Town of Dewey-Humboldt PARA Transportation Study

ADOT MPD Task Assignment 17-11
PGTD 0717
Contract # T08-49-U0001

FINAL
Working Paper 2
Evaluation Criteria and Plan for Improvements

Prepared by:

Kimley-Horn and Associates, Inc.

In association with:
Field Data Services of Arizona, Inc.
KDA Creative

Prepared for:
ARIZONA DEPARTMENT OF TRANSPORTATION
TOWN OF DEWEY-HUMBOLDT

March 2012
091374044

IDENTIFICATION

Management Team

Arizona Department of Transportation
Mail Drop: 310B
206 S. 17th Ave.
Phoenix, AZ 85007

Dianne Kresich, Project Manager
Email: dkresich@azdot.gov
Telephone: 602-712-3134
Fax: 602-712-3046

Town of Dewey-Humboldt
P.O. Box 69
2735 South Highway 69, Suite 12
Humboldt, Arizona 86329

Grant Anderson, Acting Town Engineer
Email: ganderson@willdan.com
Telephone: 602-395-7509
Fax: 602-870-7601

Study Consultant Team

Kimley-Horn and Associates, Inc.
2266 South Dobson Road
Suite 200
Mesa, AZ 85202-6412

Michael Grandy, P.E., Project Manager
Email: michael.grandy@kimley-horn.com
Telephone: 480-756-6137
Fax: 602-944-7423

Field Data Services of Arizona, Inc.
21636 North Dietz Drive
Maricopa, Arizona 85138

Jerry Morris, President
Email: jmorris@fdsaz.com
Telephone: 520-316-6745
Fax: 520-316-6743

KDA Creative
4545 E Shea Blvd, Ste 210
Phoenix, AZ 85028

Amy Rosar
Email: amy@kdacreative.com
Telephone: 602-368-9644
Fax: 602-368-9645

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

APPENDICES

Appendix A – Construction Cost Estimates
Appendix B – Traffic Impact Guidelines
Appendix C – Excerpts from the ADOT *State Route 69 Access Management Plan*
Appendix D – Excerpts from the ADOT *State Route 169 Access Management Plan*

1 INTRODUCTION

The Arizona Department of Transportation (ADOT) awarded funding for the Town of Dewey-Humboldt Transportation Study through the Planning Assistance for Rural Areas (PARA) program. The purpose of the PARA program is to assist rural counties, cities, towns, and tribal communities in conducting multimodal transportation planning for roadways and other modes of travel.

1.1 Study Purpose

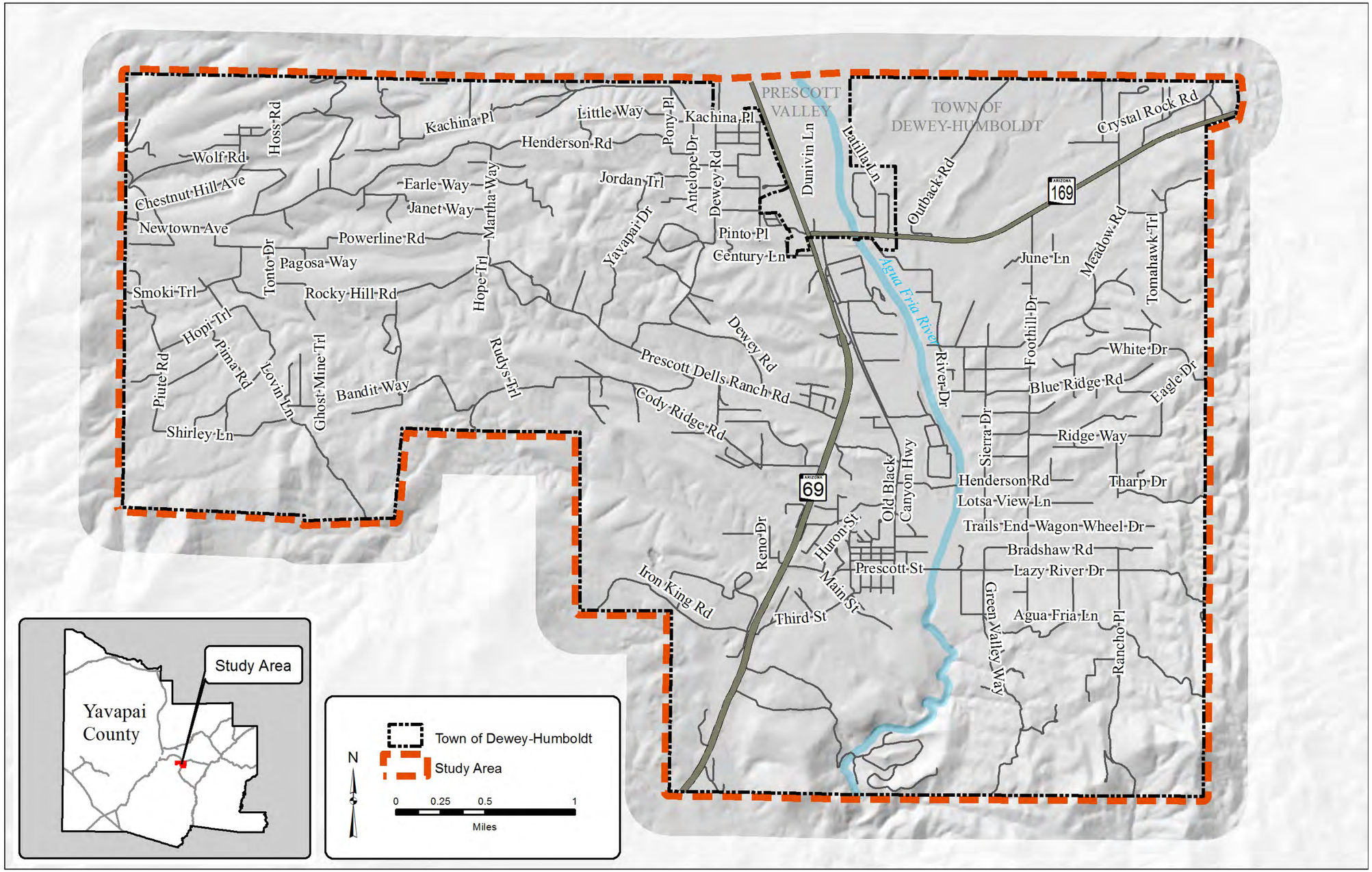
The Dewey-Humboldt PARA Transportation Study (study) identifies the roadway, transit, bicycle, and pedestrian needs within the Town of Dewey-Humboldt (Town). For purposes of this study, needs are defined as unmet demand for transportation facilities or services. The study recommends improvements to help meet the identified needs over the next 20 years. These recommendations serve as a guide for future community development, project funding applications, and project implementation.

1.2 Document Purpose

This document, Working Paper 2 – *Evaluation Criteria and Plan for Improvements*, discusses evaluation criteria for potential improvements and presents a plan for implementing recommended improvements that address the transportation needs identified previously in Working Paper 1 – *Current and Future Conditions*.

1.3 Study Area

The study area is all of the land within the Dewey-Humboldt town limits, as well as the southern tip of Prescott Valley, as shown in **Figure 1**. The study area measures approximately 12,322 acres, or 19.25 square miles.



Source: Town of Dewey-Humboldt

Figure 1 – Study Area Map

2 REVIEW OF PREVIOUSLY IDENTIFIED NEEDS

Transportation system needs (i.e., unmet demand for transportation facilities or services) were identified previously during the analysis of current and future conditions. In addition, comments have been received from the public, the Technical Advisory Committee (TAC), and stakeholders regarding transportation system needs. Based on the needs identified and the comments received, areas for improvements were identified, evaluation measures were defined, and potential improvement projects and actions were developed. The needs identified are summarized in the following sections.

2.1 Identified Current Needs

The current needs for the study area transportation system were identified in Working Paper 1. They are summarized here for reference.

2.1.1 Roadways

The following study area roadway segment and intersection improvements are currently needed to provide a continuous, all-weather roadway network that promotes safe and efficient traffic operations:

- Improving or paving existing unpaved roadways;
- Pavement maintenance of deteriorating roadways;
- Traffic signal modifications at the State Route (SR) 69/SR 169 intersection;
- Implementation of access management plans along SR 69 and SR 169;
- Federal functional reclassification of several existing roadway segments;
- All-weather access across the Agua Fria River near Prescott Street; and
- Improved network continuity and emergency vehicle access west of SR 69.

2.1.2 Other Modes of Travel

The transit needs within the study area include transit services for disadvantaged populations, more mobility management to better coordinate private transit services, and stable funding for transit services.

There is a need for clearly-defined bicycle and pedestrian networks throughout the study area to connect activity centers, residential areas, and recreation areas. Sidewalks and accessible facilities that are compliant with the Americans with Disabilities Act (ADA) are needed, particularly in the vicinity of activity centers such as the Humboldt Elementary School, commercial areas, and the community core.

There is a need for a clearly-defined, continuous trail network to accommodate recreational travel throughout the study area and to connect to the existing regional trails adjacent to the study area.

2.2 Identified Future Needs

The future needs for the study area transportation system were identified in Working Paper 1. These needs are in addition to the current needs listed previously.

2.2.1 Roadways

The following study area roadway segment and intersection improvements are likely to be needed within the next 20 years:

- Improving or paving additional existing unpaved roadways;
- Continued pavement maintenance of deteriorating roadways;
- Further study of capacity on SR 69 north of SR 169 and on SR 169 if the planned Fain Road connector is not constructed;
- Continued implementation of access management plans along SR 69 and SR 169;

- Potential traffic control changes at the SR 69/Main Street, SR 69/SR 169, SR 69/Kachina Place, and SR 169/Foothill Drive intersections; and
- Potential additional federal functional reclassifications.

2.2.2 Other Modes of Travel

Anticipated future transit needs in the study area include continued transit services for disadvantaged populations, evaluation of participation in a regional transit system, continued mobility management to better coordinate private transit services, and stable funding for transit services.

As population and employment grow and sustainable transportation becomes a higher priority, additional bicycle, pedestrian, and recreational trail facilities will likely be needed.

3 EVALUATION CRITERIA

Evaluation criteria are factors that are considered in the analysis of a proposed improvement project to identify potential benefits, impacts, and constraints. The criteria are not all quantifiable; some are purely qualitative. More detailed analysis of evaluation criteria will be required during the scoping, concept development, and design phase of an improvement project. The following is a description of the evaluation criteria used in this study.

3.1 Meets Identified Need

Potential improvement projects should meet an identified need. This criterion helps ensure that staff and financial resources are spent on projects that address identified needs rather than on extraneous improvements.

3.2 Safety

This is a qualitative assessment that considers the impact a potential improvement may have on safety. Factors considered include current design standards for roadway, transit, bicycle, and pedestrian facilities.

3.3 Total Estimated Cost

Planning level right-of-way acquisition cost estimates were developed for each proposed improvement project utilizing a unit cost of $1.00 per square foot of vacant land for partial parcel acquisitions and a purchase cost equal to the current Yavapai County Assessor's website full cash value assessment for full acquisition of parcels containing residential structures.

Planning-level construction cost estimates have been developed for each proposed improvement project based on unit costs for each project type. Construction cost estimates include design and construction management costs unless otherwise noted.

Planning-level construction cost estimates are based on per-mile unit costs developed from historical bid prices for similar projects. Per-mile construction unit costs were developed for three types of terrain: level, rolling, and steep. The construction unit costs used in the evaluation process are shown in **Table 1**. Construction cost estimate details are shown in **Appendix A**.

Table 1 – Construction Unit Costs

Construction Description	Unit	Unit Cost Level Terrain	Unit Cost Rolling Terrain	Unit Cost Steep Terrain
Upgrade existing unpaved roadway to all-weather roadway	mile	$200,000	$520,000	$740,000
Pave existing unpaved roadway using chip seal	mile	$440,000	$760,000	$980,000
Pave existing unpaved roadway using asphalt	mile	$500,000	$820,000	$1,040,000
Realign and upgrade to all-weather roadway	mile	$640,000	$1,370,000	$2,010,000
Realign and upgrade to all-weather roadway using chip seal	mile	$900,000	$1,630,000	$2,270,000
Realign and upgrade to all-weather roadway using asphalt	mile	$970,000	$1,700,000	$2,340,000
Construct 6' sidewalk with curb and gutter	mile	$980,000	-	-
Construct 6' sidewalk without curb and gutter	mile	$630,000	-	-
Construct 6' unpaved shared-use path/trail	mile	$310,000	$800,000	$1,190,000
Install traffic signal	each	$500,000	-	-
Install roundabout	each	$1,000,000	-	-

The total estimated cost is the sum of the right-of-way and construction cost estimates and is calculated in 2012 dollars. Some individual improvement cost estimates are more specific because of available information. More detailed improvement costs will need to be developed during the scoping phase of each project and included in the Town's Capital Improvement Program (CIP) and the Central Yavapai Metropolitan Planning Organization (CYMPO) Transportation Improvement Program (TIP) where applicable.

3.4 Impacts to Right-of-Way

This is a quantitative measure that identifies if and how much right-of-way is anticipated to be needed. It does not include right-of-way for easements or construction activities.

3.5 Impacts to Existing Residences/Businesses

This is a quantitative measure that documents the number of residential and business buildings expected to be acquired as part of a potential improvement. The number is a conservative estimate at the planning stage.

3.6 Engineering Issues

Engineering issues require special design features in order to make a potential improvement feasible. Engineering issues could include bridges, drainage, terrain, and utilities.

3.7 Level of Service/Delay

Level of service and delay are quantitative measures for how much traffic congestion occurs. These measures give an indication of the overall impact of a potential improvement on the efficiency of the transportation system.

3.8 Accessibility/Mobility

This is a qualitative measure of a potential improvement's ability to improve the overall transportation system in terms of accessibility and mobility.

3.9 Network Continuity

This is a qualitative measure to assess a potential improvement's impact on providing a continuous transportation system by eliminating gaps that may exist in the current system.

3.10 Environmental Impacts

This is a qualitative measure that notes potential environmental issues. At the planning level, it is a visual observation of possible environmental constraints such as impacts to air quality, adjacent schools, parks, or natural habitat. Air quality impacts include vehicle emissions corresponding to the vehicular level of service/delay and dust emissions corresponding to vehicular travel on unpaved roadways.

3.11 Multimodal Compatibility

This is a qualitative measure that considers whether a potential improvement addresses multiple modes of travel by providing transit, bicycle, or pedestrian facilities.

4 IMPROVEMENT CONSIDERATIONS

The considerations described below guided the development and analysis of potential improvements.

4.1 Functional Classification Considerations

Functional classification defines the hierarchy of streets in a roadway system according to the character of service they are intended to provide as it relates to mobility, access, and trip length. The roles and standards for each type of roadway must be established in order to plan an efficient and effective system. Most travel involves movement through a network of roadways of varying functional classification.

The Federal Highway Administration (FHWA) has developed guidelines for federal functional classification of roadways. The federal functional classification groups include principal arterials, minor arterials, major collectors, minor collectors, and local roads. In general, the arterials provide a high level of mobility for the traveling public while the collectors and local roads provide for residential and non-residential access. The FHWA guidelines also distinguish between rural roadways (in areas with a population less than 5,000) and urban roadways (in areas with a population greater than 5,000).

The proper classification of roadways is important because classification indicates roadway function, and different roadway design guidelines and standards apply depending on the functional classification of the roadway. In addition, FHWA distributes federal aid funding based in part on functional classification. Most federal funding programs require roadways to have a functional classification of a rural major collector or higher.

The following describe the general characteristics associated with the different functional classifications.

