets are facilities that carry a high proportion of the total traffic volume on a minimum amount of mileage. Major arterials typically serve as connections between major traffic generators and land use concentrations, moving large volumes of through traffic. Optimally, major arterial roadways are fully controlled access facilities. Major arterial streets may be part of a state highway system or other interregional facility.

Because direct access to abutting property is a secondary function of arterial streets, access should be carefully managed to avoid adverse impacts on the movement function intended for these facilities. Refer to the section on Access Management for additional information.

Minor Arterials

Minor Arterials primarily provide for traffic movement, with a minor function of providing direct access to abutting properties. Minor arterials typically serve as connections between local and connector streets and the major arterials, and facilitate the movement of large traffic volumes over shorter distances within the community. Minor arterial streets provide functional service to retail, commercial, and industrial land uses. Minor arterial roadways carry a medium proportion of the total traffic on a moderate amount of mileage. Minor arterial roadways are fully or partially controlled access facilities spaced at approximately one mile intervals.

In Bullhead City, minor arterial roadways should develop with five to six lanes consisting of travel lanes and turn lanes separated by a landscaped barrier median where possible. Left-turn lanes should be provided within the median and right-turn lanes should be provided where high traffic volumes necessitate right in/out turning movements to abutting parcels.

Collectors

Collector streets provide for a balance of traffic movement and property access functions. Collector streets carry a relatively high volume of traffic within larger neighborhoods and can accommodate minor retail and other commercial establishments abutting their alignments. Traffic movement is often internal to localized areas, with collectors connecting residential neighborhoods, parks, churches, etc. with the arterial system. Collector streets are generally located at approximately mid- or quarter-section lines and are intended to provide a discontinuous roadway network, with convenient traffic movement within residential, commercial, and industrial areas, and to the most accessible arterial roadways. As compared to arterial streets, collectors accommodate smaller traffic volumes over shorter distances.

Local and Limited Use Streets

Local streets function to provide access to abutting properties and to collect and distribute traffic between individual parcels of land and collector or arterial streets. Local and limited use streets are generally utilized in residential areas where frequent access points cause and require a reduction in vehicle speed. Local roadways serve abutting land uses and also provide access to higher level roadway categories. Local and limited use streets are designed where slow speeds and multiple access points are needed and should consist of one or more of the following types: roadways with on-street parking; reduced-width residential roadways with increased off-street parking; and, cul-de-sacs.

Local roadways with on-street parking are primarily used in single-family detached residential communities. In higher density developments, the residential street widths may be reduced, but off-street parking must be increased to allow adequate stall space. The use of cul-de-sacs eliminates through traffic, reduces vehicle speed, and are generally used in single-family residential communities.

Future Roadway Functional Classification Plan

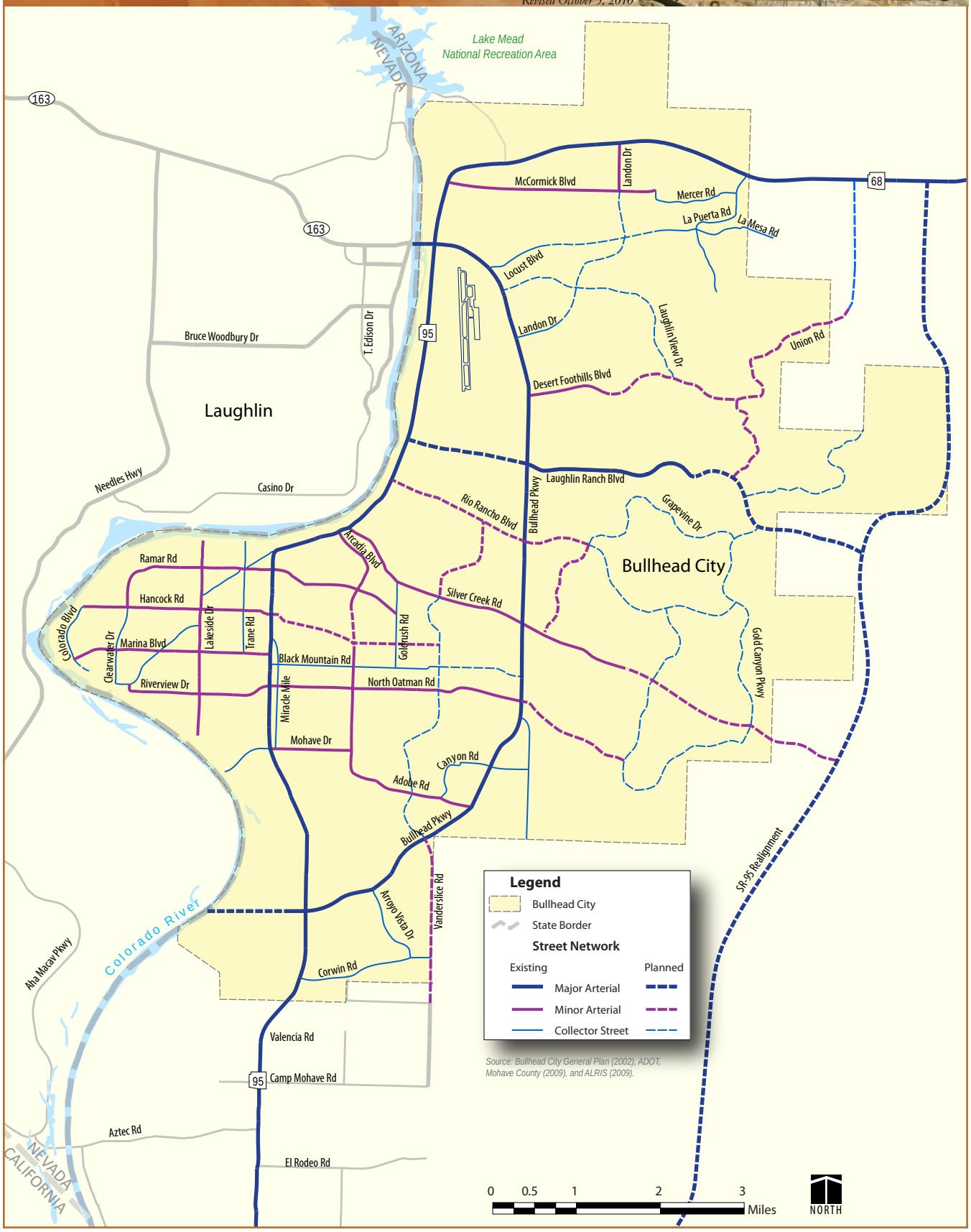
The proposed system was developed based upon field reconnaissance, physical characteristics, traffic volumes, and input from City staff and the project TAC.

Figure 10 shows the 2030 Transportation Plan Functional Classification Map which reflects the improvements discussed in the Plan for Improvements. Right-of-way preservation is critical for implementing the recommended roadway improvements. Each roadway classification will require the necessary right-of-way to construct the full cross section. Specific right-of-way requirements for each planned roadway facility should be considered when reviewing future development proposals. The adopted Bullhead City Standard Detail Street Sections are shown in Appendix F.

Bullhead City Transportation Plan

Figure 10 Future RoadwayFunctional Classification

Revised October 3, 2010



4.4 Additional Improvements

Future Traffic Signal Locations

At a planning level effort, future year potential traffic signal locations were identified based on the estimated daily traffic volume thresholds provided in the California Manual on Uniform Traffic Control Devices (2003), shown in Table 7. The travel demand modeling results for each planning horizon year have been used to identify the potential future traffic signal locations. In this way anticipated funding for these operational improvements can also be estimated. Analyses were conducted for the following scenarios using the daily traffic volumes estimated in travel demand model:

- 2015 No Bridge
- 2020 Southern Option Bridge
- 2030 Mid-town and Southern Option Bridge

The daily traffic volume thresholds provided in Table 7 were used to determine whether there may be a future need for a traffic signal. This warrant compares the combination of the major and minor street daily volumes to a threshold that has been determined to be indicative of the need for a traffic signal (note: for each intersection, the major street is the street with the higher daily traffic volume). As a conservative approach, daily volumes at an intersection meeting either of the above criteria were identified as a potential future traffic signal location. Potential traffic signals by horizon years are shown in Figure 11.

The need for a new traffic signal at an unsignalized intersection is determined through a system of warrants which assess peak hour and hourly traffic volumes, pedestrian crossing volumes, accident rates, school crossing needs, and other operational issues. The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, provides descriptions of the eight signal warrants.

Traffic signals should not be installed without conducting a detailed study and unless one or more of the MUTCD warrants are satisfied. However, the satisfaction of a warrant or warrants is not in itself justification for a signal. Every situation is unique and warrant guidelines must be supplemented by the effects of specific site conditions and the application of good engineering judgment. Installation of a traffic signal should improve the overall safety and/or operation of an intersection and should be considered only when deemed necessary by careful traffic analysis and after less restrictive solutions have been attempted.

Table 7 Traffic Signal Warrants based on Estimated Average Daily Traffic

Number of Lanes on Each Approach		Estimated Daily Volume	
Major Street	Minor Street	Major Street (Sum of both Approaches)	Minor Street (Higher Approach Only)
Minimum Vehicular			
1	1	8,000	2,400
2 or More	1	9,600	2,400
2 or more	2 or more	9,600	3,200
1	2 or more	8,000	3,200
Interruption of continuous Traffic			
1	1	12,000	1,200
2 or More	1	14,400	1,200
2 or more	2 or more	14,400	1,600
1	2 or more	12,000	1,600

Source: California Manual on Uniform Traffic Control Devices, 2003

The results of this analysis indicate that as many as 26 additional signals may be warranted by the study's 2030 planning horizon. Of these, the travel demand modeling indicates that 14 of these may be needed by 2015; eight of which are along SR 95 and an additional three along Bullhead Parkway. The remaining signals are projected to be needed by the 2020 (5 signals) and 2030 (7 signals) planning horizons.

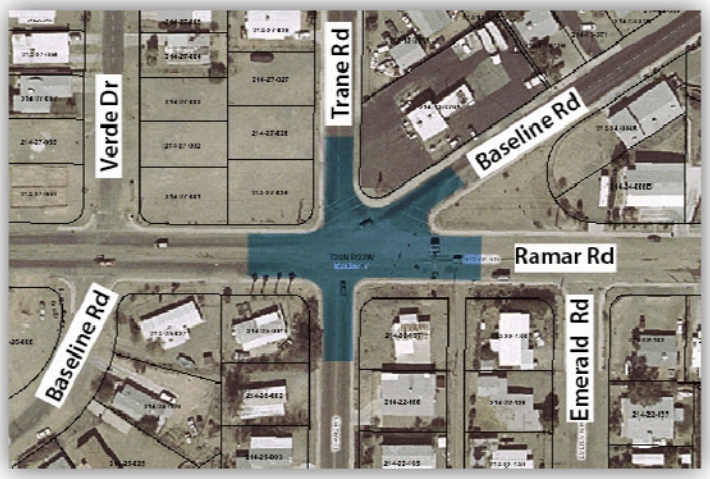
Intersection of Trane, Baseline and Ramar Roads

The Trane Road/Ramar Road/Baseline Road intersection is a 5-leg unsignalized intersection with all-way stop control. Identified as one of eight high accident locations by Bullhead City Engineering, the Police Department, and ADOT in March 2010, this intersection has issues due to topography and the multi-legged intersection.

All approaches are single lane. Ramar Road is a minor arterial; Trane Road and Baseline Road are collector streets.

The configuration of parcels is such that there may be sufficient right-of-way to consider alternative intersection treatments, such as a modern roundabout.

Additional study is recommended.

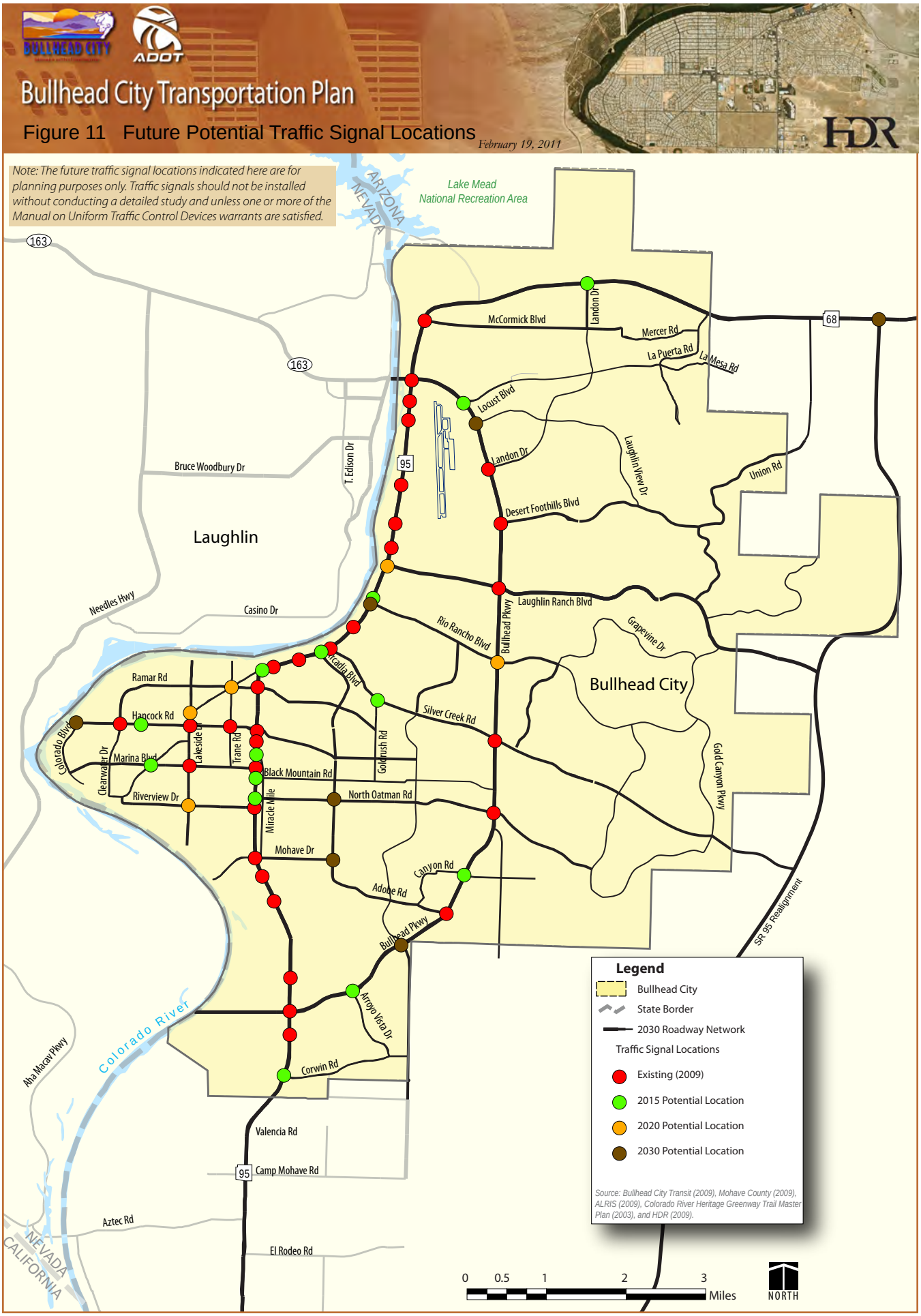


The five-way intersection of Baseline, Ramar, and Trane roads in the Riviera area of Bullhead City.
Source: Mohave County Information Technology.

Bullhead City Transportation Plan

Figure 11 Future Potential Traffic Signal Locations

February 19, 2011



Capacity Enhancement

Additional considerations for capacity enhancement, though not evaluated as part of this Plan, include:

- Restrict on-street parking
  Restricting on-street parking may have application in the Riviera area, where roadways are relatively narrow and on-street parking congests streets.
- Optimize signal coordination
  Traffic Signal Progression along SR 95 is a short-range improvement that could optimize traffic flow along this major arterial route. In particular, the signal at Thunderstruck Drive was identified as one location where improvements would benefit traffic flow.
- Increase intersection capacity by adding turn lanes, longer storage lengths
  The Plan calls out identifying and acquiring additional ROW on Bullhead parkway to accommodate future turn lanes.
- Restrict truck access during peak periods
  With the opening in 2010 of the Hoover Dam bypass bridge, and the possible reduction in traffic as a result of the current economic downturn, further study is necessary to determine need for truck restrictions.
- Implement intelligent transportation systems (ITS)
  ITS vary in technologies applied. Basic systems include such items as traffic signal control systems; variable message signs; speed cameras to monitor applications, such as security CCTV systems. More advanced applications integrate live data and feedback from a number of other sources, such as parking guidance and information systems; weather information and the like.
- Install changeable message sign (CMS) with advance warning for crashes, detour, road closure, construction
  CMSs are portable signs capable of displaying several messages in a sequence and display traffic operational and guidance information. Messages may be changed manually, by remote control, or by automatic controls. Use of CMSs should conform to the general principles of the MUTCD.
- Encourage working at home, telecommunicating
  Telecommuting is a work arrangement in which employees enjoy flexibility in working location and hours.
- Reduce work days
  Many jurisdictions in Arizona have moved to a four day work week. Doing so lessens vehicles traveling to work and reduces transportation costs for employees.
- Encourage carpools, ridesharing
  Ridesharing reduces vehicle miles traveled and the number of vehicles on the road.
- Enhance alternative modes in existing corridors (bicycle, pedestrian, transit circulators, etc.)
  Benefits of increasing alternative modes include reduced traffic congestion and air pollution and improved community livability.

Traffic Patterns and Accommodation of Special Events

A number of special events are held in Bullhead City every year. These events range from fixed gatherings at one site, like Hardyville Days and sporting events, to moving events that travel along City streets, such as parades and the Laughlin River Run.

Additional considerations for special event traffic management, though not evaluated as part of this Plan, include:

- Traffic management systems such as video surveillance, dynamic message signs
  Electronic or dynamic message sign often used on roadways to give travelers information about special events. Such signs warn of traffic congestion, accidents, incidents, roadwork zones, or speed limits.
- Media/public communication system
  Numerous methods exist to communicate traffic information to the public; traffic management sends incident notifications to local media who broadcast on local public radio. Some cities use a site such as Nixle.com to provide notification of incidents of traffic issues.
- Website announcements providing advance warning (see above)
- Shuttle service/more frequent public transportation
  Shuttle service for specific events (such as the Bullhead City River Regatta).
- Additional parking spaces associated with park/ride facility
- Temporary speed reduction near the site
  At events such as River Run Motorcycle Rally temporary speed reductions may be recommended for traffic safety and could be communicated via CMS.
- Early defined access/egress points to control incoming/outgoing traffic flow
  Existing pedestrian facilities, namely sidewalks and crosswalks, may not adequately accommodate pedestrian traffic in the vicinity of a planned special event venue during ingress or egress. At these times stakeholders should implement proper pedestrian control measures (involving a routing component and a crossing component).
- Pedestrian flow management, guided road crossing
- Restrictions on parking, truck access
  The City may institute on-street parking restrictions on the day-of-event and institute truck route diversions to limit traffic in congested areas.
- Recruit and train volunteers
  Special event organizers should be encouraged to recruit, train and manage volunteers to assist with special event planning.
- Technologies such as cell phone text messaging/Twitter
  Such a service could allow users to sign up for messages; when there is an update the user will receive a text message to a phone, computer or Personal Digital Assistant.

4.5 Planned Improvements Outside Bullhead City Jurisdiction

Needles Highway

The Southern California Association of Governments (SCAG) has identified improvements to the Needles Highway. For Bullhead City Transportation Plan these improvements were included in the travel demand model.

For 2015, identified improvements include realign, rehabilitate, widen shoulders, turn/passing/ and acceleration lanes from 'N' Street (California) to the Nevada state line (source: SCAG, Local Highway Listing Adopted 2008 Regional Transportation Improvement Program). By 2030, SCAG anticipates they will add one lane in each direction from the Nevada state line to the southern boundary of Fort Mohave Indian Reservation.

Vanderslice Road

Mohave County has identified necessary improvements to Vanderslice Road from Courtwright Road north to Bullhead Parkway. The improvements, identified in the Vanderslice Road Design Concept Report (2008), ultimately describe a five-lane roadway implemented over time with completion by 2030 (source: Vanderslice Road DCR, August, 2008). Note: the portion of Vanderslice Road within the City limits is anticipated to be completed by the 2030 planning horizon.

4.6 2030 Plan for Improvements

Using the Bullhead City Capital Improvement Plan (CIP) and other sources, as well as the assumptions inherent in the socioeconomic projections, HDR developed a plan of improvements for the Bullhead City Transportation Plan roadway network.

The roadway framework for Bullhead City's future roadway facilities is based on planned regional roadways, the currently adopted land use plan, mobility, forecasted roadway deficiencies, access to planned land uses, and integration with the other travel modes. It also provides for continuity of the existing street network.

Major regional roadway improvement assumptions include the SR 95 Realignment, extension of Vanderslice Road from Mohave Valley to Bullhead Parkway, and a second Colorado River crossing. Figure 12 identifies the planned and committed roadway improvements for the Bullhead City area.

The 2030 Plan for Improvements (refer to Figure 12) shows the recommended roadway improvements that focus primarily on providing access and mobility throughout the City. The 2030 Plan for Improvements also identifies timeframes for these improvements.

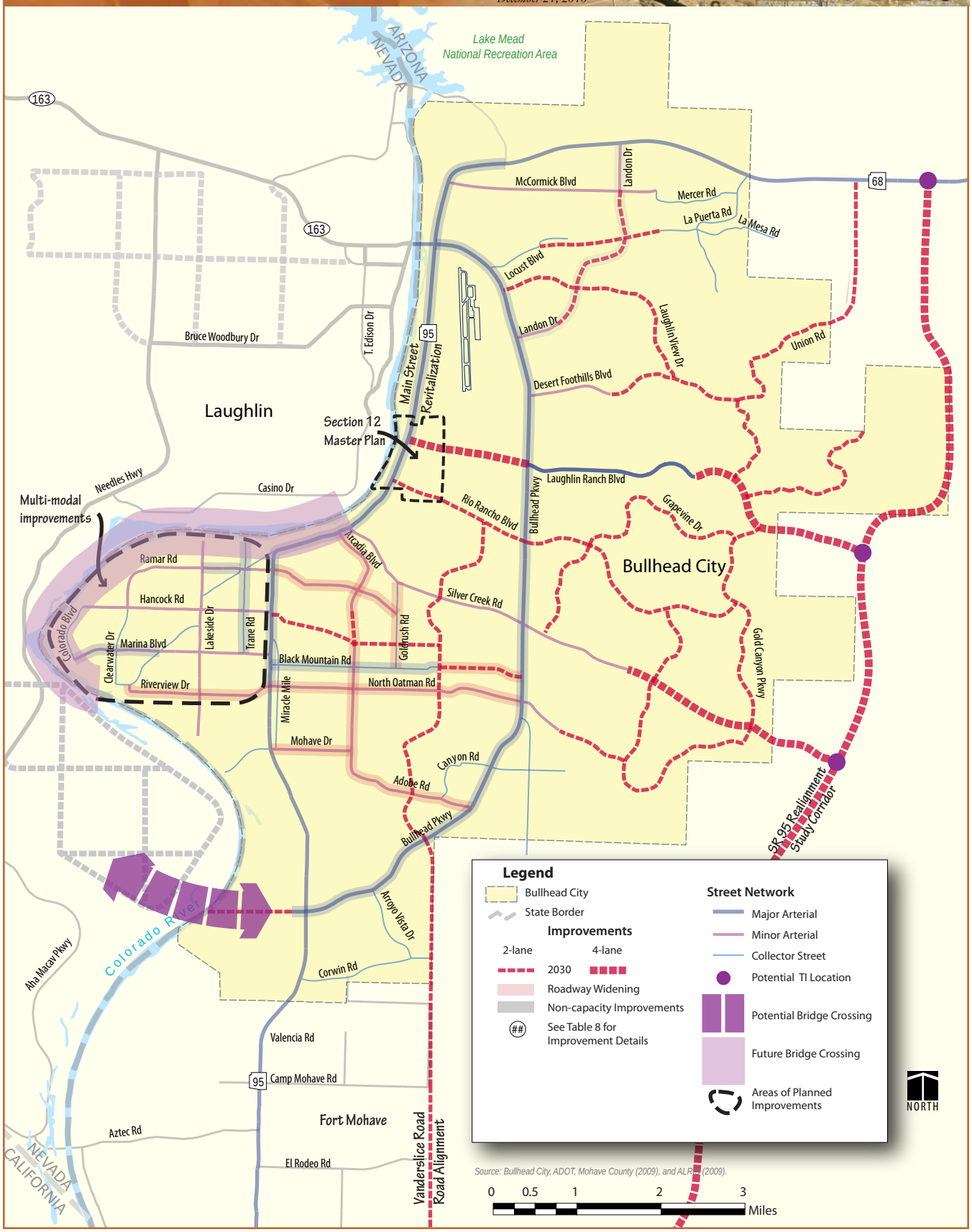
The construction of these roadway improvements would depend on the phasing of the developments that these new facilities would serve. The future roadway network and the phasing shown in the Plan are based upon the population and employment projections developed as part of this Plan and in response to anticipated development. The timing of such improvements is predicated on that development; deviations from the projections may require the phasing to adapt accordingly. Continued coordination between the Bullhead City and the development community will help identify when design and construction on these improvements should begin. It should be noted that some of the projects identified are outside of the control of Bullhead City and therefore may not proceed as indicated. Effort was made to establish the validity of the projects and timeframes noted to provide the best estimate for their implementation. Numerous factors, such as changes in growth, priorities or other needs, may result in changes to this list and the timeframes noted.

The Transportation Plan is meant to be reviewed on a regular basis and modifications recommended to keep it current (for example, some communities review their Transportation Plan annually).

Bullhead City Transportation Plan

Figure 12 Plan for Improvements

December 21, 2010



4.7 List of Planned Improvements for the Planning Horizons

In 2009, expenditures for transportation capital improvement projects totaled less than $200,000. This lack of capital spending is largely a result of the downturn in the economy. As may be seen from Table 8, Planned Roadway Improvements within Bullhead City, projects identified as the responsibility of the City in the short-term planning horizon (2015) are estimated at $42 million. Excluding the Colorado River Crossing (i.e. “2nd Bridge”), which accounts for nearly one half of the anticipated costs, this amounts to $4.4 million per year. Based on historical transportation spending this represents a potential expenditure shortfall of over $4 million per year (expressed in 2010 dollars).

Some identified projects may be pushed out to a later date depending upon the need and available funding. However, projects such as the Neighborhood Street Improvement Program (NSIP) will end up costing the City more money in the long run if they are deferred too long. Traditional sources of funds, including state and federal fuel taxes at today’s levels, are no longer sufficient to operate, maintain, and rehabilitate the existing transportation infrastructure, much less to fund any significant expansions.

In order to close the gap between the cost of the City’s transportation needs and expected revenues, additional funding sources will be required. Alternative revenue sources are identified in Appendix K. These ideas are offered as considerations for discussion with the Community, inclusion in the Plan are neither an endorsement nor recommendation for any of the concepts listed.

Table of Planned Improvements

The planned improvements noted in Table 8 are also shown on Figure 12, 2030 Plan for Improvements. Notes referenced in the first column are described at the end of the table. Additional details on the development of Table 8 may be found in Appendix L.

Table 8 Planned Roadway Improvements within Bullhead City

	Notes	Term	Roadway	Location	Description	TYPE	Lanes	Length (miles)	Cost $ (1000s)	Responsible Entity
1.	1	2015	Five-way Intersection	Intersection of Trane, Baseline and Ramar Roads	Study to evaluate and recommend improvements	S	-	-	$25	BHC
2.	12	2015	Colorado River Crossing (i.e. "2nd Bridge")	Southern Option	New 4-lane bridge	NB	4	-	$20,200	BHC
3.	2	2015	Goldrush Rd	Ramar Rd to Silver Creek Rd	Improvements, 2 to 4 lanes	RW	4	0.4	$783	BHC
4.	1	2015	Access Management Plan	-	Develop access management standards and procedures	M	-	-	$50	BHC
5.	3	2015	Multi-use Path	Riverview Dr south on to Lakeside Dr	Segment completes loop of Rotary Park	P	-	1.0	$518	BHC
6.	1	2015	Bullhead Pkwy	Entire length	Multi-modal improvements	RI	-	10.1	$489	BHC
7.	2	2015	Ramar Rd	Alta Vista Rd to Goldrush Rd	Improvements, 2 to 4 lanes	RW	4	1.2	$2,350	BHC
8.	2, 4	2015	Ramar Rd Multi-modal Improvement	SR 95 to Alta Vista Rd	Improvements, 2 to 4 lanes	RI	4	0.5	$795	BHC
9.	5	2015	Surface Treatment Surveys	City-wide	Annual program	RI		77.7	$58	BHC
10.	1	2015	Sidewalk Inventory and Prioritization	-	Identify schools and heavily populated areas for sidewalks	M	-	-	$10	BHC
11.	5	2015	Neighborhood Street Improvement Program	City-wide, (based on the current PCI)	Annual street improvement program	M	-	-	$14,920	BHC
12.	6	2015	Traffic Signals	Throughout the City	As many as 4 addt'l signals may be needed	M	-	-	$740	BHC
13.	4	2015	Trane Road	Hancock Rd to Zircon Ave	Construction of curbs, gutters and sidewalks and bicycle lanes	RI	-	0.3	$795	BHC
14.	2	2015	Locust Blvd	Pegasus Ranch Rd to La Mesa Rd	New roadway, 2 lanes	RN	2	1.4	$3,212	Developer
15.	6	2015	Traffic Signals	Throughout the City	As many as 10 addt'l signals may be needed	M	-	-	$1,850	Developer
					2015 Subtotal Bullhead City				***$41,733***	
					2015 Subtotal Developer Cost				***$5,062***	

	Notes	Term	Roadway	Location	Description	TYPE	Lanes	Length (miles)	Cost $ (1000s)	Responsible Entity
16.	7	2020	Alta Vista	Hancock east of SR 95	Multi-modal improvements	RI	2	0.7	$519	BHC
17.	2	2020	Arcadia Blvd	Havasupai Dr to Alta Vista Rd	New roadway, 2 lanes	RN	2	0.7	$1,661	BHC
18.	8	2020	Bullhead Pkwy	Entire length	Multi-modal improvements	RI	4	10.1	$11,125	BHC
19.	2	2020	Bullhead Pkwy	Mohave Crossroads Mall to Colorado River	New roadway, 4 lanes	RN	4	1.0	$3,463	BHC
20.	9	2020	Bullhead Pkwy	Entire length	[ROW acquisition for future improvements (i.e. turn lanes)]	M	4	10.1	$417	BHC
21.	2, 10	2020	Landon Dr	State Land portion of alignment	New roadway	RN	2	1.0	$4,248	BHC
22.	7	2020	Marina Blvd Multi-modal Improvement	Colorado Blvd to Riviera Blvd	Multi-modal improvements	RI	2	1.0	$742	BHC
23.		2020	Olde Town/ Bullhead area		Rejuvenation/ Revitalization (specific projects not identified)	M	-	-	-	BHC
24.	7	2020	Ramar Rd Multi-modal Improvement	Lakeside Dr to Trane Rd	Multi-modal improvements	RI	2	0.5	$371	BHC
25.	2	2020	Riverview Dr	Riviera Blvd to SR 95	Improvements, 2 to 4 lanes	RI	4	1.8	$3,524	BHC
26.	11	2020	Silver Creek Rd	Bullhead Pkwy to Gold Canyon (E)	New roadway, 4 lanes	RN	4	1.9	$4,579	BHC
27.	5	2020	Surface Treatment Surveys	City-wide	Annual program	RI		77.7	$58	BHC
28.	5	2020	Neighborhood Street Improvement Program	City-wide, (based on the current PCI)	Annual street improvement program	M	-	-	$14,920	BHC
29.	6	2020	Traffic Signals	Throughout the City	As many as 5 addt'l signals may be needed	M	-		$925	BHC
30.	7	2020	Trane Rd Multi-Modal Improvement	Zircon Ave to Ramar Rd	Multi-modal improvements	RI	2	0.3	$223	BHC
31.	2	2020	Mohave Dr	SR 95 to Adobe Rd	New roadway, 2 lanes	RN	2	1.0	$1,958	BHC
32.	11	2020	North Oatman Rd	East of Bullhead Pkwy to Gold Canyon	New roadway, 2 lanes	RN	2	0.6	$1,020	Developer
33.	11	2020	Black Mountain Rd	SR 95 to Tesota Way	Pave existing dirt road	RI	2	2.0	$2,733	Developer
34.	11	2020	Gold Canyon Pkwy	Southern Loop	New roadway, 2 lanes	RN	2	3.3	$5,350	Developer
35.	2, 10	2020	Landon Dr	Private portion of alignment	New roadway	RN	2	0.9	$4,018	Developer
36.	2	2020	Laughlin Ranch Blvd	SR 95 to Bullhead Pkwy	New roadway, 4 lanes	RN	4	1.5	$5,194	Developer
37.	11	2020	Rio Rancho Blvd	Bullhead Pkwy to Grapevine Dr	New roadway, 2 lanes	RN	2	2.1	$3,570	Developer
38.	1	2020	North Oatman Rd	"S' curve from SR 95 to Riverview Dr	Improve roadway geometric design	RI	4	0.2	$2,000	Developer
						2020 Subtotal Bullhead City			***$48,733***	
						2020 Subtotal Developer Cost			***$23,885***	

	Notes	Term	Roadway	Location	Description	TYPE	Lanes	Length (miles)	Cost $ (1000s)	Responsible Entity
39.	13	2030	Colorado River Crossing	Mid-Town Option	New 4-lane bridge	NB	4	-	-	BHC
40.	5	2030	Surface Treatment Surveys	City-wide	Annual program	RI		77.7	$117	BHC
41.	5	2030	Neighborhood Street Improvement Program	City-wide, (based on the current PCI)	Annual street improvement program	M	-	-	$29,840	BHC
42.	6	2030	Traffic Signals	Throughout the City	As many as 7 addt'l signals may be needed	M	-	-	$1,295	BHC
43.	11	2030	Vanderslice Rd	Bullhead Pkwy to Sterling Rd	New 4 lanes	RN	4	1.7	$3,995	BHC
44.	2	2030	Arcadia Blvd	SR 95 to Adobe Rd	2-lane to 4-lane	R	4	2.8	$5,482	BHC
45.	11	2030	Silver Creek Rd	East of BHP to Gold Canyon Pkwy (W)	New roadway, 4 lanes	RN	4	0.6	$1,410	Developer
46.	11	2030	Black Mountain Rd	Tesota Way (Proposed) to Bullhead Pkwy	New roadway, 2 lanes	RN	2	1.0	$1,622	Developer
47.	11	2030	Laughlin Ranch Blvd	East to SR 95 Bypass (proposed)	New roadway, 4 lanes	RN	4	2.6	$6,267	Developer
48.	11, 10	2030	Rio Rancho Blvd	Grapevine Dr (Proposed) to Gold Canyon Pkwy (Proposed)	New roadway, 2 lanes	RN	2	1.8	$4,871	Developer
49.	11	2030	Silver Creek Rd	East of Gold Canyon to SR 95 Bypass	New roadway, 4 lanes	RN	4	1.0	$2,350	Developer
50.	2, 14	2030	Tesota Way	Rio Rancho to Bullhead Pkwy	New roadway	RN	2	4.6	$16,413	Developer
51.	2	2030	Adobe Rd	Arcadia Blvd to Bullhead Pkwy	2-lane to 4-lane	RW	4	1.8	$3,524	Developer
52.	2	2030	North Oatman Rd	SR 95 to Bullhead Pkwy	2-lane to 4-lane	RW	4	3.0	$5,874	Developer
					2030 Subtotal Bullhead City				***$40,728***	
					2030 Subtotal Developer Cost				***$42,331***	

Table Notes:

BHC – Bullhead City Developer – These projects are identified as being the responsibility of the developer associated with improvements in the area

TYPE:	M Miscellaneous	P Pathway	RN Roadway, New
S Study Recommendation	NB New Bridge	RI Roadway Improvements	RW Roadway, Widening

Costs are in 2010 dollars

All new and widened roadway costs include (2) 10' shoulders.