Principal Arterials

- Include freeways and major highways;
- Provide regional connectivity;
- Mobility is the primary objective;
- Serve the highest volume generators;
- Usually carry regional bus routes; and
- Limited access with capability of moving high volumes at high speeds.

Minor Arterials

- Include other highways;
- Higher speed than collector or local;
- Longer trip length compared to collector and local;
- Usually carry local bus routes; and
- Do not usually connect through neighborhoods.

Major Collectors

- Distribute traffic to/from arterials;
- Collect traffic from minor collectors and local streets;
- Serve traffic generators of intracounty importance;
- May carry local bus routes; and
- May access neighborhoods.

Minor Collectors

- Distribute traffic to/from arterials and major collectors;

- Collect traffic from local streets;
- Serve traffic generators of intracommunity importance;
- May carry local bus routes; and
- May access neighborhoods.

Local Roads

- Provide direct access to abutting land;
- Discourage through traffic; and
- Lower speed limit than other classifications.

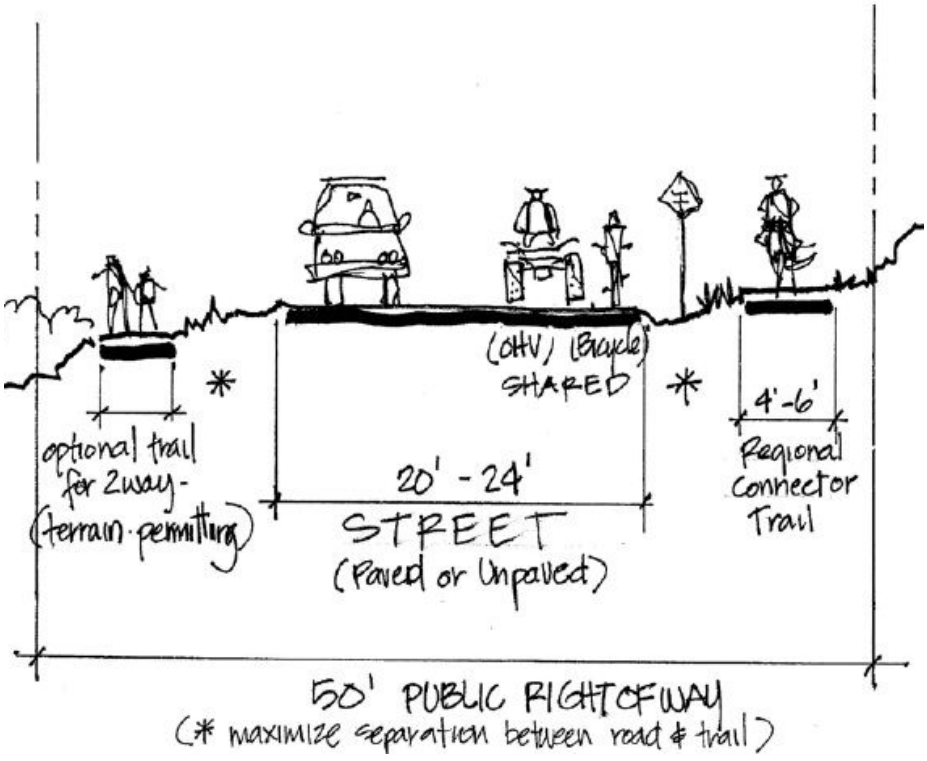
4.2 Complete Street Cross-Sections

Nationally, interest continues to increase regarding accommodating all roadway users (e.g., motorists, bicyclists, pedestrians, and transit riders) by creating "complete streets" that provide facilities (e.g., sidewalks, bike lanes, and transit amenities) for all of these user groups (see www.completestreets.org). Roadway users of all ages and abilities should be able to safely move along and across complete streets.

Elements of complete streets can include sidewalks, shared-use paths, bicycle lanes (or wide paved shoulders), special bus lanes, comfortable and accessible transit stops, frequent crossing opportunities, median islands, accessible pedestrian signals, curb extensions, and more. A complete street in a rural area may have a different cross-section than a complete street in an urban area, but both should be designed to balance safety and convenience for everyone using the roadway.

The Town's *Open Space and Trails Plan* (OSAT), which was completed in August 2010, provides several roadway cross-sections that include elements of complete streets. One of these cross-sections in particular, the Regional Connector Trail Cross-Section (see **Figure 2**), shows adequately-sized elements of a complete street within 50 feet of right-of-way. The cross-section includes one travel lane for motorized vehicles in each direction that is ten feet to twelve feet wide and shared-use paths for other modes of travel that are four feet to six feet wide. A natural planter strip/drainage area separates the motorized travel lanes from the shared-use paths for other modes of travel. Bicycles can utilize either the travel lanes or the shared-use paths.

Most of the Town's existing roadways have 50 feet of right-of-way and one travel lane in each direction for motorized vehicles (similar to the Regional Connector Trail Cross-Section) but they generally do not provide facilities for other modes of travel. In rural areas, the Town's existing roadways could be converted into complete streets by providing unpaved shared-use paths that are separated from the motorized travel lanes by a buffer that also acts as a drainageway. The shared-use paths should be four feet to six feet wide and the buffers should be four feet to eight feet wide, depending on the terrain. In urban areas, the buffer could be comprised of an eight-foot-wide parallel parking area and the shared-path could be replaced by a sidewalk, if desired. New roadways could be built to match the rural or urban versions of the Regional Connector Trail Cross-Section, as appropriate.



Source: Town of Dewey-Humboldt Open Space and Trails Plan

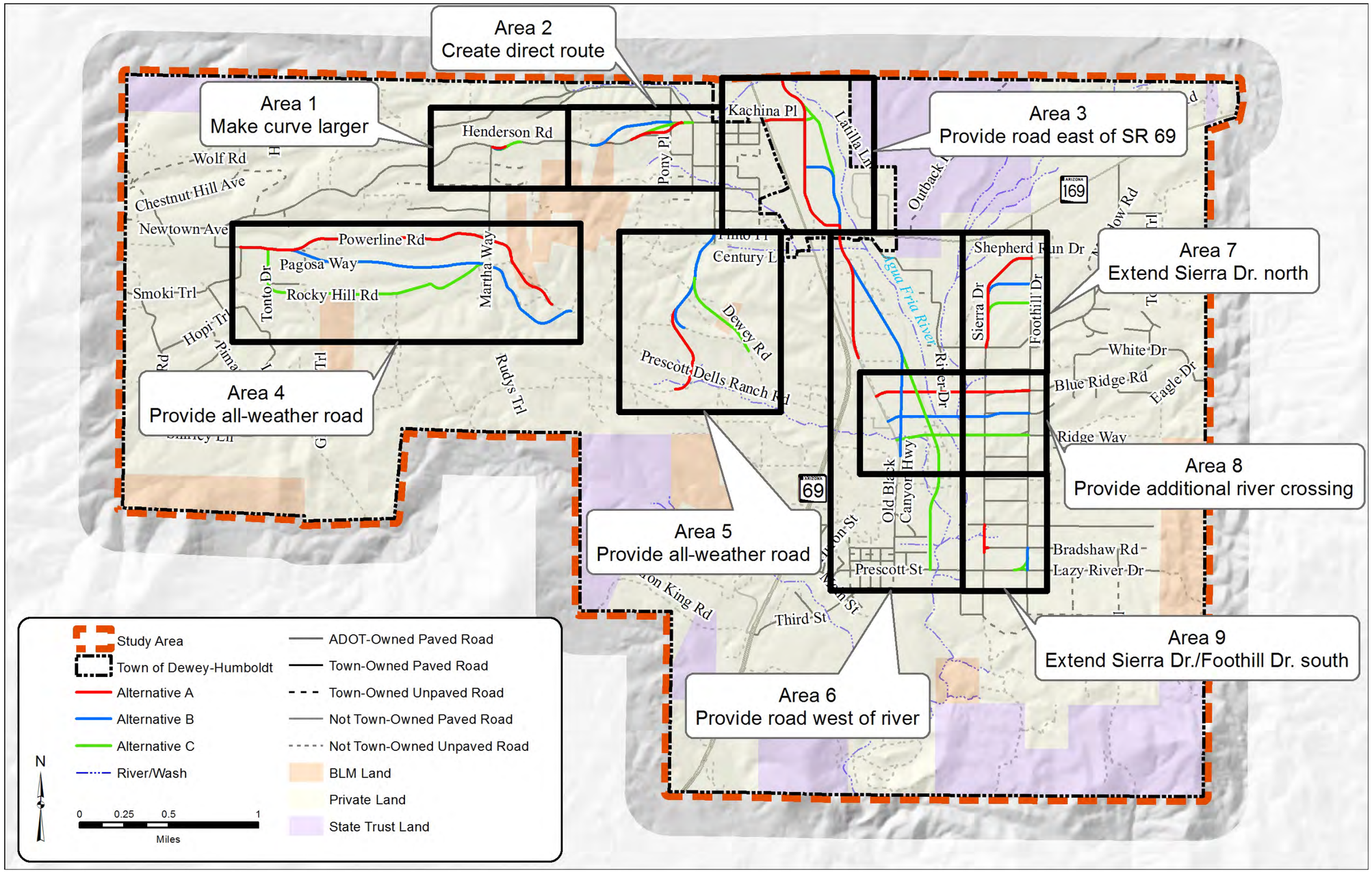
Figure 2 – Regional Connector Trail Cross-Section

4.3 Roadway Network Alternatives

The roadway network needs identified as part of this study include better network continuity, safety, emergency vehicle access, and dust control by means of an interconnected and continuous all-weather roadway network. Existing roadway network issues were identified in the following areas (see **Figure 3**) by comparing anticipated desired travel paths between origins and destinations with actual available travel paths:

- Area 1: Henderson Road/Martha Way Curve;
- Area 2: Henderson Road/Pony Place/ Horseshoe Lane;
- Area 3: Prescott Valley New Development Connection;
- Area 4: Powerline Road/Rocky Hill Road/Martha Way;
- Area 5: Dewey Road;
- Area 6: New Road West of Agua Fria River;
- Area 7: Sierra Drive Extension North;
- Area 8: Additional Agua Fria River Crossing; and
- Area 9: Sierra Drive and Foothill Drive Connections.

Three potential improvement alternatives were developed to address roadway network connectivity in each area. Each alternative has advantages and disadvantages. A comparative analysis of the potential improvement alternatives, along with a no-build alternative, was conducted using the evaluation criteria presented earlier in this document. The no-build alternative represents the do-nothing approach where no improvements are made to existing conditions.



Source: Kimley-Horn and Associates, Inc.

Figure 3 – Network Continuity Issue Areas and Alternatives

Planning-level construction cost estimates were calculated for each potential roadway network improvement alternative for three all-weather roadway surface types: upgraded unpaved (i.e., improved grading and minor drainage improvements), chip seal, and asphalt pavement.

Roadway easements or dedications, a lower-cost option to right-of-way acquisition, could be a viable solution in certain circumstances. For example, some of the roadway network improvement alternatives follow the same alignment as existing unpaved roadways that are privately-owned. These privately-owned roadways are often not well-maintained and may not be traversable during adverse weather conditions. If the owners of these private roadways are interested in improving these roadways to be all-weather roadways but do not have the financial resources to make the necessary improvements, the Town could potentially offer to make the desired improvements and provide ongoing maintenance on the roadways in exchange for voluntary roadway easements or dedications that would effectively convert the private roadways to public roadways without the Town having to purchase the right-of-way for the roadways.

The following subsections discuss each of the areas containing roadway network issues in more detail. Figures are provided that show the potential improvement alternatives developed for each area. Tables are provided that summarize the comparative analysis of the potential improvement alternatives and the no-build alternative.

4.3.1 Area 1: Henderson Road/Martha Way Curve

The sharpest curve along Henderson Road exists just east of the Henderson Road/Martha Way intersection and has a radius of 150 feet. To further promote safety and driver comfort at this curve, three potential roadway improvement alternatives have been developed. The alternatives are shown in **Figure 4** and are described more fully as follows:

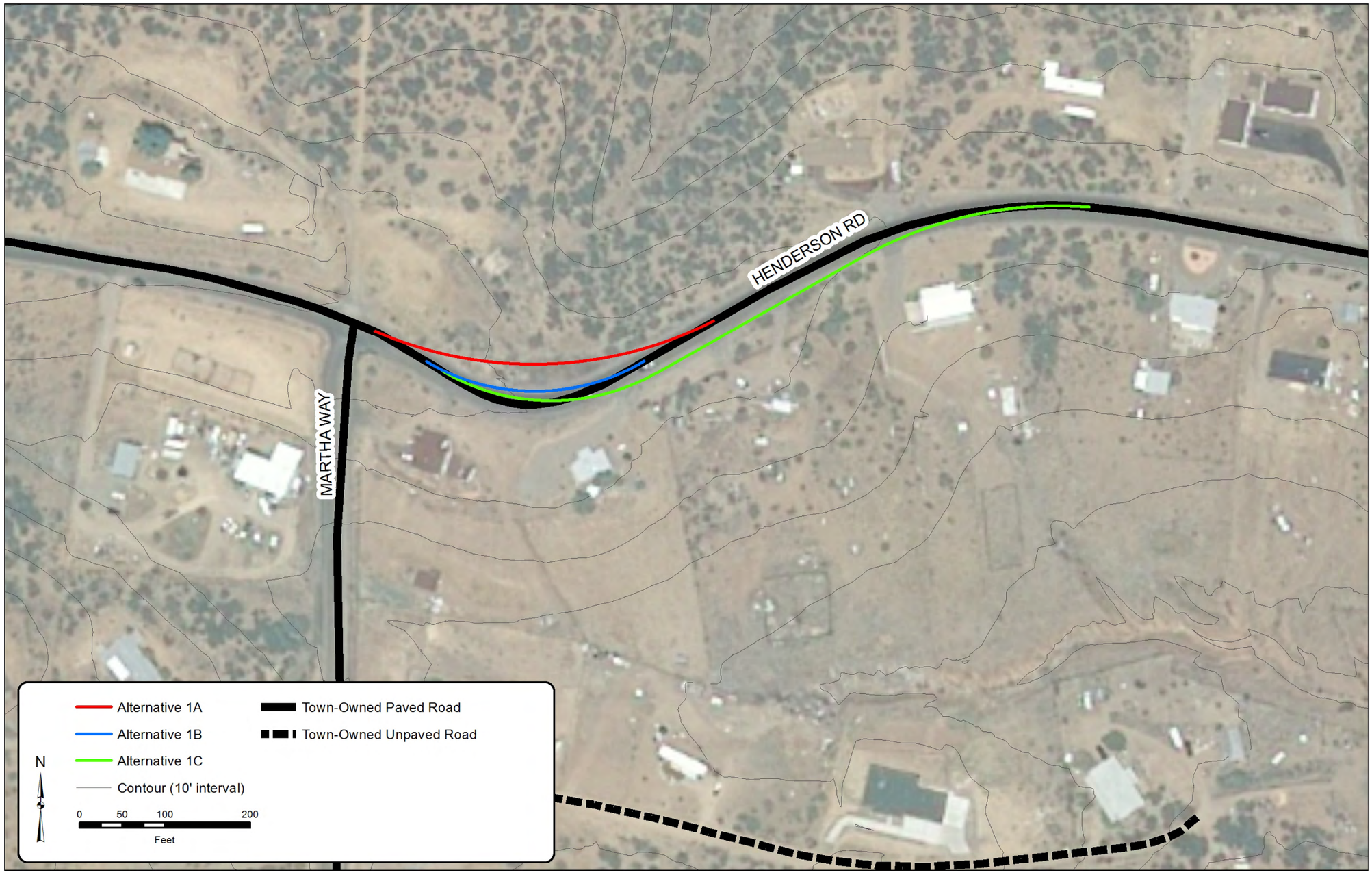
- *Alternative 1A* – This alternative provides a new curved roadway segment along Henderson Road that has a radius of 465 feet. This larger curve impacts the existing adjacent parcel on the north side of Henderson Road;
- *Alternative 1B* – This alternative provides a new curved roadway segment along Henderson Road that has a radius of 250 feet. This alternative has a smaller radius and less right-of-way impact to the parcel on the north side of Henderson Road compared to Alternative 1A; and
- *Alternative 1C* – This alternative provides a new curved roadway segment along Henderson Road that has a radius of 250 feet that stays within the Town's existing right-of-way and ties back in with existing Henderson Road farther to the east. This alternative has a similar curve radius to Alternative 1A but requires more new roadway construction.

A low-cost interim option to the three alternatives mentioned above would be to post "Curve Ahead" warning signs with a speed advisory plaque of 10 mph along Henderson Road on either side of the curve just east of the Henderson Road/Martha Way intersection.

Table 2 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 2 – Evaluation of Area 1 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 1A	Alternative 1B	Alternative 1C
Meets Identified Need	No	Yes	Yes	Yes
Safety	Potential safety issue	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $9,000	$0 - $2,000	$0
Construction Cost	None	$76,000	$50,000	$150,000
Total Estimated Cost	None	$76,000 - $85,000	$50,000 - $52,000	$150,000
Impacts to Right-of-Way	None	Yes (1 parcel)	Yes (1 parcel)	No impacts
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	No impacts
Engineering Issues	None	None	None	None
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	No impacts	No impacts	No impacts
Network Continuity	No impacts	No impacts	No impacts	No impacts
Environmental Impacts	None	Minimal	Minimal	Minimal
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 4 – Area 1: Henderson Road/Martha Way Curve Alternative

4.3.2 Area 2: Henderson Road/Pony Place/Horseshoe Lane

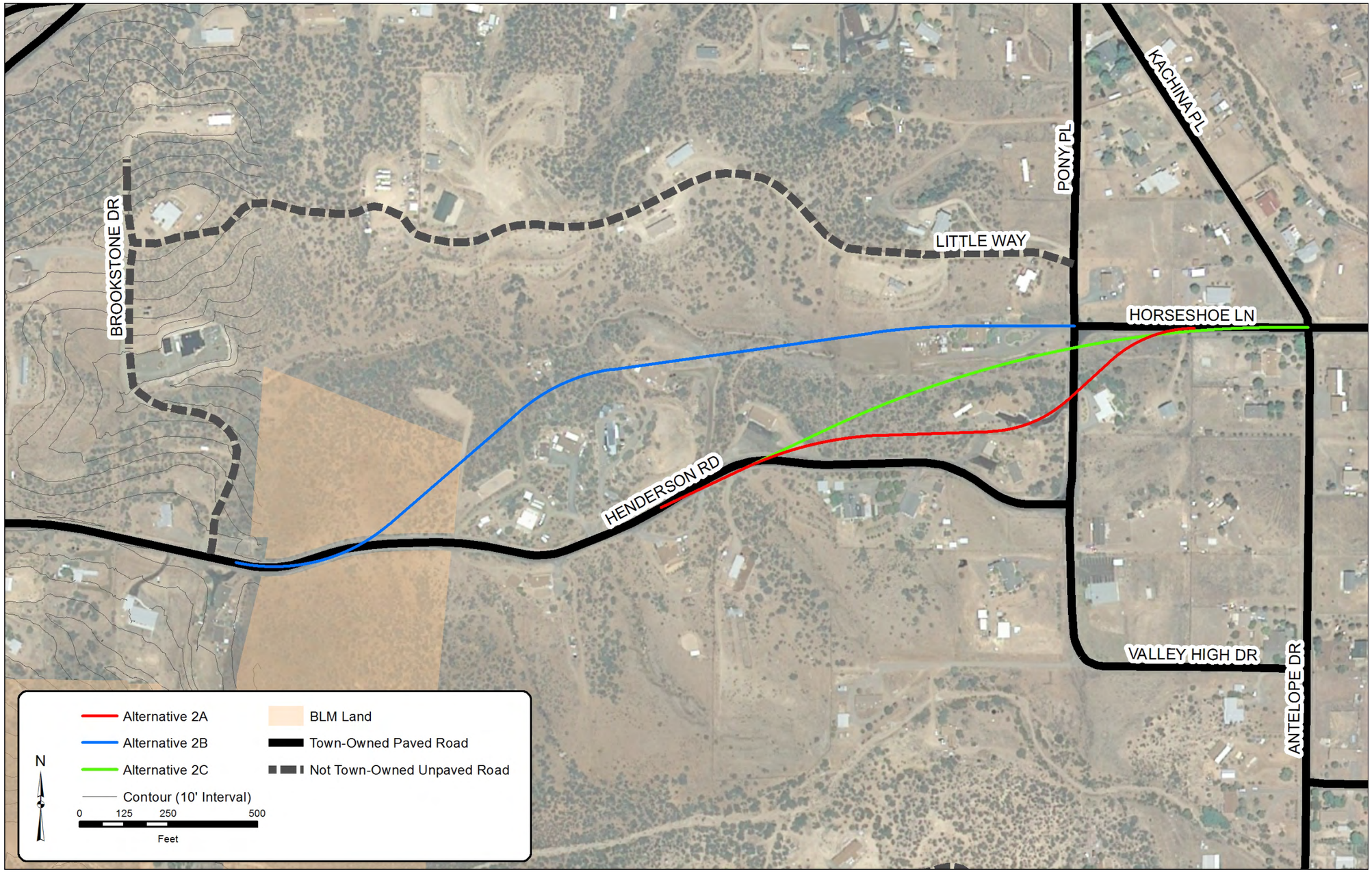
There is currently an offset in the rural minor collector comprised of Henderson Road, Pony Place, and Horseshoe Lane. While the roadway is continuous, it requires two turns in a short distance and is not direct. The existing roadway has an estimated maximum grade of six percent and crosses a parcel owned by the Bureau of Land Management (BLM). Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 5** and are described more fully below:

- *Alternative 2A* – This alternative provides a new reverse curve roadway segment that connects Henderson Road to Horseshoe Lane with the least deviation from the existing roadways while still providing appropriate minimum curve radii for a 20 mph posted speed limit. Pony Place intersects the reverse curve roadway segment at a skewed angle. This alternative has an estimated maximum grade of ten percent and impacts ten parcels and one existing residence;
- *Alternative 2B* – This alternative provides a new reverse curve roadway segment that connects Henderson Road to the west leg of the Pony Place/Horseshoe Lane intersection. This alternative has an estimated maximum grade of ten percent and impacts eight private parcels, one BLM parcel, and one existing residence; and
- *Alternative 2C* – This alternative provides a new curved roadway segment that connects Henderson Road to Horseshoe Lane with a single large curve. Pony Place intersects the reverse curve roadway segment at a slightly skewed angle. This alternative has an estimated maximum grade of ten percent and impacts eleven parcels.

Table 3 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 3 – Evaluation of Area 2 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 2A	Alternative 2B	Alternative 2C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $140,000	$0 - $190,000	$0 - $100,000
Construction Cost	None	$520,000	$820,000	$620,000
Total Estimated Cost	None	$520,000 - $660,000	$820,000 - $1,010,000	$620,000 - $720,000
Impacts to Right-of-Way	None	Yes (10 parcels)	Yes (8 parcels & 1 BLM parcel)	Yes (11 parcels)
Impacts to Existing Businesses/Residences	None	Yes (1 residence)	Yes (1 residence)	No impacts
Engineering Issues	None	Steep terrain	Steep terrain	Steep terrain
Level of Service/Delay	No Impacts	Improved	Improved	Improved
Accessibility/Mobility	No Impacts	Improved	Improved	Improved
Network Continuity	No Impacts	Improved	Improved	Improved
Environmental Impacts	None	Minimal	Minimal	Minimal
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 5 – Area 2: Henderson Road/Pony Place/Horseshoe Lane Alternatives

4.3.3 Area 3: Prescott Valley New Development Connection

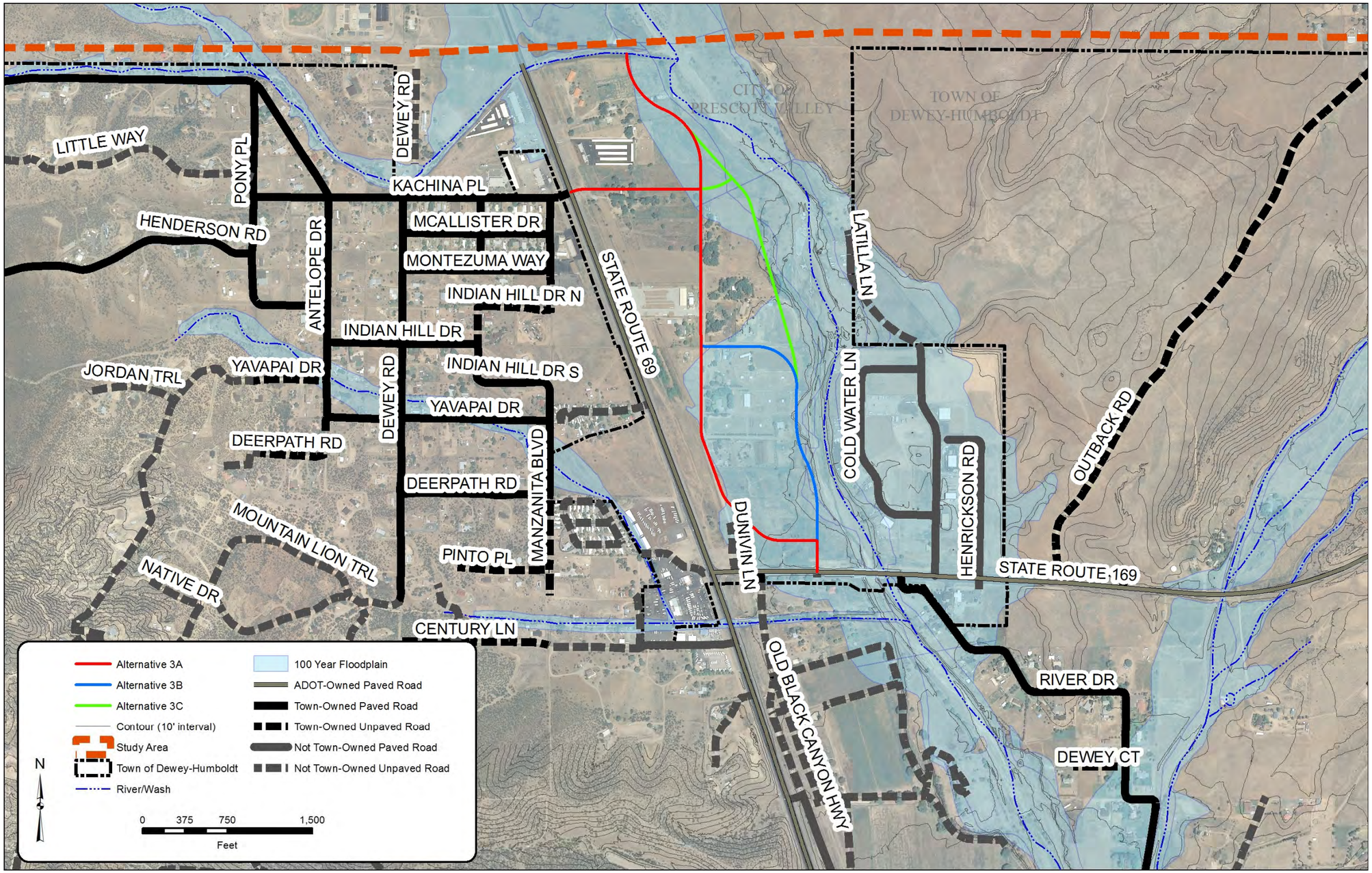
There is currently no all-weather north-south roadway east of SR 69 and north of SR 169. If the northeast corner of the SR 69/SR 169 intersection is developed as has been proposed by developers, an all-weather north-south roadway will likely be needed to provide access to the developments. This new north-south roadway would also provide an alternate route that could be utilized if the SR 69/SR 169 intersection is blocked due to a crash or other emergency situation. Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 6** and are described more fully below:

- *Alternative 3A* – This alternative begins at an ADOT-approved planned access point on SR 169 and heads north for approximately 300 feet before bending west to follow Dunivin Lane north out of the study area. Kachina Place extends east from SR 69 and connects to this alternative. This alternative generally is congruent with the conceptual roadway layout from the Prescott Valley Crossing and Headwaters proposed development site plans;
- *Alternative 3B* – This alternative begins at the ADOT-approved planned access point on SR 169 and heads north parallel to the Agua Fria River for approximately 1,500 feet before bending west into Alternative 3A. This alternative also generally is congruent with the conceptual roadway layout from the Prescott Valley Crossing and Headwaters proposed development site plans; and
- *Alternative 3C* – This alternative begins at the ADOT-approved planned access point on SR 169 and heads north parallel to the Agua Fria River until it converges with Alternative 3A. This alternative generally matches the north-south roadway alignment shown in this area in the draft *Prescott Valley 2025 General Plan*.

Table 4 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 4 – Evaluation of Area 3 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 3A	Alternative 3B	Alternative 3C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $810,000	$0 - $820,000	$0 - $810,000
Construction Cost	None	$810,000 - $1,220,000	$820,000 - $1,240,000	$800,000 - $1,210,000
Total Estimated Cost	None	$810,000 - $2,030,000	$820,000 - $2,060,000	$800,000 - $2,020,000
Impacts to Right-of-Way	None	Yes (22 parcels)	Yes (19 parcels)	Yes (17 parcels)
Impacts to Existing Businesses/Residences	None	Yes (2 residences)	Yes (2 residences)	Yes (2 residences)
Engineering Issues	None	Agua Fria River floodplain	Agua Fria River floodplain	Agua Fria River floodplain
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Minimal	Minimal	Minimal
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 6 – Area 3: Prescott Valley New Development Connection Alternatives