Due to insufficient highway user revenues (gas taxes), street improvements may not occur in the fiscal year programmed.

Roadway estimates includes public relations (1%), maintenance of traffic (7%), erosion control (1%), mobilization (9%), contractor quality control (0.75%), surveying (1.75%), and contingencies (20%), Departments C&E (14%).

Right of Way is calculated for all 'new roadways' based on estimated cost of $25,000 per acre.

Not included in estimates are temporary construction easement considerations, existing utility adjustments or relocations, and new utility installations.

1. Planning level estimate
2. Includes multi-modal improvements: bike lane striping, new curb, gutters, sidewalks, full pavement replacement and widening and drainage improvements.
3. Path/trail costs include general signing. Costs also presume projects may be funded with federal dollars and several percentage of construction costs are added (3 percent topography survey + 15 percent PS&Es + 5 percent drainage report + 1 percent SWPP plan + 8 percent mobilization + 5 percent traffic control + 1 percent survey control + 18 percent administrative costs + 5 percent contingencies = 61 percent)
4. Bullhead City Public Works Department (TE Grant Application)
5. City of Bullhead City Pavement Management Analysis Report, February, 2007
6. Planning level estimate, assumes $185,000 per arterial signal
7. Multi-modal improvements; bike lane striping, curb, gutter and sidewalk
8. Includes (2) 10' shoulders and streetlights
9. Planning level estimate based on a Right-of-Way estimate of $25,000 per acre
10. Includes one 2-lane bridge, span of 250'
11. Does not include curb, gutters, sidewalks
12. Bullhead City Annual Budget Fiscal Year 2010-2011
13. Estimate of cost not developed
14. Includes three 2-lane bridges, span of 250' each

Additional details on the development of Table 8 may be found in Appendix L – Table of Planned Improvements.

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5.0 Transit and Non-Motorized Transportation

5.1 Transit Service

The BATS operates a curb-to-curb, fixed, and deviated fixed route system. In existence since 2000, BATS currently serves more than 14,000 passengers a month.

Transit ridership will increase in the Bullhead City area as the population grows an estimated 66 percent between 2009 and 2030. The BATS is anticipated to experience demand for increased service in areas with forecasted high population and employment growth, such as the central city and along SR 95 south of the City limits. The BATS Five-Year Transit Plan (January 2009) provides a comprehensive resource for near-term transit improvements.

Fixed-Route Service

BATS three scheduled fixed routes operating in Bullhead City: Route 1 (the Red Line), operating north-south along SR 95; Route 2 (the Blue Line), operating in the Riviera area of the City serving major shopping and medical centers; and Route 3 (the Green Line[1]), serving between Adobe Road north to the Katherine Heights subdivision off SR 68.

Riders board from designated bus stops located throughout Bullhead City. Many of these stops, designated with signs, offer pedestrian amenities such as benches, bus shelters, and trash receptacles. A Laughlin connection is also available and links BATS with Laughlin's Silver Rider Transportation Hub/Facility located at Casino and Laughlin Civic drives in Laughlin.

The fixed-route service extends from the Riverside Boat Dock along SR 95 across from the Bullhead City Airport south to the Mohave Crossroads shopping center, just south of Bullhead Parkway. Fares are currently $1.25 per person per boarding with discounted rates for seniors, students or those with disabilities. Bullhead City reports that the BATS has one of the highest fare box recovery rates of 19 rural transit providers in Arizona.

The drivers report the following as the busiest stops along the respective lines.

Red Line	Blue Line	Green Line
• Boat Dock	• Smiths	• Katherine Heights Community
• Safeway	• Safeway	• Boat Dock
• Hastings	• WARMC	• WARMC
• Riverview Mall	• Kmart	• Fox Creek Center
• Wal-Mart	• Library	
• Mohave Crossroads	• City Hall	

[1] The Green Line operates as a "deviated fixed route," which means the bus travels along a set route at scheduled times and maintains scheduled stops where passengers may board. However, this bus also deviates off the route to provide the equivalent of curb-to-curb service for pre-qualified curb-to-curb passengers who are unable to access the bus stop.

Demand Response Service

BATS offers a demand responsive, curb-to-curb service, also known as Dial-A-BATS, where riders can call to arrange a pickup to and from their destination. Dial-A-BATS operates Monday through Saturday 6:00 AM – 8:30 PM. Curb-to-curb service is a first-come, first-serve shared-ride program. BATS requires reservations 24-hours in advance to reserve space, although riders will be accommodated with shorter notice if space is available. The dial-a-ride service operates with a 30-minute window for pickup and is available throughout the Bullhead City limits.

Fleet Data

The BATS currently operates a fleet of twelve vehicles: one 36-foot passenger bus, one 33-foot passenger bus, one 26-foot passenger bus, five 22-foot passenger buses, and four 19-foot passenger buses.

The City is preparing to purchase one new bus this year, and is planning to replace five more in the next. Fleet maintenance is handled at the Public Works Annex. The City is considering construction of a bus yard adjacent to the maintenance facility where all of the buses may be stored in the future.

Estimate of Transit Demand Population

The Arizona Rural Transit Needs Study (ADOT, 2008) report identified the Arkansas Public Transportation Needs Assessment (APTNA) as the recommended method to quantify rural transit demand in Arizona. The APTNA method calculates the demand for transit service by applying trip rates to the transit dependent population groups. Populations of elderly persons age 60 and over, persons with a disability under the age of 60, and persons living in poverty under age 60 are considered transit dependent populations.

To determine the potential demand for transit services, APTNA was used to assess trip rates based on Census information, which was reported as an annual trip rate for each group. The findings are reported in Table 9.

Table 9 Bullhead City Projected Future Demand for Transit Services

Year	Population[a]	Elderly[b]	Poverty[b]	Disabled[b]	Transit Dependent Population
Percent of Bullhead City Year 2000 Census Population		25.7%	12.3%	3.2%	
2009	41,984	10,790	5,164	1,343	17,297
2015	46,914	12,057	5,770	1,501	19,328
2020	51,800	13,313	6,371	1,658	21,342
2030	63,140	16,227	7,766	2,020	26,013

Notes: a. The population estimate and projections reported here were developed for the Bullhead City Transportation Plan.

b. The demographic population percentages are from the 2005 Census, and applied to the projected populations.

Tri-City Connector

The Tri-City Connector is a proposed fixed-route transit service that would operate between Bullhead City, Kingman, and Lake Havasu City. The proposed service is an outcome of the WACOG and ADOT Connector Program and Transit Feasibility Review and Implementation Plan.

The proposed system consists of two routes connecting the locations identified during the feasibility phase of the study. The *Kingman – Bullhead City Connector* operates between Kingman and Bullhead City, with service in both directions throughout the day. Stops are suggested at the Ross Center, Golden Valley, Boat Dock, Mohave Crossroads, and Valley View Medical Center. The *Lake Havasu City Connector* provides service in both directions between Bullhead City, Lake Havasu City, and Kingman. Stops are suggested at the Ross Center, Lake Havasu City Mall, and Valley View Medical Center. The two routes intersect at Ross Center in Kingman and Valley View Medical Center in Bullhead City, where transfers between routes could occur.

5.2 Recommendations for Transit Service

For the foreseeable future, the greatest challenge for Bullhead City transit service, as with many other municipalities operating transit service, is funding. Demands for service will continue to grow. In addition, the relationship with Laughlin, Nevada, and the 24-hour a day/7-day a week environment suggest service in the future operate on a similar 24/7 schedule.

Public-private partnerships may need to be created to sustain an effective public transit system. Coordination with private industry for the provision of van pools, car sharing, short-term vehicle rentals, and shuttle services are other options to consider. These partnerships, in turn, create jobs and can be used to induce employees to take advantage of the public transit system. Private companies can assist Bullhead City in providing funding and infrastructure for public transit. These suggestions may be raised in discussions with existing businesses and businesses looking to locate in the area.

Collaboration with faith-based, non-profit, and other public agencies can also help meet the transportation needs of underserved areas. Land use planning should encourage transit-oriented development as well as the use of public transit. As can be seen with the WACOG Study, public transit can also be improved through greater coordination among local and regional governments.

General suggestions to consider include:

- Privatize the operation of public transit.
- Partner with private companies to implement intelligent transportation systems to reduce traffic congestion.
- Coordinate with non-profits and faith-based organizations to provide transportation opportunities to the elderly, youth, the disabled, the economically disadvantaged, and those who need transportation to health care facilities.

Specific recommendations with regard to current and future service include:

Green Line (North Bullhead City)

Growth in unincorporated Mohave County will result in increased demand for public transit service to Bullhead City. The Green Line currently provides service north of the City to the Katherine Heights subdivision, and there is no existing service beyond the southern city limits. Funding for the extension of the Green Line to the Katherine Heights subdivision will end in 2011. This extension is currently being privately subsidized. Prior to the expiration of funding, it would be helpful to study the expected need for and cost of permanently extending the Green Line with a limited number of trips into the subdivision.

Red Line (along SR-95)

Growth projections show a concentration of increased employment and population is anticipated along the SR 95 corridor south of Bullhead City. This area is not presently served by BATS. Although the potential need for service to this area has been identified, there has not been a completed formal study of its transit propensity. WACOG recently

completed a study effort that documented the need for transit service along this corridor (refer to *Tri-City Connector* above). Depending on demand, an extension of the Red Line could provide residents and businesses with access to transit, while maintaining existing transit connections.

Blue Line (Central Bullhead City)

In response to increased demand for transit, BATS is transitioning its fleet from passenger vans to larger capacity transit vehicles. As this trend towards larger vehicles continues, routing the Blue Line onto higher capacity streets could reduce circuitous route patterns potentially resulting in reduced overall wear and tear on transit vehicles, lower maintenance costs, and reduced travel time. Minor arterials should be considered preferable to local streets. It may be possible to make these modifications without substantially impacting the area of service. As a rule of thumb, people will generally walk up to a quarter of a mile to reach a bus stop.

Tri-City Connector

Implementation of the Tri-City Connector program has been suspended as a result of funding issues. At such time as is feasible, the program should be implemented based on the implementation plan detailed in the WACOG plan titled WACOG Connector Program Transit Feasibility Review and Implementation Plan.

5.3 Non-Motorized Transportation

Bullhead City is committed to developing a walk-able and bike-able community. Various street improvement projects are currently being planned and implemented to include improvements for pedestrians and bicyclists.

In areas like the Riviera neighborhood, where there is a greater student age population and 10 percent of the households do not have access to a vehicle, street improvements should be planned to improve the pedestrian and bicycling environment. Several stakeholders raised a concern with pedestrian crossings of SR 95, especially in the vicinity of Mohave High School.

Within this relatively densely populated area are a number of minor arterial streets (Ramar, Hancock and Trane roads, Lakeside and Riverview drives, and Marina Boulevard), several schools (Mohave High, Bullhead Junior High, and Coyote Canyon Elementary), civic buildings, and medical facilities. Hancock Road is a major commercial corridor that has grocery stores, banks, and other retail businesses.

During the project's outreach process, school officials noted safety concerns regarding students in the area. Improvements to multi-modal transportation throughout this area would provide greater safety for students traveling to and from school and improve the liveability of the neighborhood by making improvements to its walkability.

Currently, Trane Road north of Hancock is a 25-foot wide road with unpaved shoulders, and bicyclists and pedestrians must utilize the unpaved shoulders to travel, or risk traveling on the pavement, which is neither safe nor recommended.

It is recommended that the City address walking in the vicinity of its public schools. While there are four schools in the Riviera area, including a middle school and high school, there are schools located throughout Bullhead City that would benefit from sidewalks. Walking conditions in the vicinity of the schools should be improved to provide a safe environment for pedestrians. Not only will this support the City's effort to improve walkability, it may aid in alleviating the school area vehicular traffic that occurs as a result of parent drop-offs and pickups.

ADOT's Pedestrian Safety Action Plan identified three segments in the Bullhead City areas as "High Pedestrian Crash State Highway Locations": SR 95, North Oatman Road to SR 68; SR 68, SR 95 to Davis Dam Road; and, SR 95, Joy Lane to Camp Mohave Road (outside Bullhead City limits). The segment of SR 95, North Oatman Road to SR 68, was reported as having a total of 24 crashes, half of which were Fatal and Incapacitating Crashes (ADOT Final Report Pedestrian Safety Action Plan, 2009).

ADOT's Pedestrian Safety Action Plan identified potential countermeasures for the segments. The recommendations that were identified in the SR 95 Road Safety Assessment (October 2008) are included in Appendix G, SR 95 Safety Recommendations. Recommendations from a road safety assessment conducted for other roadways in the City are included in Appendix I – Road Safety Assessment (RSA), Various Locations within Bullhead City.

Colorado River Heritage Greenway Trail

The 2003 Colorado River Heritage Greenway Trail Master Plan outlined a vision for an innovative 25-mile multi-use trail that starts at Davis Dam and travels through Bullhead City to the Colorado River Nature Center. The greenway is envisioned to link the region by connecting the multi-use trail to the River Walk in Laughlin and continuing it on to Lake Mead National Recreation Area and to the Fort Mojave Indian Reservation.

The proposed Colorado River Heritage Greenway Trail will follow the riverfront wherever possible, connecting parks and habitat restoration sites, meandering through riverfront neighborhoods, and highlighting areas of historical and ecological significance. The Colorado River Heritage Greenway Trail is an opportunity to attract visitors to the region, improve the quality of life for residents, and provide for economic growth opportunities, recreation, and habitat conservation.

Since the 2003 completion of the Colorado River Heritage Greenway Trail Plan, there have been modifications to the plans for Bullhead City Community Park (Section 12) and Rotary Park; however, the vision for the Greenway Trail remains intact.

Recreation trails are proposed throughout the City. Planning is currently underway for trails within the Colorado River Nature Center's 500-acre site at the southern end of the City. To the north, the Section 12 Master Plan identifies the Riverfront Promenade, a multi-use paved path running the full length of *RiverCenter's* proposed riverfront, as part of the Colorado River Heritage Greenway Trail system.

Bicycling

Bicycling is a popular mode of transportation for residents and visitors. Bicyclists may be seen traveling on Bullhead City streets and often a number of bicycles may be seen secured at the Ferry landing, many of whom are likely workers commuting to Laughlin, Nevada. The dense area of the Riviera neighborhood with its proximity to schools and attractions such as parks and shopping is also an active area for bicyclists.

A number of residents and visitors also bicycle for recreation. The City facilitated a discussion of bicycle stakeholders as part of the Plan outreach (refer to Appendix A – Stakeholder Meetings). Through this discussion, an on-street bicycle system emerged that makes use of existing bicycle lanes and popular bicycling routes throughout the City.

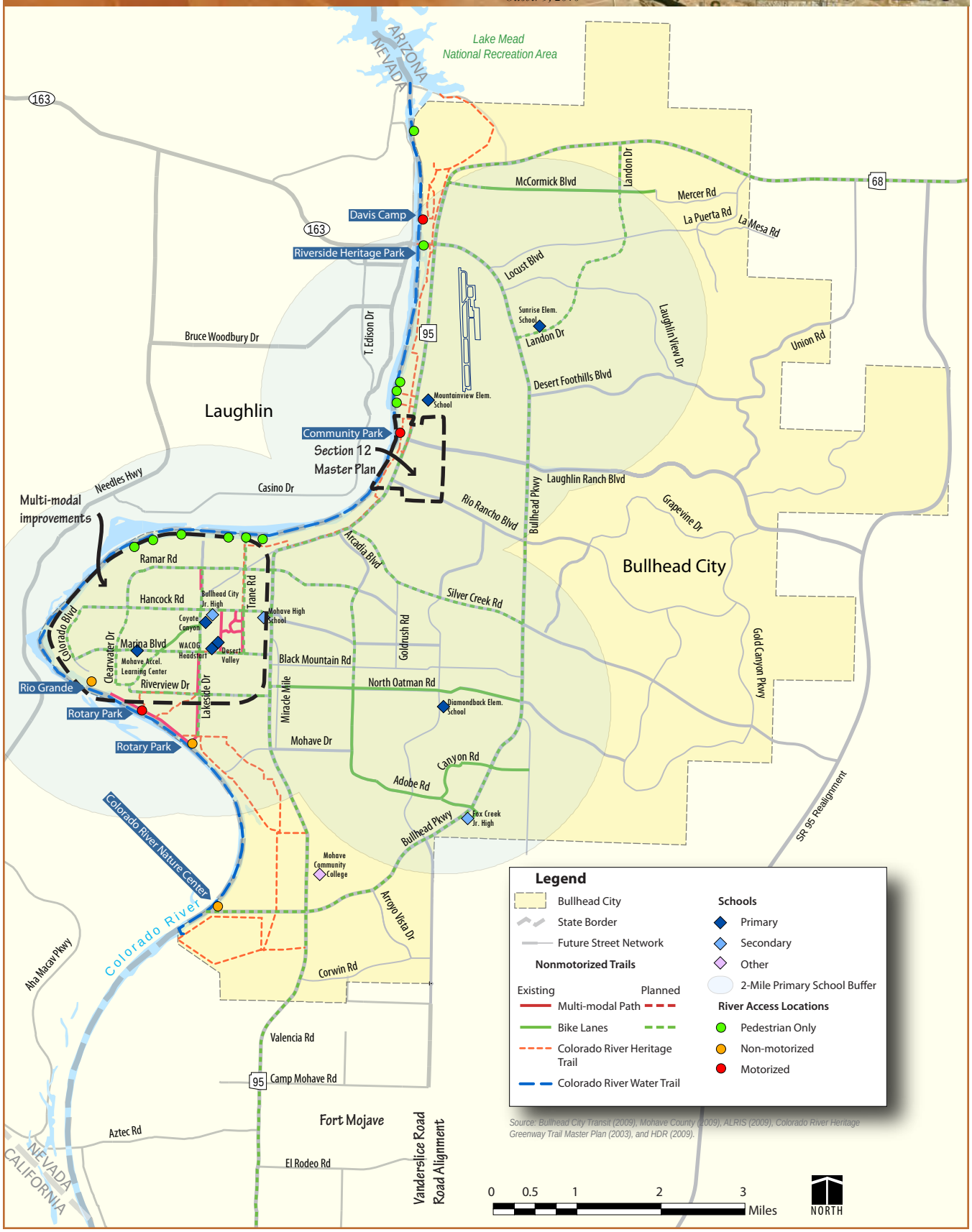
A bicycle lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. Currently there are designated bicycle lanes on portions of North Oatman Road and Adobe Boulevard and on Adobe and Canyon roads. The City is currently considering plans to provide bicycle lanes on Bullhead Parkway, completing the North Oatman/Adobe roads loop, popular today amongst bicyclists.

Figure 13, Non-motorized Transportation Map, shows the existing and planned non-motorized transportation routes within the City.

Bullhead City Transportation Plan

Figure 13 Non-motorized Transportation

October 5, 2010



Source: Bullhead City Transit (2009), Mohave County (2009), ALRIS (2009), Colorado River Heritage Greenway Trail Master Plan (2003), and HDR (2009).

The inclusion of non-motorized routes in the City is increasingly important as development occurs to lessen on-road conflicts and to ensure that pedestrians, bicycles and other non-motorized modes are accommodated. Figure 13 shows the general alignment of the Colorado River Heritage Greenway Trail.

Water Transportation

In addition to the traditional modes of transportation discussed above, a ferry provides regular service between Bullhead City and Laughlin. The boat is privately operated by the Riverside Resort Casino and travels between the Riverside Resort Casino in Laughlin and the parking lot between SR 95 and the Colorado River, south of the Bullhead Parkway (North)/Laughlin Bridge crossing.

Colorado River Access

Important to the quality of life for Bullhead City residents is continued and enhanced access to the Colorado River. The Colorado River Heritage Green Way Trail Master Plan identifies a “Water Trail” (shown on Figure 13), traveling from the Davis Dam at the northern edge of the City to the Colorado River Nature Center at its southern edge. The various existing and planned access points to the river are shown on Figure 13.

5.4 Recommendations for Non-Motorized Transportation

Pedestrian Safety Recommendations

As noted above, the construction of multi-modal improvements on the collector streets in the Riviera neighborhood (Lakeside Drive, Ramar Road, Riverview Drive, Marina Boulevard, Colorado Boulevard, Clearwater Drive, Riviera Boulevard, and Trane Road) would greatly improve the walkability of the community. In addition, it is recommended that the City develop a sidewalk inventory to assist in prioritizing improvements throughout the City, especially in those areas within the walkshed (1/2 mile distance) of public schools.

The City has proposed enhancing Ramar Road to provide a bicycle, pedestrian, and transit-friendly multi-modal transportation environment. Major elements identified include sidewalks, 10-foot bike lanes, and trees to provide shade for transit riders waiting for the bus. The City has also identified Trane Road for multi-modal transportation improvements including construction of bicycle lanes, curbs, gutters and sidewalks. These are examples of the types of improvements recommended by the plan for areas of greater activity, such as near schools, commercial areas, and areas of relatively dense residential population.

A multi-use path and pedestrian shade shelter along Lakeside and Riverview drives enhances the walkability of the area.

Pedestrians At-Grade Crossing

At signalized intersections with pedestrian crossings, crosswalks should be distinguishable by pavement marking/aesthetic brickworks; pedestrian signals providing ample walk time; ADA compatibility; and pedestrian refuge islands. Uncontrolled pedestrian movements (jay walking) should be minimized using protective devices such as buffering, fences, guardrails, low-height barrier walls raised medians, etc. Pedestrians crossing roadways other than at crosswalks, decrease roadway performance and increase potential safety risk.

Every effort should be made to minimize the number of marked crosswalks to key strategic and logical crossing locations, in particular to signalized or stop-controlled intersections. “Quality over quantity” reduces the number of crossing locations and minimizes vehicular-pedestrian conflicts.

Pedestrian Bridge

A pedestrian bridge is an alternative way to facilitate pedestrian movements. It is deemed to be a viable option in an urban setting with high pedestrian volumes. However, high construction and maintenance costs associated with under-utilization, unaesthetic scenic view, and space requirements make this concept fairly unpopular,

unless the roadway is partially depressed and the structure height is 15 to 25 foot above the roadway.

Besides high construction cost, a pedestrian bridge requires special arrangements for ADA accessibility and only provides limited multi-modal access. In addition, shading, an important element in Arizona, is hard to achieve in overpasses.

SR 95

The ADOT Pedestrian Safety Action Plan and SR 95 Roadway Safety Assessment identified specific countermeasures to address pedestrian safety concerns along SR 95. These measures are included in Appendix G of this report. Specific recommendations include such items as:

- Improve lighting between 3rd Street and 6th Street, particularly near 5th Street, to increase pedestrian visibility at night
- Consider one of the following signal/crosswalk recommendations:
  - Conduct a signal warrants analysis to determine the need for a traffic signal at 5th Street
  - Install an In-Road Warning Light System with a high visibility crosswalk and LED pedestrian crossing signs at 5th Street
  - Install 2-stage pedestrian crosswalks near 5th Street
  - Install a Pedestrian Hybrid Signal, similar to the HAWK that the City of Tucson uses, near 5th Street
- Provide additional advanced warning of pedestrian crossing areas with oversized pedestrian crossing signs on both sides of SR 95, in both directions, with “Next xx Feet” plaque
- Long term, consider eliminating the crest curve near 5th Street
- Improve lighting between Thunderstruck Drive and Ramar Road
- Provide a Leading Pedestrian Interval phase at Thunderstruck Drive

Bullhead Parkway

During the stakeholder meeting on August 30, 2010, bicycle advocates in Bullhead City discussed the significance of Bullhead Parkway as an element of recreational bicycling in the City. An existing route commonly used by cyclist is the Adobe Road/North Oatman/Bullhead Parkway loop. Plans are currently underway to complete improvements on Bullhead Parkway so that the route has continuous bike lanes and signage. Ultimately, the entire Bullhead Parkway will be improved to accommodate bicyclists. These improvements will include improving the shoulders on both sides of the roadway with continuous bike lanes.

6.0 Transportation Revenue Sources

The following section describes and summarizes the revenue sources that are currently available for funding roadway transportation projects in Bullhead City. It should be noted that in the current environment the funding of significant transportation projects is complex and, in most cases, requires multiple sources. Also, transportation funding is dynamic and there is a need to continuously monitor the existing sources and new sources that may become available as state and federal legislation changes. Innovation has become the mainstay of successful transportation funding.

6.1 Existing and Potential Revenue Sources

The draft Bullhead City Capital Improvement Program (CIP) for transportation projects for fiscal years 2011 through 2015 identifies approximately $31.7 million in transportation capital improvements between 2010 and 2015. Of this amount, $20.2 million is allocated in 2011/12 for the "Second Bridge". Funding for these improvements comes from the following existing sources:

Revenue Bonds. The issuance of bonds against City revenues can be used to accelerate project construction. While not a direct funding source, bonding can be used to mitigate the immediate impacts of significant capital improvement projects and spread the costs over the useful life of the project. Though interest costs are incurred, the judicious use of debt financing can serve not only as a practical means of funding major improvements, but is also viewed as an equitable funding strategy, spreading the burden of repayment over existing and future citizens and businesses that will benefit from the projects.

Highway User Revenue Fund (HURF). HURF represents the most significant source of transportation funds in the State of Arizona. Funds are derived primarily from motor vehicle fuel taxes and vehicle license taxes. HURF funds are shared with and allocated through ADOT and distributed as an entitlement to cities, towns and counties based on population.

Grants. Community Development Block Grants and other one-time only funding sources are available from some federal, state, and private entities to fund infrastructure development.

Bullhead City General Fund. The CIP identified City general fund monies used for improvements and operations and maintenance.

Other Funding Sources. The CIP identified other unspecified sources of revenue used for transportation funding.

Other revenue sources potentially available to the City include:

Development Impact Fees. An increasing number of growing Arizona communities are relying on transportation development impact fees for both residential and commercial development. Development impact fees are one-time payments for public facilities based

on a pro-rata share of costs incurred for facilities needed to accommodate new development. Development fees relate to only capital facility expansions benefiting new development and are not to be utilized for rehabilitation efforts or operating expenses.

Improvement Districts. Improvement districts are authorized by the State legislature for the construction of a wide range of public works facilities. They are formed to fund repaving projects, construction of roadways or sidewalks, installation of landscaping, and other public improvements within a defined geographic area. The districts are initiated by property owners who combine resources with the City to finance the improvements. Property owners are assessed over a several year timeframe to repay their share of the cost of the improvement.

Highway Extension Expansion and Loan Program (HELP). HB 2488, enacted into law on August 21, 1998, established a comprehensive loan and financial assistance program for eligible highway projects in Arizona. The program, designated as HELP, provides communities in Arizona a new financing mechanism to stretch limited transportation dollars and bridge the gap between the needs and available revenues. HELP provides the State and its communities with an innovative financing mechanism to accelerate the funding of road construction projects and has proven to be a significant tool for financing the construction of highway projects throughout the State. Similar to bond funds, the HELP is a loan, hence there are payback obligations. The major advantage is there are no application fees and the rate under statute is “below market.”

Greater Arizona Development Authority (GADA). The GADA was created by the Arizona State Legislature to assist local and tribal governments and special districts with the development of public infrastructure. GADA leverages its funds to lower the costs of financing and help accelerate project development for public facilities owned, operated, and maintained by a political subdivision, special district or Indian tribe. GADA has both financial and technical assistance programs.

Surface Transportation Program (STP). The STP provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and intra-city and intercity bus terminals and facilities. For projects programmed with STP funds from a Council of Governments (COG) Transportation Improvement Program, local project sponsors may exchange STP funds for a reduced amount of HURF funds from ADOT, enabling the project sponsor to assume greater control over project development and implementation. The exchange program is currently on hold by ADOT until the HURF gains are shown for the revenue stream.

Highway Safety Improvement Program (HSIP). The purpose of the HSIP is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. Each State's apportionment of HSIP funds is subject to a set aside for construction and operational improvements on high-risk rural roads. High-risk rural roads are roadways functionally classified as rural major or minor collectors or rural local roads with a fatality and incapacitating injury crash rate above the statewide average for those functional

classes of roadways; or likely to experience an increase in traffic volume that leads to a crash rate in excess of the average statewide rate.

Economic Strength Project (ESP) Program. The Arizona Department of Commerce in collaboration with ADOT administers the ESP Program. This joint program for local governments provides grants for road projects that result in economic development and meet three primary goals: create and retain a significant number of jobs in Arizona; lead to significant capital investment in Arizona; and make a significant contribution to the economy of Arizona. The ESP Program has a continuous funding source through ADOT. Annually there are two funding rounds in which at least $500,000 is available for new road construction, upgrading existing roads, turn lanes, acceleration or deceleration lanes, and reconstruction and paving.

Highway Bridge Replacement and Rehabilitation Program (BR). The BR program provides funding for replacement of a structurally deficient or functionally obsolete highway bridge or rehabilitates the structural integrity of a bridge.

National Highway System (NHS) Program. The program provides funding for improvements to rural and urban roads that are part of the NHS, including the Interstate System and designated connections to major intermodal terminals. Under certain circumstances, NHS funds may also be used to fund transit improvements in NHS corridors.

Safe Routes to School Program. The program purpose is to enable and encourage children, including those with disabilities, to walk and bicycle to school; to make walking and bicycling to school safe and more appealing; and to facilitate the planning, development, and implementation of projects that will improve safety, reduces traffic, fuel consumption, and air pollution in the vicinity of schools.

Transportation, Community, and System Preservation Program (TCSP). The TCSP Program is intended to address the relationships among transportation, community, and system preservation plans and practices and identify private sector-based initiatives to improve those relationships. States, metropolitan planning organizations, local governments and tribal governments are eligible for TCSP Program discretionary grants to plan and implement strategies which improve the efficiency of the transportation system, reduce environmental impacts of transportation, reduce the need for costly future public infrastructure investments, ensure efficient access to jobs, services and centers of trade, and examine development patterns and identify strategies to encourage private sector development patterns which achieve these goals.

Transportation Enhancement Program (TE). The TE program's purpose is to strengthen the cultural, aesthetic, and environmental aspects of the nation's intermodal transportation system. Funding is derived from the State's annual STP apportionment. The program provides funding for facilities such as pedestrian walkways and bicycle paths, acquisition of scenic easements, restoration of scenic or historic sites, and landscaping and other scenic beautification.

Transit Funding Assistance

Transit services are funded through a variety of federal, state, and local programs, as well as farebox revenue, advertising, and other nongovernmental sources. Most local government funding for transit service is provided by general fund revenues of municipalities and/or counties. Sources of potential transit funding include:

Section 5311 Formula Funds. This funding supports capital expenditures (based on an 80/20 match with municipality or other entity), operating expenses (50/50 match), and administrative expenses (80/20 match). The funding is allocated through an annual competitive application process.

STP Flex Funds. STP flex funds are available through ADOT in support of the Section5311 Program. Typically these funds are used to augment the capital procurement process. STP funding levels for local governments are determined annually by the State Transportation Board.

BATS scheduled route service includes the Red Line, traveling north and south along Highway 95; the Blue Line traveling east and west; and the Green Line that provides service to the northern area of the City, including McCormick Boulevard, sections of the Bullhead Parkway, and Katherine Heights.
Source: Bullhead City website (2010).

7.0 Access Management

Access management is the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. Access management attempts to balance the need to provide good mobility for through traffic with the requirements for reasonable access to adjacent land uses. ADOT defines access management as the control of the location and design of all vehicular approaches to the state highway system including driveways and public and private roads. This control includes the option to deny a direct highway connection when it is appropriate.

The most important concept in understanding the need for access management is that through movement of traffic and direct access to property are in mutual conflict. No facility can move traffic effectively and provide unlimited access at the same time. In many cases, accidents and congestion are the result of street operations attempting to serve both mobility and access at the same time.

The challenge of access management is creating and maintaining a balance between land development plans and the functional integrity of the roadways that serve these developments and the region.

An effective access management program will accomplish the following:

1) Limit the number of conflict points at driveway locations. Conflict points are indicators of the potential for accidents. The more conflict points that occur at an intersection, the higher the potential for vehicular crashes. When left turns and cross street through movements are restricted, the number of conflict points are significantly reduced.
2) Separate conflict areas. Intersections created by streets and driveways represent basic conflict areas. Adequate spacing between intersections allows drivers to react to one intersection at a time, and reduces the potential for conflicts.
3) Reduce the interference of through traffic. Through traffic often needs to slow down for vehicles exiting, entering, or turning across the roadway. Providing turning lanes, designing driveways with large turning radii, and restricting turning movements in and out of driveways allows turning traffic to get out of the way of through traffic.
4) Provide sufficient spacing for at-grade, signalized intersections. Good spacing of signalized intersections reduces conflict areas and increases the potential for smooth traffic progression.
5) Provide adequate on-site circulation and storage. The design of good internal vehicle circulation in parking areas and on local streets reduces the number of driveways that businesses need for access to the major roadway.

Source: Transportation Access Management Guidelines for the City of Tucson (2003)

Traffic signal spacing is among the most important access management components. According to the Access Management Manual decreasing signal spacing from four to two per mile decreases total delay by nearly 60 percent and vehicle-hours of travel by nearly 50 percent (TRB, 2003).

With the exception of the Bullhead Parkway, Bullhead City does not have access management plans or policies in place.

The City may wish to consider developing a comprehensive access management plan. In addition to classifying roadways according to function and then planning, designing, and maintaining them based on these hierarchical classifications (as the City does today), a comprehensive access management plan would:

1. Detail acceptable levels of access and volume levels of roadway classifications and establish criteria for spacing of signals and access points
2. Apply appropriate geometric design and engineering standards at access points that relate to the roadway classification
3. Establish policies, regulations, and permitting procedures to implement the management plan

An Access Management Plan is a comprehensive study of existing and planned transportation infrastructure and land use within a defined study area that establishes a plan for providing reasonable access to all properties, while restoring or preserving the integrity of the transportation system. The primary benefit of having such a plan is that it lays the foundation for correcting existing access management problems and preventing others from occurring in the future.

Adopting these types of guidelines would make them much more enforceable. In addition to roadway regulations, the City may wish to incorporate guidelines into the land development regulations such as subdivision controls or lot dimension requirements that can influence access issues.

In the near term, access management policies should be adopted as part of the planning for a second bridge. Any mid-town crossing would result in a substantial increase in traffic on the approach road. An access management policy for the approach road would help to mitigate the conflicts resulting from the projected increased volume.

Bullhead Parkway Access Management

The goals of access management along Bullhead Parkway are to:

- Provide full access only at major streets/driveways
- Provide right-in right-out traffic movement at minor access points
- Prohibit mid-block left-turns with raised medians
- Allow pedestrian crossing only at designated intersections/crosswalk
- Encourage shared/common driveways among several business establishments

Figure 14 shows the approved access locations for Bullhead Parkway. This is based on the Bullhead Parkway Access Map dated January 1990, with subsequent modifications (A-N West Inc., 1990). The stationing information included is based on A-N West, Inc. Bullhead Parkway Construction Plans (locations are approximate).

Bullhead City Transportation Plan

Figure 14 Bullhead Parkway Approved Access Locations

August 4, 2009

#	Access Location	Station
1	Cimmeron Dr./ Arroyo Vista Dr.	65 + 81
2	Camino Real Blvd.	80 + 96
3	Camino Real Blvd.	99 + 55
4	Adobe Road	148 + 12
5	Canyon Road	172 + 73
6	N. Oatman Rd.	223 + 75
7	Hillview Dr./ Black Mountain Rd.	239 + 43
8	Montano Ridge Place	252 + 26
9	Silver Creek Rd.	272 + 27
10	Proposed Collector Street	295 + 34
11	Rio Rancho Blvd.	324 + 32
12	Gateway/ Laughlin Ranch Blvd.	372 + 70
13	Desert Foothills Blvd.	420 + 70
14	Landon Dr.	453 + 36
15	Laughlin View Dr. South	484 + 79
16	Locust Blvd.	501 + 10
17	(not specified)	348 + 02
18	Desert Trail Dr.	396 + 70
19	Larado Dr.	206 + 04
20	RV Park Dr. & Laughlin View Dr. North	511 + 00
21	Vanderslice Rd. & Tesota Way	117 + 00

Legend

- Bullhead City
- State Border

Street Network

- Study Area Streets
- Local Street
- # Approved Access Locations

Source: Bullhead City, ADOT, Mohave County (2009), and ALRIS (2009).

0 0.5 1 2 3 Miles

NORTH

8.0 Roadway Design Standards

8.1 Existing Roadway Design Standards

Standard Detail Street Sections are contained in the City's General Plan and include roadway design criteria and cross sections for arterials, collectors, and local streets. The existing standards specify the total roadway widths and number of travel lanes by functional classification, including the width of travel lanes, width of medians, and provision for parking and emergency vehicle access. The design standards for State-maintained highways, such as SR 95, are specified by ADOT.

8.2 Proposed Roadway Cross Sections

The design requirements of a given street depend, in part, upon the function of the facility as well as the magnitude and characteristics of the projected traffic volumes. Roadway widths and rights-of-way width, utilizing City standards, are recommended for future roadway classification types to be located within the incorporated area. Figure 15 illustrates typical street sections for major and minor arterial streets and collectors showing the provision of multimodal facilities. The key element of these cross sections is the increased or reduced right-of-way width depending upon the roadway function. The City will continually assess existing roadway cross sections for unique circumstances that could require modification of the accepted right-of-way widths.

The proposed typical roadway cross sections for Bullhead City were formulated based on traditional transportation planning methodologies, community goals and values, network continuity, provision of a balanced transportation system, land access, and projected population and employment growth. Additional right-of-way may be reserved to accommodate features such as:

- Future traffic needs
- Space for efficient vehicle operations
- Adequate room for turning movements

Border areas are provided on both sides of each cross section for utilities, such as water, sewer, telephone, and electric services. Border areas are typically included within the right-of-way of each cross section, but the City may permit a developer to dedicate the border area during the plat approval process rather than include the border area within the right-of-way.

Additionally, right-of-way requirements for arterial and collector facilities may increase at intersections or major driveways in order to provide room for turn lanes; turn-bays, and traffic signalization. In addition, for roadways which are maintained by ADOT, additional right-of-way may be required to accommodate future expansion of the state highway system.

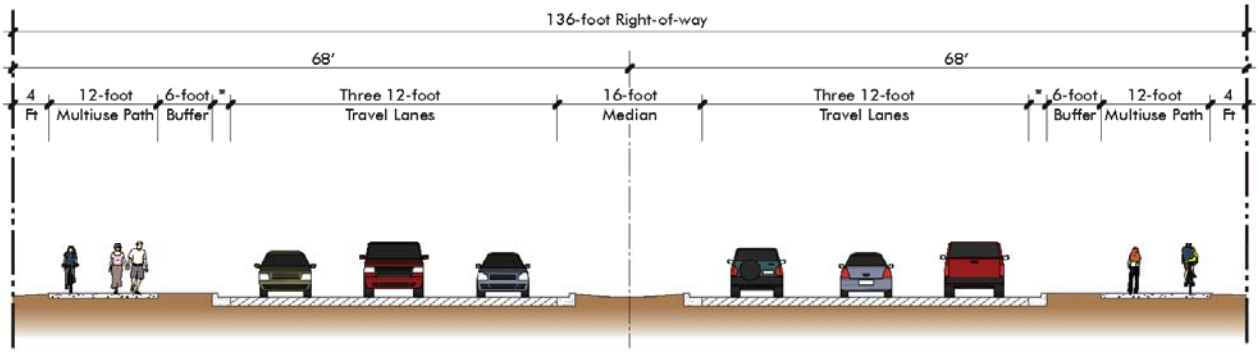
While street classification reflects the functions that roadways serve as part of the street and highway network, roadway design standards are related to traffic volume, design capacity, and level of service. Typical cross sections identify the recommended minimum dimensional criteria for right-of-way and pavement width, and configurations for number of travel lanes, medians, and on-street parking. Recommended roadway cross sections for the City were developed based on local conditions and preferences, emergency vehicle access requirements, cross section standards for other Arizona cities and other sources.

Refer to Appendix F for the adopted Bullhead City Standard Detail Street Sections.

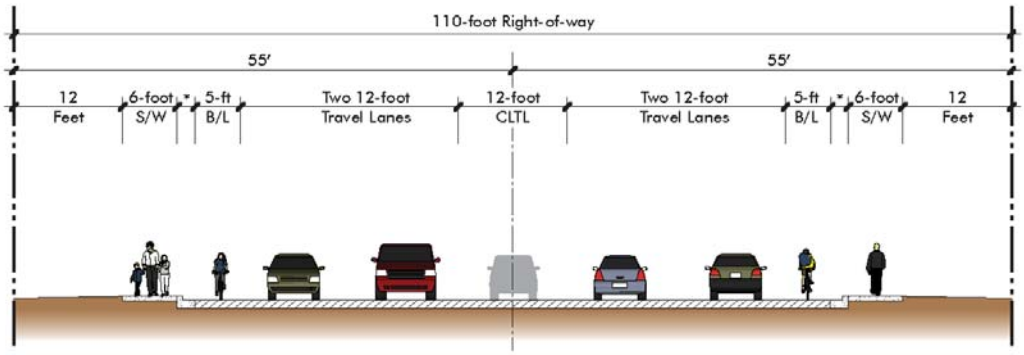
Figure 15 Standard Detail Street Sections

The (three) typical street sections shown below illustrate the following roadway sections:

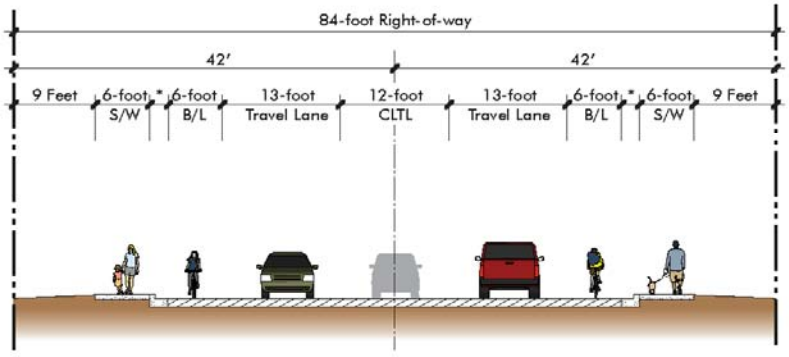
- Major Arterial
- Minor Arterial
- Collector



Major Arterial



Minor Arterial



Collector

NOTES: * Curb and gutters are shown at 2 feet wide.
Right-of-way and pavement widths are based on proposed street sections being considered by the City.

9.0 Pavement Management

At a replacement cost approaching one million dollars per mile – excluding right of way costs, the City has over $182 million invested in their paved roadway structures, plus an additional $136 million in roadside adjacent curbing, sidewalks, drainage and signs. Sound decisions on maintenance, rehabilitation, and reconstruction of streets are crucial to protecting that investment (Pavement Management Analysis Report, February 2007).

Pavement management is the process of planning, budgeting, funding, designing, constructing, monitoring, evaluating, maintaining, and rehabilitating the pavement network to provide maximum benefits for available funds. The streets owned or managed by Bullhead City consist of approximately 233 centerline miles of pavement.

The Pavement Condition Index (PCI) is the metric used to characterize the condition of the pavement for a roadway segment, with 0 being the worst and 100 being the best. The PCI score indicates the overall pavement condition and represents the amount of equity in the system and is the value most commonly considered when gauging the overall quality of a roadway network. It may also be used to define a desired level of service – that is an agency may wish to develop a pavement management program such that in 5 years the overall network score meets a set minimum value. It is the backlog however, that defines the amount of work an agency is facing and is willing to accept in the future. Further, it is the combination of the two that presents the true picture of the condition of a roadway network, and conversely defines improvement goals.

Generally a backlog of 10 to 20 percent of the overall network is considered acceptable and manageable from a funding point of view – a target value of less than 15 percent would be considered ideal. With the City of Bullhead City's current reconstruction backlog at just over 13 percent, the City is in good shape to implement a preventative maintenance program and not let the backlog grow.

Four analysis models were investigated in order to determine the recommended program for Bullhead City. Budget run BHC04, at $3 million per year was selected as the recommended program as it meets both the PCI and backlog criteria; an annual budget dedicated to roadway rehabilitation of approximately $3 million is required to achieve this goal in 5 years.

The City should consider developing an ongoing program to maintain the pavement and right of way asset management system such that it can be continued to be used effectively manage the City's roadway assets. Maintenance of the asset management system should consist of:

- Updating the pavement condition information either every 3 years, or completing 1/3 of the network annually. This will allow the City to update their roadway inventory, GIS data and pavement condition data on a routine basis.
- An estimated budget of $125 to $150/mile (inclusive of surface distress data collection and processing, and data loading) may be used to cover the annual surveys.

Appendix J summarizes the pavement conditions along SR 95 and SR 68.

10.0 Conclusion

As noted in the Introduction of this Plan, the need for new facilities is predicated on the growth which is occurring within Bullhead City, the unincorporated areas of Mohave County, and the region as a whole. The factors that make Bullhead City a desirable place to live remain in place, and long-term it is expected that population and employment in Bullhead City and the region will continue to grow. By taking the recommendations as outlined in this Plan, Bullhead City will be prepared to meet the multimodal transportation demands of the next generation.

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Appendix A – Stakeholder Meetings

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Meeting Notes

Subject: Stakeholder Meetings	
Client: Arizona Department of Transportation	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7 and 8, 2009	Meeting Location: Bullhead City Hall

The Arizona Department of Transportation (ADOT), in partnership with Bullhead City, is preparing a Transportation Plan for Bullhead City. The Transportation Plan will address the needs of the Bullhead City community and identify priorities, potential improvements, and policies to improve the transportation system. The plan will provide guidelines to integrate different modes of transportation into an efficient system and outline a 2015, 2020, and 2030 year Transportation Improvement Program for Bullhead City.

As part of this effort a series of stakeholder meetings were held at City Hall on May 7th and 8th, 2009. HDR, the consultant contracted by ADOT and the City to prepare the Plan, coordinated these meetings.

In all, fifty-six letters were sent out to stakeholders representing some thirty-three different entities. Stakeholders included City elected officials and staff from both Bullhead City and Laughlin, and Mohave County; public safety and transportation representatives from the City, Mohave County and local school districts and the Community College; business people from Bullhead City and Laughlin Chambers of Commerce, the real estate community and members of the Bullhead Regional Economic Development Authority; resource managers from BLM, State Land and Arizona Game and Fish; local Indian communities and gaming interests; and the local utilities.

Meetings were arranged as focus groups with the following groupings: City staff, City elected officials, education, landowner, municipal, Native American, public safety, recreation, resource, and utilities. A total of twenty-six individuals participated in the discussions. The notes on the following pages represent the topics discussed and information presented.

The following is a list of entities contacted for stakeholder interviews:

- Arizona Department of Public Safety
- Arizona Game & Fish
- Arizona State Lands Department
- AVI Resort & Casino
- Bullhead 4-Wheelers Inc.
- Bullhead Area Chamber of Commerce
- Bullhead Area Transit System
- Bull head City
- Bullhead City Elementary School District
- Bullhead City Fire Department
- Bullhead City Police Department
- Bullhead Regional Economic Development Authority
- Bullhead/Mohave Valley Board of Realtors
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation, Lower Colorado Regional Office
- Chamber of Commerce
- Colorado River Indian Tribes
- Colorado River Union High School District
- Fort Mojave Indian Tribe
- Laughlin, Town Board
- Mohave Community College
- Mohav e County
- Mohave County Floodplain District
- Mohave County Public Schools
- Mohave County Transportation Commission
- Mohave Electric Cooperative, Inc.
- Mohave Valley Elementary School District
- Mohave Valley Fire Department
- NPG Cable
- Southwest Gas
- Town of Laughlin
- US Army Corps of Engineers

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Meeting Notes

Subject: Stakeholder Meeting – Business Group 815	
Client: Arizona Department of Transportation	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7, 2009	Meeting Location: Bullhead City Hall
Notes by: Michael LaBianca	

Attendees: See attached

Topics Discussed:

- SR95
  - o Reali gnment
    - Refer to SR95 Website for additional information
    - Bypass route is not a concern to business owners
    - Laughlin Ranch Road (just north of Pass Canyon) – needs to push through to 95 – open up for land development.
  - o Historically a 2-lane road (SR95)
  - o Traffic @ Joy Lane significant.
  - o SR95 is really a local road as far as operation.
  - o Bullhead Parkway access map shows the existing access points (one is Laughlin Ranch)
- Airport exit handle weight of a C-5 aircraft, one of the longest runways in the state.
- Bridge location needs good access
  - o Can bridge access become Alt. Route 95?
  - o Riverview Drive access connecting to SR 95, could carry on 5 lanes to Bullhead Parkway.
- Vanderslice is important route to be developed
- Mohave Valley – only access to 95
- Brackman is a key alignment
- Laug hlin
  - o 24k Homes projected in the current master plan (doesn't include Colorado River Conservation lands)
  - o Don't see large retail attracted (not enough population base) focusing on planning light industrial
- Comm ercial
  - o Airport area is key
  - o Also seeing along Bullhead Parkway - need additional east-west connections to address
  - o Limiting access (as has been shown at Lipan Blvd and SR95) – is key to safety
- Thunderstruck access to Hancock should be eliminated - signals too closely spaced
  - Can address through a relocated H.S. access point
  - → Look at signal timing Hancock Road south of SR95
- Direct access to I-40 would be key for more industrial development.
  - o Business could locate here if access existing.
  - o Courtwright Road another option (where Vanderslice will end, 14 miles from Parkway) turn for "golden shores". Brackman another options.
- Issue with improvements to Needles Parkway, San Bernardino concerned with California providing access to Nevada gaming.

→ Laughlin Chamber recommended Right-of-Way thru tribal lands, tribes have been receptive (request copy from Janet Medina, Laughlin Chamber of Commerce)

- Fort Mohave Indians have jointed the Economic Development Authority

- → Chamber Development Map (request copy from Mike Conner)
- EDA interested in a "Main Street Program" for original Bullhead, looking to get acknowledged (Airport to Chamber of Commerce)
- ROW limits in this area with turn back, Arizona turns back to City – What about "business route"
- Recognition made of the work of Mike Kondelis, ADOT, for the City

Action/Notes:

- → Items preceded by arrow require follow-up

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Meeting Notes

Sign-In — ***Bullhead City Transportation Study***

Business Focus Group

MEETING LOCATION: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 7, 2009 at 8:00 AM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.	Joe Morabito	BREDA			
2.	LEIGH VERLEY	BREDA		928-758-7676	lverleycpa@citlink.net
3.	MIKE CONNER	BULLHEAD AREA CHAMBER of COMMERCE	1251 Hwy 95 BULLHEAD CITY 86429	928-754-4121	MCONNER@BULLHEADCHAMBER.COM
4.	Janet Medina	Laughlin Nevada Chamber of Commerce	1585 S. Casino Dr. Laughlin, NV 89029	(702) 298-2141	jmedina@laughlinchamber.com
5.	Ashford Todd	BullHead City FIRE Dept-Chair	BHC 86442 1441 E Hancock Lane	9285426193	83ashtodd@Gmail.Com
6.	Barbara Pape	BATS Commissioner		928-758-2639	bpape.63137@aol.com
7.	Dennis DeSanis	BHCPD	1255 Marina Blvd	928-763-9200	bhctraffic@frontiernet.net
8.					
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Subject: Stakeholder Meeting – City Staff	
Client: Arizona Department of Transportation	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7, 2009	Meeting Location: Bullhead City Hall, Room 200
Notes by: Michael LaBianca	

Attendees: See attached

Topics Discussed:

- Looking for balance in land use to provide necessary mix of uses and densities to support transit
- Seeing new development mostly to east of Parkway
- Tran sit
    - Green Line is a new deviated fixed route, connects with the Red Line at boat ramp
        - Serves numerous apartment complexes and assisted living facilities and up to Katherine's Landing
    - → 5 year Rural Transportation Plan (recently adopted) – request from Sandy Smith
    - Concern of transit bus stop pull outs
- General Plan (2012) City preparing to update
- Additional e/w routes, n/s route needed throughout City
- Since 2002 Plan, Mohave and Oatman
- Laughlin Ranch Road could connect to proposed SR95
- Section 12 Strategic Plan
    - Shows new align "River Center" as new road
- Tie-in for Laughlin Ranch Blvd. has changed
- San Bernardino
- Alt SR95 – 40 – 60
- Commercial vehicle traffic contingent on new bridge opening at Hoover Dam
- SR 95
    - average speed 35 / speed limit is 45
    - SR95 – BH parkway connection to alleviate traffic on SR 95
        - parallel routes internally
    - SR95 / 7th Street – pedestrian fatalities
        - move to 5th / SR95 for pedestrian safety.
- Not a lot of bicycle traffic, see a number of scooters (especially since fuel prices escalated), pedestrian traffic along SR95 & Hancock Road (2 schools on, 1 just off) – safety concern.
- Trail Master Plan
    - Look to construct in segments, City Hall and schools have been priority
    - General plan shows sections of trail (urban vs. rural)
    - Bicycles along thru SR 95 multipurpose trail would be really nice
    - Schools have been a priority
    - Sidewalks improvements critical to schools
    - → SRTS, transportation director, Janice Wilhelm, HS (928) 788-1332 / 768-1665
- → Recently annexed 160 acres (saw tooth area in S Bullhead) – make change on map
- Cra sh Data
    - Signals Thunderstruck/Hancock (high rate)

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  - Marina to Silver Creek - majority due to inattention, rear cards and access to businesses
  - Look at raised medians to limit.
    - Discussion medians at some locations along SR95.
  - Study identified business that were impacted by medians found few are (except time sensitive)
- 22 signals in City
- SR 68
  - Landon Road SR 68 – Signal configuration at Landon an issue
    - signal may interfere with runaway truck ramp – coordination (ramp is below Landon)
    - Grade separation one option
  - state reduced speed limit (1st time in state) - at milepost 15 trucks doing 50
  - Landon on hold due to economic circumstances
- Fire Department
  - Laughlin Ranch Road extension for SR95 –additional station in future
  - River Center Road up through Section 12.
    - General Plan amendment shows the alignment – will address response time
  - Fire Department – 5 stations
  - Katherine Heights (Station 3)
  - Laughlin Ranch is far point for response time
- Transit seeing more and more ADA
- Bridge location(s)
  - Riv erview
    - Could accommodate 5 lanes on Oatman (ROW exits)
  - Rain bow
  - Parkway location
    - Clearwater Shores, residential subdivision
    - State land parcel on SR95
- Just added bike rack on busses
- Trails don't come in Highway
- Wal-Mart to Nature Center
  - Trails that have been completed are a real improvement
  - Laughlin moving with trails along river from Davis Dam to south, looking to connect with Bullhead City

Action/Notes:

→ Items preceded by arrow require follow-up

- Charlene FitzGerald to send invite to all stakeholders for next outreach events

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Meeting Notes

Sign-In

Bullhead City Transportation Study

City Focus Group

MEETING LOCATION: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 7, 2009 at 9:00 AM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.	TIM ERNSTER	CITY OF BULLHEAD CITY	2355 TRANE RD. BHC AZ 86442	928-763-0122	TIM@BULLHEADCITY.COM
2.	PAWAN AGRAWAL	"	"	928 763 0128	PAGRAWAL@Bullheadcity.com
3.	Keith Surrillas	BATS		7739310091	KSurrillas@gmail.com
4.	SANDY SMITH	BATS	"	928 763 9400 X374	SSSMITH@BULLHEADCITY.COM
5.	Karla Brady	BHC	"	928 763-9400 x 207	KBrady@bullheadcity.com
6.	Dave Heath	BHC	2047 Commercial Way BHC, AZ 86442	928 763-0158	dheath@bullheadcity.com
7.	Nancy Sinagoga	Colorado River Union High School District	P.O. BOX 21479 Bullhead City, 86439	928 768 1665	nsinagoga@cruhsd.org
8.	Janice D. Paul	BHC	2355 Trane Road BHC, AZ 86442	928 763-0123	jpaul@bullheadcity
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Subject: Stakeholder Meeting – Education	
Client:	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7, 2009	Meeting Location: Bullhead City Hall
Notes by: Michael LaBianca	

Attendees: See attached

Topics Discussed:

- A new school is scheduled for about 5 years / subject to growth
    - For High School, year after
- Growth is occurring south of Bullhead Parkway (develop occurring in North Oatman area) – elementary needed here
    - All schools feed into Diamondback Elementary School (E/S) –
- Completion of North Oatman helped with bussing
- Target area of Community College for east-west connection
- 2 E/S ~ 700 each and 3 additional E/S – combined enroll ~ 700
- New Junior High school up by Laughlin Ranch BHP area
- East – west is difficult
- Like to see Miracle Mile improved, pavement bad
    - Miracle Mile would provide congestion relief to SR 95, extending it would help more.
- Hancock / Silver Creek recently improved
- General road conditions are poor
- Riviera Neighborhood
    - Streets are narrow, difficult for busses and dangerous for children
    - Riviera Neighborhood is ½ school population
    - Challenging through this area
    - Riverview and Lakeside roads are narrow
    - High numbered registered sex offenders causes concern.
    - Walk only if desire, provide bussing to all children
    - Lack of sidewalks in river bend area
    - Special Needs Routes (door to door pick-ups) difficult in bend area.
- Katherin e Heights
    - Going to be a problem
- Hancock / Lakeside
    - 3 schools transportation dept. and district office
- Bullhead City Junior High School
    - 650 enrollment
    - Load/unload within ½ hour of each other (JR H and HS)
- Canyon Elementary
    - 700 enrollment
    - No crosswalk at Junior High
        - Last year child was hit
        - Could use a crosswalk at this location (Hancock) – there is school zone on Lakeside

- Concern with bus stops – nice to have in designated areas – may be shared with public transit
    - There are shared routes/stops between schools
- Issue with vehicles parked on side of street
- Bullhead City Elementary School District uses 84 passenger busses
- Curbs and sidewalks don't exist -- parking is random
- Pedest rian Congestion
    - How to address traffic
    - Combined dismissal times challenging
    - Hancock is loaded with vacant land available
        - Provide route for off street trail would be helpful
    - No protected crosswalks in vicinity
    - Sequence of lights along SR-95
    - Blind spots along Highway – difficult pulling in and out
    - Hancock students trying to cross between lights
    - SR95/Hancock busiest at arrival/departure times
- Black Mountain would be useful east-west connector
- Mohave Drive realign to Adobe would be good

Action/Notes:

→ Items preceded by arrow require follow-up

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Meeting Notes

Sign-In — ***Bullhead City Transportation Study***

Education Focus Group

MEETING LOCATION: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 7, 2009 at 10:00 AM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.	William Allsbrooks	BCESD#15	1004 Hancock	928 758-3961	WallsBrooks@bullheadschools.com
2.	Jamie Wilhelm	CRUSD	Hwy 95 & Hancock	788-1332	JWilhelm@CRUSD.org
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Meeting Notes

Subject: Stakeholder Meeting – Municipal	
Client: Arizona Department of Transportation	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7, 2009	Meeting Location: Bullhead City Hall
Notes by: Michael LaBianca	

Attendees: See attached

Topics Discussed:

- Vanderslice still key interface with city
    - Where it ties into BHP is not hammered down – need to get official confirmation
        - Where it intersections BHP Vanderslice hooks to 1000' radius and ties into planned DeSoto Way (in Mohave County ends @ Sterling)
    - Start as 2 lanes with ROW for 4 lanes
    - Access every section, ½ mile – no driveways
    - Set alignment, passed through Board of Development
    - Vanderslice portions are development driven
    - Vanderslice seen as alternative to BHP
    - Planned for 4-lane ultimate build-out
- Industrial Development
    - Rail would be helpful, unlikely unless supported by industry
    - Need access to I-40
    - Vanderslice at Courtwright – trucking (transfer) facility built
- Checkerboard land ownership pattern
    - Every other mile is Indian land, relationship has become more cooperative
- Mohave Mesa, Mohave Valley – growing constantly
- Private land owner has donated 50/60 acres for community park in unincorporated Mohave Count
- Needles cement bridge pedestrian removed back on to sides to 4-lane building access to I-40.
- Would like to see BHC bus system extended to Lower Valley
    - Fort Mohave north of Boundary Cone Road
    - Lower Valley south of Boundary Cone Road
- Bus allowed to stop on 95 now
- SR 95 at Boundary Cone Road 55 mph - no turn lanes (refer to improvements @ E Lipan Blvd)
- State government raiding HURF funds – less for counties
- Wiring an intersection for signals not expensive (~ $16K)
- Loop BHC / Lake Havasu / Kingman – Tri-City bus route
- Mohave County Transportation
    - Transportation Commission - 3 members from each Board of Supervisors district (BHC – Mohave to Willow – District 2)
    - 2,000 miles of road (750 paved), Run 25 blades on unpaved streets
    - Receive $1 m year to pave ~ equates to about 3 miles, $550K ERP funds
- SR95 show all on map
- New City at intersection with I-40 and realigned SR 95 (proposed)

Action/Notes:

→ Items preceded by arrow require follow-up

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Meeting Notes

Sign-In — ***Bullhead City Transportation Study***

Municipal Focus Group

MEETING LOCATION: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 7, 2009 at 11:00 AM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.	Jim Roberts	COUNTY	2251 E Palo Verde	330 2089	
2.	M. Ray Lackey	County	2941 La Paloma Dr	(928) 754-1941	
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Meeting Notes

Subject: Stakeholder Meeting – City Elected Officials	
Client: Arizona Department of Transportation	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7, 2009	Meeting Location: Bullhead City Hall, Room 200
Notes by: Michael LaBianca	

Attendees: Mayor Jack Hakim
Councilwoman Leslie Blaydes
Rob LaFontaine, Analyst/Government Affairs, Office of the City Manager
See attached (sign-in not completed)

Topics Discussed:

- Trent / Titus $20M appropriations for 2nd bridge
- Governors Task Force – convened meeting at Davis Dan
- Look at 'Alt 95' for state facility and state funding
- In February 2009 new ADOT director met with BHC
- Bullhead City is looking for Economic Development Authority (EDA) Director
- Original Bullhead "plan" for SR 95 is for "Main Street"

→ Section 12, review the City's plan for this section

- Strip development commercial project being proposed for original BH at SR 95
- EDA – BHC contributes 60 percent, 10 percent less each year
    - Estimated contribution is $129K this year
- Sam's Club – none in Kingman
    - ½ of business for store is from outside of City
- Tri-City Council
    - Really grown, Speaks with one voice for the region
- Airport
    - Looking to expand passenger service
        - Pursuing a commercial airline - 5 flights week regular, any of the following locations for connections at either Dallas, Phoenix, Los Angeles, Las Vegas
    - Kingman, Prescott, Phoenix, Great Lakes
    - February 2008 Grant – Mohave County Airport Authority – $500K fed, $500K municipalities
    - Airport has done a lot – airport committee active, raising matching funds
    - Once expansion see more traffic
    - Runway is 7,500 feet long, 3rd longest in State
- SR95 Economic Recovery Plan – repave Marina to McCormick (anticipated Fall 2009)
- Laughlin Bridge / SR95 – Hancock/95 year ago really bad, has been patched – much improved
- Section 20
    - State Lane interest (Jamie L. Hogue, Deputy State Land Commissioner, Arizona State Land)
    - Mixed use proposal, west portion residential, east commercial
    - Affordable housing (as identified in Housing Study)
- May 2008 Section 31 (across from Home Depot)
    - Brentwood LLC – condo development being proposed
    - Met with ADEQ others re: Sustainability
- Residents' desire beach area, see Section 12.
- "AlCaNa" – lot of traffic – 45,000
- Laughlin promoting trail from Fisherman's Access Park along Riverwalk down to Casino
- No impact fees or Property Tax
- Need to develop a strategic plan for Bullhead City

- Traffic
    - Have counts dropped?
        - → HDR to look closer at #'s
    - What is the impact of enhanced transit service
    - Impact of Bullhead Parkway
- Redflex red light cameras in contract

→ Need to reply to article in Mohave Daily News on LOS

Action/Notes:

→ Items preceded by arrow require follow-up

Meeting Notes

Sign-In

Bullhead City Transportation Study

City Elected Focus Group

MEETING LOCATI0N: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 7, 2009 at 2:00 PM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.					
2.	Mayor Hakeim	BHC	Didn't sign in, arrived ~12:45		
3.					
4.	Councilwoman Bltd	Blaydes BHC	Didn't sign in, arrived ~1:15		
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Meeting Notes

Subject: Stakeholder Meeting – Utilities	
Client:	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 7, 2009	Meeting Location:
Notes by:	

Attendees: See attached

Topics Discussed:

- Pipelines ideally look to piggy back with roads
- Within Bullhead City, n/s Routes are critical
- The power plant in Laughlin considering converting to natural gas
    - Currently on what's called a "permanent outage"
- Within the City there are two natural gas lines
    - El Paso
    - SW Gas Transmission (Serves Las Vegas)
- Identify drainages, real impediment within the City for development

Action/Notes:

→ Items preceded by arrow require follow-up

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Meeting Notes

Sign-In — ***Bullhead City Transportation Study***

Utilities Focus Group

MEETING LOCATION: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 7, 2009 at 3:00 PM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.	MICHAEL J. HIGGINS	SOUTHWEST GAS CORP	1705 LANGFORD DR.	928 763-7467	MIKE.HIGGINS@SWGAS.COM
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Meeting Notes

Subject: Stakeholder Meeting – Resource Group	
Client:	
Project: Bullhead City Transportation Plan	Project No: 104966
Meeting Date: May 8, 2009	Meeting Location: Bullhead City Hall
Notes by: Michael LaBianca	

Attendees: See attached

Topics Discussed:

- Ownership map does not show latest bridge information
  (maps were provided for land ownership information only)
- BLM Lands in Laughlin planned for through the Las Vegas BLM district
- We have limited resources, is growth sustainable in this region
  - Sensitive lands especially to the east
- Roads to the east (Realign of SR 95) can be defined as edge of growth, look at design examples in Europe
  - Permeable to wildlife and recreation users
- Improvements necessary in BHC for transportation
  - Vanderslice is a good example
- Recreation and Public Purpose (RPP) lease
- Avi Bridge prepared to be expanded to 4-lanes
- Resource Management Plans
- Look at 93 as example for wildlife crossings
  - East of I-40 (Nothing AZ) Desert Tortoise, example of what went wrong
- Wash access is legal (refer to management plans)
  - RMP breaks it down – sometimes includes roads, sometimes includes trails, sometimes includes washes
- Fort Mohave issues with regard to burial grounds
- Game and Fish online resource tool for identifying endangered and threatened wildlife species
  - Look for sensitive species
- BLM Las Vegas and Needles office also have jurisdiction
- Landon alignment crosses State Land in Section 28

Action/Notes:

→ Items preceded by arrow require follow-up

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Meeting Notes

Sign-In

Bullhead City Transportation Study

Resource Focus Group

MEETING LOCATI0N: Bullhead City Hall, Room 240 **MEETING DATE & TIME:** May 8, 2009 at 9:00 AM

	NAME	COMPANY/ AFFILIATION	ADDRESS	PHONE	E-MAIL
1.	DIANE WILLIAMS	BLM	2618 Successful Ter Lake Havasu City	928 505-1250	Diane_Williams@blm.gov
2.	JOHN REID	BLM	2755 Mission Blvd Kingman AZ 86401	928 718 3735	John_Reid@blm.gov
3.	Janice Strad	AZGFD	5225 N. Stockton Hill Rd Kingman AZ 86409	928-692-7700	jstrad@azgfd.gov
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Meeting Notes

Subject: Stakeholder Meeting – Bicycle Advocates		
Client: Arizona Department of Transportation		
Project: Bullhead City Transportation Plan	Project No:	104966
Meeting Date: August 30, 2010	Meeting Location:	Bullhead City Hall, Conference Call (HDR)
Notes by: Michael LaBianca		

Attendees:

Pawan Agrawal	Gary Johnson	By Phone:	Brent Cain
Mark Clark	Troy Teske		Michael LaBianca
Chuck Davis	Steven Wright		Bob Leuck

The meeting commenced at 6:30 pm.

Pawan Agrawal, Bullhead City, introduced the meeting and welcomed everyone. Brent Cain, HDR, provided a brief overview of the project and objectives for the meeting. The group provided brief introductions of themselves. Participants were encouraged to mark the maps provided to BHC in advance of the meeting. *(Note: these were subsequently scanned by Bullhead City and are included as exhibits at the end of this document).*

The following topics were discussed:

- Pawan Agrawal noted that he would like the participants to focus on the overall system needs for the near (5 year)-, mid (10 year)-, and long (20 year)-term timeframes.
- Mike Donnelly mentioned the new sign at North Oatman, “right turn lane yield to bicyclists”. Several participants acknowledged the sign and encouraged more signage to improve safety and education of the roadway users.
- It was noted that bicyclists riding in the shoulder receive less leeway than those that ride on the edge of lanes.
- All agreed that additional signage and motorist education would be beneficial.
- Bullhead Parkway:
    - The Bullhead parkway is a popular route for bicyclists.
    - The lack of a bicycle lane, condition of shoulder, and rumble strips present challenges for bicyclists.
    - There are several areas where the condition of the shoulder (degraded asphalt, debris, etc.) requires bicyclists to move into roadway.
    - It was suggested that the path be moved outside guardrail where it exists. (Pawan noted this could be a long-term goal, however, difficult due to right-of-way and side slopes.)
    - The minimum standard for the shoulder is 4-feet.
    - It would be nice to have signage with a contact number to report debris in road.
    - Roadway (pavement?) transitions can be a bit rough for cyclists.
- There are more (recreation) bicyclists in the winter months than rest of the year.
- SR 95 has sufficient space in right lane for bicyclists, ideally speeds would be lower.
- Residential streets are OK for riding (do not require any additional treatment for bicyclists).
- Pawan noted that as a result of requests to the City, all Bullhead City transit buses now have bicycle racks installed.

- A distinction was made that shared-use paths (both existing and planned) are for families and children, the recreational rider prefers to be with traffic due to higher speeds and continuity of routes.
- It would be nice to be able to travel over the future bridge into Nevada (which has desirable bicycling).
- Look at the Lake Havasau model which uses directional shared-use paths.
- Once complete, Rotary Park loop (Lakeside and Riverview drives) will provide another 3 mile recreational loop.
- Arcadia, once complete, would provide an ideal extension of bicycle routes.
- It would be nice to have a complete Bullhead City loop using the Bullhead Parkway and Colorado River Heritage Trail to circumnavigate the City.
- Refer to marked up participant maps (attached) for additional comments.

end.

Notes prepared by Michael LaBianca and are his understanding of the subjects discussed and the decisions reached. Any exceptions, corrections, or additions should be forwarded to Michael LaBianca, HDR, in writing with five (5) days of receipt of this document.