4.3.4 Area 4: Powerline Road/Rocky Hill Road/Martha Way

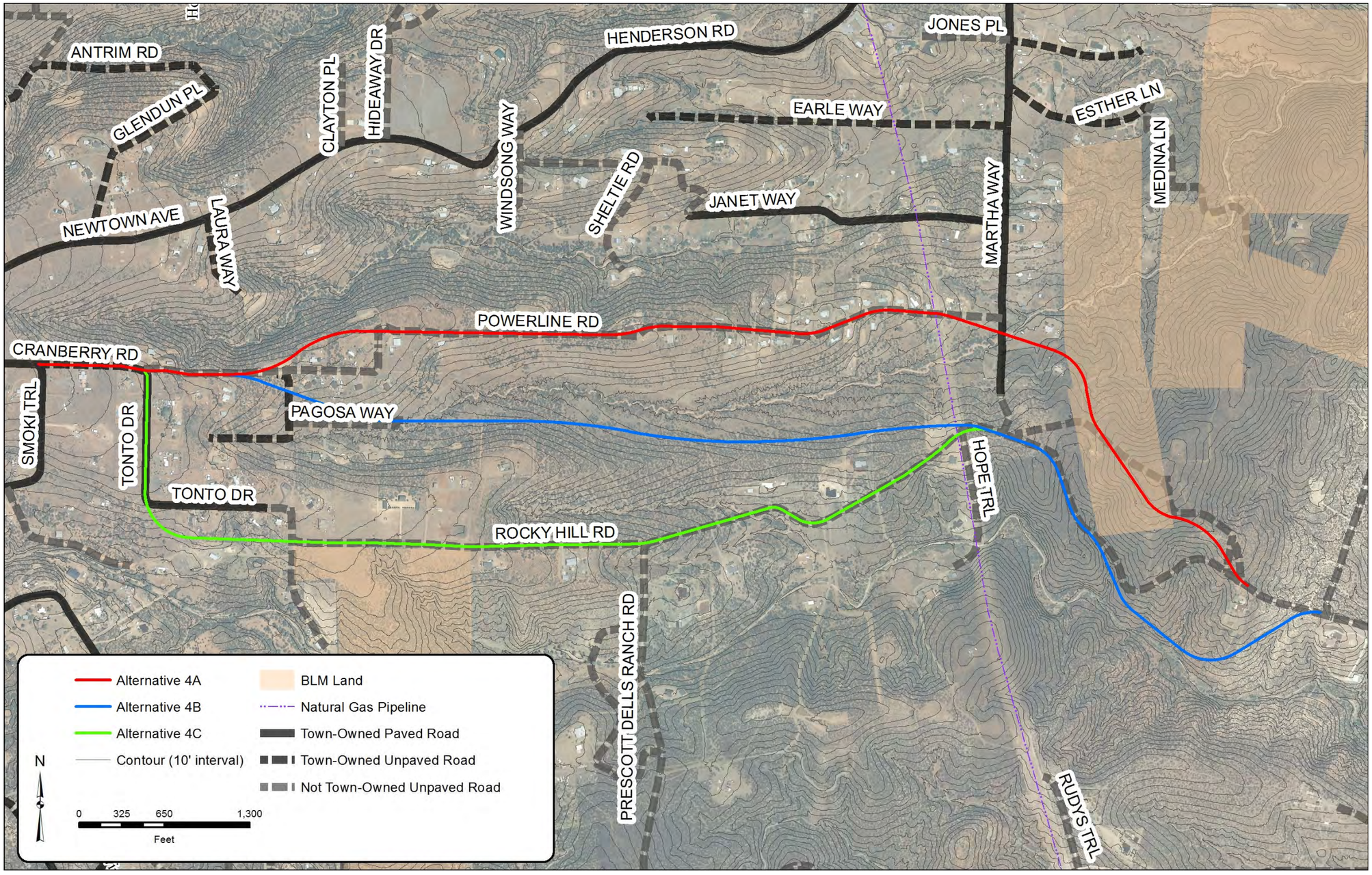
The roadway network near the Powerline Road/Martha Way intersection and Rocky Hill Road/Martha Way intersection includes steep grades, narrow unpaved roads, and indirect traffic flow. Access to this area from Rocky Hill Road is difficult without a four-wheel-drive vehicle as the existing roadway has an estimated maximum grade of sixteen percent. Powerline Road and Rocky Hill Road both cross the Transwestern natural gas transmission pipeline. Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 7** and are described more fully below:

- *Alternative 4A* – This alternative provides a new reverse curve roadway segment that connects Cranberry Road to Powerline Road. The improvement alternative generally follows the existing Powerline Road alignment until it diverges south just west of the Powerline Road/Martha Way intersection and ultimately ties into Rocky Hill Road. This alternative has an estimated maximum grade of thirteen percent and generally utilizes existing unpaved roadway alignments. The improvement alternative impacts 59 private parcels and one BLM parcel;
- *Alternative 4B* – This alternative provides a new reverse curve roadway segment that connects Cranberry Road to Pagosa Way. The improvement alternative generally continues east-west until it intersects Rocky Hill Road just west of Martha Way. The alternative bends southeast of Martha Way to achieve a more gradual roadway grade and to avoid the BLM parcel, ultimately tying back into Rocky Hill Road. This alternative has an estimated maximum grade of twelve percent and generally consists of new roadway alignment. The improvement alternative impacts 24 private parcels; and
- *Alternative 4C* – This alternative ties into the north-south portion of Tonto Drive and curves east to tie into existing Rocky Hill Road. The improvement alternative generally follows the existing Rocky Hill Road alignment until it ties in with Alternative 3B. This alternative has an estimated maximum grade of thirteen percent and generally utilizes existing unpaved roadway alignments. The improvement alternative impacts 35 private parcels.

Table 5 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 5 – Evaluation of Area 4 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 4A	Alternative 4B	Alternative 4C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $440,000	$0 - $480,000	$0 - $520,000
Construction Cost	None	$2,300,000 - $2,800,000	$3,300,000 - $3,900,000	$2,400,000 - $3,000,000
Total Estimated Cost	None	$2,300,000 - $3,240,000	$3,300,000 - $4,380,000	$2,400,000 - $3,520,000
Impacts to Right-of-Way	None	Yes (59 parcels & 1 BLM parcel)	Yes (24 parcels)	Yes (35 parcels)
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	No impacts
Engineering Issues	None	Steep terrain and gas pipeline crossing	Steep terrain and gas pipeline crossing	Steep terrain and gas pipeline crossing
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Improved air quality if paved	Improved air quality if paved	Improved air quality if paved
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 7 – Area 4: Powerline Road/Rocky Hill Road/Martha Way Alternatives

4.3.5 Area 5: Dewey Road

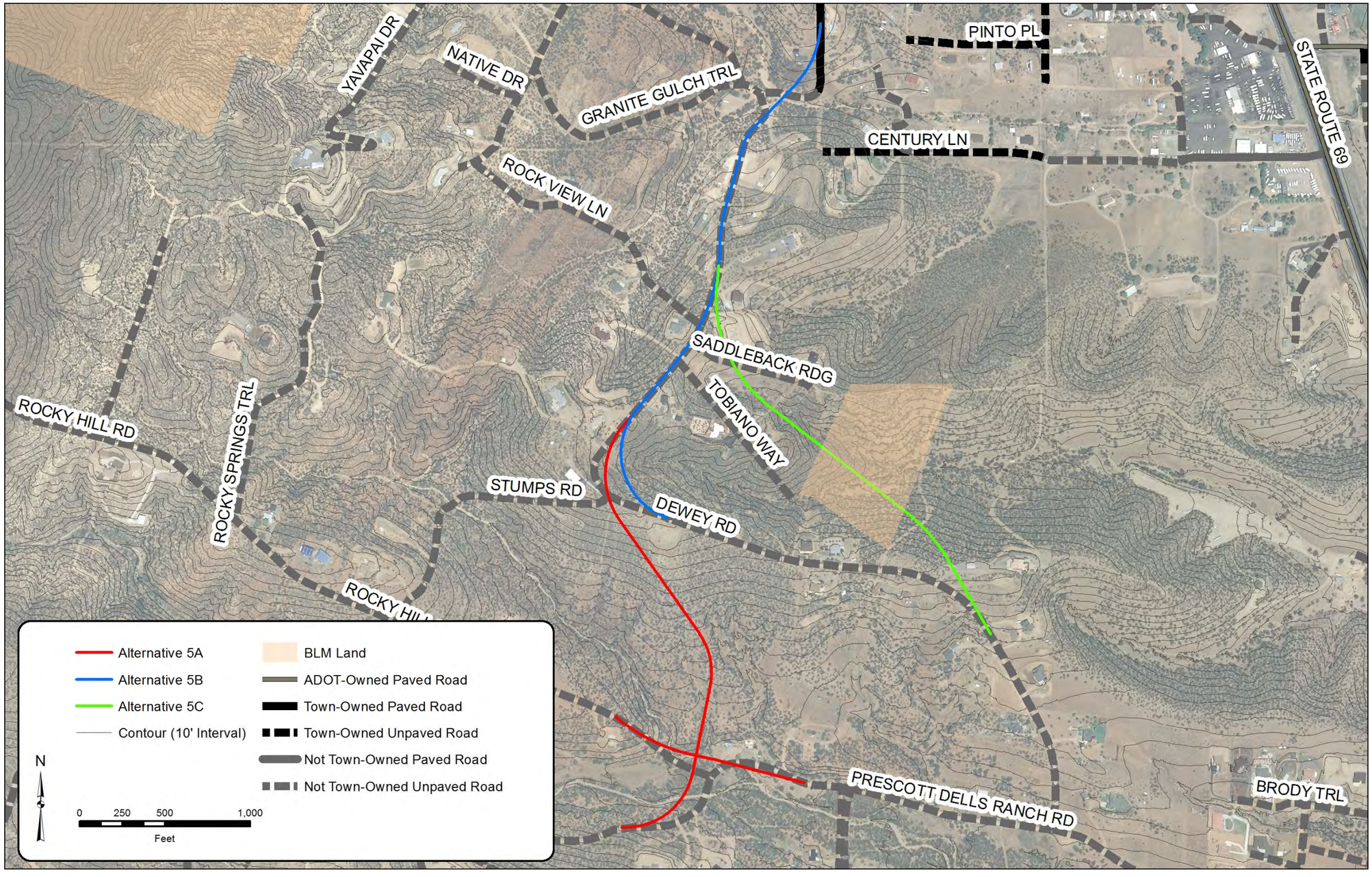
Dewey Road is currently an unpaved roadway with sharp turns that provides an indirect north-south connection between Prescott Dells Ranch Road and Kachina Place. This existing roadway has an estimated maximum grade of thirteen percent. Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 8** and are described more fully below:

- *Alternative 5A* – This alternative relocates the existing Rocky Hill Road/Prescott Dells Ranch Road three-legged intersection and ties in Dewey Road as a north leg of a four-way intersection. The Dewey Road leg then continues up the hill to the north and ties in with the existing Dewey Road alignment north of Stumps Road. This alternative has an estimated maximum grade of thirteen percent and provides an improved intersection layout at the Rocky Hill Road/Prescott Dells Ranch Road intersection. The improvement alternative impacts 36 private parcels and one BLM parcel;
- *Alternative 5B* – This alternative generally follows the existing alignment of Dewey Road but utilizes larger curve radii near Stumps Road and Granite Gulch Trail. This alternative has an estimated maximum grade of ten percent and primarily utilizes the existing Dewey Road alignment. The improvement alternative impacts 22 private parcels; and
- *Alternative 5C* – This alternative provides a new reverse curve roadway segment that connects existing north-south segments of Dewey Road to create a more direct route. This alternative has an estimated maximum grade of thirteen percent. The improvement alternative impacts 23 private parcels and one BLM parcel.

Table 6 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 6 – Evaluation of Area 5 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 5A	Alternative 5B	Alternative 5C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $340,000	$0 - $120,000	$0 - $220,000
Construction Cost	None	$2,100,000 - $2,500,000	$790,000 - $990,000	$1,680,000 - $1,950,000
Total Estimated Cost	None	$2,100,000 - $2,840,000	$790,000 - $1,110,000	$1,680,000 - $2,170,000
Impacts to Right-of-Way	None	Yes (36 parcels)	Yes (22 parcels)	Yes (23 parcels & 1 BLM parcel)
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	No impacts
Engineering Issues	None	Steep terrain	Steep terrain	Steep terrain
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Improved air quality if paved	Improved air quality if paved	Improved air quality if paved
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 8 – Area 5: Dewey Road Alternatives

4.3.6 Area 6: New Road West of Agua Fria River

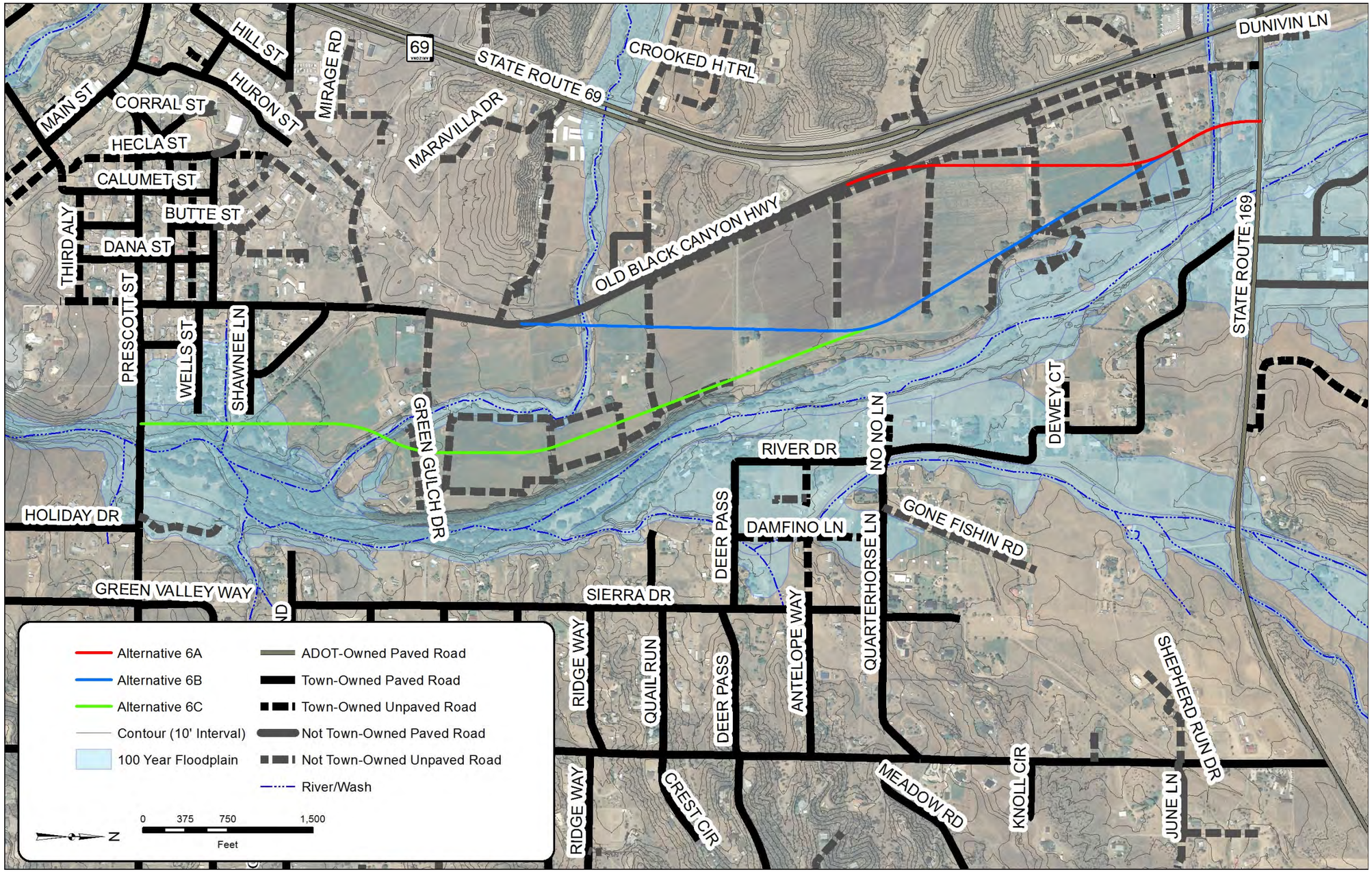
Old Black Canyon Highway is currently the only existing north-south route between SR 69 and the Agua Fria River. While much of Old Black Canyon Highway is paved, the segments north of Green Gulch Drive are privately owned. Old Black Canyon Highway connects to SR 169 near the SR 169/SR 69 intersection. If the Mortimer Family Farms parcel is developed, additional north-south circulation routes may be necessary, particularly ones that connect to SR 169 further east from where Old Black Canyon Highway currently connects to SR 169. Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 9** and are described more fully below:

- *Alternative 6A* – This alternative diverges from Old Black Canyon Highway at roughly the theoretical intersection of No No Lane and Hecla Street and continues north and intersects SR 169 at an ADOT-approved planned access point. Other existing roadways currently intersecting SR 169 in the vicinity of this alternative should be considered for rerouting to tie into the new road west of the Agua Fria River so that intersections with SR 169 can be consolidated to the ADOT-approved planned access point along SR 169. The improvement alternative impacts five private parcels;
- *Alternative 6B* – This alternative diverges from Old Black Canyon Highway north of Green Gulch Drive and continues north parallel to the Agua Fria River until it joins with Alternative 5A just south of SR 169. The improvement alternative impacts five private parcels; and
- *Alternative 6C* – This alternative starts at the theoretical intersection of River Drive and Prescott Street and continues north parallel to the Agua Fria River until it joins with Alternative 5B. The improvement alternative impacts ten private parcels and two existing residences.

Table 7 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 7 – Evaluation of Area 6 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 6A	Alternative 6B	Alternative 6C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $190,000	$0 - $360,000	$0 - $720,000
Construction Cost	None	$460,000 - $690,000	$900,000 - $1,300,000	$1,300,000 - $2,000,000
Total Estimated Cost	None	$460,000 - $880,000	$900,000 - $1,660,000	$1,300,000 - $2,720,000
Impacts to Right-of-Way	None	Yes (5 parcels)	Yes (5 parcels)	Yes (10 parcels)
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	Yes (2 residences)
Engineering Issues	None	None	None	Floodplain
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Minimal	Minimal	Minimal
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 9 – Area 6: New Road West of Agua Fria River Alternatives

4.3.7 Area 7: Sierra Drive Extension North

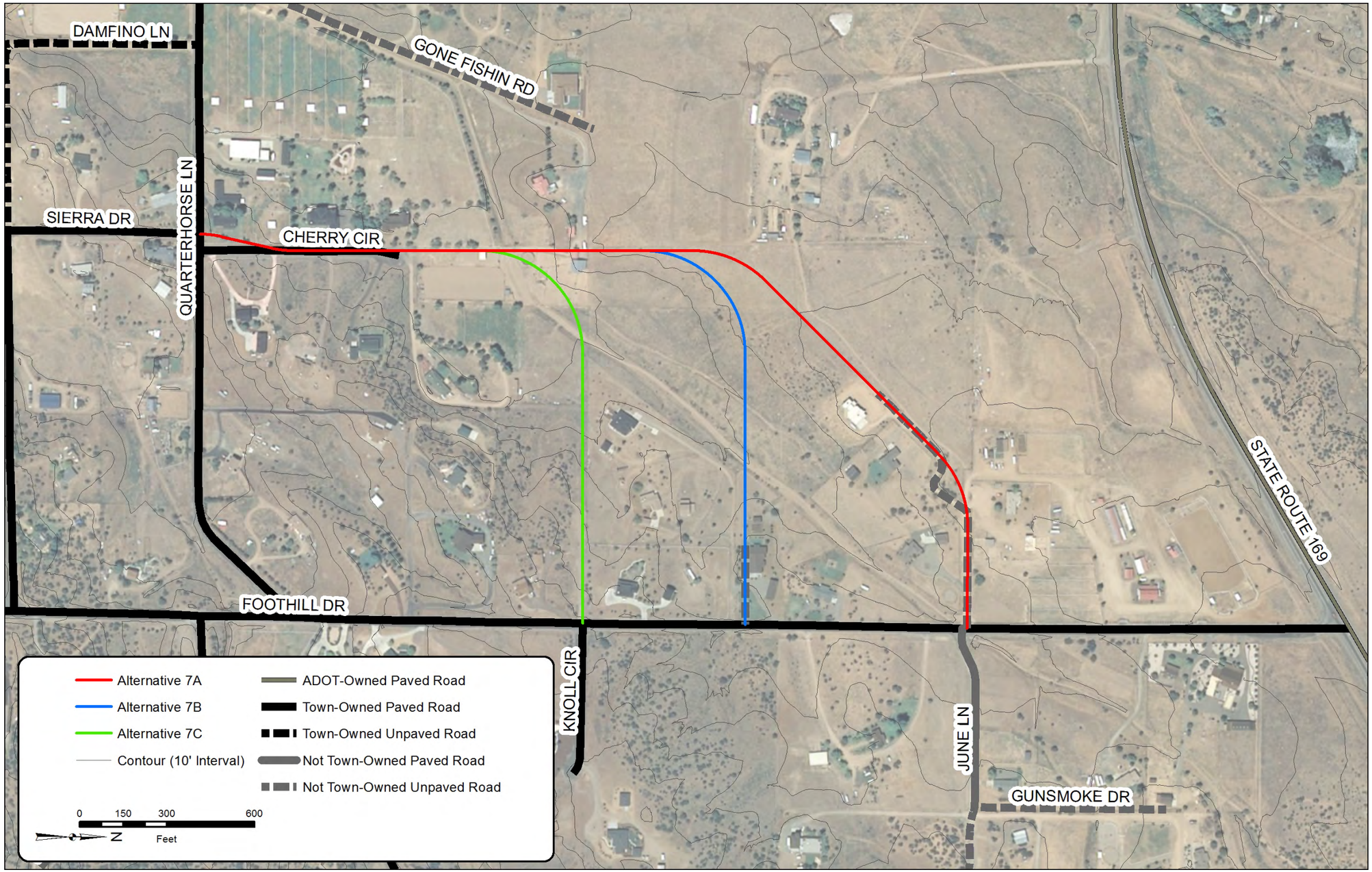
There is currently an offset in the Sierra Drive/Quarterhorse Lane/Cherry Circle intersection. Sierra Drive is not continuous between the Cherry Circle cul-de-sac and Foothill Drive. Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 10** and are described more fully below:

- *Alternative 7A* – This alternative begins at the Sierra Drive/Quarterhorse Lane intersection and provides a reverse curve that connects Sierra Drive to Cherry Circle and then continues north before bending east to intersect Foothill Drive at June Lane. The improvement alternative impacts eight private parcels;
- *Alternative 7B* – This alternative is similar to Alternative 6A except that it bends east to intersect Foothill Drive between Knoll Circle and June Lane. The improvement alternative impacts five private parcels; and
- *Alternative 7C* – This alternative is similar to Alternative 6A except that it bends east to intersect Foothill Drive at Knoll Circle. The improvement alternative impacts four private parcels.

Table 8 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 8 – Evaluation of Area 7 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 7A	Alternative 7B	Alternative 7C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $180,000	$0 - $160,000	$0 - $130,000
Construction Cost	None	$370,000 - $580,000	$310,000 - $470,000	$240,000 - $370,000
Total Estimated Cost	None	$370,000 - $760,000	$310,000 - $630,000	$240,000 - $500,000
Impacts to Right-of-Way	None	Yes (8 parcels)	Yes (5 parcels)	Yes (4 parcels)
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	No impacts
Engineering Issues	None	None	None	None
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Minimal	Minimal	Minimal
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

Figure 10 – Area 7: Sierra Drive Extension North Alternatives

4.3.8 Area 8: Additional Agua Fria River Crossing

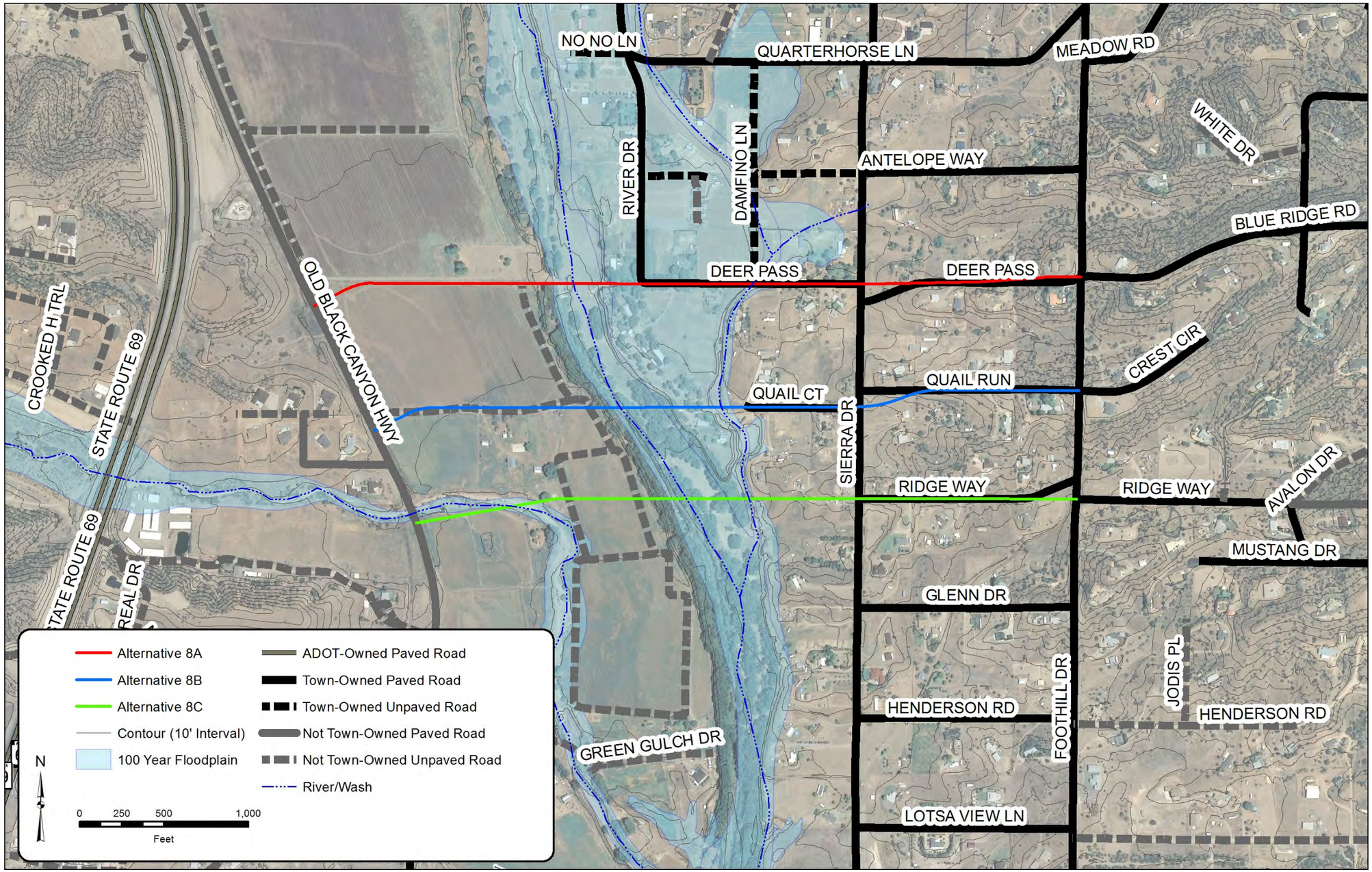
There are currently only two crossings of the Agua Fria River in the study area: a bridge on SR 169 and a low-flow at-grade crossing on Prescott Street. To improve circulation and access, three potential improvement alternatives have been developed to provide an additional at-grade crossing of the Agua Fria River. These alternatives are shown in **Figure 11** and are described more fully below:

- *Alternative 8A* – This alternative provides a crossing of the Agua Fria River along the Deer Pass alignment that connects Old Black Canyon Highway and Foothill Drive. This alternative includes a realignment of Deer Pass where it approaches Sierra Drive from the east. The floodplain for the river is wide along the Deer Pass alignment. The improvement alternative impacts four private parcels;
- *Alternative 8B* – This alternative provides a crossing of the Agua Fria River along the Quail Run alignment that connects Old Black Canyon Highway and Foothill Drive. This alternative includes a realignment of Quail Run where it approaches Sierra Drive from the east. The improvement alternative impacts thirteen private parcels; and
- *Alternative 8C* – This alternative provides a crossing of the Agua Fria River along the Ridge Way alignment that connects Old Black Canyon Highway and Foothill Drive. This alternative includes a realignment of Ridge Way where it approaches Foothill Drive from the west. The floodplain for the river is relatively narrow along the Ridge Way alignment. The improvement alternative impacts eight private parcels.

Table 9 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 9 – Evaluation of Area 8 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 8A	Alternative 8B	Alternative 8C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $120,000	$0 - $130,000	$0 - $140,000
Construction Cost	None	$800,000 - $1,100,000	$810,000 - $1,060,000	$820,000 - $1,060,000
Total Estimated Cost	None	$800,000 - $1,220,000	$810,000 - $1,190,000	$820,000 - $1,200,000
Impacts to Right-of-Way	None	Yes (4 parcels)	Yes (13 parcels)	Yes (8 parcels)
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	No impacts
Engineering Issues	None	Agua Fria River crossing	Agua Fria River crossing	Agua Fria River and wash crossing
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Improved air quality; potential adverse impacts to river	Improved air quality; potential adverse impacts to river	Improved air quality; potential adverse impacts to river
Multimodal Compatibility	No impacts	Improved connection across river	Improved connection across river	Improved connection across river



Source: Kimley-Horn and Associates, Inc.

Figure 11 – Area 8: Additional Agua Fria River Crossing Alternatives

4.3.9 Area 9: Sierra Drive and Foothill Drive Connections

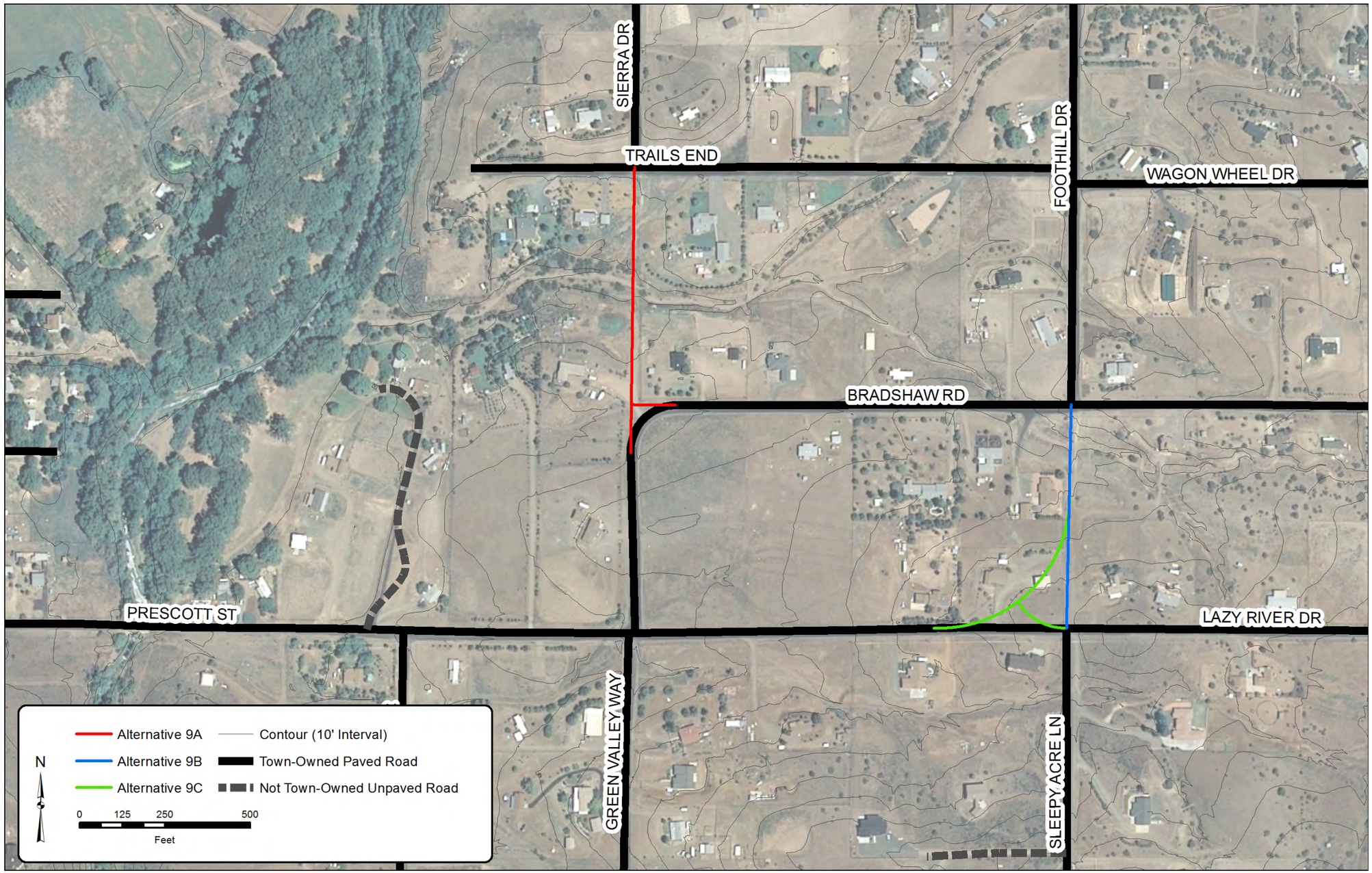
There is currently an offset in the rural minor collector comprised of Prescott Street, Green Valley Way, Bradshaw Road, and Foothill Drive. There is also a gap in Sierra Drive between Bradshaw Road and Trails End although there is existing Town right-of-way generally along the Sierra Drive alignment between Bradshaw Road and Trails End. While the existing roadway is continuous, it requires two turns in a short distance and is not direct. Town right-of-way generally exists along the Foothill Drive alignment between Bradshaw Road and Lazy River Drive. Three potential improvement alternatives have been developed. These alternatives are shown in **Figure 12** and are described more fully below:

- *Alternative 9A* – This alternative begins at the Green Valley Way/Bradshaw Road intersection and continues north to intersect Sierra Drive at Trails End. The improvement alternative impacts one private parcel;
- *Alternative 9B* – This alternative begins at the Sleepy Acre Lane/Lazy River Drive intersection and continues north to the Bradshaw Road/Foothill Drive intersection. The improvement alternative impacts no private parcels; and
- *Alternative 9C* – This alternative begins west of the Sleepy Acre Lane/Lazy River Drive intersection and provides a curved roadway segment that connects to Foothill Drive south of the Bradshaw Road/Foothill Drive intersection. The improvement alternative impacts one private parcel and one residence.