Appendix B –Socioeconomic Projections by Traffic Analysis Zone for Years 2009, 2015, 2020, and 2030

Table B1 **Socioeconomic Projections by Traffic Analysis Zone for Years 2009, 2015, 2020 and 2030**

TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
1	BHC	57	31	26	60	31	26	64	31	27	64	31	27
2	BHC	263	144	2	294	152	3	315	153	5	366	178	7
3	MO	109	56	0	247	126	0	262	126	0	262	126	0
4	BHC	0	0	1	0	0	1	0	0	1	0	0	1
5	BHC	730	400	5	782	404	21	839	408	91	845	411	147
6	BHC	1,284	703	9	1,374	710	17	1,460	710	26	1,470	715	35
7	BHC	0	0	0	0	0	0	51	25	0	308	150	0
8	MO	0	0	0	0	0	0	0	0	0	0	0	0
9	MO	0	0	0	0	0	0	0	0	0	0	0	0
10	BHC	0	0	562	0	0	572	0	0	584	0	0	584
11	BHC	46	25	0	143	74	0	234	114	0	605	294	0
12	BHC	1,275	698	27	1,370	708	88	1,497	728	175	1,703	828	237
13	BHC	0	0	0	0	0	0	0	0	0	0	0	0
14	BHC	0	0	0	0	0	0	0	0	0	0	0	0
15	BHC	0	0	0	0	0	0	0	0	0	0	0	0
16	BHC	0	0	0	0	0	0	0	0	0	0	0	0
17	BHC	0	0	0	0	0	0	0	0	0	617	300	0
18	BHC	652	357	169	701	362	199	755	367	226	960	467	263
19	BHC	0	0	690	0	0	759	0	0	835	0	0	919
20	BHC	0	0	77	0	0	90	0	0	106	0	0	147
21	BHC	411	225	92	542	280	94	617	300	97	1,080	525	135
22	BHC	18	10	0	58	30	0	113	55	1	617	300	1
23	BHC	0	0	0	0	0	0	0	0	0	125	61	0

TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
24	MO	0	0	0	0	0	0	0	0	0	0	0	0
25	BHC	566	310	482	600	310	487	638	310	492	658	320	497
26	BHC	0	0	108	0	0	127	0	0	150	0	0	209
27	BHC	1,052	576	509	1,142	590	561	1,261	613	620	1,314	639	689
28	BHC	0	0	0	0	0	0	0	0	60	0	0	125
29	BHC	232	127	228	246	127	267	261	127	314	313	152	426
30	BHC	0	0	0	236	122	0	302	147	81	559	272	82
31	BHC	0	0	0	118	61	0	150	73	130	202	98	365
32	BHC	0	0	0	118	61	0	150	73	130	202	98	265
33	BHC	0	0	0	0	0	0	0	0	0	0	0	0
34	BHC	0	0	0	0	0	0	0	0	0	0	0	0
35	BHC	0	0	0	116	60	0	171	83	0	222	108	1
36	BHC	0	0	0	0	0	0	0	0	0	0	0	0
37	BHC	0	0	0	0	0	0	0	0	0	0	0	0
38	BHC	771	422	431	817	422	437	868	422	444	868	422	451
39	BHC	960	526	49	1,096	566	56	1,205	586	65	1,254	610	76
40	BHC	1,242	680	8	1,336	690	16	1,423	692	26	1,680	817	37
41	BHC	1,324	725	8	1,403	725	17	1,491	725	25	1,512	735	34
42	BHC	1,187	650	333	1,258	650	342	1,337	650	351	1,357	660	361
43	BHC	1,050	575	92	1,113	575	100	1,182	575	109	1,203	585	118
44	BHC	1,200	657	209	1,272	657	219	1,351	657	229	1,372	667	239
45	BHC	548	300	77	581	300	80	617	300	84	638	310	87
46	BHC	652	357	178	691	357	183	734	357	189	755	367	194
47	BHC	959	525	35	1,016	525	42	1,080	525	50	1,088	529	58
48	BHC	577	316	64	612	316	69	650	316	74	654	318	79
49	BHC	776	425	36	823	425	52	874	425	68	890	433	84
50	BHC	276	151	330	302	156	332	321	156	333	374	182	334
51	BHC	1,369	750	126	1,467	758	136	1,559	758	147	1,816	883	159
52	BHC	411	225	216	439	227	218	471	229	219	779	379	221

TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
53	BHC	718	393	121	765	395	128	833	405	134	1,069	520	141
54	BHC	3,150	1,725	151	3,339	1,725	179	3,547	1,725	209	3,547	1,725	241
55	BHC	2,113	1,157	216	2,239	1,157	252	2,379	1,157	271	2,379	1,157	293
56	BHC	1,156	633	92	1,225	633	108	1,302	633	125	1,302	633	143
57	BHC	1,021	559	274	1,082	559	301	1,150	559	312	1,150	559	324
58	BHC	374	205	119	397	205	143	422	205	150	422	205	158
59	BHC	1,893	1,037	180	2,007	1,037	215	2,133	1,037	233	2,133	1,037	253
60	BHC	0	0	0	0	0	0	0	0	0	0	0	0
61	BHC	0	0	134	0	0	137	0	0	139	0	0	142
62	BHC	0	0	0	0	0	0	41	20	0	247	120	0
63	BHC	0	0	0	0	0	0	41	20	0	247	120	0
64	BHC	1,875	1,027	312	1,992	1,029	325	2,124	1,033	339	2,318	1,127	354
65	BHC	0	0	0	48	25	0	103	50	0	308	150	0
66	BHC	5	3	17	149	77	17	169	82	17	202	98	17
67	BHC	124	68	283	141	73	294	158	77	305	175	85	327
68	BHC	27	15	0	126	65	20	156	76	41	226	110	56
69	BHC	0	0	0	87	45	0	103	50	2	128	62	2
70	BHC	822	450	26	900	465	28	1,008	490	50	1,316	640	72
71	BHC	192	105	11	232	120	12	257	125	14	566	275	16
72	BHC	205	112	2	246	127	4	282	137	5	590	287	8
73	BHC	0	0	0	0	0	0	101	49	2	202	98	2
74	BHC	0	0	0	0	0	0	0	0	0	2,015	980	122
75	BHC	0	0	0	0	0	0	0	0	0	0	0	0
76	BHC	1,052	576	558	1,115	576	586	1,185	576	615	1,257	611	664
77	BHC	0	0	0	0	0	0	0	0	0	0	0	0
78	BHC	210	115	99	343	177	121	385	187	144	409	199	187
79	BHC	0	0	16	0	0	16	0	0	24	0	0	32
80	BHC	0	0	2	0	0	2	125	61	12	150	73	52
81	BHC	548	300	2	840	434	5	907	441	9	967	470	13

TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
82	BHC	0	0	0	97	50	10	128	62	20	333	162	60
83	BHC	959	525	176	1,016	525	184	1,080	525	191	1,080	525	199
84	BHC	743	407	303	788	407	309	888	432	314	1,300	632	322
85	MO	1,262	650	19	1,372	700	29	1,458	700	39	1,458	700	48
86	MO	0	0	0	0	0	0	0	0	0	0	0	0
87	MO	84	43	216	247	126	250	294	141	270	460	221	332
88	MO	1,464	754	206	1,693	864	235	1,966	944	259	2,132	1,024	304
89	MO	752	387	62	847	432	94	950	456	118	1,043	501	173
90	MO	0	0	29	0	0	43	0	0	51	0	0	73
91	MO	146	75	118	229	117	251	273	131	330	460	221	579
92	MO	0	0	86	0	0	258	0	0	360	0	0	685
93	MO	1,189	612	686	1,337	682	695	1,524	732	706	2,295	1,102	718
94	MO	49	25	0	57	29	0	69	33	1	92	44	1
95	MO	0	0	160	0	0	214	0	0	246	0	0	346
96	MO	1,457	750	409	1,674	854	420	1,883	904	433	2,674	1,284	448
97	MO	738	380	453	1,100	561	570	1,252	601	659	2,153	1,034	861
98	MO	1,068	550	40	1,137	580	59	1,291	620	75	2,105	1,011	104
99	MO	0	0	0	0	0	0	0	0	0	0	0	0
100	MO	126	65	2	151	77	4	160	77	6	160	77	6
101	MO	1,389	715	213	1,590	811	224	1,772	851	236	2,343	1,125	249
102	MO	1,319	679	45	1,380	704	63	1,535	737	80	1,797	863	106
103	MO	0	0	0	0	0	0	0	0	0	10	5	0
104	MO	0	0	0	0	0	0	0	0	0	0	0	0
105	MO	971	500	11	1,147	585	23	1,270	610	34	1,641	788	49
106	CL	0	0	10	0	0	10	0	0	10	0	0	10
107	CL	0	0	0	0	0	0	0	0	0	0	0	0
108	CL	0	0	0	0	0	0	0	0	0	0	0	0
109	CL	2	1	0	2	1	39	242	116	77	869	416	258
110	CL	4	2	0	4	2	77	88	42	25	318	152	86

TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
111	CL	0	0	0	0	0	60	0	0	120	0	0	400
112	CL	4	2	52	6	3	59	6	3	69	17	8	178
113	CL	857	410	592	857	410	612	899	430	636	1,087	520	755
114	CL	0	0	1,620	0	0	1,825	0	0	2,118	0	0	2,403
115	CL	0	0	3,916	0	0	3,916	0	0	3,916	0	0	4,246
116	CL	0	0	2,980	0	0	2,980	0	0	2,980	0	0	3,231
117	CL	4,310	2,062	84	4,989	2,387	136	5,198	2,487	195	5,198	2,487	287
118	CL	2,404	1,150	386	3,240	1,550	415	4,172	1,996	456	4,172	1,996	541
119	CL	0	0	58	0	0	58	0	0	58	0	0	58
120	CL	167	80	0	167	80	1	188	90	2	188	90	3
121	CL	0	0	3,507	0	0	3,949	0	0	4,326	0	0	4,326
122	CL	0	0	0	0	0	549	0	0	1,097	0	0	2,193
123	CL	993	475	0	993	475	4	993	475	9	1,191	570	115
124	CL	0	0	32	0	0	32	0	0	32	0	0	2,032
125	CL	36	17	0	48	23	0	69	33	0	117	56	1,315
126	CL	10	5	0	157	75	100	268	128	159	811	388	323
127	CL	0	0	0	0	0	0	0	0	0	491	235	50
128	CL	0	0	0	0	0	0	0	0	0	0	0	300
129	CL	0	0	0	0	0	0	0	0	0	0	0	0
130	CL	495	237	52	600	287	58	740	354	65	1,070	512	113
131	SB	0	0	0	0	0	0	0	0	0	0	0	0
132	CL	0	0	525	0	0	525	0	0	525	0	0	570
133	SB	0	0	0	0	0	0	0	0	0	0	0	0
134	BHC	9	5	0	29	15	0	62	30	0	123	60	1
135	BHC	0	0	0	0	0	0	0	0	0	0	0	0
136	BHC	0	0	0	0	0	0	0	0	0	0	0	0
137	BHC	0	0	20	0	0	20	0	0	20	0	0	20
138	BHC	0	0	0	0	0	0	0	0	0	0	0	0
139	BHC	0	0	0	0	0	0	0	0	0	0	0	0

TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
140	MO	0	0	0	0	0	0	0	0	0	0	0	0
141	BHC	0	0	0	0	0	0	0	0	0	0	0	0
142	BHC	0	0	0	0	0	0	103	50	0	341	166	0
143	BHC	0	0	0	0	0	0	103	50	0	341	166	0
144	BHC	0	0	0	0	0	0	0	0	0	0	0	0
145	BHC	228	125	11	254	131	13	278	135	15	290	141	17
146	BHC	0	0	0	0	0	0	0	0	0	0	0	0
147	BHC	0	0	0	0	0	0	0	0	0	0	0	0
148	BHC	0	0	0	0	0	0	0	0	0	0	0	0
149	BHC	0	0	0	0	0	0	0	0	0	0	0	0
150	BHC	498	273	85	676	349	89	755	367	94	792	385	99
151	BHC	0	0	0	0	0	0	51	25	0	101	49	2
152	BHC	0	0	0	0	0	0	0	0	0	0	0	0
153	BHC	0	0	0	0	0	0	0	0	0	0	0	0
154	BHC	0	0	0	0	0	0	0	0	0	177	86	0
155	BHC	0	0	0	0	0	0	251	122	0	341	166	0
156	BHC	0	0	0	0	0	0	0	0	0	0	0	0
157	BHC	0	0	0	0	0	0	0	0	0	0	0	0
158	BHC	736	403	97	823	425	102	925	450	107	1,080	525	111
159	BHC	639	350	16	726	375	21	771	375	27	771	375	32
160	BHC	0	0	359	0	0	425	0	0	□60	0	0	520
161	BHC	0	0	525	0	0	537	0	0	547	0	0	567
162	BHC	0	0	394	0	0	397	0	0	401	0	0	406
163	BHC	378	207	268	401	207	272	426	207	275	426	207	278
164	BHC	7	4	190	8	4	220	8	4	250	8	4	280
165	BHC	456	250	43	484	250	67	514	250	91	514	250	135
166	BHC	0	0	0	19	10	0	62	30	0	313	152	2
167	BHC	0	0	0	10	5	75	21	10	126	123	60	202
168	BHC	0	0	0	0	0	0	0	0	0	0	0	0

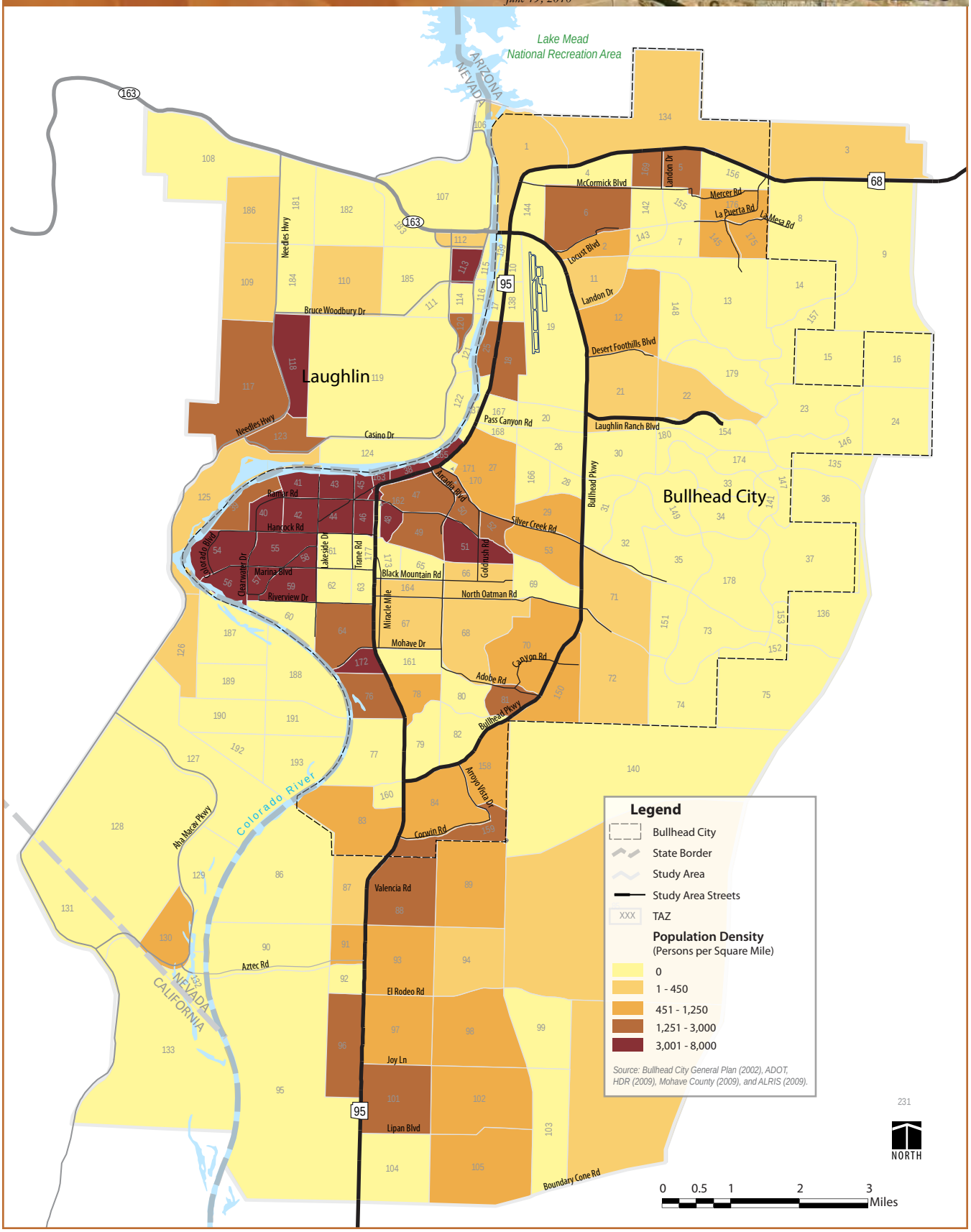
TAZID	Study Area	2009			2015			2020			2030		
		Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment	Population	Dwelling Units	Total Employment
169	BHC	639	350	114	708	366	119	786	382	139	821	399	169
170	BHC	183	100	2	195	101	13	212	103	25	214	104	46
171	BHC	0	0	125	0	0	177	0	0	196	0	0	227
172	BHC	599	328	26	635	328	31	675	328	36	675	328	41
173	BHC	0	0	622	48	25	657	93	45	687	298	145	737
174	BHC	0	0	0	0	0	0	0	0	0	101	49	0
175	BHC	126	69	17	141	73	18	150	73	19	156	76	20
176	BHC	411	225	13	457	236	16	506	246	20	529	257	23
177	BHC	0	0	370	0	0	380	0	0	390	0	0	400
178	BHC	0	0	0	0	0	0	0	0	0	97	47	0
179	BHC	0	0	0	0	0	0	0	0	0	0	0	0
180	BHC	0	0	0	0	0	0	0	0	0	0	0	0
181	CL	0	0	0	0	0	0	84	40	25	314	150	86
182	CL	0	0	0	0	0	0	84	40	26	314	150	84
183	CL	0	0	0	0	0	0	90	43	26	305	146	86
184	CL	0	0	0	0	0	0	90	43	26	305	146	85
185	CL	0	0	16	0	0	16	90	43	42	305	146	102
186	CL	2	1	0	2	1	38	242	116	77	869	416	259
187	CL	0	0	0	251	120	0	435	208	10	1,354	648	20
188	CL	0	0	0	272	130	0	470	225	10	1,496	716	20
189	CL	0	0	0	157	75	0	268	128	10	807	386	20
190	CL	0	0	0	184	88	0	314	150	6	959	459	14
191	CL	0	0	0	167	80	0	276	132	6	815	390	14
192	CL	0	0	0	125	60	0	199	95	5	575	275	10
193	CL	0	0	0	224	107	0	380	182	5	1,187	568	9
225	CL	0	0	0	0	0	0	0	0	0	0	0	0
Total		63,391	33,674	28,155	73,567	37,439	31,547	83,644	40,448	35,218	109,359	52,853	45,913

BHC – Bullhead City
MO – Mohave County
CL – Clark County, NV
SB – San Bernardino County, CA

Bullhead City Transportation Plan

Figure B-1 Population Density (2009)

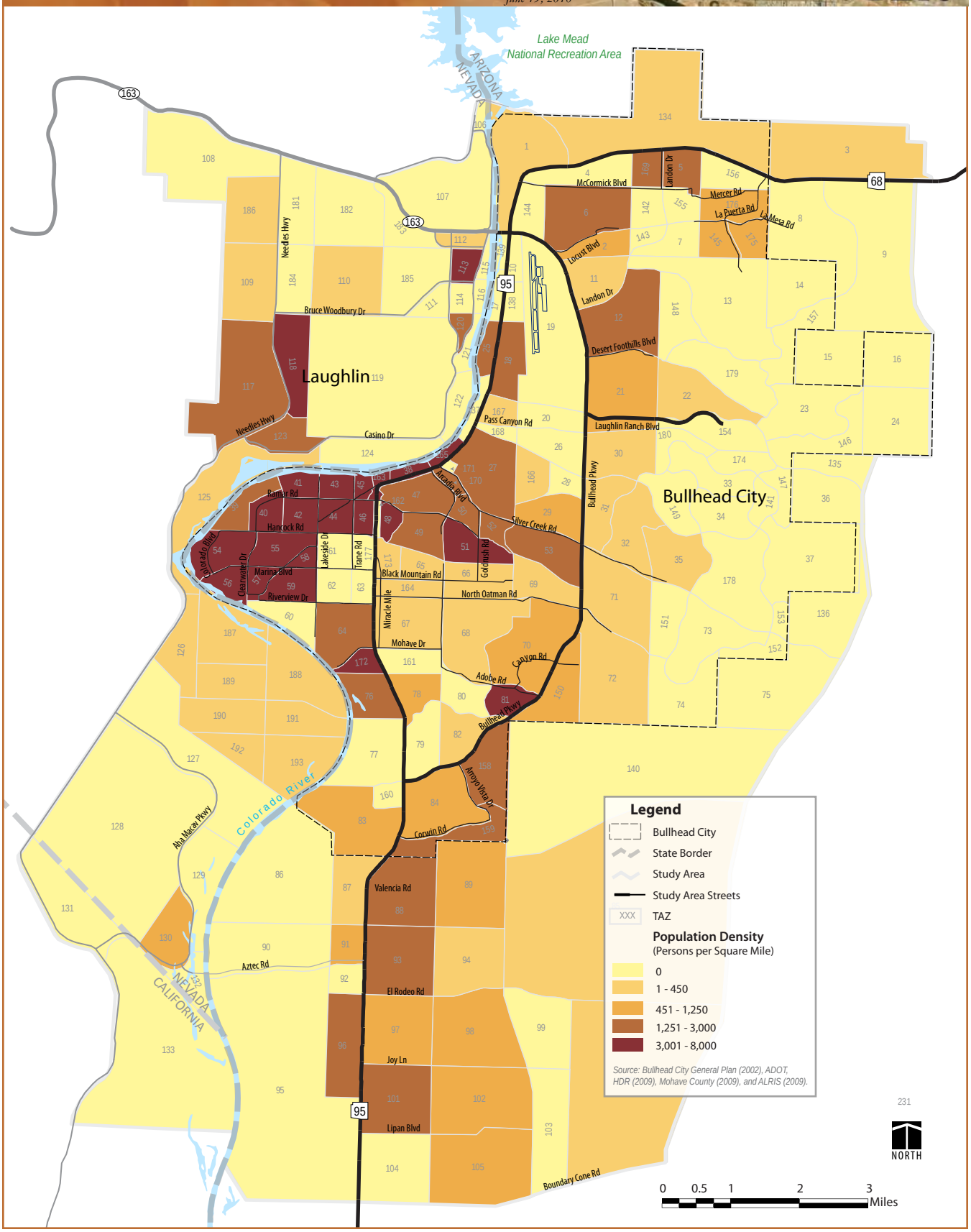
June 19, 2010



Bullhead City Transportation Plan

Figure B-2 Population Density (2015)

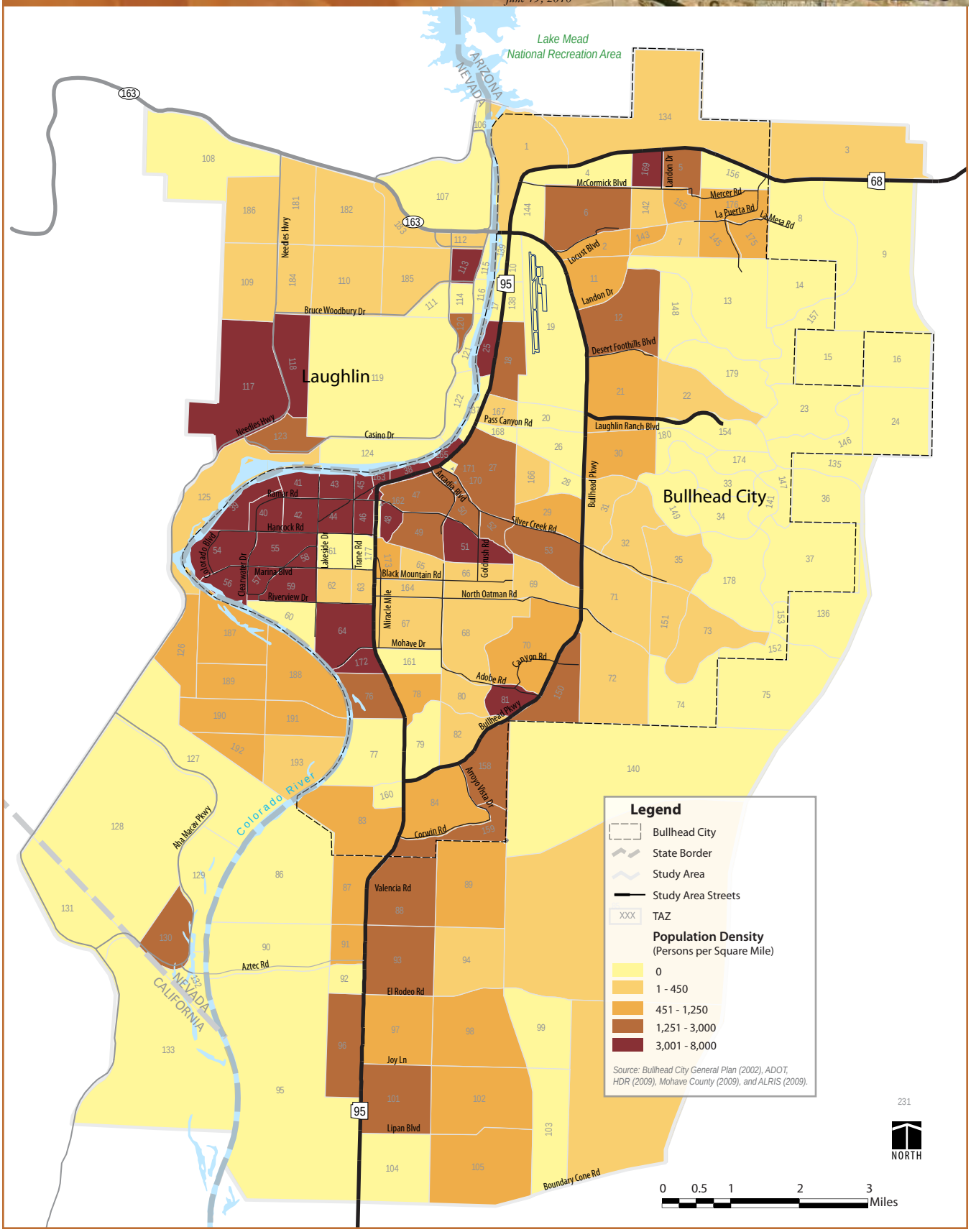
June 19, 2010



Bullhead City Transportation Plan

Figure B-3 Population Density (2020)

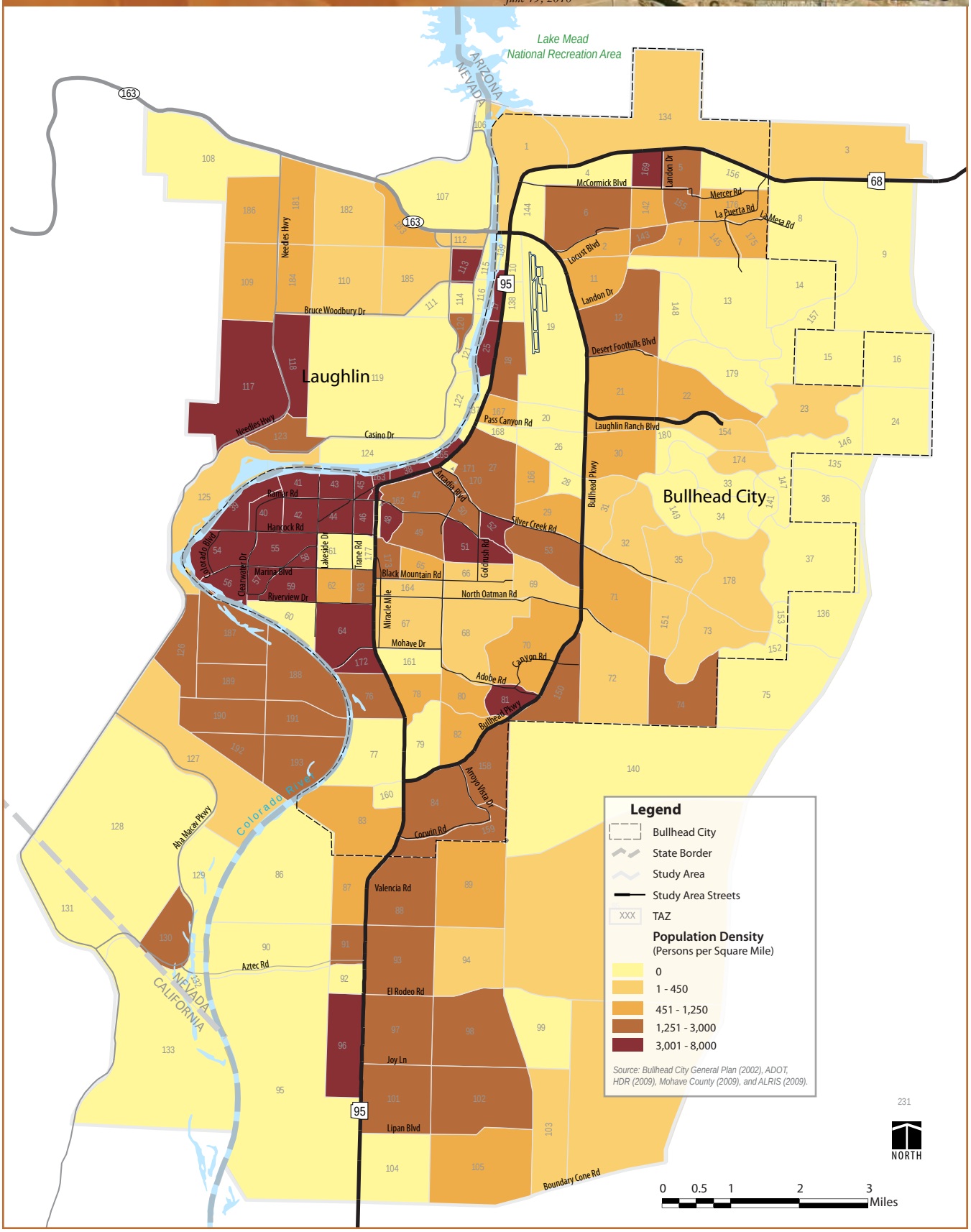
June 19, 2010



Bullhead City Transportation Plan

Figure B-4 Population Density (2030)

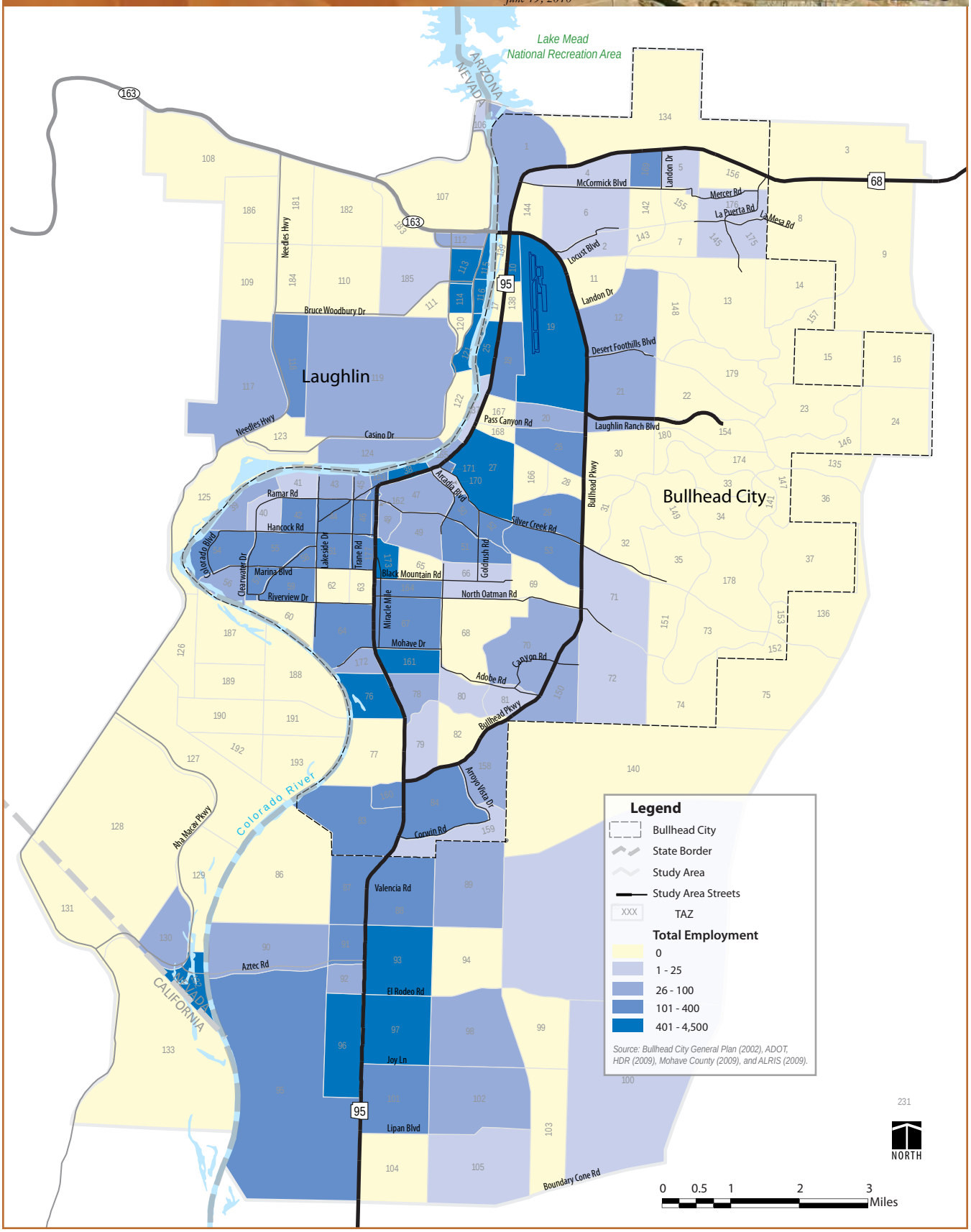
June 19, 2010



Bullhead City Transportation Plan

Figure B-5 Total Employment (2009)

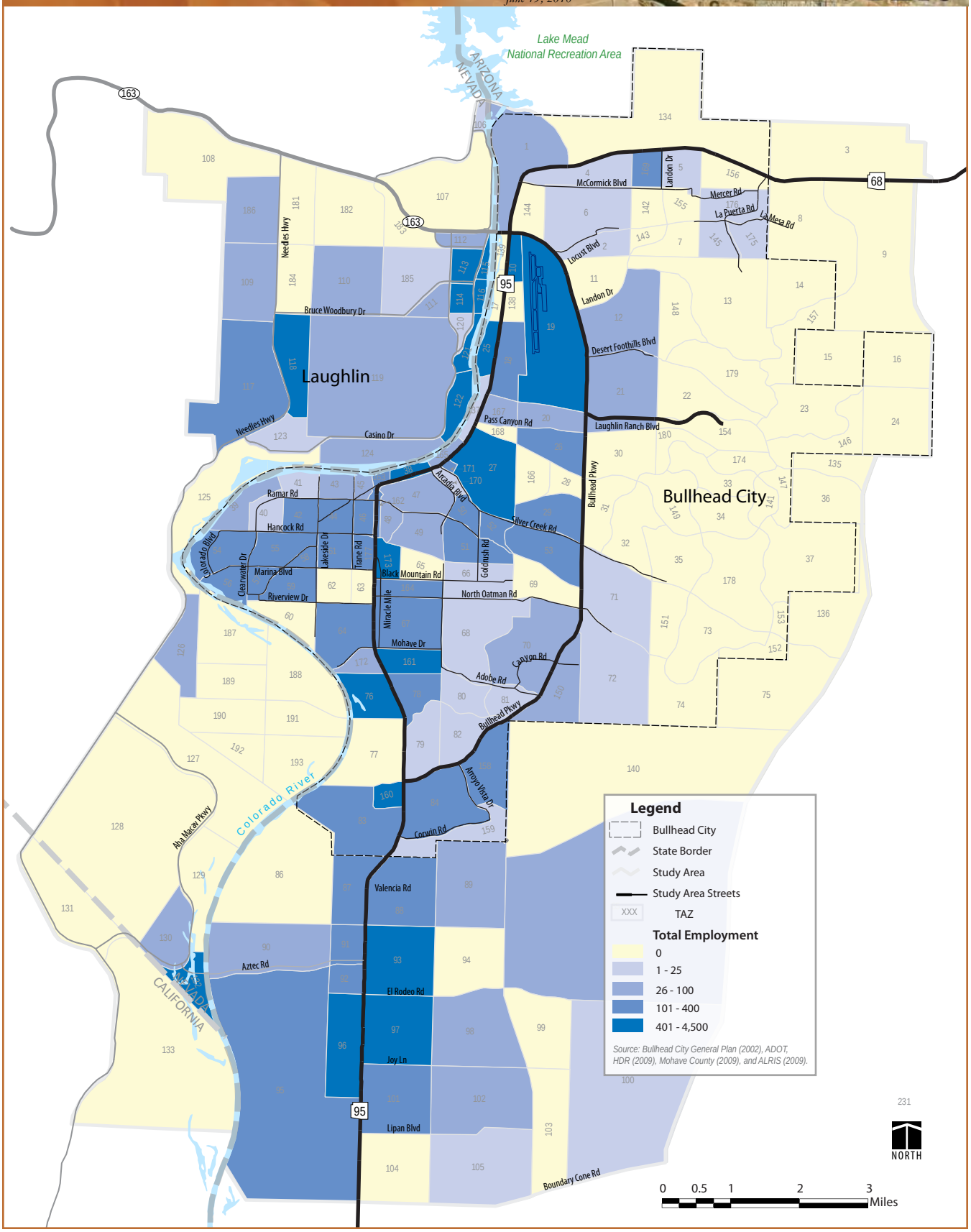
June 19, 2010



Bullhead City Transportation Plan

Figure B-6 Total Employment (2015)

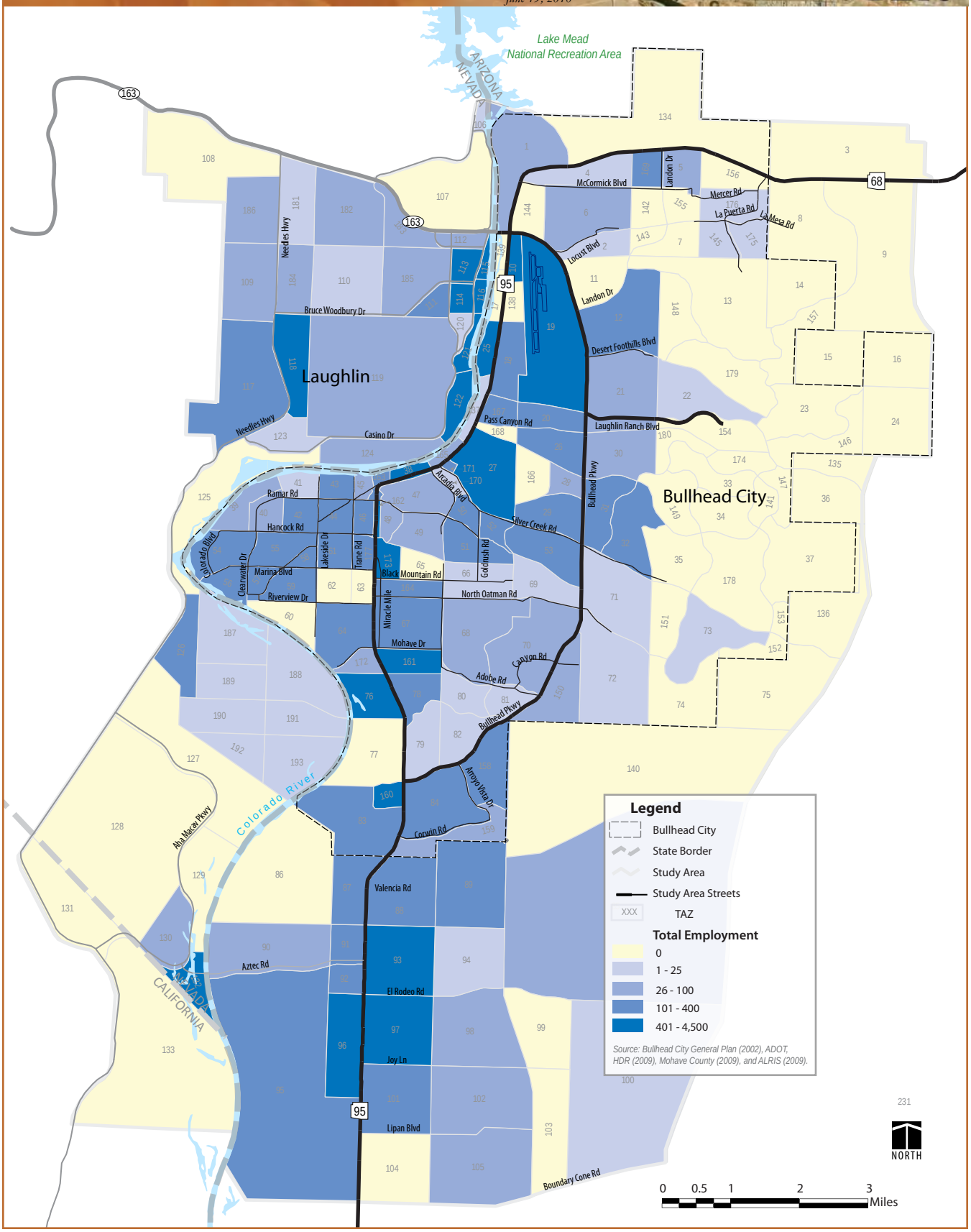
June 19, 2010



Bullhead City Transportation Plan

Figure B-7 Total Employment (2020)

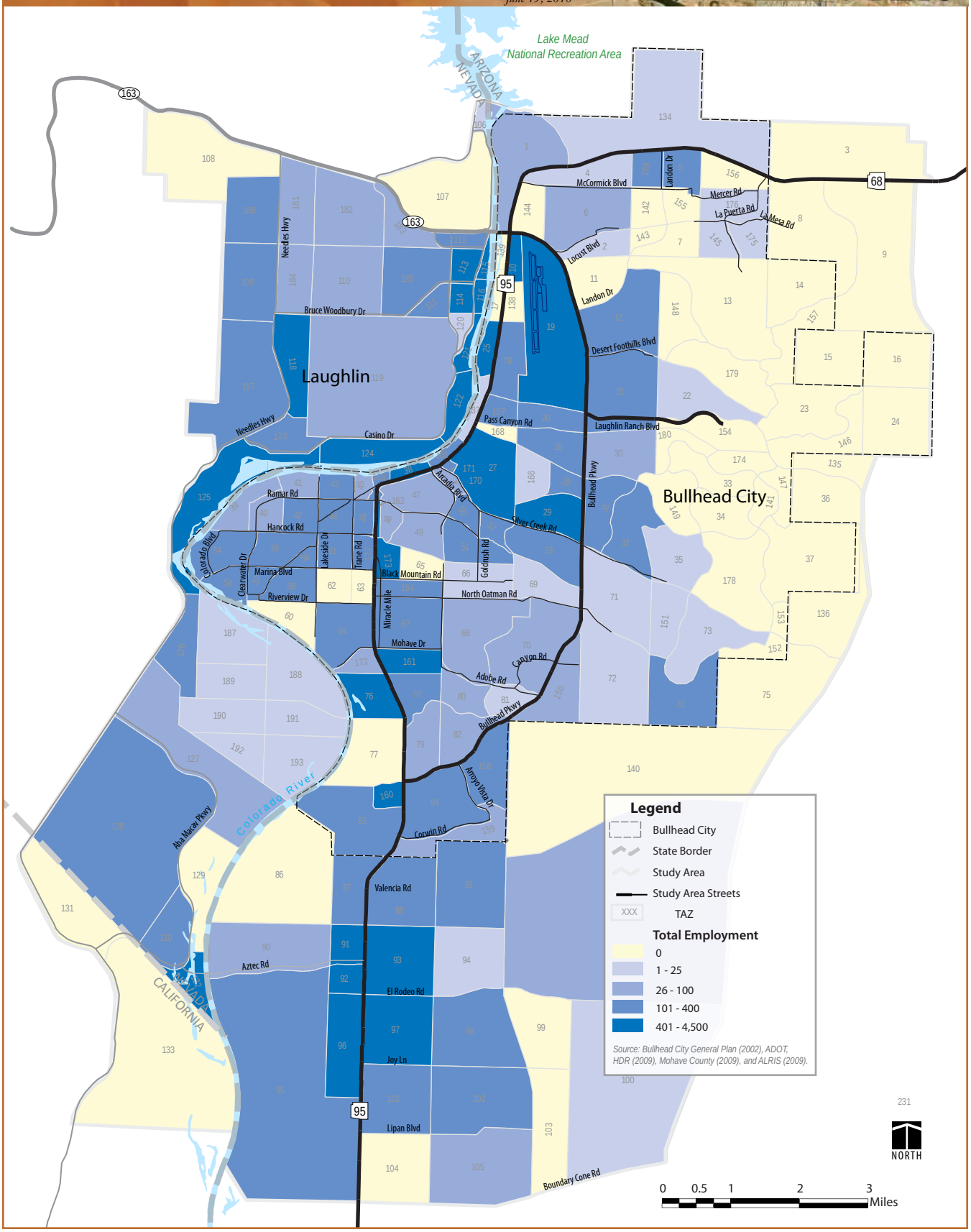
June 19, 2010



Bullhead City Transportation Plan

Figure B-8 Total Employment (2030)

June 19, 2010



Appendix C – Bullhead City Land Administration

State and federal agencies administer approximately one-quarter of the incorporated area of Bullhead City. The major landowners or land administrators in Bullhead City are shown in Table C-1 and further described below.

Table C-1 Public Land Administrators in Bullhead City

Owner	Acres	Percent (%)
Private	28,752	76
State Trust[a]	4,297	11
Bureau of Land Management	3,139	8
Lake Mead National Recreation Area	1,575	4
Arizona Game and Fish	136	<1
Total	37,899	100

Source: Arizona Land Resource Information System (2009)

Note: a. State Trust land includes sovereign lands. Sovereign lands are those lands lying in the beds of navigable waterways, specifically, the Colorado River. They are held in trust by the State in order to provide public access to those waterways for the purposes of fishing, commerce, and navigation.

State Trust Lands. The Arizona State Land Department (ASLD), the largest governmental landowner in Bullhead City, controls approximately 11 percent of the incorporated area of the City. The State Trust lands are held in trust for designated beneficiaries that derive operating funds from these lands. As such they are more similar to lands held in private ownership. Some of this land may remain as open space. However, most of these parcels are available for development through one of their processes. In particular, portions of Sections 30 and 31 are currently leased for parking to support the Laughlin casinos. This land along the Colorado River and directly adjacent to the Bullhead-Laughlin Airport offers a unique opportunity for resort commercial development. This land use is reflected in the Bullhead City General Plan.

The ASLD has also prepared conceptual development plans for three of their larger land holdings in Bullhead City. These plans include 7,260 dwelling units, but the maximum density would permit 9,441 dwelling units. It is unlikely that these plans will be fully realized due to topographic constraints.

Bureau of Land Management. Within Bullhead City the Bureau of Land Management (BLM) manages almost 3,140 acres or approximately 8 percent of the City. The BLM currently leases land to various local agencies, organizations, districts, and governments for recreation and public purposes. The Bullhead City Administrative Complex property is leased from the BLM, as are numerous other civic, government, and park facilities.

Bureau of Reclamation. The Bureau of Reclamation (BOR) acts as the Colorado River water manager, contracting with water users and managing the flow of the Colorado River and water releases from Davis Dam, located at the north end of Bullhead City. The BOR's land management responsibilities are limited to the areas surrounding Davis Dam.

U.S. Army Corps of Engineers. The U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged and/or fill materials into waters of the U.S., which includes the Colorado River, as well as most of the washes that traverse the City. Authorization to conduct construction activities, included, but not limited to, residential, institutional, and commercial development, mining, infrastructure placement (roads and utilities) and recreational development must be obtained from the Corps prior to commencement of the activity. In planning projects, proponents are encouraged to avoid impacts to the waters of the U.S. Any impacts which cannot be avoided must be mitigated. Mitigation can occur on-site or off-site (such as the Colorado River Nature Center) or in lieu fees can be accepted when there is an acceptable land trust sponsor.

Appendix D – Existing Transportation System Conditions

Background

Bullhead City is situated on the flank of the Black Mountains, a great mesa that rises to the east of the Colorado River. The mountains drain west to the Colorado River, creating the large washes carrying flood waters east to west across the City. As a result, there are limited north-south routes through the City.

Previous and Current Studies

ADOT Arizona Rural Transit Needs Study (2008)

The purpose of this study was to develop regionally based needs and solutions for rural transit service in Arizona. Transit demand in rural Arizona is projected to grow from 7.8 million passenger trips in 2007 to 10.5 million in 2016, an increase of 34 percent. Only 18 percent of estimated demand is currently being met and that number is expected to decrease to 13 percent of demand by 2016 if no additional services are introduced. By 2016 Mohave County is expected to have the second highest demand of all Arizona counties (projected at 1.3 million trips).

The study identified steps to address the transit needs of rural Arizona such as adding rural public transit service within cities, towns, and Tribal Reservations to assure service needs of the elderly, persons with disabilities, and general public are met; connect rural and urban communities, which represents a growing Arizona need; increase funding at all levels of government to support these services, with cooperation from private and non-profit sectors; and establish clearly defined roles and responsibilities between the State, councils of governments, local governments, Tribal Governments, and transit operators.

Mohave County General Plan

The Mohave County General Plan (amended 1995) was developed as a guide to manage the natural and built environments within the county. This Plan addresses land use, transportation, and resource conservation issues that arise as development occurs in the County's urbanizing areas as well as rural, unincorporated, and non-tribal areas. This Plan is the primary document used for decisions regarding land use and zoning. This Plan is currently being updated.

ADOT Road Safety Assessment (RSA): Bullhead Parkway (2007)

From 2001 to 2006, there were 14 fatalities on Bullhead Parkway. This report presents a detailed crash analysis along Bullhead Parkway, conducted by ADOT on request by the City. The report analyzed the crash data for a three year period. Site reviews were conducted along Bullhead Parkway and the problems causing the crashes were identified. The report presented observations for improvements and related countermeasures to improve the safety performance along Bullhead Parkway. Some of

the safety issues the report addressed included roadside and edge drop-offs, median, guardrail, signs, markings, and signals.

As noted in the RSA, the City budgeted approximately 2 million over the following four years to safety concerns on the Parkway. Since 2007 there have been no fatalities along Bullhead Parkway.

Colorado Regional Transportation Study (1998)

The Colorado Regional Transportation Study was a cooperative planning effort by the neighboring counties of Mohave, Arizona; San Bernardino, California; and Clark, Nevada and the Fort Mohave Indian Tribe. Key elements of the Plan include widening SR 95, the Needles Highway (Nevada), and adding a number of new bridges over the Colorado River. The Plan also recommended that the jurisdictions consider forming a Joint Powers Agency to implement the Plan.

Bullhead City General Plan and Laughlin Ranch Amendment (2005)

The Bullhead City General Plan Amendment (2005) addressed the future land use of the recently annexed Laughlin Ranch. Laughlin Ranch, a master plan community of over 10,000 acres, involved the annexation of approximately 7,800 acres. Together the Bullhead City General Plan (2002) and Laughlin Ranch Amendment (2005) lay the groundwork for Bullhead City's development. Together these plans envision as many as a quarter-million people at build-out.

Laughlin-Bullhead City Bridge Project

The stated purpose of the Laughlin-Bullhead City Bridge Project is to provide better connectivity between the two communities, better access to and delivery of emergency services, improved service on SR 95, an additional crossing for vehicles, and accommodations for present and future traffic demand.

The project was initiated in 2004. Currently, the involved agencies are working together on the environmental studies needed for the project as required by the National Environmental Policy Act (NEPA). The Riverview Drive location has been identified as the preferred bridge site. However, two additional locations will continue to be studied - Rainbow Drive and Bullhead Parkway (South).

SR 95 Realignment Study: I-40 to SR 68, Location/Design Concept Report and Environmental Impact Statement

A realignment study for SR 95 is currently underway that would ultimately define a new route from Interstate 40 (I-40) to SR 68, between the Black Mountains to the east and the developed portions of the Colorado River corridor to the west. The project is being studied because travelers on the existing SR 95 between I-40 and Bullhead City experience high traffic volumes and long delays. Additionally, SR 95 in its current alignment does not connect to I-40. Although SR 95 was widened in the year 2000, it still functions as a city arterial street with many signalized intersections, numerous driveways, and miles of urban sidewalks.

The new SR 95 is envisioned as an access-controlled highway, realigning SR 95 north of I-40 and continuing to SR 68 just east of Bullhead City. Access along the new highway would ultimately be limited to grade-separated interchange locations, spaced approximately 3 to 5 miles apart along the selected corridor route, facilitating regional traffic flow, reducing traffic congestion, and enhancing safe travel for the traveling public.

ADOT Road Safety Assessment: SR 95 MP 242-250 (2008)

This assessment was conducted by ADOT after this section of SR 95 included five one-mile segments of the State's Top Five Percent List of high crash locations in 2007. This segment of SR 95 has also been identified in the State's Pedestrian Safety Action Plan as a priority location for pedestrian crashes. The report highlights that 5 of 9 fatal crashes were pedestrian crashes (56 percent), a high percentage when compared with the percentage of pedestrian crashes statewide, which is 13 percent. This report presents a detailed crash analysis along SR 95 from MP 242 to MP 250. The report documents the site review observations. Safety concerns identified included pedestrian activity, speed limits, geometrics, driveway openings, pavement markings, signal timing, etc. The report concluded with recommendations for the safety improvements in the study area.

A request for Highway Safety Improvement Program funds has been made by ADOT's State Engineer to address some of the pedestrian issues identified in the Assessment. Specific improvements include a street lighting evaluation; installation of an In-Road Warning Light System with high visibility crosswalk(s) and LED pedestrian crossing signs; and installation of advanced warning of pedestrian crossing areas with oversized signs. These improvements are expected to reduce the number and severity of pedestrian crashes.

Vanderslice Road Alignment/Design Concept Report and Environmental Studies (2008)

This study identified various alternatives for the Vanderslice Road corridor that could serve a alternate, parallel route to SR 95. The preferred alignment, about 8.3 miles long, starts at approximately one mile east of Arroyo Vista Drive on Bullhead Parkway connecting Martindale Drive to the south. The report also identified facility requirements needed to feasibly initiate a new north/south corridor that would improve traffic mobility, traffic flow, and safety.

Multimodal Freight Analysis Study (2009)

This is an ongoing statewide multimodal freight analysis study conducted in support of long-range transportation planning efforts at ADOT. This report is expected to be a comprehensive analysis of Arizona's multimodal freight network, and the current and future demands on that network. The final report will highlight the key findings of technical analyses, framework policies, strategies, and performance indicators for advancing freight planning within ADOT.

ADOT Top Five Percent Report

As part of the SAFTEA-LU Highway Safety Improvement Program, states are required to submit an annual report describing not less than 5 percent of their highway locations exhibiting the most severe safety needs (Top Five Percent Report). According to ADOT's 2007 Top Five Percent Report, as of August 2006 there are six locations within Bullhead City that were high crash locations. The report identifies the safety issues and recommendations at these locations.

According to ADOT's 2008 Top Five Percent Report, two locations within Bullhead City were identified as high crash locations, one being Bullhead Parkway and SR 95 at MP 243.0. The report identifies the safety issues and potential remedies at these locations.

ADOT Western Transportation Planning Framework Study (anticipated spring 2009)

The Arizona State Transportation Board has allocated resources for a statewide collaborative process called "Building a Quality Arizona, or bqAZ" to quantify transportation needs statewide and identify the full range of options to address those needs.

The development of a Statewide Transportation Planning Framework includes transportation alternatives and integrates them with land use and economic planning and development. As part of this effort, ADOT has implemented Regional Framework Studies that will feed into the Statewide Transportation Planning Framework. The long-range focus of the studies is unique and will identify the State's needs in the 2030-2050 timeframe.

The Western Arizona Framework Study, which includes Bullhead City, is one of four framework studies currently underway. Framework study teams will assess transportation needs region by region, and based on the results, transportation options will be recommended. The Regional Framework Study results will feed into the multimodal Statewide Transportation Planning Framework.

US 93: Kingman to State Line Traffic Study (2004)

This study, conducted by HDR Engineering, Inc. for ADOT, investigates the change in traffic due to the truck travel restrictions following the terrorist activities of 2001 and analyzes traffic operating conditions in the future years 2008, 2018, and 2028 along the two-lane section of US 93 (from MP 17.0 to MP 2.0). According to the report, the study segment is expected to perform at a poor level of service (LOS E and F) in the future years if it continues to be a two-lane section.

Housing Needs Assessment and Strategy: Bullhead City, Arizona

The Housing Study rose out of a concern of Bullhead City that recent changes in the housing market have made finding quality, affordable housing difficult for the average household, and that this is having a negative impact on the ability of the City to attract

and retain critical support personnel. Bullhead City has seen a large increase in the price of homes in the last few years.

The Study recommended strategies for addressing the workforce housing affordability issue. The study cited the need for additional multi-family units and encouraged greater infill development. The Study cautioned against impact fees, as the surrounding County land does not impose such fees.

Colorado River Heritage Greenway Trail Master Plan (October 2003)

The Colorado River Heritage Greenway Master Plan is a proposed 25-mile multi-use trail that starts at Davis Dam and travels through Bullhead City to the Colorado River Nature Center, located in the southwestern portion of Bullhead City.

The vision calls for expanding the greenway into a regional context by connecting the multi-use trail to the River Walk in Laughlin, Nevada, and continuing it onto Lake Mead National Recreation Area and the Mojave Reservation. The proposed Colorado River Heritage Greenway Trail will follow the riverfront where ever possible, connecting parks and habitat restoration sites.

The Trail will be implemented through the Colorado River Heritage Greenway Project, a community-based effort to establish a river and land trail system for the residents and visitors of Bullhead City. The trails will link canoeists, kayakers, boaters, walkers, and bicyclists to the region's family of parks including Lake Mead National Recreation Area, Davis Camp, Community Park, Rotary Park, Ken Fovargue Park and the Colorado River Nature Center.

Bullhead Area Transit System Five Year Transit Plan (January 2009)

The Five Year Plan, prepared by ADOT for the City, is intended to assist recipients of Section 5311 funding with a plan to address current and future needs of the Community. The Plan has seven sections: Community Goals for Transit; Community Profile; a Transit Demand Estimate; Transit Service Inventory; Coordination Strategy; Service Analysis/Alternatives; and a Five-Year Implementation Plan.

RiverCenter: Section 12 Strategic Master Plan (September 2008)

RiverCenter consists of land along both sides of SR 95 south of First Street (Section 12) on land owned by the Bureau of Land Management (BLM). Most of the land is leased to the City, “with the west-side waterfront land reserved for public recreational uses, and the east-side uplands available for an as-yet-undetermined variety of uses” (RiverCenter Strategic Master Plan, 2008). The City would like the “RiverCenter to become a hub of activity for City residents,” and “a civic hallmark showing off the city’s best qualities.”

Functional Classification

Functional classification is the grouping of highways, roads, and streets into classes with respect to their service and purposes. It also serves as a basis for establishing speed limits, parking restrictions, design standards, and access controls. Federal Highway

Administration criteria have been used to determine the functional classification of the existing roadways. The Bullhead City Circulation Map was adopted in 2002 as part of the Bullhead City General Plan (Bullhead City, 2002). The Circulation Map has been amended by the City since that time and Figure D–1 shows the existing roadway functional classification for the study area roadways.

The Circulation Map categorizes the roadway network into the following functional classes:

- Major Arterial
- Minor Arterial
- Collector
- Local Road

Existing Roadway Characteristics and Conditions

This section presents the key physical and operating characteristics of the major roadway network within the study area today. The major roadways are summarized below.

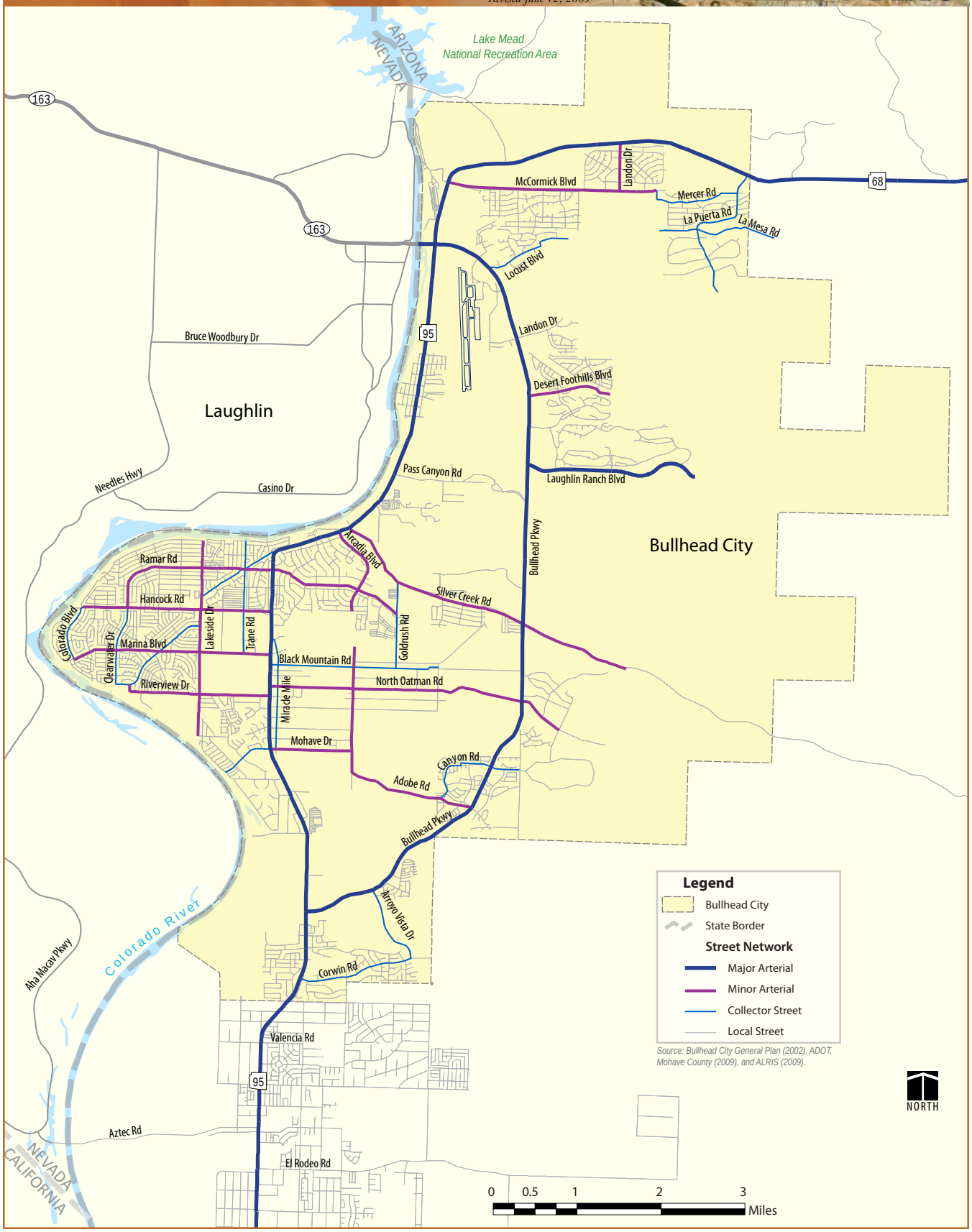
Arizona State Route (SR) 95

State Route 95 is a north-south state highway along the western edge of Arizona. The road begins at the Colorado River Bridge across from Needles, California, and extends north to Bullhead City, terminating at its junction with SR 68 north of the City. The posted speed limit on SR 95 is 45 miles per hour (MPH) from south of the City limits to SR 68. Within the City there are 21 traffic signals along SR 95. SR 95 through Bullhead City is a five-lane major arterial having two lanes in each direction with a center two way left-turn lane. The 2009 Average Daily Traffic (ADT) on SR 95 ranges from 27,200 at south of Bullhead Parkway (North) to 37,500 north of Corwin Road. Trucks can comprise as much as 17 percent of the traffic along SR 95 north of Ramar Road (HDR, 2009). Within the City limits, numerous businesses and residential developments have direct access to SR 95.

Bullhead City Transportation Plan

Figure D-1 Roadway Functional Class

Revised June 12, 2009



Arizona State Route 68

Arizona State Route 68 is located on the northern edge of the City. It runs between Bullhead City and Kingman, over the Black Mountains immediately east of the City, and through the desert landscape of Golden Valley west of Kingman. It is a four-lane roadway, classified as a major arterial, with a posted speed limit of 45 MPH within the City, increasing to 65 MPH east of Landon Drive. South of McCormick Drive, the ADT is approximately 18,100.

Bullhead Parkway

Bullhead Parkway is a four-lane roadway running north and south along the east side of Bullhead City. It intersects SR 95 on the south and SR 95 and SR 68 on the north at the bridge to Laughlin. The speed limit on Bullhead Parkway is 50 MPH and the lanes are 12-feet wide. The roadway has an eight-foot outside paved shoulder with rumble strips and a center median with four-foot-paved shoulders on each side with rumble strips. ADT values range from 9,400 at the south end to 11,700 south of Silver Creek Road.

Silver Creek Road

Silver Creek Road is an east-west minor arterial connecting SR 95 with Bullhead Parkway. It is one of three roads connecting east to west between SR 95 and Bullhead Parkway; the others being North Oatman Road and Mohave Drive to Adobe Road. The posted speed limit is 35 MPH between SR 95 and Goldrush Road, and increases to 40 MPH further east. Silver Creek Road has two through lanes in each direction. The ADT ranges from 6,800 at Bullhead Parkway to 8,000 east of Goldrush Road.

Ramar Road

Ramar Road is an east-west two-lane roadway between the Colorado River at the west and Goldrush Road at the east. Ramar Road is classified as a minor arterial with a posted speed limit of 25 MPH. Daily traffic counts on Ramar Road reported an ADT of 7,700 and 4,800 west and east of SR 95, respectively.

Hancock Road

Hancock Road is a minor arterial. The west terminus is at Colorado Boulevard. It is two lanes in each direction with an additional center turn lane. The speed limit on Hancock Road is 35 MPH.

Marina Boulevard

Marina Boulevard is a minor arterial having two lanes in each direction with center left-turn lane between SR 95 and Lakeside Drive, and then narrows down to one lane in each direction further west until Colorado Boulevard. The posted speed limit ranges between 25 MPH (west of Lakeside Drive) and 35 MPH (from Lakeside Drive to SR 95).

Riverview Drive

Riverview Drive has one lane in each direction, with speed limits of 30 MPH (west of Lakeside Drive) and 35 MPH (SR 95 to Lakeside Drive).

McCormick Boulevard

McCormick Boulevard is an east-west minor arterial having one lane in each direction. The posted speed limit is 35 MPH between SR 68 and Landon Drive. McCormick Boulevard does not continue west of SR 68. The roadway is signalized at SR 68.

Lakeside Drive

Lakeside Drive is a north-south minor arterial running one mile to the west of SR 95. Lakeside Drive has two through lanes in each direction, between Riverview Drive and Hancock Road, with one lane in each direction south of Riverview Drive and north of Hancock Road. The posted speed limit is 25 MPH.

North Oatman Road

North Oatman Road is one of three roads connecting east to west between SR 95 and Bullhead Parkway. It is a two-lane road with a 40 MPH speed limit. Average daily traffic along North Oatman Road is reported under 3,000 ADT (HDR, 2009).

Arcadia Boulevard

Arcadia Boulevard is a two-lane minor arterial off SR 95 just south of Silver Creek Road. It is a discontinuous route, intersecting a major wash (Montana Wash) before connecting with Adobe Road to the south. The section south of the wash, referred to as Acacia Way, was significantly improved in 2007 as a part of the East-West Corridor Project that improved North Oatman Road. The roadway is one lane in each direction with a 25 MPH speed limit north of North Oatman Road and 40 MPH south where it turns into Adobe Road and continues on to Bullhead Parkway. East of SR 95, ADT was reported under 1,000 vehicles.

Roadway Characteristics

Existing roadway characteristics information was collected on the existing roadway system through site visits. All study roadways are paved under existing conditions. Roadway characteristics data includes number of lanes, signalized intersection control, speed limits, and pavement and bridge conditions, which are briefly described below.

Roadway Lanes, Intersection Control and Speed Limits

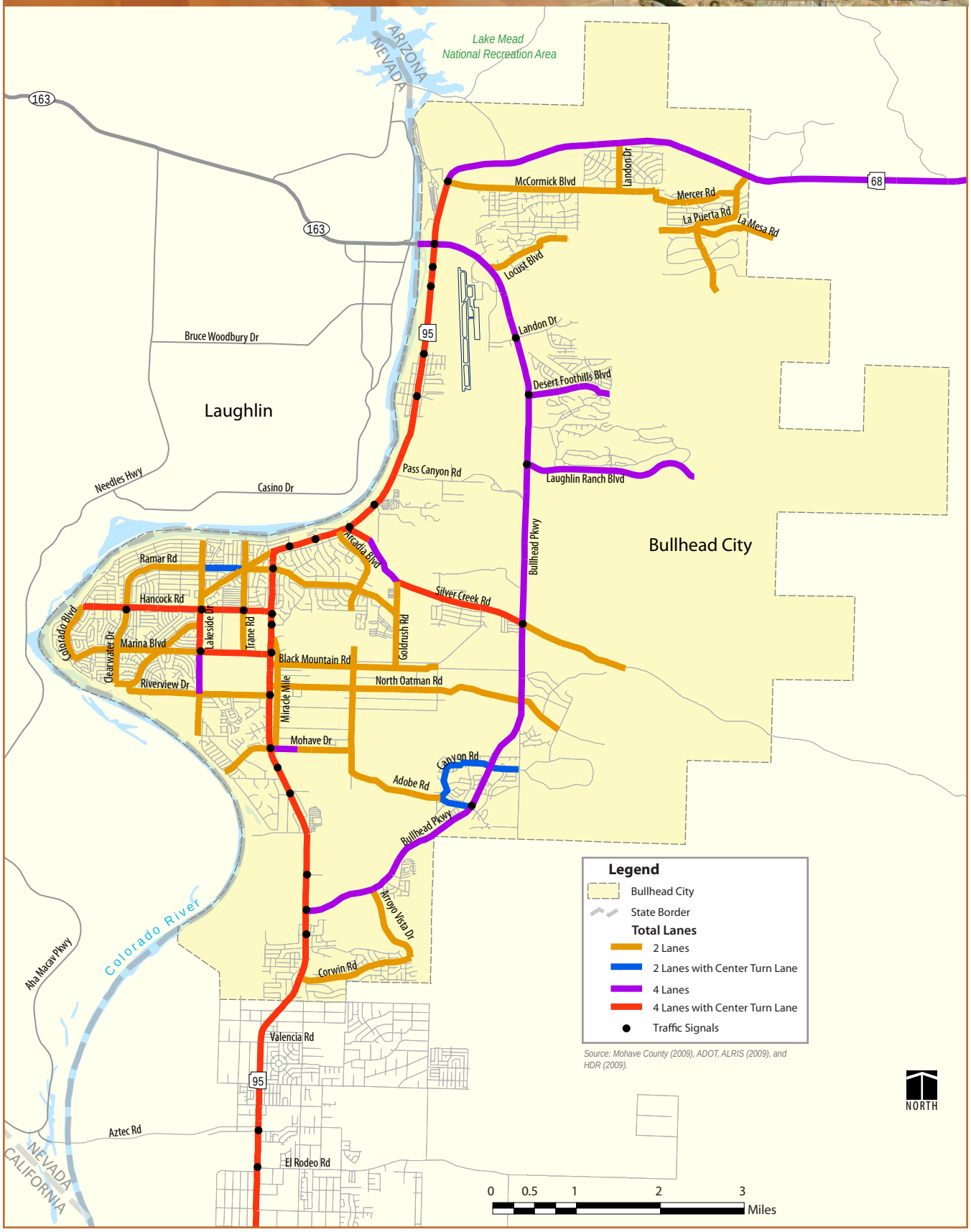
The number of travel lanes is illustrated in Figure D–2. Figure D–2 also documents the signalized intersections within the City. Thirty signalized intersections were identified of which 21 are along SR 95. Many of the intersections within the City are side-street stop controlled with several all-way stop controlled.

Figure D–3 shows the posted speed limits collected through field review. The posted speed along SR 95 is 45 MPH. Bullhead Parkway has 50 MPH posted speed limit. Posted speed limits on local roadways are typically 25 MPH. Restricted speed limits through school areas were noted, but are not reported here.