Table 10 shows how the no-build alternative and the potential improvement alternatives perform in regards to the evaluation criteria.

Table 10 – Evaluation of Area 9 Alternatives

Evaluation Criteria	No-Build Alternative	Alternative 9A	Alternative 9B	Alternative 9C
Meets Identified Need	No	Yes	Yes	Yes
Safety	No impacts	Improved	Improved	Improved
Right-of-Way Cost	None	$0 - $10,000	$0	$0 - $150,000
Construction Cost	None	$120,000 - $180,000	$80,000 - $130,000	$100,000 - $150,000
Total Estimated Cost	None	$120,000 - $190,000	$80,000 - $130,000	$100,000 - $300,000
Impacts to Right-of-Way	None	Yes (1 parcel)	No impacts	Yes (1 parcel)
Impacts to Existing Businesses/Residences	None	No impacts	No impacts	Yes (1 residence)
Engineering Issues	None	None	None	None
Level of Service/Delay	No impacts	Improved	Improved	Improved
Accessibility/Mobility	No impacts	Improved	Improved	Improved
Network Continuity	No impacts	Improved	Improved	Improved
Environmental Impacts	None	Minimal	Minimal	Minimal
Multimodal Compatibility	No impacts	No impacts	No impacts	No impacts



Source: Kimley-Horn and Associates, Inc.

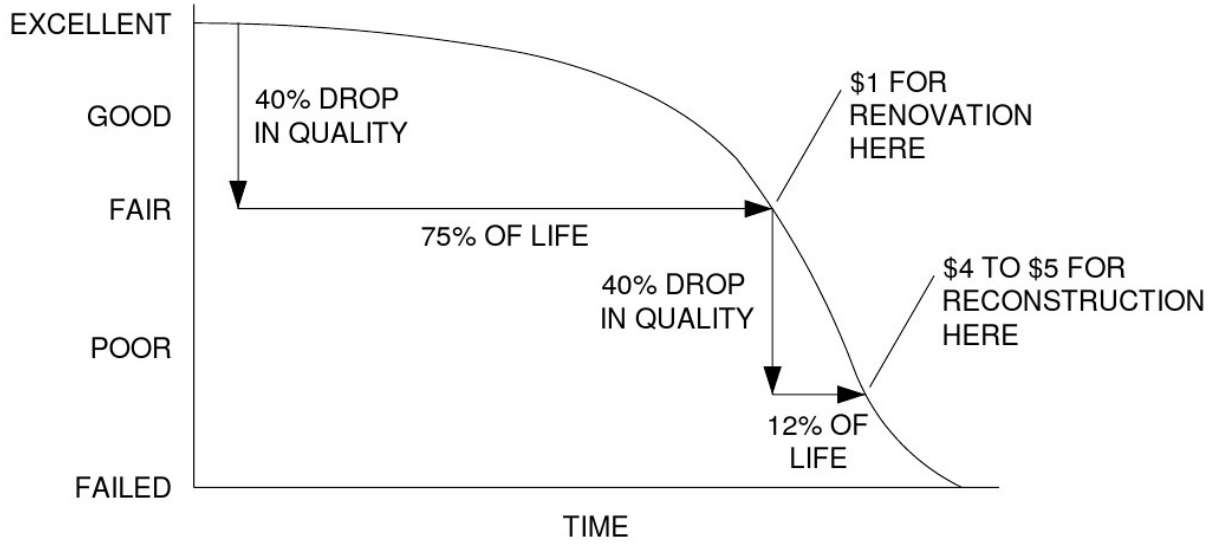
Figure 12 – Area 9: Sierra Drive and Foothill Drive Connections Alternatives

4.4 Pavement Maintenance

The pavement evaluation procedure, rating criteria, and current conditions for the paved roadways within the Town are discussed in detail in Working Paper 1.

As summarized in Working Paper No. 1, the roadway pavement conditions were rated on a scale of 1 to 5 with a rating of 1 being Excellent, 2 being Good, 3 being Fair, 4 being Poor, and 5 being Failed. The majority of roadways within the Town are in Fair condition with the most common distresses observed being age- or climate-related distress such as longitudinal and transverse cracking, edge cracking, weathering, and raveling. However, there are a number of roadway segments that have significantly deteriorated and are in Poor or Failed condition.

Pavement generally deteriorates over time regardless of the level of maintenance activities. Pavement typically performs well over the first 75 percent of the pavement's life, but deterioration rapidly accelerates during the final 25 percent of the pavement's life, as shown in **Figure 13**. Although it's difficult to determine the "positive signal" at the juncture between the first 75 percent and the final 25 percent, this point generally occurs as the pavement condition deteriorates from Fair to Poor. Proactive maintenance activities can prolong pavement life cycle spans, thus requiring less capital expenditure.



Source: Kimley-Horn and Associates, Inc.

Figure 13 – Pavement Life Cycle

The level of deterioration and resulting future pavement condition for the roadway segments identified within the Town are dependent upon various factors including climate, traffic, and general site conditions. There are many pavement sections within the Town that are in Fair condition but approaching the point at which the rate of deterioration is likely to increase more rapidly if preventive maintenance activities are not conducted in the near-term to slow the rate of deterioration. Once the pavement has deteriorated to a rating of Poor or Failed, applying preventive maintenance activities, such as crack sealing, patching, or surface treatments, is likely not cost-effective. If preventive maintenance activities are not routinely conducted, costly major rehabilitation activities such as mill/replace or reconstruction are likely to be required.

Taking a proactive approach in managing the overall condition of the pavement network and applying maintenance and rehabilitation activities at the appropriate time will allow the Town to make cost-effective decisions and protect their investment in the roadway network. It is important that the Town make maintenance and rehabilitation decisions that consider the underlying cause of the pavement deterioration so that repairs will restore the expected useful life of the pavement.

5 RECOMMENDED IMPROVEMENTS

Based on the evaluation criteria and considerations described previously, recommended improvements have been developed to address the study area's identified current and future needs. Similar individual recommended improvements are grouped by type of improvement and are discussed below.

5.1 Roadways

This section discusses the roadway improvements recommended to address identified needs. Whenever feasible, these roadway improvements should incorporate complete streets concepts and be constructed in conjunction with multimodal improvements. The recommended roadway improvements are grouped in the categories below by type of roadway improvement:

- Roadway network improvements;
- Safety;
- Paving of existing unpaved roadways;
- Pavement maintenance and rehabilitation plan;
- Intersection traffic control improvements;
- Federal functional classification changes;
- Agua Fria River all-weather crossing;
- Traffic impact guidelines;
- Access management; and
- Roadway improvement easements.

5.1.1 Roadway Network Improvements

Due to a lack of design-level data, anticipated difficulties in acquiring necessary right-of-way, potential engineering constraints, limited Town financial resources, and potential public opposition, additional study and public input will be necessary to determine a recommended roadway network improvement alternative in the nine aforementioned Areas. The network alternatives evaluation included in the previous section of this document provides a series of network improvement options for more detailed consideration in the future.

5.1.2 Safety

To further promote safety and driver comfort, it is recommended that curve ahead warning signs with 10 mph advisory speed plaques be installed in both directions on Henderson Road approximately 100 feet in advance of the curve just east of Martha Way. The estimated sign installation cost, including the cost for each sign, post, and foundation, is $500 on each approach, for a total estimated cost of $1,000.

5.1.3 Improving Existing Unpaved Roadways

Improving the following existing unpaved roadways to all-weather roadways within the study area is recommended:

- Dewey Road (0.63 miles, steep terrain) – Prescott Dells Ranch Road to 500 feet east of Stump Road (the end of the Area 5 network improvement alternatives);
- Prescott Dells Ranch Road (0.84 miles, level terrain) – Rocky Hill Road to SR 69;
- Rocky Hill Road (0.80 miles, steep terrain) – 0.5 miles east of Martha Way (the end of the Area 4 network improvement alternatives) to Prescott Dells Ranch Road;
- Cranberry Road (0.15 miles, rolling terrain) – Smoki Trail to Tonto Drive (the end of the Area 4 network improvement alternatives);

- Martha Way (0.07 miles, rolling terrain) – 350 feet north of Rocky Hill Road (the end of the existing paved portion of Martha Way) to Rocky Hill Road; and
- Meadow Road (0.44 miles, rolling terrain) – Meadow Ranch Place to Tanya Boulevard.

All-weather roadway surfaces can be developed by upgrading the existing unpaved surface (i.e., improved grading), paving the surface with chip-seal, or paving the surface with asphalt. Improving the identified roadways is assumed to cover the width of the existing unpaved roadway, which is generally 18 to 24 feet wide and accommodates one travel lane in each direction. Graded shoulders and minor drainage improvements are assumed to be included in all three all-weather roadway surface options.

Right-of-way or easements will need to be secured for Dewey Road, Prescott Dells Ranch Road, and Rocky Hill Road before improving these roadways can begin.

The limits of these recommended roadway surface improvement projects tie into the roadway network improvement alternatives described in the previous section of this document. The roadway surface improvement limits and cost may vary based on the implementation of roadway network improvements.

5.1.4 Pavement Maintenance and Rehabilitation Plan

Two types of recommended activities, preventive maintenance and rehabilitation, will provide the Town with the framework and general guidelines to follow when making decisions regarding the maintenance of pavement infrastructure.

Preventive Maintenance Recommendations

Typically preventive maintenance recommendations are divided into two sub-categories that include stop-gap (safety) and preventive maintenance. Stop-gap maintenance activities address safety issues, such as high-severity potholes, for roadways that are either significantly deteriorated and funding is not available for rehabilitation, or to address localized areas of failure for roadways that are in Good condition. It is imperative that the Town have an annual budget to address stop-gap needs when necessary.

Preventive maintenance activities slow the rate of deterioration for pavement sections that are in Good condition. The application of preventive maintenance activities to deteriorated pavement sections is typically very expensive and not cost-effective. Preventive maintenance activities that should be considered by the Town include, but are not limited to, crack sealing, patching, and surface treatments. Surface treatments are typically applied on an interval basis (e.g., every five years) and each treatment results in an increase in life of the pavement section.

Surface treatments such as a fog seal or chip seal are used primarily to slow the rate of deterioration and extend the life of the pavement. These treatments are most cost-effective when applied to a pavement section that is not significantly deteriorated and is mainly exhibiting climate-related distresses such as longitudinal cracking or weathering and raveling. Applying a surface treatment to a segment of roadway pavement that is exhibiting load-related distress is not correcting the underlying deficiency in the pavement. It is strongly recommended that the existing condition and distress types present prior to the application of a surface treatment be evaluated to determine if such a treatment is a cost-effective maintenance alternative.

It is recommended that the Town initially consider preventive maintenance activities such as crack sealing and patching for pavements between three and five years old and surface treatments for pavements between six and ten years old or when a pavement reaches a condition rating of Good with the predominate distress types being climate-related. Surface treatments can be considered for segments with a condition rating of Poor if the amount of load-related distress is limited; however, surface treatments should not be considered for segments with a condition rating of Failed. **Table 11** provides general guidelines for the application of preventive maintenance treatments and approximate unit costs.

Table 11 – Dewey-Humboldt Preventive Maintenance Strategies

Preventive Maintenance Activity	2011 Pavement Condition Rating	Approximate Age at Initial Treatment (Years)	Treatment Interval (Years)	Estimated Unit Cost
Asphalt Crack Sealing	2 or greater	3 - 5	3 - 5	$1.00/linear foot
Asphalt Patching - As Necessary	Varies	As necessary	As necessary	$2.00/square foot
Surface Treatment - Fog Seal	1 or greater	3 - 5	3 - 5	$0.07/square foot
Surface Treatment - Chip Seal	2 or greater*	6 - 10#	5 - 7	$0.20/square foot

* Not to exceed a rating of 4 and consider distress types present
# Age at initial treatment should be dependent on condition and distress types present

If preventive maintenance activities are applied at the proper time, an annual preventive maintenance budget of approximately $200,000 is anticipated to be sufficient to address the needs of the Town. These needs may fluctuate annually based on weather and traffic conditions – therefore a system-wide evaluation should be performed every three to five years.

Major Rehabilitation Recommendations

Major rehabilitation is recommended to correct or improve structural deficiencies and/or functional deterioration within a pavement network. Major rehabilitation should be considered when a segment of pavement has deteriorated to a point where preventive maintenance activities are no longer cost-effective.

For the purposes of this study, major rehabilitation activities should be considered necessary for a roadway with a rating of Poor or Failed or if the pavement is exhibiting a high percentage of load-related distress. Generally, a high percentage of load-related distress indicates that the pavement may be structurally deficient or that the traffic being applied is different than what the pavement was designed to accommodate.

In the case of Dewey-Humboldt, the rolling topography, numerous low-water crossings, poor ditch conditions, and areas of inadequate drainage can contribute to structural deterioration where water has infiltrated the underlying support soils and weakened them, resulting in a lack of subgrade support. It is recommended that the Town not only address the pavement condition during rehabilitation activities but also the surrounding site conditions, including drainage.