Bullhead City Transportation Plan

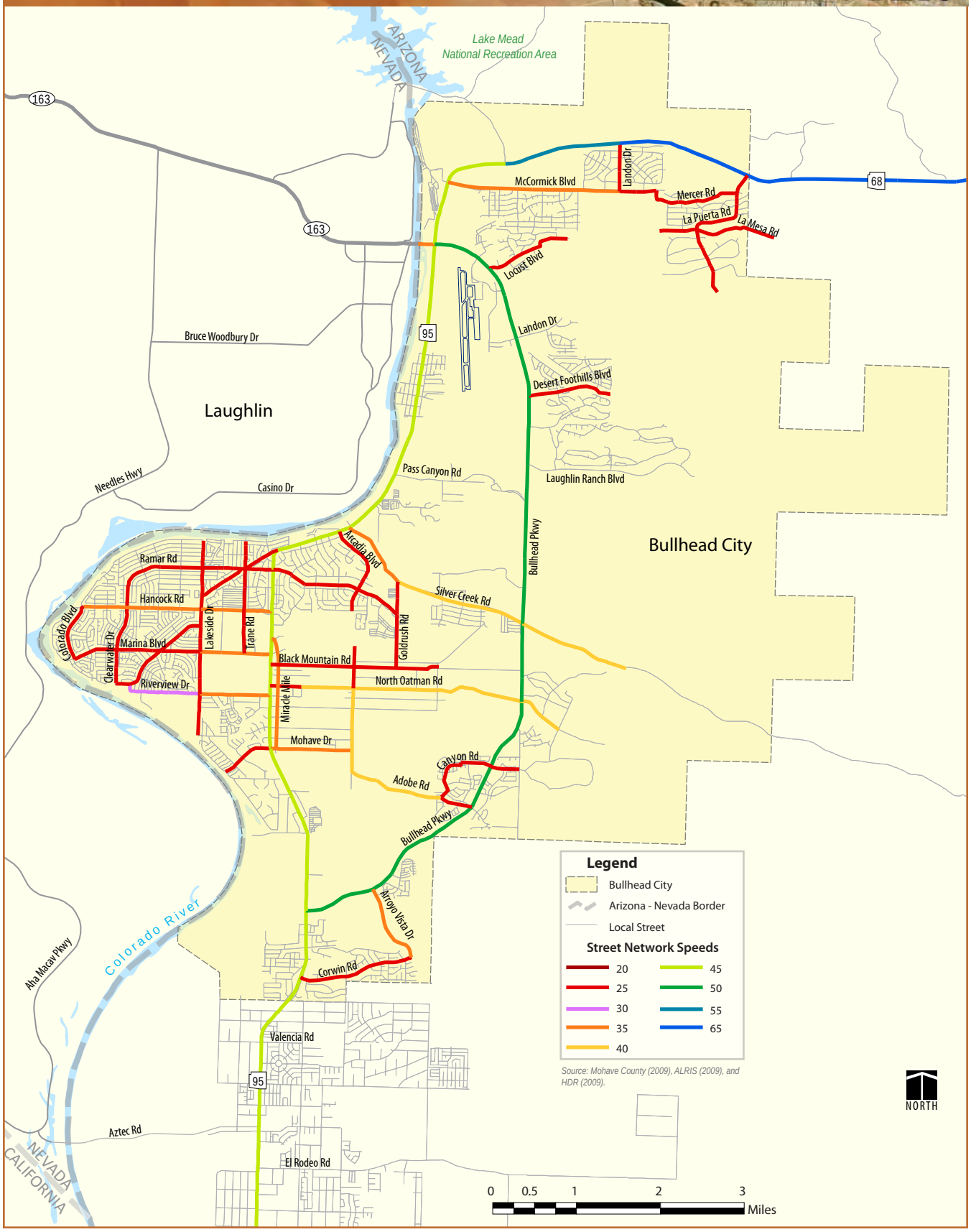
Figure D-2 Roadway Lanes and Signalized Intersections

Revised June 7, 2009



Bullhead City Transportation Plan

Figure D-3 Posted Speed Limits



Revised June 12, 2009

Existing Traffic Conditions

This section documents existing traffic conditions related to the City's existing daily and peak hourly traffic counts, as well as intersection and roadway traffic operations. This information will be used for conducting existing roadway traffic operational analysis, provide traffic data for development of the travel demand forecasting model, and in evaluating the performance of the proposed roadway and transit improvements.

Average Daily Traffic

Average daily traffic (ADT) data was collected at 36 locations along major corridors throughout the City. The counts were collected the week of March 10, 2009 during mid-week work days. March is one of the highest travel months of the year in the City due to moderate temperatures and winter visitors. Traffic volumes are typically at the peak in March. Therefore, no seasonal traffic factor was used to adjust the daily traffic volume. The traffic flow map for year 2009 with prevailing ADT volumes along major corridors is shown in Figure D-5.

Vehicle Classification Counts

Daily vehicle classification counts were conducted at seven locations to determine the truck traffic along the major roadway on March 10 through 11, 2009. Counts indicated that approximately 17 percent of the traffic on SR 95 north of Ramar Road is truck traffic. SR 68, east of Bullhead Parkway was also reported to have 17 percent trucks. A higher percentage of multi-unit trucks (11 percent of total traffic) were observed at this location.

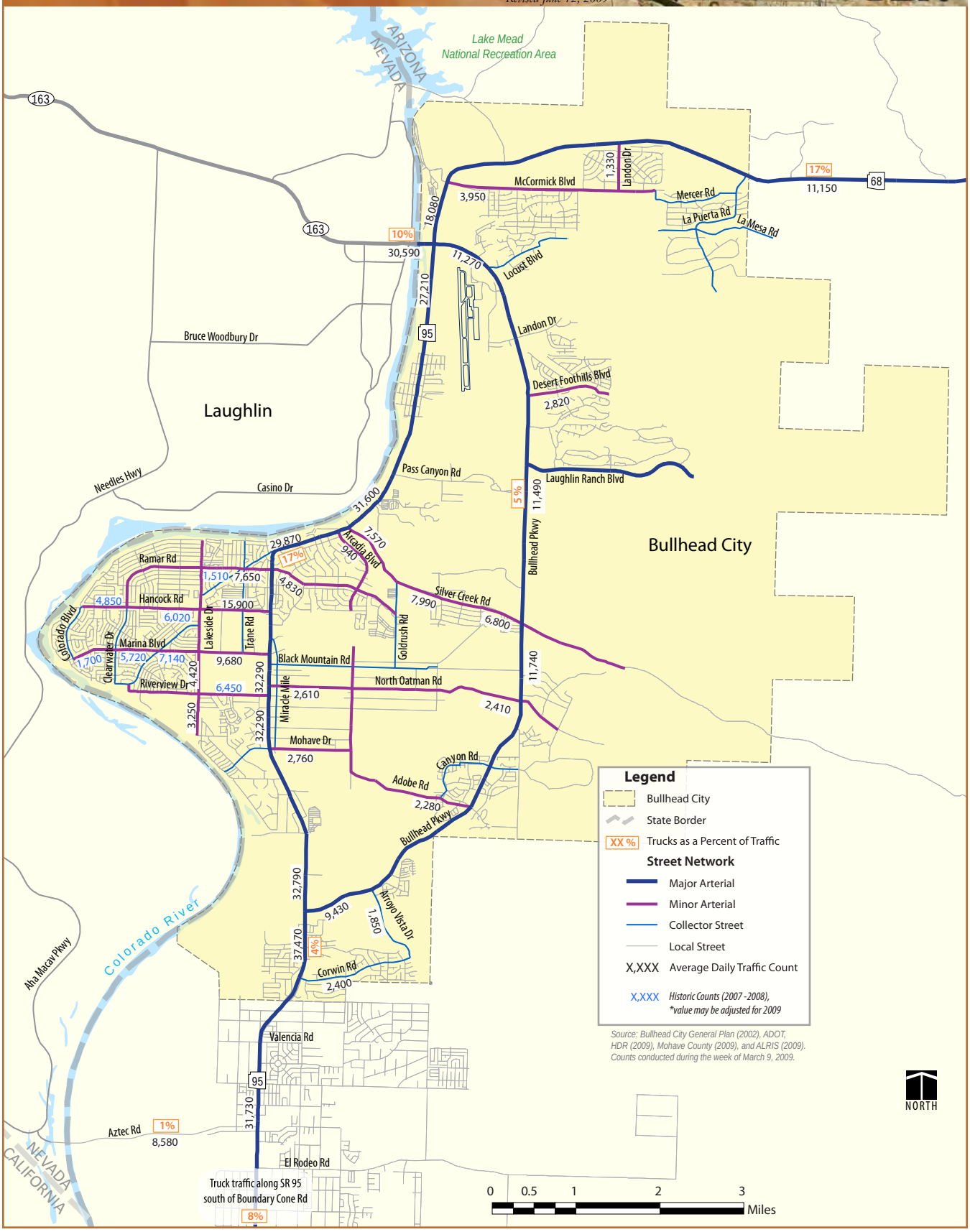
Peak Hour Intersection Turning Traffic Movements

Four key intersections were selected along SR 95 and Bullhead Parkway for the peak hour turning movement counts. Morning peak (6:00 to 9:00 AM) and afternoon peak (3:00 to 6:00 PM) intersection turning movement counts were conducted at these intersections during the mid-week workday on Wednesday, March 11, 2009. Existing peak hourly turn traffic movements and lane configurations at all approaches of the turning movement count locations are shown in Figure D–5.

Bullhead City Transportation Plan

Figure D-4 Average Daily Traffic Volumes

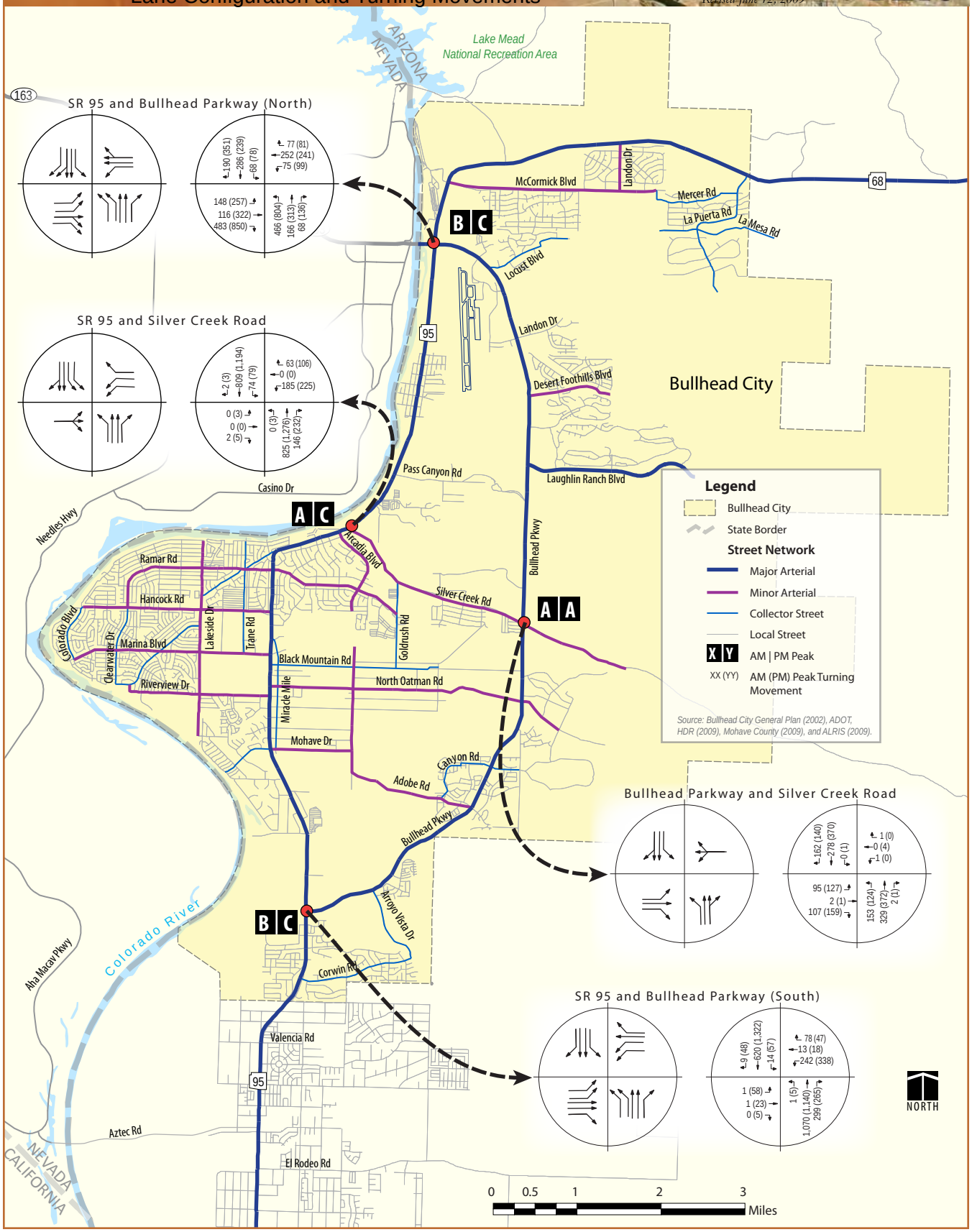
Revised June 12, 2009



Bullhead City Transportation Plan

Figure D-5 Existing Level of Service, Major Intersection Lane Configuration and Turning Movements

Revised June 12, 2009



Existing Level of Service

The Level of Service (LOS) grading system qualitatively characterizes traffic conditions associated with varying levels of traffic. LOS ranges from LOS A – representing free-flow traffic conditions with little or no delay experienced by motorists, to LOS F - describing congested conditions where traffic flows exceed design capacity, resulting in long queues and delays. LOS A, B, and C are generally considered to be satisfactory service levels, while the influence of congestion becomes more noticeable at LOS D. LOS E is undesirable and is considered by most agencies to be the limit of acceptable delay, and LOS F conditions are considered to be unacceptable to most drivers. Most jurisdictions strive to attain a LOS of at least D or better on all roadways and signalized intersections in urban areas, and LOS C is targeted for rural conditions.

LOS Analysis Methodology

Transportation system performance is commonly measured using planning level capacity analysis techniques using volume to capacity ratio (v/c) for roadway segments. Operational level capacity analysis is more detailed and requires extensive data collection.

Four key study intersections were analyzed using the Transportation Research Board's Highway Capacity Manual (2000) methodology as required by ADOT. Table D-1 presents the LOS criteria for signalized intersections.

Table D-1 Signalized Intersection LOS Definitions

Level of Service	Description	Average Control Delay (sec/vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	< 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10 – 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20 – 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35 – 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55 – 80
F	Operations with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80

Source: Highway Capacity Manual, Transportation Research Board, 2000

Roadway LOS was also performed on segments based on the daily traffic flows, roadway capacity area type, and functional classification. Typical roadway capacities in urban and rural areas based on roadway classification are shown in Table D-2.

Table D-2 Daily Roadway Capacity

Roadway Classification	Daily Capacity Per Lane
Major Arterial	10,800
Minor Arterial	8,400
Collector	7,750

Source: HDR Engineering, Inc. (April 2009)

The stratification of roadway LOS using volume over capacity (v/c) ratios was derived using the threshold values presented in Table D-3.

Table D-3 Roadway Level of Service

Roadway LOS	Volume Over Capacity (V/C) Ratio
LOS A – LOS C (Under Capacity)	< 0.80
LOS D (Near Capacity)	0.81 – 0.90
LOS E (At Capacity)	0.91 – 1.00
LOS F (Over Capacity)	> 1.00

Source: Transportation Research Board, Highway Capacity Manual, 2000

LOS Analysis Results

SYNCHRO models were developed for weekday AM and PM peak scenarios for the four study intersections where data was collected. SYNCHRO is a micro-simulation program based on the methods described in the Highway Capacity Manual to evaluate traffic operations on roadway systems. Peak hour traffic volumes and peak hour factors, lane configurations, traffic control parameters, and free flow speeds were coded into SYNCHRO models. Intersection lane configurations were obtained during the site visit.

Intersection turning movement counts were conducted at the four locations and level of service analyses were conducted. Intersection LOS analysis results under the existing conditions show the four key study intersections operate at LOS C or better.

Roadway segment LOS was calculated based on the daily roadway capacity and volume-over-capacity (V/C) ratio shown in Table D-2 and Table D-3. Analyses showed that the segments of all study roadways where traffic counts were conducted operate at an acceptable LOS. Figure D–5 shows the existing level of service at traffic counted intersections for AM and PM peak hours as well as roadway segment LOS.

Bridge Sufficiency Rating

Bridge information along the study roadway networks was obtained from the ADOT Bridge Management Division. Bridges are assigned a Bridge Sufficiency Rating (BSR) based on the structural inventory and appraisal, maintained and administered by ADOT. The sufficiency rating is a percentage indicative of bridge adequacy to remain in service. Ratings of 50.0 or less are eligible for either replacement or rehabilitation. Ratings between 50.0 and 80.0 are eligible for rehabilitation. Replacement of bridges rated higher than 50.0 may be considered if life-cycle analysis reports cost-effectiveness over rehabilitation and has FHWA concurrence.

Bullhead City is currently mapping the location of their bridge structures in the City's GIS. Table D-4 shows the Bridge Sufficiency Ratings for Bullhead City's bridge structures.

Table D-4 Bridge Sufficiency Ratings

Route	Milepost	Structure Type	Sufficiency Rating
Bullhead City	n/a	Structural Plate Pipe Arch	82.7
Bullhead City	n/a	Laughlin Ranch Covered Br	86.3
Bullhead City	n/a	RCB	96.8
Bullhead City	n/a	Concrete Arch Culvert	99.6
Bullhead City	n/a	Structural Plate Pipe Arch	82.7
Bullhead City	n/a	Structural Plate Pipe Arch	82.6
Bullhead City	n/a	Structural Plate Pipe Arch	99.8
Bullhead City	n/a	Sun Ridge 1 Drn Chnl RCB	99.9
Bullhead City	n/a	Concrete Arch Culvert	99.6
Bullhead City	n/a	N Fork Covered Bridge1	93.0
Bullhead City	n/a	SPPA	81.3
Bullhead City	n/a	Drn Chnl Steel Culvert	89.9
Bullhead City	n/a	Drain Channel RCB	99.9
Bullhead City	n/a	N Fork Drn Chnl RCB1	94.3
Bullhead City	n/a	Desert Shores Drn Chnl RCB	84.8
SR 68	1.12	Arabian Wash Bridge	80.0
SR 95	237.66	RCB Flood Control Channel	71.3
SR 95	240.58	RCB	79.5
SR 95	240.6	RCB	79.5
SR 95	241	RCB	79.5
SR 95	241.05	RCB	79.5
SR 95	241.46	RCB	79.5
SR 95	242.76	RCB	79.5

Route	Milepost	Structure Type	Sufficiency Rating
SR 95	242.78	RCB	79.5
SR 95	242.9	RCB	99.9
SR 95	245.07	Montana Wash RCB	65.0
SR 95	246.3	Silver Creek RCB	65.0
SR 95	246.75	Dump Wash RCB	65.0
SR 95	247.1	Secret Pass Wash RCB	65.0
SR 95	247.37	Boat Ramp Wash RCB	65.0
SR 95	249.73	Highland Wash RCB # 1	65.0
SR 95	249.93	Highland Wash RCB # 2	70.0

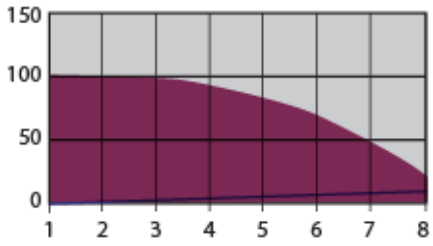
Source: ADOT Bridge Management Division, April 2009
Note: 1 These structures have not yet been accepted by Bullhead City.
RCB - Reinforced Concrete Box
SPAA – Structural Plate Pipe Arch

As shown in Table D-4, none of the bridges has a sufficiency rating less than 50.0; therefore, they are not eligible for either replacement or rehabilitation. However, all bridges on SR 95, except the one located at milepost 242.90, may be eligible for rehabilitation.

Pavement conditions

Maintaining and operating pavements on a large roadway system typically involves complex decisions about how and when to resurface or apply other treatments to keep the streets performing and operating costs at a reasonable level. A pavement management plan is outside the purview of this Plan, but because pavement likely represents the largest capital investment in Bullhead City's street system, a brief summary is presented here.

Pavement tends to deteriorate very slowly during the first few years after placement and very rapidly when they are aged. Even though pavement designs and materials vary widely, the deterioration of pavement follows a standard curve. This curve, Pavement Condition Index (PCI) vs. age (years 1-8), is shown in the graph at right.



ADOT performs periodic pavement inspections for State facilities. At the time of the most recent inspections (June and September 2008), most of the pavement conditions for SR 95 and SR 68 were rated good to very good, with the exception of a segment of SR 95 (milepost 245 – 246) which received a fair rating. This information may be found in Appendix E.

In 2007, Bullhead City completed a comprehensive pavement analysis. The following summarizes the results of this study; the report is available with the Bullhead City Public Works Department.

Bullhead City's street network consists of approximately 233 centerline miles of pavement. The overall condition of the pavement is 65 as measured by the PCI, with 100 being considered very good. As a rule of thumb, roadways with a PCI rating in the poor and unacceptable category may be considered in the City's backlog of "immediate work to do" category. These are the roadways in need of rehabilitation efforts, requiring thicker depths or reconstruction. Bullhead City's current reconstruction backlog is at just over 13 percent. Generally, a backlog of 10 percent to 20 percent of the overall network is considered acceptable and manageable. Based on the backlogs, available monies may be spent in the following order:

- Critical roadways that require a thin overlay are rehabilitated first. This is to prevent then from becoming reconstruction candidates and place them on perpetual life cycle curve.
- Roadways that are about to become overlay candidates are slurry sealed or micro surfaced using pavement preservation techniques.
- Moderate overlay candidates from the worst to best using traffic as the priority factor.
- Reconstruction candidates to lower the backlog.
- Thick overlays and surface reconstructs.

Four analysis models were investigated in order to determine the recommended program for Bullhead City. The budget run model 'BHC04 - 3.0M per year' was selected as the recommended program meeting the PCI score of 76 and addressing the backlog criteria.

The Pavement Management Analysis Report makes the following recommendations:

- An annual budget dedicated to roadway rehabilitation of 3.0M is required to achieve this goal in five years.
- The City should continue a proactive approach to pavement management, focusing on early intervention and maintaining their existing investments in pavement.
- The full suite of rehabilitation strategies should be reviewed prior to finalization of these budgets as they can have large effects on the analysis. This analysis primarily focused on primary activities of micro-surfacing, overlays, and reconstruction. The City may wish to expand the overlay strategies to include progressively thicker layers based on decreasing PCI scores.

References: City of Bullhead City, "Pavement Management Analysis Report", February 2007.

Crash Data

A crash analysis was conducted for this study to identify crash patterns, trends, and classifications during the five year period from January 1, 2003 through December 31, 2007. The purpose of pursuing this analysis is to determine whether there are sections within the study area that should be addressed to eliminate potential safety hazards and improve safety.

Crash Locations

A total of 4,553 crashes were reported within the City limits during the five years analysis period. During this time, 48 percent of the reported crashes occurred at the intersections, while 52 percent occurred at mid-block locations and driveway access points. Table D-5 shows the crashes by location and percentage. Crashes occurring within a 250-feet radius of an intersection were analyzed as intersection crashes, while mid-block crashes occurred along roadway sections, at driveway access and alleys. Mid-block crashes do not include the crashes that occurred at intersections.

Table D-5 Crash Locations

Location	Number of Crashes						% of Crashes
	2003	2004	2005	2006	2007	5-Yr Total	
Mid-Block	482	532	532	477	357	2,380	52
Intersection	371	463	470	489	380	2,173	48
TOTAL	853	995	1,002	966	737	4,553	100

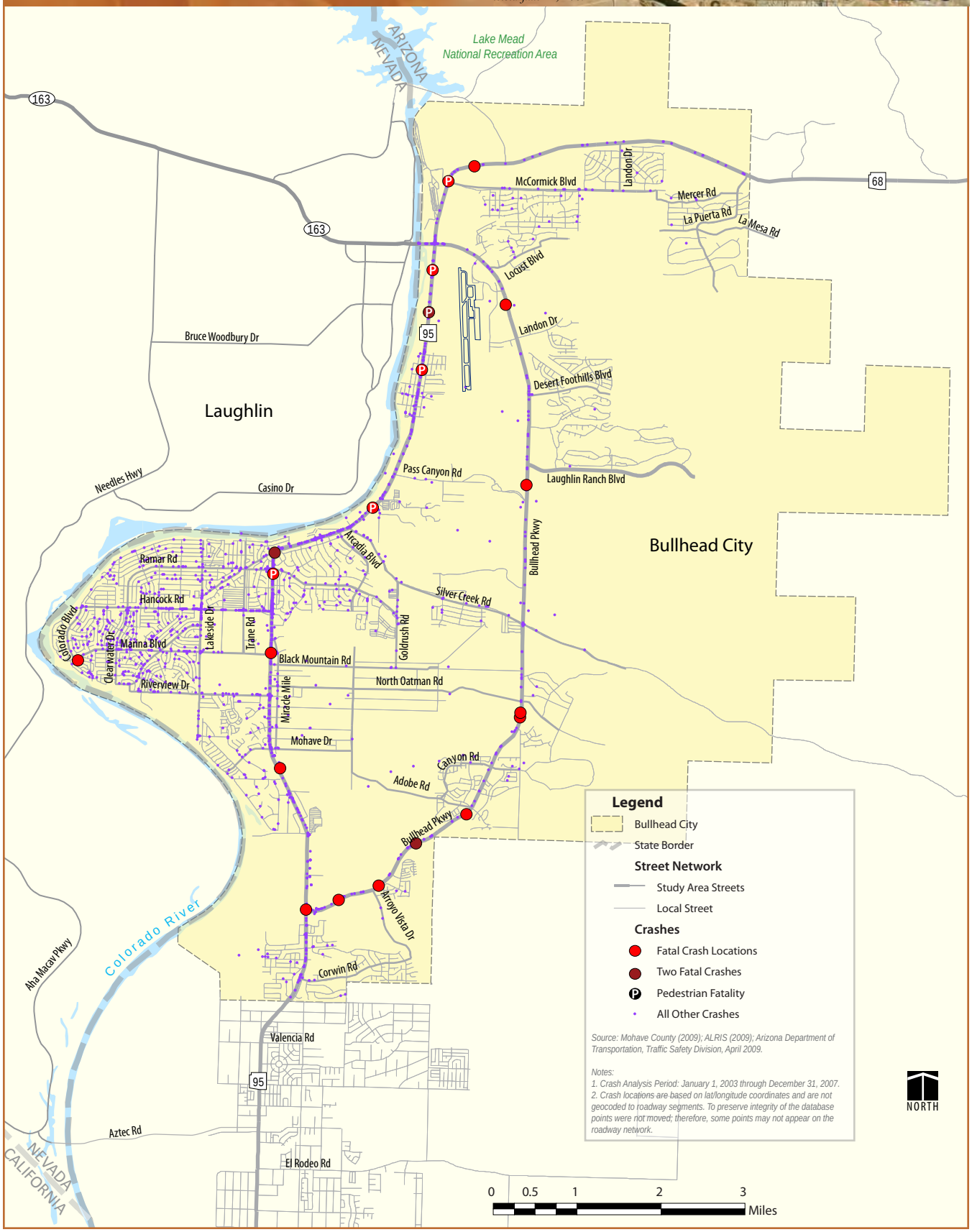
Source: ADOT Traffic Safety Division, April 2009.

Figure D–6 shows the crash locations within the study area during the analysis period. Major corridors such as SR 95, SR 68, Bullhead Parkway, Silver Creek Road, Ramar Road, Hancock Road, Marina Boulevard, Riverview Drive, and Lakeside Drive attributed most of the crashes within the City. As presented in Figure D–7, roads with a high concentration of crashes included Lakeside Drive (from Ramar Road to Hancock Road), Hancock Road (SR 95 to Riverside Drive), and much of SR 95 between Bullhead Parkway North and South. Also, while a clear upward trend in both classes of accidents is evident between 2003 and 2005, the opposite is evident for the years subsequent to 2005.

Bullhead City Transportation Plan

Figure D-6 Crash Locations

Revised June 12, 2009



Crash Trend

Chart 1 presents the yearly crash trend for years 2003 through 2007. While an increasing trend of property-damage-only crashes were observed between years 2003 and 2005, the number of these crashes showed a decreasing trend between 2005 and 2007. Injury crashes slightly varied between years 2003-06 and decreased during year 2007. The Unreported category includes crashes where the crash type was not reported.

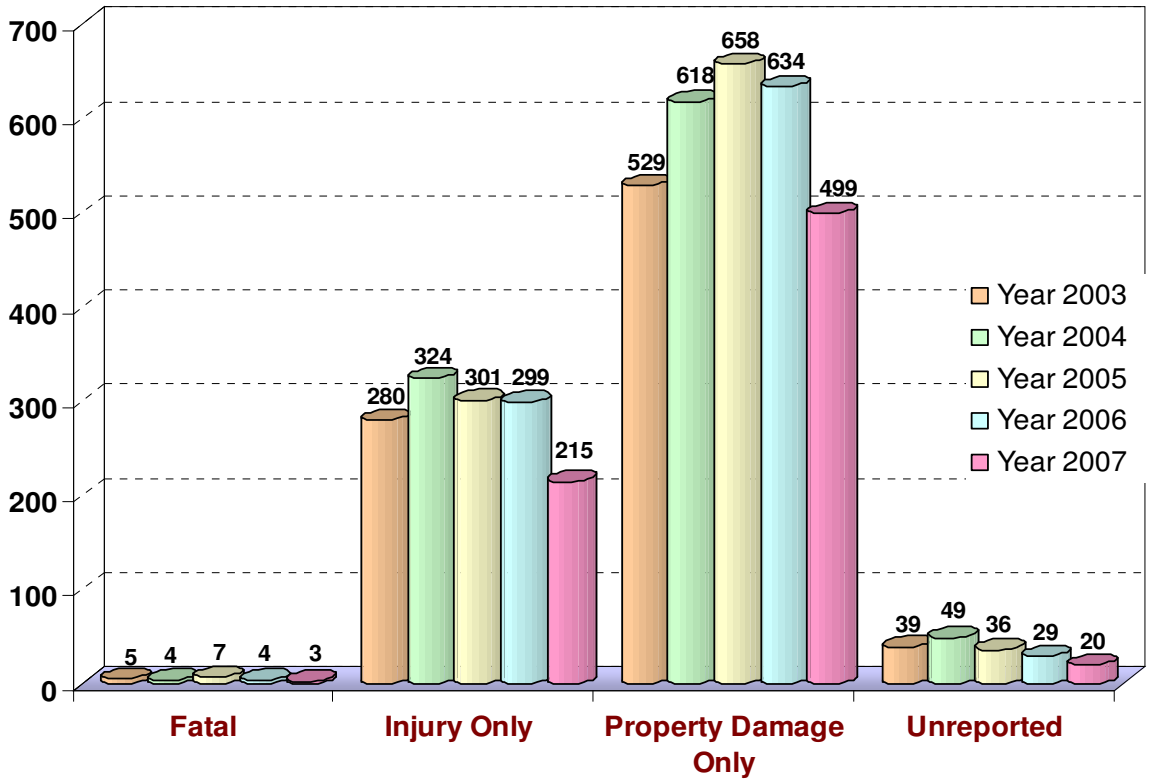


Chart 1 Crash Trend from January 1, 2003 through December 31, 2007

Crash Severity

Out of the total 4,553 crashes, 1,419 crashes resulted in injuries (31 percent) at various levels. There were 23 fatal crashes (less than one percent) during the five-year analysis period. There were a total of 69 pedestrian-involved crashes, of which seven were fatal, and 54 resulted in injuries. The intersection of Hancock Road and Lakeside Drive had four pedestrian-involved injury type crashes. SR 95 experienced 16 pedestrian involved injury crashes at various locations (nine at mid-block locations and seven at intersections). Figure D–7 shows the fatal crash locations during the five-year analysis period.

There were a total of 2,938 property-damage-only crashes (65 percent). Crash severity was not reported in the remaining 173 crashes. Table D-6 illustrates the number of the crashes by severity. The Unreported category includes crashes where the severity was not reported.

Table D-6 Crashes by Severity

Severity	Number of Crashes	% of Total Crashes
Fatal Crash	23	< 1
Injury Only Crash	1,419	31
Property Damage Only Crash	2,938	65
Unreported	173	< 4

Source: ADOT Traffic Safety Division (April 2009)

Crash Classification

Crash classification based on crash type is shown in Chart 2. Rear-end (1,572 crashes, 35 percent), single vehicle (920 crashes, 20 percent), and angle (771 crashes, 17 percent) were the predominant crash types.

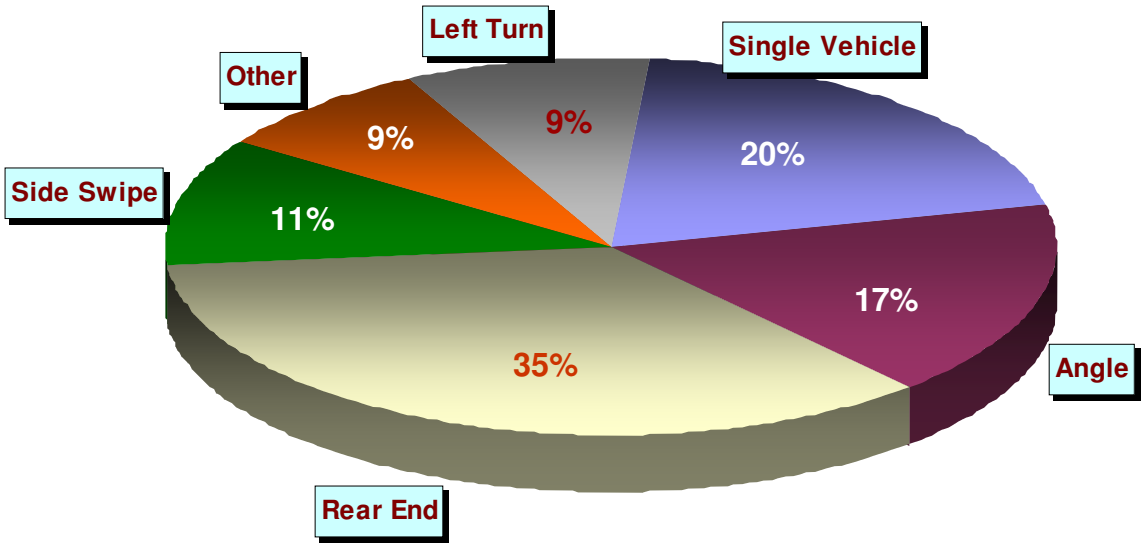


Chart 2 Crash Classification

The majority of objects that were first collided with were other motor vehicle (82 percent), fixed object (11 percent), non-collision (3 percent) and non-fixed object (2 percent). Table D-7 identifies the number of crashes by the objects that were first collided with.

Table D-7 Crashes by Objects First Collided With

Collided Object	Number of Crashes						% of Total Crashes
	2003	2004	2005	2006	2007	5-yr Total	
Collision with Other Motor Vehicle	688	811	817	791	621	3,728	82%
Collision with Fixed Object	96	110	111	100	81	498	11%
Collision with Non Fixed Object	28	24	28	23	9	112	2%
All Non-Collision	27	40	31	33	15	146	3%
Collision with Pedestrian	14	10	15	19	11	69	2%

Source: ADOT Traffic Safety Division
Note: Crash Analysis Period: January 1, 2003 through December 31, 2007

Statistics for the crash data indicated that 82 percent of crashes occurred under clear weather conditions, whereas 10 percent, 4 percent and 4 percent crashes occurred during cloudy, rainy and other weather conditions, respectively. Approximately 74 percent of reported crashes occurred under daylight conditions and 26 percent occurred during dawn, dusk, or darkness conditions.

Crashes by Functional Classification

Five-year crash data was analyzed by the roadway functional classification. Only mid-block crashes were taken into account under this analysis. Table D-8 shows the number of crashes by roadway functional classification and their percentages.

Table D-8 Crashes by Roadway Functional Classification

Functional Classification	Number of Crashes	Percent
Major Arterial	1,360	57
Minor Arterial	354	15
Collector	135	6
Local*	531	22
TOTAL	2,380	100

Note:
* Crashes occurred on local streets.
Crash analysis period: January 1, 2003 through December 31, 2007
Only mid-block crashes were analyzed under this category. Intersection related crashes not included.

As noted in Table D-8, major arterials (SR 95, SR 68, and Bullhead Parkway) contributed 1,360 crashes (57 percent) out of the total 2,380 mid-block crashes. There were 354 mid-block crashes on minor arterials and 135 crashes along collector roadways during the five-year analysis period.

High Crash Locations

Crashes were analyzed at intersections and mid-block sections to identify high crash locations triggering potential safety hazards within the study area. Figure D–7 shows the intersections and mid-block locations with the highest crash rates. The highest number of intersection crashes (100 crashes during 5-years) occurred at SR 95/Bullhead Parkway (North). Table D-9 summarizes high crash intersection locations, crash type and their respective percentages. Most predominant crashes within the study area included single vehicle, angle, left turn, rear end, and sideswipe types. Therefore, only these crashes are documented in Table D-9 for analysis purposes. The crash rate was also calculated for the study intersections. The intersection of Hancock Road/Lakeside Drive has the highest crash rate of 1.48. Note that the crash rate is a function of the number of entering vehicles at that intersection. Therefore, a higher number of crashes does not always result in a higher crash rate.

Table D-9 High Crash Intersections

Location	# of Crashes	Crash Rate1	Single Vehicle	Angle	Left Turn	Rear End	Side Swipe	Other
Hancock Rd/ Lakeside Dr	56	1.48	8 (14%)	8 (14%)	17 (30%)	15 (27%)	4 (7%)	4 (8%)
SR 95/Mohave Rd	78	1.40	1 (1%)	8 (10%)	23 (29%)	39 (50%)	2 (3%)	5 (7%)
SR 95/Ramar Rd	84	1.27	4 (5%)	10 (12%)	20 (24%)	40 (48%)	5 (6%)	5 (5%)
SR 95/Bullhead Pkwy(N)	100	1.26	2 (2%)	7 (7%)	6 (6%)	55 (55%)	26 (26%)	4 (4%)
SR 95/Hancock Rd	83	1.20	3 (4%)	14 (17%)	21 (25%)	36(43%)	7 (8%)	2 (3%)
SR 95/Marina Blvd	76	1.13	3 (4%)	6 (8%)	27 (36%)	28 (37%)	8 (11%)	4 (4%)
Bullhead Pkwy/ Silver Creek Rd	30	1.10	0 (0%)	14 (47%)	9 (30%)	6 (20%)	1 (3%)	0 (0%)
SR 95/Thunderstruck Rd	57	0.97	2 (4%)	9 (16%)	17 (30%)	26 (45%)	2 (4%)	1 (1%)
SR 95/Corwin Rd	59	0.91	4 (7%)	18 (31%)	13 (22%)	17 (29%)	5 (8%)	2 (3%)
SR 95/Riverview Dr	53	0.85	0 (0%)	7 (13%)	15 (28%)	22 (42%)	7 (13%)	2 (4%)
SR 95/Third St	43	0.78	5 (12%)	5 (12%)	8 (19%)	25 (57%)	0 (0%)	0 (0%)
SR 95/Meadows Dr	19	0.75	1 (5%)	1 (5%)	2(11%)	10 (53%)	3 (16%)	2 (10%)
Hancock Rd/Trane Rd	20	0.70	2 (10%)	8 (40%)	2 (10%)	6 (30%)	2 (10%)	0 (0%)
SR 95/Plata Dr	42	0.68	2 (5%)	8 (19%)	12 (29%)	15 (36%)	3 (7%)	2 (4%)
Lakeside Dr/ Marina Blvd	20	0.62	0 (0%)	3 (15%)	8 (40%)	6 (30%)	3 (15%)	0 (0%)
SR 68/McCormick Blvd	16	0.49	1 (6%)	2 (13%)	2(13%)	7 (44%)	2 (13%)	2 (11%)
SR 95/Bullhead Pkwy(S)	27	0.38	0 (0%)	2 (7%)	5 (19%)	18 (67%)	1 (4%)	1 (3%)
Lakeside Dr/Riviera Blvd	19	0.32	1 (5%)	11 (58%)	0 (0%)	1 (5%)	3 (16%)	3 (16%)

Source: ADOT Traffic Safety Division, 2009

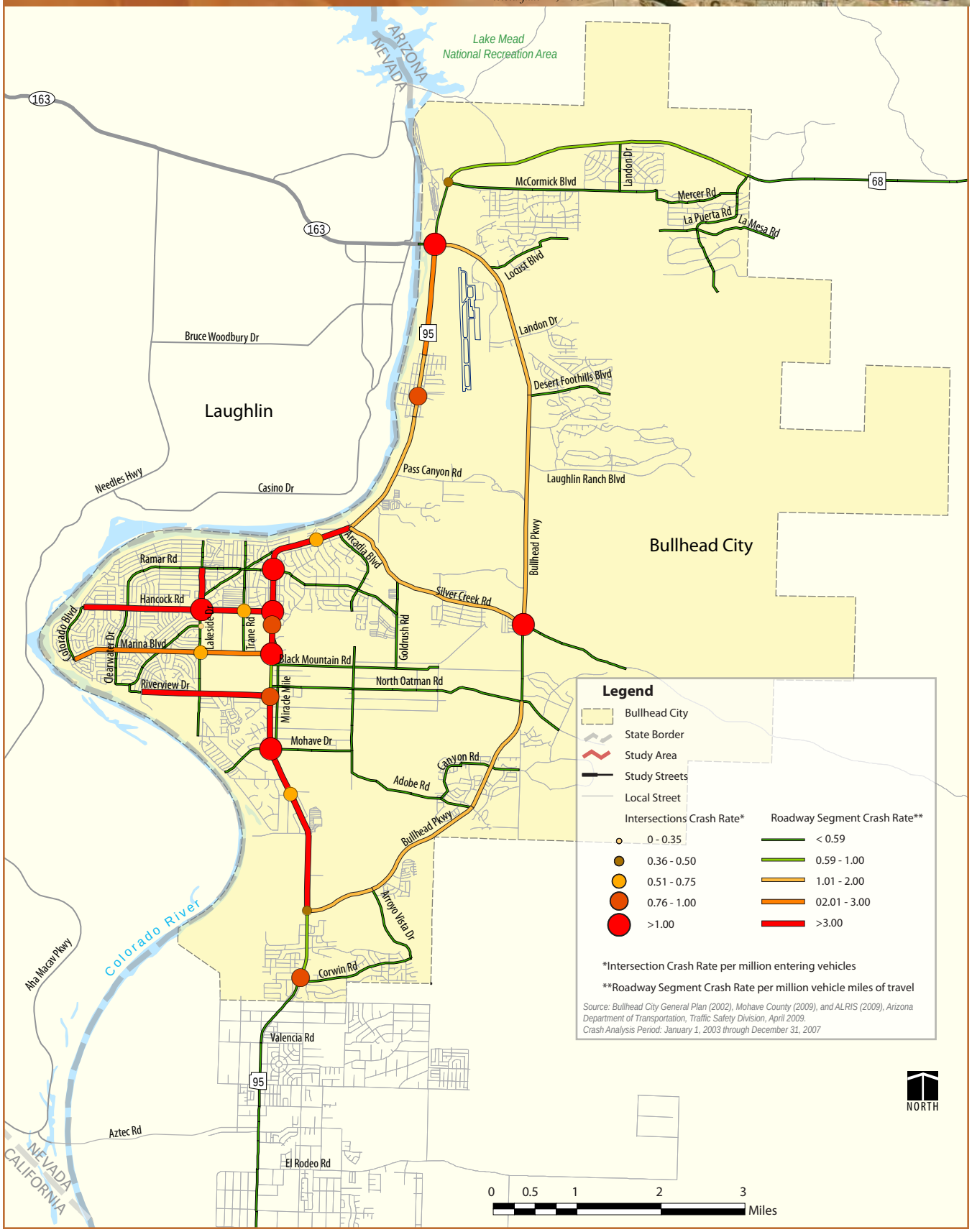
Notes: 1. Crash Rate per million entering vehicles = # of crashes x 106/ (Daily entering traffic x # of Yrs x 365)

Crash Analysis Period: January 1, 2003 through December 31, 2007; Intersection crashes represent the crashes occurring within 250-ft radius of an intersection. Intersections with at least 15 or more crashes during five-year analysis period are summarized.

Bullhead City Transportation Plan

Figure D-7 High Crash Locations

Revised June 12, 2009



Roadway segments were identified with high number of mid-block, driveway and alley crashes during the five-year period. There were 1,019 mid-block crashes reported on SR 95 between Bullhead Parkway North and South. The entire stretch of Bullhead Parkway experienced 146 mid-block crashes. There were 107 mid-block crashes on Hancock Road between SR 95 and Colorado Boulevard. Table D-10 shows roadway segment locations with high numbers of crashes during the five-year of analysis, including crash types.

The segment of SR 95 between Marina Boulevard and Ramar Road had 251 mid-block crashes during the five-year analysis period. However, the segment of Lakeside Drive from Ramar Road to Hancock Road had the highest crash rate of 6.97. Segment crash rate is a function of length and ADT; therefore, a higher number of crashes does not always result in a higher crash rate.

Table D-10 High Crash Mid-block Segments

Location	# of Crashes	Crash Rate[1]	Single Vehicle	Angle	Left Turn	Rear End	Side Swipe	Other
Lakeside Dr.: Ramar Rd. to Hancock Rd.	28	6.97	7 (25%)	9 (32%)	1 (14%)	4 (14%)	4 (14%)	3 (11%)
Hancock Rd.: SR 95 to Riverside Dr.	107	6.84	19 (18%)	32 (30%)	6 (6%)	28 (26%)	17 (16%)	5 (4%)
SR 95: Marina Blvd. to Ramar Rd.	251	4.51	10 (4%)	17 (7%)	27 (11%)	165 (65%)	29 (12%)	3 (1%)
SR 95: Ramar Rd. to Silver Creek Rd.	223	4.10	23 (10%)	50 (22%)	13 (6%)	98 (44%)	34 (15%)	5 (3%)
SR 95: Bullhead Pkwy. (S) to Riverview Dr.	183	3.09	18 (10%)	19 (10%)	9 (5%)	99 (54%)	25 (14%)	13 (7%)
Riverview Dr.: SR 95 to Balboa St.	28	3.07	8 (29%)	5 (18%)	0 (0%)	8 (29%)	1 (4%)	6 (20%)
SR 95: 7th St. to Bullhead Pkwy. (N)	135	2.72	10 (7%)	18 (13%)	7 (5%)	71 (53%)	20 (15%)	9 (7%)
Marina: SR 95 to Colorado Blvd.	36	2.61	10 (28%)	0 (0%)	0 (0%)	7 (19%)	8 (22%)	11 (31%)
Silver Creek Rd.: SR 95 to Bullhead Pkwy.	26	1.75	14 (54%)	0 (0%)	0 (0%)	4 (15%)	5 (19%)	3 (12%)
SR 95: Silver Creek Rd. to 1st St.	99	1.72	11 (11%)	5 (5%)	6 (6%)	55 (56%)	19 (19%)	3 (3%)
Bullhead Pkwy.: Arroyo Vista Dr. to Adobe Rd.	25	1.46	20 (80%)	0 (0%)	0 (0%)	1 (4%)	2 (8%)	2 (8%)
SR 95: 1st St. to 7th St.	86	1.45	7 (8%)	12 (14%)	9 (10%)	42 (49%)	12 (14%)	4 (5%)
Bullhead Pkwy.: Desert Foothills Rd. to SR 95	29	1.41	15 (52%)	0 (0%)	0 (0%)	4 (14%)	4 (14%)	6 (20%)
Bullhead Pkwy.: Silver Creek Rd. to Desert Foothills Rd.	28	1.34	17 (61%)	1 (4%)	0 (0%)	3 (11%)	4 (14%)	3 (10%)
Bullhead Pkwy.: SR 95 to Arroyo Vista Dr.	22	1.28	13 (59%)	0 (0%)	0 (0%)	1 (5%)	4 (18%)	4 (18%)
Bullhead Pkwy.: Adobe Rd. to Oatman Rd.	20	1.17	17 (85%)	0 (0%)	0 (0%)	3 (15%)	0 (0%)	0 (0%)

Location	# of Crashes	Crash Rate[1]	Single Vehicle	Angle	Left Turn	Rear End	Side Swipe	Other
SR 95: Corwin Rd. to Bullhead Pkwy. (S)	60	0.88	10 (17%)	3 (5%)	2 (3%)	32 (53%)	10 (17%)	3 (5%)
SR 95: Riverview Dr. to Marina Blvd.	42	0.72	1 (2%)	8 (19%)	1 (2%)	26 (63%)	6 (14%)	0 (0%)
SR 68: McCormick Blvd. to La Puerta Rd.	44	0.64	22 (50%)	0 (0%)	0 (0%)	13 (30%)	7 (16%)	2 (4%)

Source: ADOT Traffic Safety Division, 2009

Notes: 1. Crash Rate = # of crashes x 106 / (Length x Average Daily Traffic x # of Years x 365)

Crash Analysis Period: January 1, 2003 through December 31, 2007; Intersection crashes represent the crashes occurred within 250-ft radius of an intersection.

At least 20 or more mid-block crashes during 5-year analysis period are summarized.

Appendix E – Origin Destination Study

An origin destination (OD) study was conducted on March 10, 2009. The study was done in both directions at six locations, primarily the entrance/exit locations to/from the City. The purpose of the license plate data collection effort was to determine the amount of traffic traveling through the City and the travel patterns of that traffic.

Origin destination studies provide valuable data for the development and update of travel demand forecasting models. For this particular report, the OD study served to help understand the number of pass-through/short-stop traffic; where pass-through/short stop traffic is defined as those vehicles which travel through stations on the perimeter of the study area within a three-hour window peak-travel period.

Data was collected during the three peak periods: the morning peak (6AM to 9AM), mid-day peak (11AM to 2PM), and afternoon peak (3PM to 6PM). The study fieldwork consisted of a survey crew stationed at each location recording vehicle license plates by direction and time. The data was analyzed by matching the license plates by peak hour to determine how vehicles were routed among the stations. The locations where origin and destination license plate study data was collected are listed below, with the numbers corresponding to the locations shown on Figure E-1.

① Needles Highway, south of Aha Macav Parkway

② Aztec Road, east of Aha Macav Parkway

③ SR 95, south of Aztec Road

④ SR 68, north of Bullhead Parkway

⑤ Laughlin Bridge, west of SR 95

⑥ Nevada State Route 163, west of Needles Highway

Attention was focused on Stations ③, ④ and ⑥; located at the southern northern, and western gateways to the City, respectively. Collected data provides an idea of the nature of the traffic passing through the City. By identifying vehicles passing any two of these stations within the three-hour windows surveyed, the travel patterns and the amount of pass-through/short stop traffic were estimated.

By analyzing the OD study results the following generalizations were made:

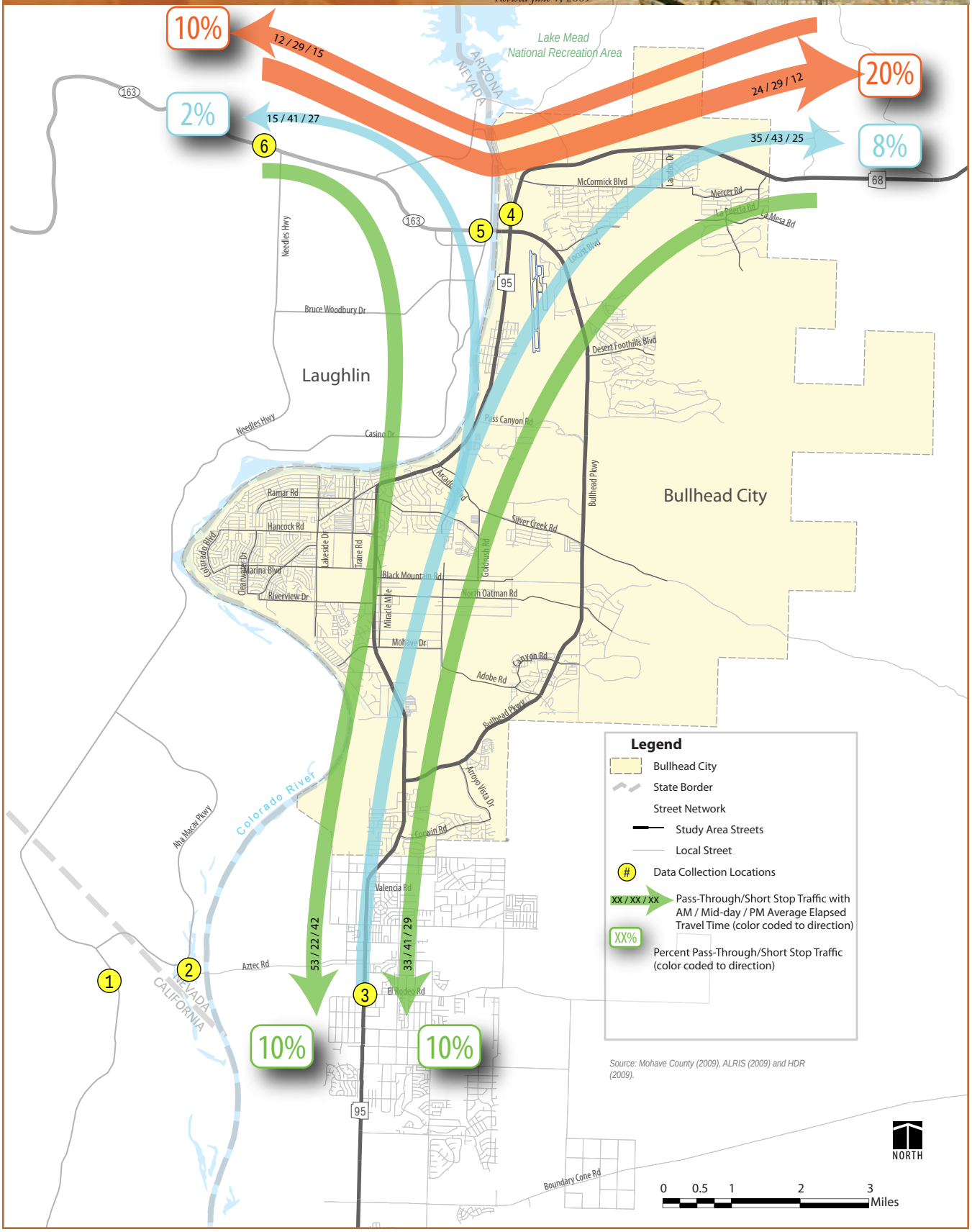
- Mid-day peak (11AM to 2PM) average elapsed travel times are generally longest amongst all stations
- Eastbound pass-through traffic travelling along SR 68 and Nevada SR 163 is higher than westbound pass-through traffic
- Approximately 10 percent of the trips originating on SR 68 (Station ④) and Nevada SR 163 (Station ⑥) are pass-through traffic traveling south of Bullhead City on SR 95 (Station ③).
- Only a small fraction (two percent) of pass-through traffic trips heading north through Bullhead City from the south (Station ③) are traveling on to Nevada SR 163 (Station ⑥).
- Approximately 90 percent of the trips within Bullhead City travel locally, i.e., not pass-through traffic as defined earlier.

The study data is summarized in this section which will be used to validate the travel demand model. The results are summarized in on Figure E-1.

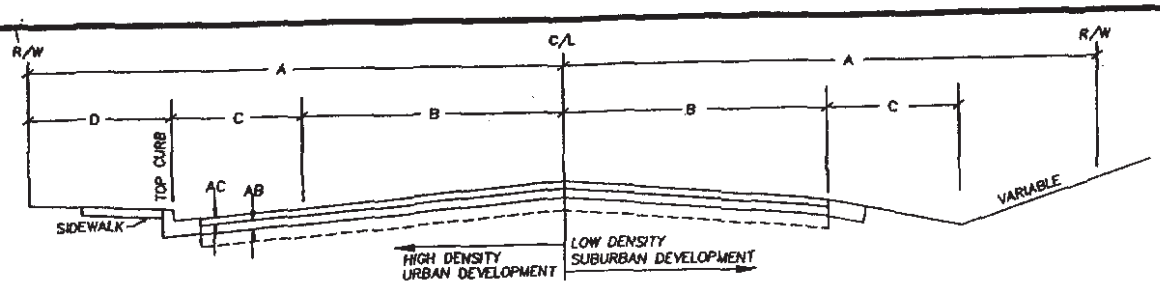
Bullhead City Transportation Plan

Figure E-1 Origin / Destination Study

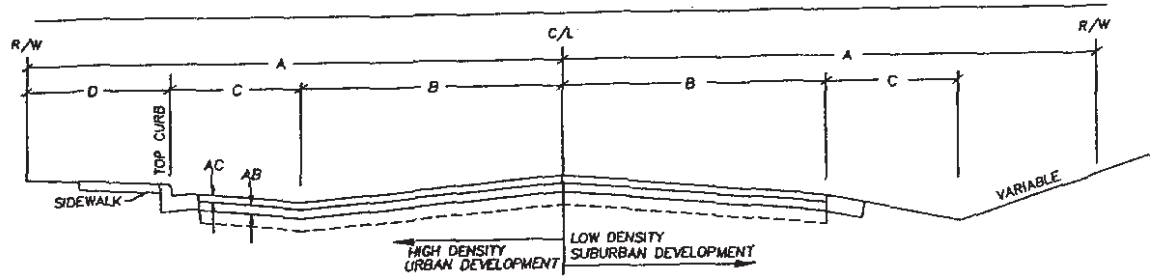
Revised June 1, 2009



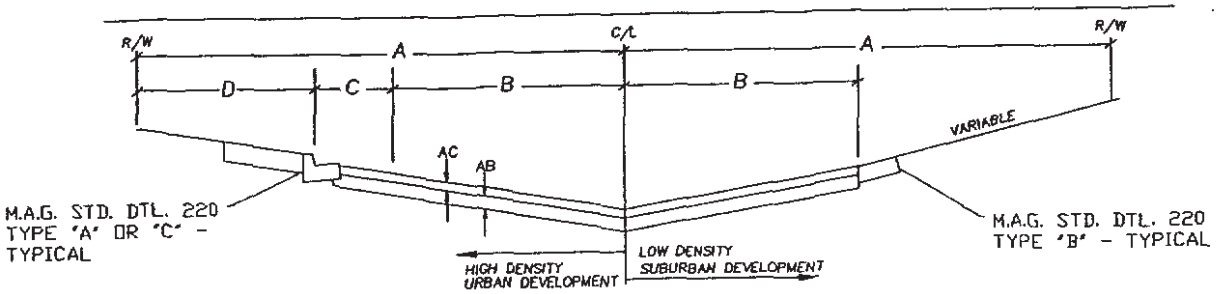
Appendix F – Bullhead City Standard Detail Street Sections



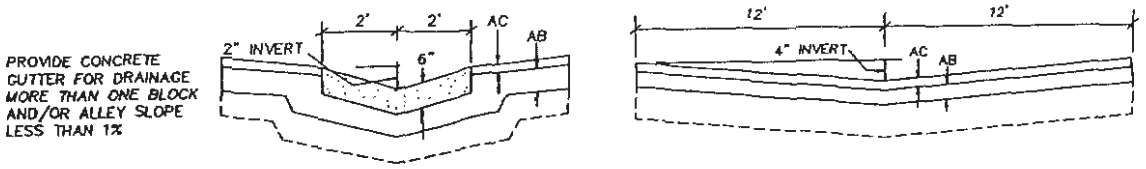
STANDARD SECTION



"W" SECTION



"V" SECTION



ALLEY SECTION

STREET TYPE	R/W RANGES	MAX. LENGTH
MAJOR ARTERIAL	110-130	-
MINOR ARTERIAL	84-110	-
COLLECTOR	70-84	-
LOCAL STREET	60	-
CUL-DE-SAC	60	600
LIMITED USE STREET	60	3000**

R/W WIDTHS	A	B	C	D	AC	AB
130	65	30	20	15	*	*
110	55	30	8	17	*	*
84	42	18	8	16	4"	*
70	35	12	10	13	3"	*
60	30	12	4	14	2"	6"

ALL DIMENSIONS IN FEET UNLESS OTHERWISE SHOWN

* PER SOILS ENGINEER

** W/ NO OTHER FUTURE OUTLET POSSIBLE. LOS C OR BETTER

1. SUB-GRADE COMPACTION SHALL BE PER SOILS REPORT OR AS REQUIRED BY CITY ENGINEER.
2. ALL STREETS SHALL BE BUILT WITH CURB, GUTTER AND SIDEWALK UNLESS APPROVED OTHERWISE BY CITY ENGINEER.
3. CROSS SLOPE ON STREETS SHALL BE A MINIMUM OF 2% AND A MAXIMUM OF 4%.
4. SIDEWALK TYPE SHALL BE PER MAG DETAIL 230.
5. STRIPING REQUIREMENTS SHALL BE AS REQUIRED BY CITY TRAFFIC ENGINEERING DEPARTMENT.
6. STREET SHALL BE DESIGNED TO CARRY EXPECTED STORMWATER RUNOFF WITHIN RIGHT OF WAY.
7. SECTIONS AC & AB SHOWN MAY BE CHANGED UPON APPROVAL BY THE PUBLIC WORKS DIRECTOR WITH A RECOMMENDATION BY A REGISTERED SOILS ENGINEER.
8. ASPHALT AT EDGE OF CONCRETE GUTTER SHALL BE PLACED 1/8" HIGHER THAN EDGE OF GUTTER.

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	2. REVISED ALLEY WIDTH TO 24' 1. ADDED LTD. USE STR. & MAX LENGTH TO DATA BOX & CHG. NOTE 7. 8-1-94 REVISION DATE	STANDARD DETAIL STREET SECTIONS	10.1

Appendix G – SR 95 Safety Recommendations

In 2008, ADOT conducted a Road Safety Assessment of SR 95, milepost 242 to 250. As part of the Long Range Transportation Plan the recommendations were reviewed and are summarized in the following table.

Table E1 Safety Recommendations along SR 95

Segment	Safety Hazard	Recommendations
At Baseline Rd near Milepost 245.1	Presence of sharp horizontal curve	Install raised pavement markers (RPMs) through the curve on the lane lines and centerline
		Conduct a ball bank analysis to determine the need for a curve warning sign
		Close the north Summit Drive intersection with SR 95 if possible. If not, consider making this intersection right-in only or entrance only
		Close the Pawn Shop driveway at the Baseline Road intersection with SR 95 if possible. If not, consider making this driveway right-in, right-out only
3rd St to 6th St	High Pedestrian Traffic	Improve lighting between 3rd Street and 6th Street, particularly near 5th Street, to make pedestrians more visible at night
		Provide additional advanced warning of pedestrian crossing areas with oversized pedestrian crossing signs on both sides of SR 95
		Consider one of the following signal/crosswalk recommendations: Conduct a signal warrants analysis to determine the need for a traffic signal at 5th Street Install an In-Road Warning Light System with a high visibility crosswalk and LED pedestrian crossing signs at 5th Street Install 2-stage pedestrian crosswalks near 5th Street Install a Pedestrian Hybrid Signal near 5th Street[1]
Thunderstruck Dr to Ramar	High Pedestrian	Improve lighting between Thunderstruck Drive and Ramar Road

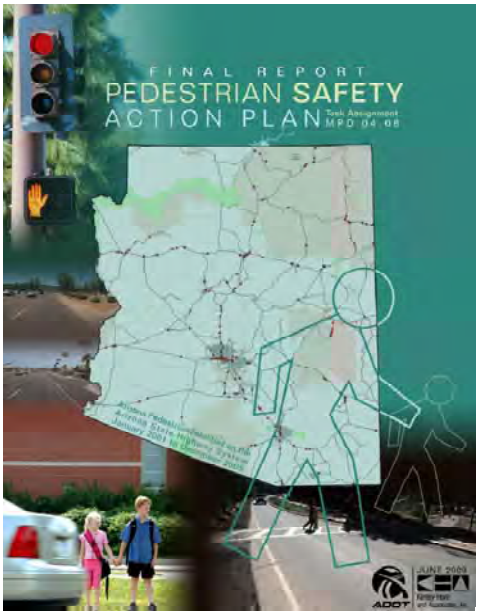
[1] Recommendation suggests use of a Pedestrian Hybrid Signal similar to the HAWK that the City of Tucson uses.

Segment	Safety Hazard	Recommendations
Rd	Traffic	Provide a Leading Pedestrian Interval phase at Thunderstruck Drive
IHOP Driveway	Visibility issue with the pork chop at night time due to lack of delineation	Install RPMs on pork chop island
		Install object marker on island for northbound vehicles
	Illegal left turn	Install second "Do Not Enter" sign on the island and oversize signs
		Install double row of RPMs at 20-foot spacing along double yellow centerline approaching driveway from the north
		Install "No Left Turn" pavement markings on southbound through lane approaching driveway
		Consider vendor demonstration project to install tubular markers along centerline approaching driveway from the north (similar to Business 8 in Yuma)
Hastings Driveway, south of Ramar Rd	Conflict of traffic making left-turn to/from the driveway	Close driveway if possible. If not, make right-in, right-out only
At Silver Creek Rd Intersection	Left-turn signal phasing	Change the protected permissive left-turn phase into protected left-turn phase on southbound dual left turn lane
General	Speed limit	Conduct speed study to determine if lower speed limit is appropriate. If speed limit reduced, consider photo enforcement
	Lighting	"Conduct routine nighttime inspections of street lights and replace lamps as needed"
	Center Left Turn Lane	Convert dedicated left-turn bays to two-way left-turn lanes

Source: Road Safety Assessment SR 95 Milepost 242 to 250, Bullhead City, October 2008

Appendix H – Potential Countermeasures for SR 95, North Oatman Road to SR 68

Excerpts from the Arizona Department of Transportation Pedestrian Safety Action Plan (2009).



The Arizona Department of Transportation Pedestrian Safety Action Plan (2009) identified three segments in the Bullhead City areas as "High Pedestrian Crash State Highway Locations": SR 95, North Oatman Road to SR 68; SR 68, SR 95 to Davis Dam Road; and, SR 95, Joy Lane to Camp Mohave Road (outside Bullhead City limits).

The Plan identified potential countermeasures for the segments. The recommendations for the segments in Bullhead City limit are shown below.

Location Description

Segment 1, SR 95, North Oatman Road to SR 68, Bullhead City

This segment is a 7.8-mile-long 4-lane state highway in urban area from North Oatman Road to Davis Dam Road (MP 243.5 to MP 251.3). The segment can be separated into two subsegments, which are continuous. The AADT is approximately 32,600 vehicles per day (vpd) on SR 95 and 13,000 vpd on SR 68. Other key features include:

SR 95

- Bicycle Lane – none
- Sidewalks – yes
- Median – TWLT median
- Posted Speed Limit – 45 mph
- Illumination – poor
- Adjacent Land Use – mostly commercial, open space in
- middle of segment
- Building Setback – majority > 25 feet
- Crosswalk Locations – only at intersections
- Bus Stop Locations – none

SR 68

- Bicycle Lane – none
- Sidewalks – only for a short segment
- Median – majority raised median, a small segment of
- TWLT median
- Posted Speed Limit – 45 mph
- Illumination – poor
- Adjacent Land Use – open space
- Building Setback – N/A
- Crosswalk Locations – only at intersections
- Bus Stop Locations – none

- Crosswalk Locations – only at intersections
- Bus Stop Locations – none

Field Review Observations / Stakeholder Comments

The City had the following comments:

- Pedestrian traffic crosses mid-block
- SR 95 has no median
- SR 68 is not well lit

The regional traffic engineer had the following comments:

- HAWK signals may work in highly concentrated areas
- Installing a raised median would be best for pedestrians
- Recent road safety assessment (RSA) suggested a median
- Alternating lighting but most of segment is lit
- Pedestrian walk time may need to be extended (discussed in RSA)
- Countdown pedestrian signals would be helpful
- Photo radar enforcement could be considered, as suggested in Road Safety Assessment

Countermeasures identified for consideration in SR 95 Road Safety Assessment, MP 242 to 250, Bullhead City, October 20-22, 2008:

- Improve lighting between 3rd Street and 6th Street, particularly near 5th Street, to increase pedestrian visibility at night
- Consider one of the following signal/crosswalk recommendations:
  a. Conduct a signal warrants analysis to determine the need for a traffic signal at 5th Street
  b. Install an In-Road Warning Light System with a high visibility crosswalk and LED pedestrian crossing signs at 5th Street
  c. Install 2-stage pedestrian crosswalks near 5th Street
  d. Install a Pedestrian Hybrid Signal, similar to the HAWK that the City of Tucson uses, near 5th Street
- Provide additional advanced warning of pedestrian crossing areas with oversized pedestrian crossing signs on both sides of SR 95, in both directions, with “Next xx Feet” plaque
- Long term, consider eliminating the crest curve near 5th Street
- Improve lighting between Thunderstruck Drive and Ramar Road
- Provide a Leading Pedestrian Interval phase at Thunderstruck Drive

Potential Countermeasures for Consideration

The following is a list of potential countermeasures that could be implemented at this location. The list is not intended to be a final list of countermeasures. Actual implementation will depend on further investigations, engineering evaluation, project development, and availability of funding The list is provided to estimate the magnitude of costs that may be required to improve pedestrian safety at this location.

	Estimated Conceptual Cost
Crosswalk Improvements SR 95 Milepost 242 to 250, Bullhead City, Road Safety Assessment, October 20-22, 2008, recommended consideration of installation of an In-Road Warning Light System with high visibility crosswalk(s) and LED pedestrian crossing signs as well as additional advanced warning of pedestrian crossing areas with oversized signs.	130,000
Enhance Pedestrian Signals Install pedestrian countdown signals along the corridor. Evaluate existing signal timing and modify pedestrian crossing time if needed.	52,000
Provide Lead Pedestrian Interval Provide leading pedestrian interval signal phase on SR 95 to allow pedestrians to enter and occupy the crosswalk before turning motorists enter it.	-
Increased Enforcement Plans Develop an enforcement plan that will help to deter careless and reckless driving and increase motorists' awareness to share the roadway with pedestrians and bicyclists along the corridor. Enforcement should be focused on speeding and pedestrians crossing illegally	-
Improve Roadway Lighting Evaluate lighting to determine appropriate lighting improvements. Design and construct lighting improvements at intersections and along the roadway.	220,000
Improve Pedestrian Crossings Install pedestrian hybrid signal crossings, with pedestrian refuges.	4,280,000
Sidewalk Improvements Install and improve sidewalks along SR 68 to separate pedestrians from roadway vehicles and improve mobility for pedestrians.	1,069,440
Construct Raised Median on SR 95 Construct a raised median to provide a refuge for pedestrians and improve safety by reducing conflicts with left-turning vehicles.	9,266,400
Planning Level Total Segment Cost *with Raised Median*	**14,237,840**
without Raised Median	**5,751,440**

Appendix I – Road Safety Assessment (RSA), Various Locations Within Bullhead City

A Road Safety Assessment (RSA) was conducted on March 22-24, 2010 at various locations throughout Bullhead City. Locations include: Bullhead Parkway/Adobe Road; Bullhead Parkway/North Oatman Road; Bullhead Parkway/Silvercreek Road; Bullhead Parkway Milepost 2.5 to 3.5; Lakeside Drive/Hancock Road; Lakeside Drive/Marina Boulevard; Trane Road/Ramar Road/Baseline Road; Mohave Drive/Miracle Mile.