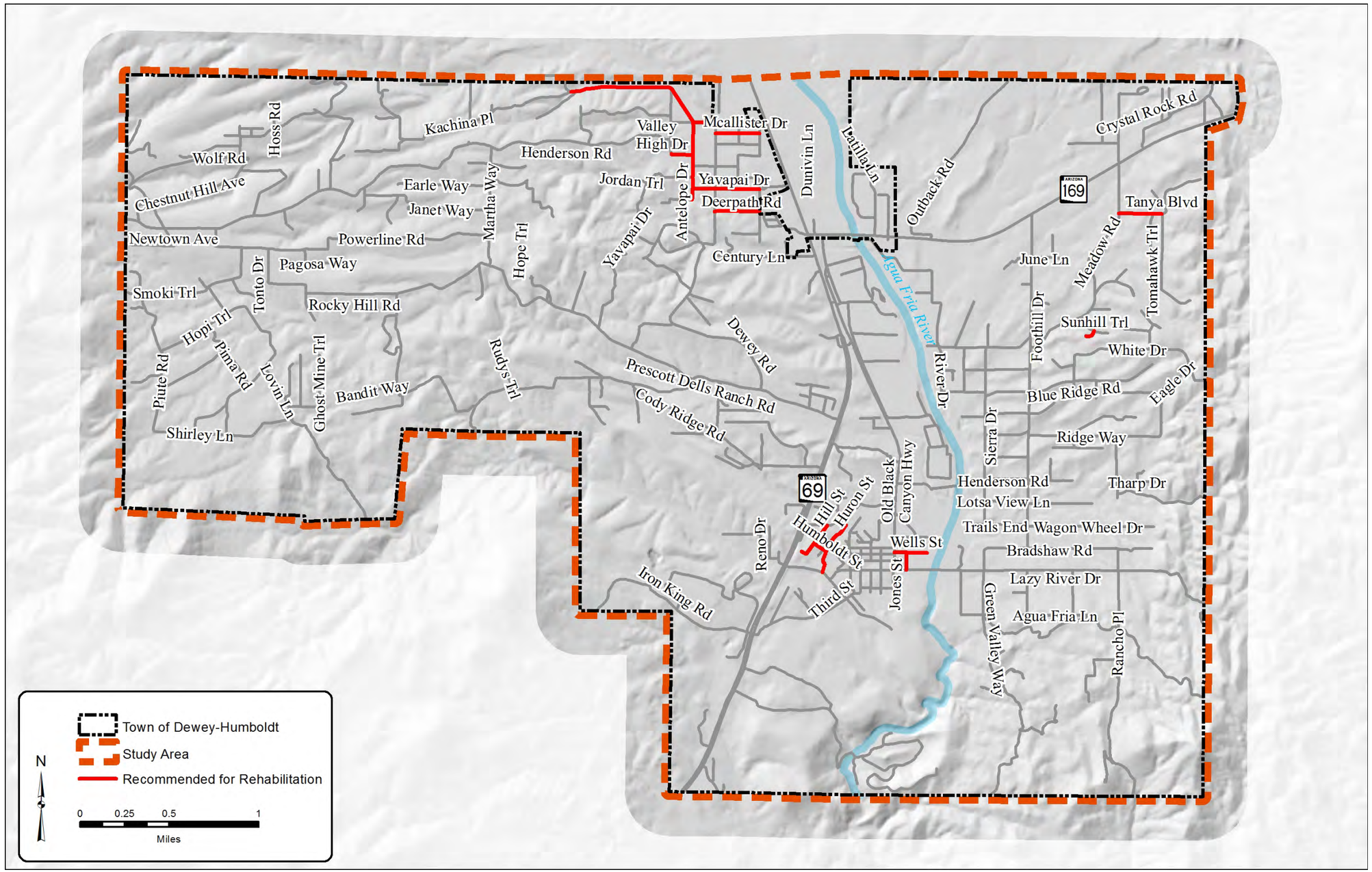
It is recommended that roadway segments with a rating of Failed be slated for rehabilitation in the near-term implementation phase. The locations, dimensions, and approximate cost of these segments are summarized in **Table 12** and their locations are shown in **Figure 14**. The Town should prioritize the rehabilitation of these roadway segments based on overall importance to the Town's roadway infrastructure.

The costs presented include only those costs associated with rehabilitation and do not account for soft costs such as engineering design, administration costs, or construction administration costs. These costs should be considered separately for planning purposes.

Rehabilitation recommendations for the mid-term and long-term planning horizons are uncertain due to the anticipated changes in condition and needs over time, but generally speaking all roadway segments with a condition rating of Poor should be considered for rehabilitation in the mid-term or long-term implementation phases.

Table 12 – Near-term Pavement Rehabilitation Recommendations

Road Name	From	To	Length (miles)	Width (ft)	Area (ft^2)	Approximate Cost of Rehabilitation ($)
Antelope Dr.	Kachina Pl.	Deerpath Rd.	0.501	20	52,906	106,000
Deerpath Rd.	Dewey Rd.	Manzanita Blvd.	0.385	20	40,656	82,000
Hill St.	Kloss Av.	S. Sub. Bdry.	0.204	20	21,542	44,000
Humboldt St.	Huron St.	Hill St.	0.09	20	9,504	20,000
Huron St.	Main St.	End	0.316	20	33,370	67,000
Jones St.	Prescott St.	Wells St.	0.097	20	10,278	21,000
Kachina Pl.	SR 69	Nancy Ln.	1.193	26	163,775	328,000
McAllister Dr.	Dewey Rd.	Manzanita Blvd.	0.237	20	25,027	51,000
Sunhill Tr.	Cherry Siding Ln.	End	0.065	20	6,864	14,000
Tanya Blvd.	Clearview Dr.	End	0.241	20	25,422	51,000
Valley High Dr.	Antelope Dr.	Pony Pl.	0.253	20	26,717	54,000
Wells St.	Old Blk. Cyn. Hwy.	End	0.183	20	19,311	39,000
Yavapai Dr.	Antelope Dr.	Manzanita Blvd.	0.506	20	53,434	107,000
					Total	984,000



Source: Kimley-Horn and Associates, Inc.

Figure 14 – Pavement Rehabilitation Recommendations

5.1.5 Intersection Traffic Control Improvements

The SR 69 and SR 169 roadways are under ADOT jurisdiction as part of the state highway system. The following improvements are recommended for consideration by ADOT.

It is recommended that ADOT consider providing additional signal heads for the SR 69 approaches and convert the SR 69 southbound left-turn phasing to protected-only phasing at the SR 69/SR 169 intersection.

It is recommended that ADOT consider regularly monitoring the existing signalized intersections of SR 69/SR 169 and SR 69/Kachina Place and make adjustments as needed to the traffic signal timing, phasing, or coordination with adjacent signalized intersections to maintain acceptable traffic operations.

It is recommended that ADOT consider conducting a traffic signal warrant and roundabout study within the next 5-10 years at the existing SR 69/Main Street intersection if traffic volumes continue to increase. If the study determines that a traffic control change is warranted, a traffic signal or roundabout should be installed at the SR 69/Main Street intersection. If the study determines that a traffic control change is not warranted yet, the SR 69/Main Street intersection should be monitored regularly thereafter to identify when conditions warrant a traffic control change.

It is recommended that ADOT consider regularly monitoring the existing unsignalized intersection of SR 169/Foothill Drive and conduct a traffic signal warrant and roundabout study within the next 15-20 years if traffic volumes continue to increase. If the study determines that a traffic control change is warranted, a traffic signal or roundabout should be installed at the SR 169/Foothill Drive intersection. If the study determines that a traffic control change is not warranted yet, the SR 169/Foothill Drive intersection should be monitored regularly thereafter to identify when conditions warrant a traffic control change.

If large-scale development is proposed on the northeast or southeast corner of the SR 69/SR 169 intersection, it is recommended that ADOT and the Town consider requiring that the developer prepare a traffic signal warrant study, if applicable, for a potential signalized access point on SR 169 just west of the Agua Fria River.

5.1.6 Federal Functional Classification Changes

It is recommended that the following changes be made to the federal functional classification of roadways in the existing roadway network:

- Reclassify as Rural Major Collectors the existing Rural Minor Collectors east of SR 69 and south of SR 169 (i.e., segments of Main Street, Prescott Street, Green Valley Way, Bradshaw Road, and Foothill Drive);
- Reclassify as Rural Major Collectors the existing Rural Minor Collectors west of SR 69 and east of Martha Way (i.e., segments of Henderson Road, Pony Place, Horseshoe Lane, and Kachina Place); and
- Classify as a Rural Minor Collector the segment of Henderson Road/Newtown Avenue between Wicklow Place and Martha Way.

If the recommended roadway surface improvements and proposed roadway network improvements are constructed, it is recommended that the following roadway segments be functionally classified as Rural Minor Collectors:

- Prescott Dells Ranch Road between SR 69 and Rocky Hill Road;
- Rocky Hill Road between Prescott Dells Ranch Road and Tonto Drive;
- Tonto Drive between Rocky Hill Road and Cranberry Road;

- Cranberry Road between Tonto Drive and Wicklow Place;
- Wicklow Place between Cranberry Road and Newtown Avenue;
- Martha Way between Henderson Road and Rocky Hill Road; and
- Dewey Road between Prescott Dells Ranch Road and Kachina Place.

If Foothill Drive is constructed between Bradshaw Road and Prescott Street/Lazy River Drive, it is recommended that this segment of Foothill Drive, along with Prescott Street/Lazy River Drive between Green Valley Way and Foothill Drive, be classified as Rural Major Collectors because these two segments would serve as the connectors between Prescott Street and Foothill Drive. Correspondingly, the segments of Green Valley Way and Bradshaw Road that had previously served as the connectors between Prescott Street and Foothill Drive should at that time be reclassified as local roads.

Figure 15 shows the recommended federal functional classifications for the study area roadway network, assuming the recommended roadway surface improvements and proposed roadway network improvements are constructed.

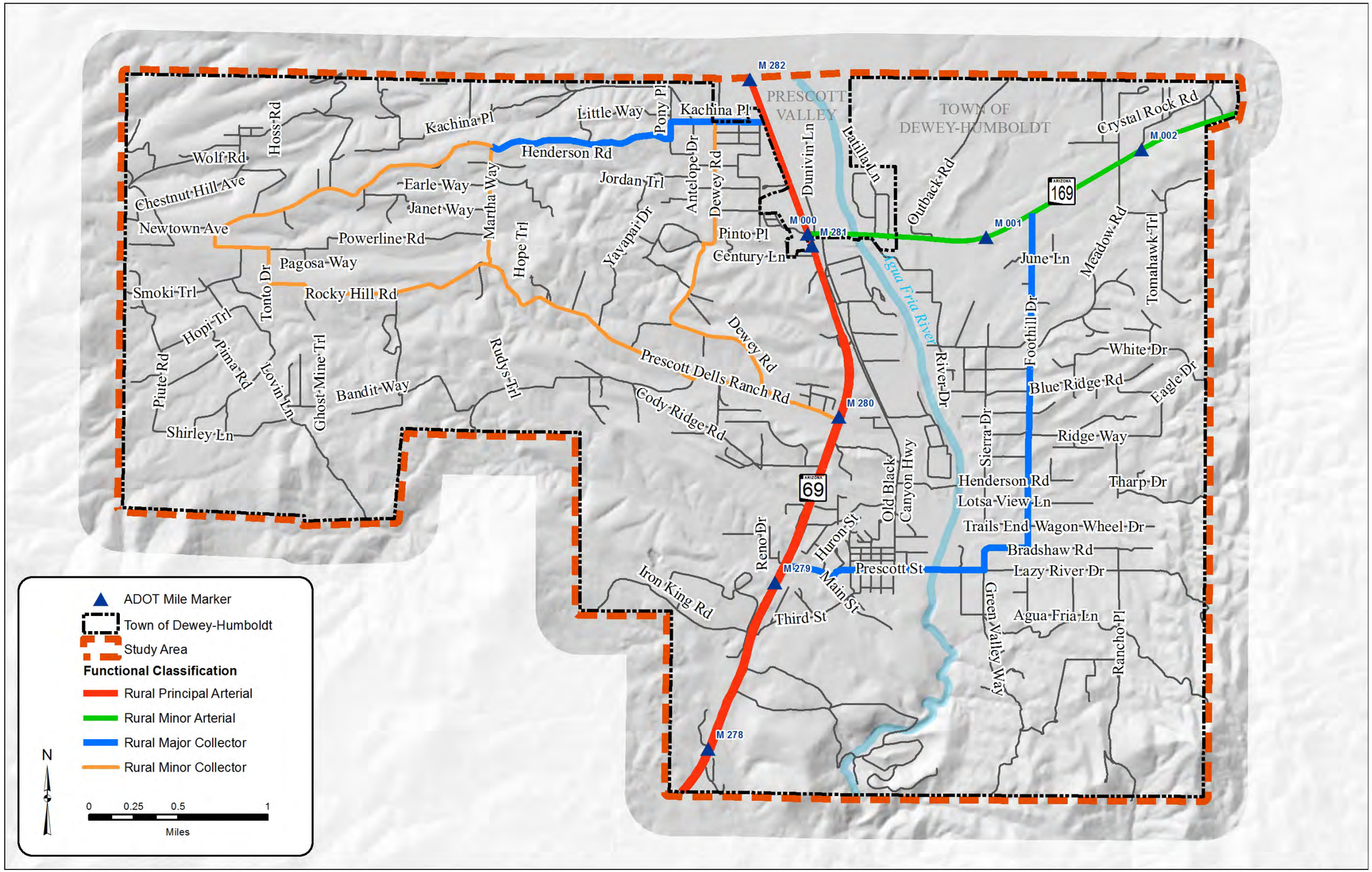
When the Town reaches a population of 5,000, it is recommended that the roadways with federal functional classifications be reclassified as "urban" instead of "rural" roadways to be consistent with federal guidelines.

5.1.7 Agua Fria River All-weather Crossing

Construction of an all-weather crossing of the Agua Fria River is recommended at the location of the existing low-flow at-grade crossing along Prescott Street to improve circulation and emergency vehicle access. The current condition includes a paved roadway that crosses six 30-inch corrugated metal pipes that are often filled with silt and thus have reduced capacity. Significant rainfall can cause the pipes to reach capacity, which forces the river to flow over the roadway. The roadway is typically not traversable a few days per year due to water flowing over the pavement.

In January 2008, the Town completed the *Report on Agua Fria River Crossing at Prescott Street.* This report presented the following six potential improvement alternatives for crossing the Agua Fria River at Prescott Street and provided construction cost estimates that do not include design costs:

- *Alternative A* – This alternative includes a bridge crossing that has a capacity of 48,600 cubic feet per second (cfs) (capable of handling a 100-year flood event) and an approximate construction cost estimate of $3,500,000;
- *Alternative B* – This alternative includes a reinforced concrete box culvert crossing with 7 barrels that has a capacity of 39,000 cfs (capable of handling a 50-year flood event) and an approximate construction cost estimate of $2,300,000;
- *Alternative C* – This alternative includes a reinforced concrete box culvert crossing with 9 barrels that has a capacity of 20,160 cfs (capable of handling a 10-year flood event) and an approximate construction cost estimate of $900,000;
- *Alternative D* – This alternative includes a box culvert crossing with 6 barrels that has a capacity of 4,020 cfs (capable of handling a 2-year flood event) and an approximate construction cost estimate of $575,000;
- *Alternative E* – This alternative includes a corrugated metal pipe culvert crossing with 10 pipes that has a capacity of 4,000 cfs (capable of handling a 2-year flood event) and an approximate construction cost estimate of $400,000; and
- *Alternative F* – This alternative includes a corrugated metal pipe culvert crossing with 8 pipes that has a capacity of 2,240 cfs (capable of handling a 1-year flood event) and an approximate construction cost estimate of $350,000.



Source: Kimley-Horn and Associates, Inc.

Figure 15 – Recommended Federal Functional Classifications

The Town's report does not provide a recommendation on which alternative should be implemented, but it does note that Alternatives D, E, and F would still result in frequent overtopping of the roadway during significant rainfall events. Because of the identified need for reliable circulation and emergency vehicle access at this crossing, it is recommended that only Alternatives A, B, and C be considered acceptable improvement alternatives.