LOCATION	SAFETY ISSUE/DESCRIPTION	COUNTERMEASURES FOR CONSIDERATION
General	1. Some sign posts had stubs higher than 4 inches, which can cause vehicle snagging when struck 2. Some drainage channels underneath sidewalks created sidewalk drop-offs that can lead to pedestrian falls 3. Many of the intersection curb ramps and pedestrian signal push button locations are not ADA compliant 4. Pavement markings at many of the intersections were faded 5. Routine guardrail maintenance is needed to help provide a better opportunity for safely stopping or re-directing an errant vehicle	1. Keep stub height to 4 inches and less 2. Use pedestrian safety rails where needed 3. Update curb ramps, pedestrian push buttons to ADA standards 4. Refresh pavement markings, including crosswalk lines, lane lines, and turn arrows. 5. Guardrail sections should be periodically inspected for routine maintenance items, including tightening bolts and nuts, replacing worn/damaged posts, and removing debris that has built-up in front of the guardrail
Bullhead Parkway and Adobe Road	1. Curb ramps and pedestrian signal push button locations are not ADA accessible 2. Pavement markings are faded 3. The widened pavement for the right-turn lane into the Circle K north of the intersection can create confusion over vehicle placement within the northbound outside lane 4. The object marker on the raised island at the end of this right-turn lane for Circle K is not very conspicuous (daytime and nighttime) 5. A tree on the northwest corner will eventually obscure the far right signal head	1. Update curb ramps, pedestrian push buttons to ADA standards 2. Refresh pavement markings 3. Install additional pavement markings for the northbound right-turn lane into Circle K to include lengthening the solid stripe and providing dashed lines that extend south to the intersection 4. Replace object marker on Circle K right-in right-out island with an OM1-1 object marker 5. Trim tree on northwest corner
Bullhead Parkway and North Oatman Road	1. It is difficult to judge adequate gaps in traffic for drivers entering the Parkway from North Oatman Road	1. Relocate the stop bar closer to the intersection 2. Install raised pavement markers

LOCATION	SAFETY ISSUE/DESCRIPTION	COUNTERMEASURES FOR CONSIDERATION
	due to volumes, speeds, and embankment 2. It is difficult to see the intersection at night to determine when to slow down and where to enter the turn lanes on Bullhead Parkway 3. Bicyclists travel a 6-mile circuit along the Bullhead Parkway between North Oatman Road and Adobe Road, along Adobe Road and Arcadia Boulevard, to North Oatman Road and the Parkway. A bicyclist fatality occurred in September 2009 just south of the North Oatman Road intersection on the west side of the Parkway	(RPMs) for the turn lane lines and solid stripes for the through lanes on the intersections approaches on the Parkway 3. Install street name signs (D3-1) with an arrow on the Parkway at the intersection; Improve bicyclist accommodations along the Parkway, Adobe Road, Arcadia Boulevard, and North Oatman Road loop; Conduct a signal warrants analysis
Bullhead Parkway and Silvercreek Road	1. Most of the crashes at this intersection involve a northbound left-turn vehicle versus a southbound through vehicle (79% of crashes) 2. The southbound approach does not have an exclusive right-turn lane 3. The intersection has no crosswalks, sidewalks, or curb ramps, and the pedestrian push button locations are not ADA compliant 4. Curbing in front of the guardrail on the east side of the Parkway just north of the intersection can lead to poor guardrail performance during a crash 5. The —Do Not Enter“ sign on the northwest corner is not needed 6. The damaged pull boxes on the northwest corner should be replaced with traffic rated boxes	1. Install a —Left Turn Yield on Green Ball“ sign for the northbound approach (may need to consider protected-only phasing if left-turn crashes persist) 2. Evaluate feasibility of constructing a southbound right-turn lane; if not feasible, install a radius edge line for southbound right-turn movement and extend the stop bar completely across southbound Parkway lanes 3. Conduct a pedestrian study and consider removing the pedestrian signals and push buttons 4. Remove curb on east side of Parkway in front of the guardrail 5. Remove —Do Not Enter“ sign 6. Replace damaged pull boxes on northwest corner with traffic rated boxes

LOCATION	SAFETY ISSUE/DESCRIPTION	COUNTERMEASURES FOR CONSIDERATION
Bullhead Parkway Milepost 2.5 to 3.5	1. Most of the crashes on this section of the Parkway were single vehicle roadway departure crashes (69%), and nearly half of these crashes occurred at night. Most of these crashes occurred prior to the shoulder improvements that were made in 2008 2. The horizontal curve near milepost 3.2 is missing several delineators	1. - 2. Install delineators through the horizontal curve near milepost 3.2 at approximately 100 foot spacing
Lakeside Drive and Hancock Road	• This intersection has a high volume of pedestrian activity, much of it associated with the Junior High School just east of the intersection on Hancock Road • The majority of crashes at this location were rear-end and left-turn crashes. There were 3 bicyclist and 2 pedestrian crashes at or near this intersection. There were also 10 crashes at the Smith‘s Food Store and Bank of America driveways just south of the intersection, including 7 crashes involving vehicles turning left from these driveways to travel north on Lakeside Drive. • The northbound —trap lane“ is not signed or marked to provide drivers‘ advance notice of the lane ending at the intersection • The pedestrian signal push buttons are not ADA compliant • The street name signs are small and located on the intersection corners, making it difficult for drivers to identify the street names • There are multiple commercial driveways that are closely spaced to each other and to the intersection • The sidewalk on the northwest leg of the intersection is discontinuous and has an excessive cross slope • Motorists were observed blocking the crosswalk on Hancock Road, forcing pedestrians out of the crosswalk and nearly into oncoming	• Install signing and marking to adequately guide and direct drivers in the northbound —trap lane“ (see example from City of Chandler) • Improve pedestrian signal push button access • Install overhead street name signs (the City is currently in the process of using new street name signs with 6¬inch letters) • Consider access control at driveways close to the intersection (for example, consider combining the Smith‘s Food Store and Bank of America driveways into one driveway farther from the intersection) • Install —Left Turn Yield on Green Ball“ signs for all approaches • Refresh pavement markings including crosswalk and arrows • Install new ADA compliant sidewalk on the northwest leg of the intersection • Develop a —Safe Routes to School“ plan for nearby schools • School crosswalk should follow ADOT‘s —Traffic Safety for School Areas Guidelines“ including a reflective vest for the crossing guard • Install a leading pedestrian interval to allow pedestrians a several second headstart to establish their presence in the

LOCATION	SAFETY ISSUE/DESCRIPTION	COUNTERMEASURES FOR CONSIDERATION
	traffic • The Elementary School crossing guard on Lakeside Drive was not wearing a safety vest	crosswalk before turning traffic receives the green signal indication • Consider installing school speed zone signs with flashers during school begin/end times
Lakeside Drive and Marina Boulevard	• The most frequent type of crash at this intersection is left-turn crashes (38%). Three crashes involved vehicles backing into the road from the lot on the southwest corner. • Several driveways are extremely close to the intersection. • There is a westbound —trap lane" that ends as a right-turn lane at the intersection that is not signed or marked to provide drivers' advance notice of the lane ending at the intersection • The sidewalk ramps on the northwest corner do not line up with the crosswalks, which forces a person in a wheelchair crossing the road to travel in the road parallel to the sidewalk until reaching the ramp • The pedestrian push buttons are not ADA compliant • The bike/pedestrian trail along the east side of Lakeside Drive does not provide a southbound entrance from the roadway. The northbound approach of the bike/pedestrian trail guides users into a gravel area and fencing. • There are no overhead street name signs • There are non-typical lane usage signs on some approaches that are not consistent with other approaches and other intersections in the area	• Install signing and marking to adequately guide and direct drivers in the westbound —trap lane" • Improve pedestrian signal push button access • Reconfigure northwest corner ramps so they line up with the crosswalk • Install overhead street name • Review AASHTO Bike Lane Design Guide for guidance on existing trail signage and obstacle clearance • Install —Left Turn Yield on Green Ball" signs for all approaches • Refresh pavement markings including crosswalk and arrows • Close driveways close to intersection • Remove non-typical lane usage signs
Trane Road, Ramar Road, and Baseline Road	• This intersection has non-typical roadway geometry, having 5 separate approaches. Most of the crashes are rear-end, with most occurring on Baseline Road.	• Remove the exclusive left-turn from the eastbound Ramar Road approach to decrease the number of oncoming lanes that other approaching vehicles must

LOCATION	SAFETY ISSUE/DESCRIPTION	COUNTERMEASURES FOR CONSIDERATION
	• There are several driveways very close to the intersection • The service station provides the only light near the intersection, and the intersection was very dark at night, making it somewhat difficult to see the approaches while turning • The sidewalk on the northwest side of Baseline Road in front of the service station is on a higher elevation than the parking lot, creating a drop of 2 to 3 feet • Gravel has washed onto the sidewalk along the south side of Ramar Road from an unpaved driveway, creating an unstable surface for pedestrians • Vertical curves on the south and east legs limit sight distance on those approaches	contend with • Install RPMs for all approaches to better delineate the intersection at night • Consider installing street lighting • Install new ADA compliant sidewalk on Baseline Road at the service station • Address loose gravel on driveways (may require paving through turn radius of driveway) • Install advance —Stop Ahead“ signs on legs with vertical curves (south leg, east leg)
Mohave Drive and Miracle Mile	• Drivers entering this intersection from the stop-controlled approaches (Miracle Mile and commercial driveway) have multiple conflicts to contend with as they make a decision on when to pull onto or cross Mohave Drive. These conflicts include vehicles in multiple lanes from both directions on Mohave Drive, in addition to vehicles turning left, right, and going straight across Mohave Drive from the opposite side of the intersection. • Most of the crashes at this unsignalized intersection are angle crashes (67%). This intersection is located within 300 feet of the signalized intersection of SR 95 and Mohave Drive. Some westbound queues extended from the signalized intersection to this intersection at Miracle Mile. • All of the pavement markings along the south leg of the intersection (private property) are yellow, including turn lane markings and	• Convert the north side of the intersection to a right-in, right-out only operation • Initiate discussion with commercial property owner to consider converting the south side of the intersection to a right-in, right-out only operation • Replace yellow pavement markings with white markings on commercial driveway • Install —Right Turn Only“ signs for eastbound right-turn lane • Refresh pavement marking arrows on Mohave Drive • Increase turning radius on the northwest corner to accommodate large vehicles • Widen the Miracle Mile approach to match the full section of roadway width just north of the intersection, providing a southbound right-turn lane • Install intersection street lighting

LOCATION	SAFETY ISSUE/DESCRIPTION	COUNTERMEASURES FOR CONSIDERATION
	arrows • The eastbound lane, both east and west of the intersection, has pavement markings indicating it is a right-turn only lane, but there is no signing indicating this. This lane eventually becomes a —trap lane“ east of the Wal-Mart truck entrance, where the two eastbound through lanes narrow to one lane. • The —arrow“ and —Only“ markings on Mohave Drive are faded Large vehicles were observed having difficulty negotiating turns onto Miracle Mile due to the tight turn radius and the narrow intersection • Intersection is dark at night (commercial street lighting does not illuminate intersection)	

Appendix J – Pavement Conditions on SR 95 and 68

Pavement conditions are assessed based on a subjective measurement of pavement smoothness, known as Pavement Serviceability Rating (PSR). The PSR rates pavement sections on a scale ranging from 0 to 5.0, with 0 being extremely deteriorated and is drivable only at reduced speeds, while 5.0 indicates new or nearly new pavements in superior condition. Pavement conditions data along SR 95 and SR 68 within the City limit were obtained from ADOT. The PSR threshold at which rehabilitation is triggered in the State of Arizona is 3.6 to 3.8, depending on the type of roadway and climate, according to the State's Pavement Management System. **Error! Reference source not found.** summarizes the pavement conditions along SR 95 and SR 68.

Table 1 Pavement Conditions

Route	Direction	Milepost	PSR[1] Rating	Condition Index
SR 68	E	0 to 1	3.0 – 4.0	Good
	E	1 to 6	4.0 – 5.0	Very Good
	W	0 to 2	3.0 – 4.0	Good
	W	2 to 6	4.0 – 5.0	Very Good
SR 95	N	230 to 235	3.0 – 4.0	Good
	N	235 to 237	4.0 – 5.0	Very Good
	N	237 to 239	3.0 – 4.0	Good
	N	239 to 240	4.0 – 5.0	Very Good
	N	240 to 241	3.0 – 4.0	Good
	N	241 to 243	4.0 – 5.0	Very Good
	N	243 to 245	3.0 – 4.0	Good
	N	245 to 246	2.0 – 3.0	Fair
	N	246 to 250	3.0 – 4.0	Good

Source: Arizona Department of Transportation, April 2009

Notes: Test dates for SR 68 and SR 95 are as follows:
SR 68 Eastbound 6/11/2008
SR 68 Westbound 9/17/2008
SR 95 6/10/2008

PSR- Pavement Serviceability Rating

Appendix K – Alternative Funding Options

Public Private Partnerships (P3s). P3s are contractual arrangements between public and private sector entities pursuant to which the private sector is involved in multiple elements of public infrastructure projects. Unlike conventional methods of contracting for a project, in which discrete functions are divided and procured through separate solicitations, P3s contemplate a single private entity being responsible and financially liable for performing all or a significant number of functions in connection with a project. The "private partner" is typically a consortium of private companies with expertise in the different functions to be performed (design, construction, financing, operation and/or maintenance). In transferring responsibility and risk for multiple project elements to the private partner, the procuring agency shifts certain risks to the private partner and focuses on desired outcomes instead of detailed project specifications. The private partner receives the opportunity to earn a financial return commensurate with the risks it assumes (FHWA, 2008).

State and local authorities use P3s to reduce costs, accelerate project delivery, allocate risk more effectively and encourage innovation. These benefits alone, however, do not explain why state and local authorities have been turning to P3s with greater frequency over the last few years.

The unprecedented use of P3s is, in large part, a response to the failings of traditional approaches to transportation funding and procurement. The primary failings include continuous growth in congestion and system unreliability over the last three decades and the difficulty that all levels of government are having satisfying the demand for transportation investment. A highway funding model that relies largely on fuel tax revenues becomes increasingly untenable as the US moves towards increased energy independence, greater fuel economy in automobiles, development of alternative fuels, and reduced emissions. The failings of the traditional transportation funding system, which are leading communities to search for alternatives, are evident across the United States at all levels of government; P3s are a preferred alternative because they address these failings.

Tolls. These fees are charges to users of a specific facility. Historically, they were used to retire bonds sold to finance construction of a highway or a bridge, or to maintain and improve such facilities. This is the definition used here. Tolls would be used to fund the construction or reconstruction of a highway or a bridge in the region. Depending on a number of variables, the toll may or may not cover the full cost of construction, right-of-way and financing. They would only be used to build or rebuild highways identified in the Transportation Policy Plan or projects consistent with the policies of the policy plan. Today, these highways or bridges might include some type of exclusive high-occupancy vehicle lane or bus lane, bicycle path or sidewalk, park-and-ride lots and passenger waiting areas. In addition, various traffic management tolls could be built into the project. Today's technology will allow electronic fee collection, which would reduce the inconvenience of frequent stops to pay tolls. This is a major complaint about present toll roads. No estimate of toll charges or revenues are given because they would vary with the corridor and facility.

Political and public sentiment increasingly supports the use of tolls and other direct user fees rather than fuel taxes. A May 2007 report from the Reason Foundation reported that polls conducted around the United States clearly demonstrate that a majority find it preferable and more fair to fund transportation with tolls rather than with increases in fuel taxes.[128] For example, a recent survey conducted by the American Automobile Association found that more than half of the respondents favor tolls while only 21 percent favor fuel taxes.

Congestion Pricing or Variable Rate User Fees. This new user fee is intended to improve travel times by providing incentives to those willing to change modes or travel times. The intent is to raise revenues, reduce congestion, and therefore reduce travel time in peak periods. This fee has been called a peak-period user fee, a congestion avoidance fee or a congestion-pricing fee. The intent of the variable fee is to reduce peak-period congestion and increase speeds on the busiest highways and bridges.

Sales Tax. Sales taxes are a commonly-used revenue source for transportation, especially at the local level. They are a particularly important source of revenue for local public transit systems.

Incentives to Build Infrastructure. In addition to directly financing and building infrastructure, the public sector can offer incentives to private parties to aid in the provision of infrastructure. Governments make extensive use of debt financing to pay for infrastructure. In order to make their debt more attractive to private investors, governments are able to issue many types of bonds as tax-exempt bonds, with the income from the bonds being exempt from federal taxation. This provision raises the after-tax yield of the bonds, making them more attractive to investors. In 2009, the US federal government enabled the use of Build America Bonds by state and local governments as part of the ARRA (stimulus bill). The bonds are a form of taxable municipal bond that offer a combination of tax credits and federal subsidies for issuers and bondholders. Their intended purpose is to lower the cost of borrowing for state and local governments so that they can initiate a large number of new construction projects designed to provide a fiscal stimulus.

Other types of financing incentives include government-backed bonds, where a unit of government guarantees the issuance of debt by a private entity, thus making it easier for that entity to obtain financing for a project on reasonable terms. Some private projects may be financed with private activity bonds, especially those where some element of public benefit may be determined. Private activity bonds that are qualified carry some of the same tax advantages as tax-exempt municipal bonds.

The provision of infrastructure often requires the purchase of land for right-of-way on which to build a facility. In the process of acquiring land, governments are enabled to use their powers of eminent domain when landowners will not willingly sell their land. Eminent domain can serve as a powerful incentive to expedite the process of infrastructure development. Governments seeking to accelerate the development of a new road, public or private, can use eminent domain powers to reduce delays in land acquisition.

Improvement Districts. Improvement Districts can be formed for the purpose of street, water, sewer, drainage and other local improvements pursuant to Arizona Revised Statute 48-909. The State of Arizona also authorizes the creation of improvement districts in unincorporated areas

(areas located outside city limits) for the purposes of making local improvements such as paving, re-paving, grading, re-grading, or to improve all, or any portion of, one or more streets in a proposed district (see Arizona Revised Statute 48, Chapter 6).

References:

Federal Highway Administration. 2008. Innovation Wave: An Update on the Burgeoning Private Sector Role in U.S. Highway and Transit Infrastructure United States Department of Transportation, July 18, 2008.

Transportation Research Board. 2002. Review of the Potential Feasibility of using Alternative Revenue Sources To Fund Future State Transportation Needs. NCHRP Project 08 36, Task 23, National Cooperative Highway Research Program.

Appendix L – Table of Planned Improvements

NO.	Responsible Entity	Notes	Item #	Roadway	Location	Description	TYPE	Lanes	Length	Cost w/ROW $ (1000s)	Column2
1	BHC	1	2015	Five-way Intersection	Intersection of Trane, Baseline and Ramar Roads	Study to evaluate and recommend improvements	M	-	-	$25	
2	BHC	12	2015	Colorado River Crossing (i.e. "2nd Bridge")	Southern Option	New 4-lane bridge	NB	4	-	$20,200	
3	BHC	2	2015	Goldrush Rd	Ramar Rd to Silver Creek Rd	Improvements, 2 to 4 lanes	RW	4	0.4	$783	2-lane to 4 lane, improvements
4	BHC	1	2015	Access Management Plan	-	Develop access management standards and procedures	M	-	-	$50	
5	BHC	3	2015	Multi-use Path	Riverview Drive south on to Lakeside Drive	Segment completes loop of Rotary Park	P	-	1.0	$518	10' multi-use path
6	BHC	1	2015	Bullhead Parkway	Entire length	Multi-modal improvements	RI	-	10.1	$489	
7	BHC	2	2015	Ramar Rd	Alta Vista Rd to Goldrush Rd	Improvements, 2 to 4 lanes	RW	4	1.2	$2,350	2-lane to 4 lane, improvements
8	BHC	2, 4	2015	Ramar Rd Multi-modal Improvement	SR 95 to Alta Vista Rd	Improvements, 2 to 4 lanes	RI	4	0.5	$795	
9	BHC	5	2015	Surface Treatment Surveys	City-wide	Annual program	RI		77.7	$58	
10	BHC	1	2015	Sidewalk Inventory and Prioritization	-	Identify schools and heavily populated areas for sidewalks	M	-	-	$10	
11	BHC	5	2015	Surface Treatment Program	City-wide, (based on the current PCI)	Annual street improvement program	M	-	-	$14,920	
12	BHC	6	2015	Traffic Signals	Throughout the City	As many as 5 addt'l signals may be needed	M	-	-	$925	
13	BHC	4	2015	Trane Road	Hancock Rd to Zircon Ave	Construction of curbs, gutters and sidewalks and bicycle lanes.	RI	-	0.3	$795	
14	Developer	2	2015	Locust Blvd	Pegasus Ranch Rd to La Mesa Rd	New roadway, 2 lanes	RN	2	1.4	$3,212	New 2-lane, improvements
15	Developer	6	2015	Traffic Signals	Throughout the City	As many as 10 addt'l signals may be needed	M	-	-	$1,850	
									Subtotal Bullhead City	**$41,918**	
									Subtotal Developer Cost	**$5,062**	
16	BHC	7	2020	Alta Vista	Hancock east of SR 95	Multi-modal improvements	RI	2	0.7	$519	Multi-modal improvements; bike lane striping, curb, gutter and sidewalk
17	BHC	2	2020	Arcadia Boulevard	Havasupai Dr to Alta Vista Rd	New roadway, 2 lanes	RN	2	0.7	$1,661	New 2-lane, improvements
18	BHC	8	2020	Bullhead Parkway	Entire length	Multi-modal improvements	RI	4	10.1	$11,125	4-lane improvements, curb, gutter and sidewalk
19	BHC	2	2020	Bullhead Parkway	Mohave Crossroads Mall to Colorado River	New roadway, 4 lanes	RN	4	1.0	$3,463	New 4-lane improvements, curb, gutter and sidewalk
20	BHC	9	2020	Bullhead Parkway	Entire length	[ROW acquisition for future improvements (i.e. turn lanes)]	M	4	10.1	$417	
21	BHC	2, 10	2020	Landon Drive	State Land portion of alignment	New roadway	RN	2	1.0	$4,248	New 2-lane, improvements

NO.	Responsible Entity	Notes	Item #	Roadway	Location	Description	TYPE	Lanes	Length	Cost w/ROW $ (1000s)	Column2
22	BHC	7	2020	Marina Boulevard Multi-modal Improvement	Colorado Blvd to Riviera Blvd	Multi-modal improvements	RI	2	1.0	$742	Multi-modal improvements; bike lane striping, curb, gutter and sidewalk
23	BHC		2020	Olde Town/ Bullhead area		Rejuvenation/ Revitalization (specific projects not identified)	M	-	-	-	
24	BHC	7	2020	Ramar Rd Multi-modal Improvement	Lakeside Dr to Trane Rd	Multi-modal improvements	RI	2	0.5	$371	Multi-modal improvements; bike lane striping, curb, gutter and sidewalk
25	BHC	2	2020	Riverview Dr	Riviera Blvd to SR 95	Improvements, 2 to 4 lanes	RI	4	1.8	$3,524	2-lane to 4 lane, improvements
26	BHC	11	2020	Silver Creek Rd	East of SR 95 to Gold Canyon (E)	New roadway, 4 lanes	RN	4	1.9	$4,579	New 4-lane
27	BHC	5	2020	Surface Treatment Surveys	City-wide	Annual program	RI		77.7	$58	
28	BHC	5	2020	Surface Treatment Program	City-wide, (based on the current PCI)	Annual street improvement program	M	-	-	$14,920	
29	BHC	6	2020	Traffic Signals	Throughout the City	As many as 5 addt'l signals may be needed	M	-		$925	
30	BHC	7	2020	Trane Rd Multi-Modal Improvement	Zircon Ave to Ramar Rd	Multi-modal improvements	RI	2	0.3	$223	Multi-modal improvements; bike lane striping, curb, gutter and sidewalk
31	BHC	2	2020	Mohave Dr	SR 95 to Adobe Rd	New roadway, 2 lanes	RN	2	1.0	$1,958	2-lane to 4 lane, improvements
32	Developer	11	2020	North Oatman Rd	East of Bullhead Pkwy to Gold Canyon	New roadway, 2 lanes	RN	2	0.6	$1,020	New 2-lane Section, no curb/gutter
33	Developer	11	2020	Black Mountain Rd	SR 95 to Tesota Way	Pave existing dirt road	RI	2	2.0	$2,733	New 2-lane Section, no curb/gutter
34	Developer	11	2020	Gold Canyon Pkwy	Southern Loop	New roadway, 2 lanes	RN	2	3.3	$5,350	New 2-lane Section, no curb/gutter
35	Developer	2, 10	2020	Landon Drive	Private portion of alignment	New roadway	RN	2	0.9	$4,018	New 2-lane, improvements
36	Developer	2	2020	Laughlin Ranch Blvd	SR 95 to Bullhead Pkwy	New roadway, 4 lanes	RN	4	1.5	$5,194	New 4-lane improvements, curb, gutter and sidewalk
37	Developer	11	2020	Rio Rancho Blvd	Bullhead Pkwy to Grapevine Dr	New roadway, 2 lanes	RN	2	2.1	$3,570	New 2-lane Section, no curb/gutter
38	Developer	1	2020	North Oatman Rd	"S' curve from Sr 95 to Riverview Dr	Improve roadway geometric design	RI	4	0.2	$2,000	
									Subtotal Bullhead City	**$48,733**	
									Subtotal Developer Cost	**$23,885**	
39	BHC	13	2020	Colorado River Crossing	Mid-Town Option	New 4-lane bridge	NB	4	-	-	
40	BHC	5	2030	Surface Treatment Surveys	City-wide	Annual program	RI		77.7	$117	
41	BHC	5	2030	Surface Treatment Program	City-wide, (based on the current PCI)	Annual street improvement program	M	-	-	$29,840	
42	BHC	6	2030	Traffic Signals	Throughout the City	As many as 5 addt'l signals may be needed	M	-	-	$925	
43	BHC	11	2030	Vanderslice Rd	Bullhead Pkwy to Sterling Rd	New 4 lanes	RN	4	1.7	$3,995	New 4-lane

NO.	Responsible Entity	Notes	Item #	Roadway	Location	Description	TYPE	Lanes	Length	Cost w/ROW $ (1000s)	Column2
44	**BHC**	2	2030	Arcadia Blvd	SR 95 to Adobe Rd	2-lane to 4-lane	RW	4	2.8	$5,482	2-lane to 4 lane, improvements
45	**Developer**	11	2030	Silver Creek Rd	East of BHP to Gold Canyon Pkwy (W)	New roadway, 4 lanes	RN	4	0.6	$1,410	New 4-lane
46	**Developer**	11	2030	Black Mountain Rd	Tesota Way (Proposed) to Bullhead Pkwy	New roadway, 2 lanes	RN	2	1.0	$1,622	New 2-lane Section, no curb/gutter
47	**Developer**	11	2030	Laughlin Ranch Blvd	East to SR 95 Bypass (proposed)	New roadway, 4 lanes	RN	4	2.6	$6,267	New 4-lane
48	**Developer**	11, 10	2030	Rio Rancho Blvd	Grapevine Dr (Proposed) to Gold Canyon Pkwy (Proposed)	New roadway, 2 lanes	RN	2	1.8	$4,871	New 2-lane Section, no curb/gutter
49	**Developer**	11	2030	Silver Creek Rd	East of Gold Canyon to SR 95 Bypass	New roadway, 4 lanes	RN	4	1.0	$2,350	New 4-lane
50	**Developer**	2, 14	2030	Tesota Way	Rio Rancho to Bullhead Pkwy	New roadway	RN	2	4.6	$16,413	New 2-lane, improvements
51	**Developer**	2	2030	Adobe Rd	Arcadia Blvd to Bullhead Pkwy	2-lane to 4-lane	RW	4	1.8	$3,524	2-lane to 4 lane, improvements
52	**Developer**	2	2030	North Oatman Rd	SR 95 to Bullhead Pkwy	2-lane to 4-lane	RW	4	3.0	$5,874	2-lane to 4 lane, improvements
									Subtotal Bullhead City	**$40,358**	
									Subtotal Developer Cost	**$42,331**	

Notes:

M Miscellaneous
NB New bridge
RW Roadway widen
P Path
RI Roadway improvement
RN Roadway new

Arterial COST PER MILE WORKSHEET						6"AC/10"AB	
New 12' Lane		***2010 Dollars***				28.6	$/SY
AC PAVEMENT SECTION	Lane/Mile	$ 201,344.00		12-Foot Lane		5280	Ft/Mile
SHOULDER PAVING	Lane/Mile	$ 122,672.00		10-Foot Lane		12	Width
LOW WATER CROSSINGS	LF	$ 322.00		Basis at 68 ft wide		63360	SF
10'W X 4'H REINF. CONCRETE BOX CULVERT	LF	$ 650.00		LF runs width of roadway		9	SY/SF
BRIDGE	SF	$ 110.00				7040	SY
CURB AND GUTTER	LF	$ 12.50				$ 201,344.00	mile
6' WIDE CONCRETE SIDEWALK	LF	$ 27.00		6 Foot Wide			
CLEARING AND REMOVALS	MILE	$ 20,000.00		Use for Trailblazing		4"AC/8"AB	Shoulder
ROADWAY EXCAVATION	Lane/Mile	$ 31,680.00		Use for Trailblazing		20.91	$/SY
ROADWAY LIGHTING	MILE	$ 112,000.00		Use for Trailblazing		5280	Ft/Mile
SIGNAGE	MILE	$ 10,000.00		Use for Trailblazing		10	Width
TRAFFIC MARKING, DELENEATORS, ETC	Lane/Mile	$ 5,000.00				52800	SF
TEMPORARY TRAFFIC MARKING	Lane/Mile	$ 1,000.00				9	SY/SF
SIGNALIZED INTERSECTION	EACH	$ 185,000.00		ARTERIAL		5866.666667	SY
STORM DRAINAGE	MILE	$ 20,000.00				$ 122,672.00	mile
LANDSCAPING	SF	$ 3.56		Cadillac Plan			
REMOVE ASPHALTIC PAVEMENTS	SY	$ 2.50				RDWY EX	
PUBLIC RELATIONS	**1%**					4.5	$/SY
MAINTENANCE OF TRAFFIC	**7%**					5280	Ft/Mile
EROSION CONTROL	**1%**					12	Width
MOBILIZATION	**9%**					63360	SF
CONTRACTOR QUALITY CONTROL	**0.75%**					9	SY/SF
SURVEYING	**1.75%**					7040	SY
CONTINGENCIES	**20%**					$ 31,680.00	$/lane mile
**Note:							
Does not include Departments C&E (14%)						CONC PAVE	
Does not include Right of Way Considerations						$ 36.00	$/SY Conc
Does not include Temporary Construction Easement Considerations						$ 4.00	$/SF Cost
Does not include Existing Utility Adjustments or Relocations						68	Width
Does not include New Utility Installations						$ 272.00	Subtotal
						$ 50.00	Cutoff wall
10' Multi-use Trail1	Lane/mile	$ 450,000.00				$ 322.00	$$/FT
15 percent contingency for drainage and slope conditions for paths/trails	1 each	$ 67,500.00					

BULLHEAD CITY
ASSUMED PAVEMENT SECTIONS

Arterial Pavement Section Nistetter 10/7/2010

3" AC C-3/4 Mix	147 #/CF = 0.3308 ton/SY				
	1.5% Min Admixture @ $90/ton		SY	$	0.45
	5.0% AC @ $400/ton		SY	$	6.62
3" AC C-3/4 Mix	AC 3/4 Mix @ $34/ton		SY	$	11.24
10" AB Class 2					
	136 #/CF				
	$23.00 per CY				
	0.278CY per SY			$	7.79
Compacted Subgrade				$	2.50
	***PER SQUARE YARD TOTAL:**			**$**	**28.60**

12 Lane width
5280 LF/Mile
63360 SF/Mile
9 SF/SY
7040 SY

*Does not include roadway excavation

Shoulder Pavement Nistetter 10/7/2010

4" AC C-3/4 Mix	147 #/CF = 0.22 ton/SY				
	1.5% Min Admixture @ $90/ton		SY	$	0.30
	5.0% AC @ $400/ton		SY	$	4.40
	AC 3/4 Mix @ $27/ton		SY	$	7.48
Prime Coat					
8" AB Class 2	136 #/CF				
	$28.00 per CY				
	0.2225CY per SY		SY	$	6.23
Compacted Subgrade				$	2.50
	***PER SQUARE YARD TOTAL:**			**$**	**20.91**

10 Shoulder width
5280 LF/Mile
52800 SF/Mile
9 SF/SY
5867 SY

*Does not include roadway excavation

Detour Pavement Section Nistetter 10/7/2010

4" AC (Misc Structural)	147 #/CF = 0.22 ton/SY				
	$80 / ton				
	4" AC Paving			$	17.60
	$1.50 per SY - Remove Detour			$	1.50
Compacted Subgrade				$	2.50
	***PER SQUARE YARD TOTAL:**			**$**	**21.60**

*Does not include roadway excavation

1/2" AR-ACFC

Asphalt Rubber Friction Course	0.025ton X $35/ton = $0.88 /SY	$	1.13	SY	$	45.00
Rubber Material @ $525 /ton (9.5%)	0.025ton X 0.095 X $500/ton = $1.19 /SY	$	1.31	SY	$	550.00
Mineral Admixture @ $90 /ton (1.0%)	0.05ton X 0.01 X $90/ton = $0.05 /SY	$	0.03	SY		
Spread Rate of 100 #/SY		$	2.46	SY		
50# = 0.05ton/SY	Tack Coat	$	0.15	SY		
		$	**2.61**	SY		

1" AR-ACFC

Asphalt Rubber Friction Course	0.05ton X $35/ton = $1.75 /SY	$	2.25	SY	$	45.00
Rubber Material @ $525 /ton (9.5%)	0.05ton X 0.095 X $500/ton = $2.38 /SY	$	2.61	SY	$	550.00
Mineral Admixture @ $90 /ton (1.0%)	0.05ton X 0.01 X $90/ton = $0.05 /SY	$	0.05	SY		
Spread Rate of 100 #/SY		$	4.91	SY		
100# = 0.05ton/SY	Tack Coat	$	0.15	SY		
		$	**5.06**	SY		

1-1/2" AR-ACFC

Asphalt Rubber Friction Course	0.075ton X $35/ton = $3.38 /SY	$	3.38	SY	$	45.00
Rubber Material @ $525 /ton (9.5%)	0.075ton X 0.095 X $550/ton = $3.92 /SY	$	3.92	SY	$	550.00
Mineral Admixture @ $90 /ton (1.0%)	0.075ton X 0.01 X $90/ton = $0.05 /SY	$	0.07	SY		

BULLHEAD CITY
ASSUMED PAVEMENT SECTIONS

Spread Rate of 150 #/SY			$ 7.36	SY
150# = 0.075ton/SY	Tack Coat		$ 0.15	SY
			$ 7.51	SY

Mineral Admixture

	1.50%	Rate	
X	0.6064	Ton/SY	
	0.009096		
	$ 90.00	$/Ton	
	$ 0.82	$/SY	Subtotal

Asphaltic Cement

	5.00%	Rate	
X	0.6064	Ton/SY	
	0.03032		
X	$ 550.00	$/Ton	
	$ 16.68	$/SY	Subtotal

1" AC Mix

	0.6064	Ton/SY	
X	**$ 45.00**	$/ton	
	$ 27.29	$/SY	Subtotal

Prime Coat or Tack Coat

	$ 440.00	$/Ton	
X	240	Gal/Ton	
	$ 1.83	$/Gal	
X	0.08	Gal/SY	
	$ 0.15	$/SY	Subtotal

ROW Cost

5280 feet/mile

Bullhead City Estimate $25,000 acre[a]

	Max ROW[b]	ROW Cost per Mile
Collector (C)	84 ft	$254,500
Minor Arterial (MI)	110 ft	$333,300
Major Arterial (MA)	130 ft	$393,900

Notes

ROW - Right of Way

[a] Estimated ROW cost per acre provided by Bullhead City

[b] Refer to Appendix F - Bullhead City Standard Detail Street Sections for ROW widths for various street types

Assumptions:

Right-of-way purchased for maximum width for each street type (Collector, Minor Arterial, Major Arterial)
it is assumed that if FC is same for future improvements, ROW exists