For purposes of this study, Alternative C (the reinforced concrete box culvert that handles a 10-year flood event) is recommended for inclusion in the study's improvement plan as the preliminary recommended alternative because it is the least expensive alternative that still addresses the need for reliable circulation and emergency vehicle access. It is recommended that the Town consider conducting a more detailed alternatives analysis as part of the project design that includes input from the Yavapai County Flood Control District and the public regarding the advantages and disadvantages of providing for the 50-year flood or the 100-year flood instead of the 10-year flood before determining the final recommended alternative. The estimated cost for design of Alternative C is assumed to be 20 percent of the construction cost (i.e., $180,000).

5.1.8 Traffic Impact Study Guidelines

It is recommended that traffic impact study guidelines be developed by the Town. The purpose of a traffic impact study (TIS) is to assist the Town in understanding the demands and impacts placed on the Town's transportation network by proposed development. Development, such as new subdivisions and businesses, generates traffic. The traffic impact study should determine if additional investments in the transportation network are required as a result of the development, including new roads, traffic signals, or turn lanes. A draft of possible traffic impact guidelines can be found in **Appendix B**.

5.1.9 Access Management

Access management refers to managing where and how often driveways and cross-streets can access a particular roadway as well as where and in what direction drivers can turn into or out of access points. On high-speed, high-volume roadways where the primary function is moving traffic (such as SR 69 and SR 169), access control is critical to providing safe and efficient traffic operations. On low-speed, low-volume roadways where the primary function is providing access to the adjacent land (such as the Town's roadways), access control is still important but does not have to be as stringent.

In 1997, ADOT completed access management plans (AMPs) for SR 69 and SR 169. The SR 69 AMP covers SR 69 from the SR 69/SR 89 interchange in Prescott to the I-17 Cordes Junction interchange. Relevant excerpts from the SR 69 AMP can be found in **Appendix C**. The SR 169 AMP covers SR 169 from the SR 69/SR 169 intersection in Dewey-Humboldt to the SR 169/I-17 interchange. Relevant excerpts from the SR 169 AMP can be found in **Appendix D**.

The general access management policies for SR 69 and SR 169 that are listed in the SR 69 and SR 169 AMPs include the following:

- Traffic signals will only be installed at major intersections when warranted;
- Only right-in, right-out and left-in access will be permitted at non-major intersections;
- Any median openings at other than dedicated roads would have to be applied for through the ADOT Regional Traffic Engineer;
- Exclusive left and right turn lanes will be required at all intersections;
- If needed, a local street network should be constructed to provide access to streets that have signalized intersections with SR 69 or SR 169;
- Existing driveway access points should be eliminated or consolidated as redevelopment occurs; and
- No new driveways will be permitted.

The SR 69 and SR 169 AMPs indicate that requests for new access to SR 69 or SR 169 should go through the following access application procedure:

- The County or municipality informs ADOT of pending developments as soon as possible. This should occur through written notification to the ADOT District Engineer;
- ADOT and the municipality agree on the access which will be allowed under the respective AMP;
- Following *ADOT Traffic Impact Study Guidelines*, a traffic impact study is prepared by the developer for the development. In addition to the information required under the guidelines, the impact study should include the type of access requested relative to the allowable access, the type of proposed traffic control, the distance to the nearest traffic signal in both directions, and alternative access available, and the need, if required, for any variances to the AMP; and
- The ADOT District Permits Engineer, in coordination with the ADOT Regional Traffic Engineer and local government, approves or denies access requests.

Other relevant recommendations pertaining to SR 69 and/or SR 169 that have been extracted from the SR 69 and SR 169 AMPs include:

- The SR 69/Main Street intersection is identified as a suitable location for a traffic signal if traffic signal warrants are met;
- Raised medians should be considered to alleviate safety concerns where applicable;
- The existing Old Black Canyon Highway driveway on SR 169 should be closed or limited to right-in/right-out access;
- SR 169 between SR 69 and just east of Foothill Drive should ultimately be improved to a four-lane divided highway with a raised median;
- SR 169 between Foothill Drive and the eastern Town limits may ultimately become a four-lane divided roadway;
- River Drive and Outback Drive should be realigned into a single access point east of the medical center on SR 169; and
- Suitable locations for future median breaks on SR 169 include the Mortimer Family Farm driveway (approximately 0.2 miles east of SR 69), the fire station (for emergency vehicle use only), the realigned River Drive, Foothill Drive and Wind River Drive/Clearview Drive.

It is recommended that the Town develop access management guidelines for Town-owned local roads and collector streets. Some policies related to access management are sprinkled throughout the Town's ordinances (such as the requirement that driveways must be located a minimum of 25 feet from the road radius for two intersecting streets), but there is no single location that provides guidance on access management. Access management guidelines should include guidance on topics such as the following:

- Consolidating driveways;
- Sight distance and corner clearance requirements for driveways and cross-streets;
- Driveway dimensions and orientations;
- Driveway and cross-street locations and spacing;
- Number of driveways per property;
- Shared driveways and cross-access;
- Raised median islands;
- Left-turn and right-turn lanes and storage lengths; and
- Traffic signal spacing.

5.1.10 Roadway Improvement Easements or Dedications

Roadway improvement easements or dedications are recommended as an interim right-of-way ownership solution in areas where roadways are privately owned and in need of maintenance but private landowners do not have the ability to maintain or improve the roads. A roadway easement or dedication would allow the Town to implement roadway network improvements without having to purchase the privately-owned right-of-way where many of the existing unpaved roadways are located.

5.2 Other Modes of Travel

The recommendations for other modes of travel focus on providing a safe and effective environment for transit and non-vehicular (e.g., bicycle and pedestrian) travel. The implementation of complete streets concepts will help provide the necessary facilities for these other modes of travel. Recommended improvements to serve these other modes of travel are discussed below and shown in **Figure 16**. Some of these improvements may overlap recommended roadway surface improvements and proposed roadway network improvements and should be constructed in conjunction with the roadway improvements.

5.2.1 Transit

Private transit providers should be encouraged to continue serving the area. Mobility management coordination with CYMPO and other regional transit representatives is recommended to ensure that available transit options are known to the Town and its residents.

The Northern Arizona Council of Governments (NACOG) manages a voucher program to serve disadvantaged populations. It is recommended that the Town coordinate with NACOG to determine if the voucher program's administrative issues can be resolved such that the voucher program can be reinstated in the Town.

If a regional transit system operated by CYMPO is created in the future, it is recommended that the Town actively support its development and implementation.

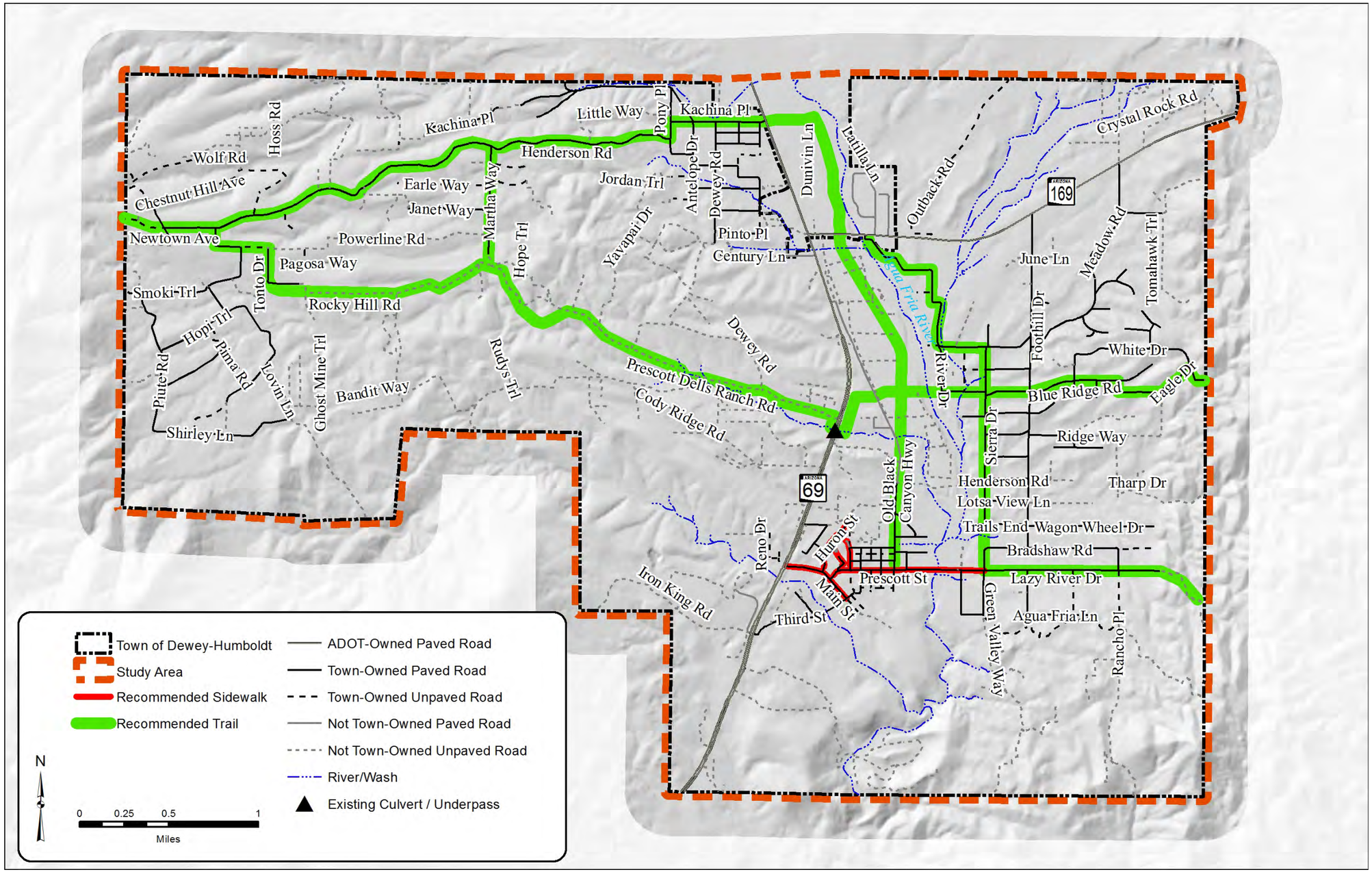
5.2.2 Bicycle and Pedestrian Facilities

Bicycle and pedestrian facilities are recommended along existing and new roadways in the study area, where feasible. Any new facilities that are constructed should comply with the latest ADA requirements.

Sidewalks are recommended in urban areas near schools or other areas of pedestrian activity. Curb and gutter could be installed in conjunction with the sidewalk to further promote safety and improve drainage.

Sidewalks are recommended along the following roadway segments:

- Huron Street – Main Street to the end of the existing pavement;
- Hecla Street – Prescott Street to Humboldt Elementary School;
- Corral Street – Prescott Street to Humboldt Elementary School;
- Prescott Street – Main Street to Sierra Drive; and
- Main Street – SR 69 to Third Street.



Source: Kimley-Horn and Associates, Inc.

Figure 16 – Other Modes of Travel Recommendations

5.2.3 Trail Facilities

Unpaved shared-use trails or paths are recommended along existing and new roadways in the study area, particularly in rural areas. These facilities should accommodate pedestrians, bicyclists, and recreational travelers (e.g., hikers and equestrians) and should be completed in conjunction with roadway improvement projects where feasible.

Trails that are at least four feet wide are recommended along the following existing roadways to create a network of trails generally consistent with the Town's OSAT:

- Lazy River Drive between Sierra Drive and the eastern Town boundary;
- Newtown Avenue/Henderson Road/Horseshoe Ln/Kachina Place between the western Town boundary and SR 69;
- Rocky Hill Road/Tonto Drive between Newtown Avenue and SR 69;
- Martha Way between Rocky Hill Road and Henderson Road;
- Blue Ridge Road between Sierra Drive and the eastern Town boundary;
- Deer Pass between SR 69 and Sierra Drive;
- Old Black Canyon Highway/new roadway between Prescott Street and SR 169;
- Quarterhorse Lane between River Drive and Meadow Road;
- River Drive between SR 169 and Quarterhorse Lane;
- SR 169 between the new roadway east of Old Black Canyon Highway and River Drive;
- Agua Fria River between SR 169 and Kachina Place;
- Kachina Place between SR 69 and Agua Fria River; and
- Sierra Drive between Lazy River Drive and Quarterhorse Lane.

The proposed trails that are new recommendations beyond what it is shown in the Town's OSAT are:

- Martha Way between Rocky Hill Road and Henderson Road;
- Blue Ridge Road between Sierra Drive and the eastern Town boundary;
- Deer Pass between SR 69 and Sierra Drive;
- Old Black Canyon Highway/new roadway between Prescott Street and SR 169;
- SR 169 between the new roadway east of Old Black Canyon Highway and River Drive;
- Agua Fria River between SR 169 and Kachina Place; and
- Kachina Place between SR 69 and Agua Fria River.

There are also some trails in the Town's OSAT that are not listed as recommended trails herein only because they are considered lower priority trails and are likely beyond the implementation timeframe of this study.

5.2.4 Safe Routes to School

The federal Safe Routes to School (SRTS) Program makes federal funding available with no local funding match required for a wide variety of programs and projects – from building safer street crossings to establishing programs that encourage children and their parents to walk and bicycle safely to school. The maximum grant amount for individual local projects is $400,000. It is recommended that the Town coordinate with the Humboldt School District to examine conditions in the vicinity of school facilities and submit applications for SRTS funding if a need for improvements is identified.

6 PLAN FOR IMPROVEMENTS

An implementation plan has been developed to prioritize the recommended improvements into near-term (0-5 years), mid-term (6-10 years), and long-term (11-20 years) timeframes. The actual phasing of implementation of the recommended improvements will be determined by a variety of factors, including funding availability, development activity, traffic patterns, and private participation. The need for improvements should be re-evaluated each year as part of the Town's budget processes or as needed if conditions and travel patterns change significantly.

Table 13, **Table 14**, and **Table 15** present the implementation plan, split into near-term, mid-term, and long-term timeframes. The cost estimate in 2012 dollars is:

- Near-term: $3.3-$3.8 million;
- Mid-term: $16.5-$23.3 million;
- Long-term: $9.2-$15.2 million; and
- Total implementation plan cost: $29.0-$42.3 million.

These costs include design, construction, and right-of-way costs. Ranges are provided for the construction costs to reflect the likely low-end and high-end cost options, which will depend on what alignment and/or level of improvement is implemented (e.g., for roadway surface improvements, providing an unpaved roadway surface with improved grading and minor drainage improvements would be at the low end of the cost range while providing a paved asphalt roadway surface would be at the high end of the cost range). Ranges are also provided for right-of-way costs where it appears right-of-way could either be purchased or obtained at no cost via voluntary easement or dedication. Partnering between agencies to share costs and responsibilities may be appropriate for certain improvements.

The overall transportation improvement plan, combining the near-term, mid-term, and long-term elements, is shown in **Figure 17**.

Table 13 – Recommended Near-term Improvement Projects

Project Location	Improvement Description	Right-of-Way Cost ($)	Construction Cost ($)	Total Cost ($)
Roadway Projects				
Area 1 Henderson Road/Martha Way Curve	Install curve warning signs with 10 mph plaque	-	1,000	1,000
Antelope Dr.: Kachina Pl.-Deerpath Rd.	Rehabilitate roadway pavement	-	106,000	106,000
Deerpath Rd.: Dewey Rd.-Manzanita Blvd.	Rehabilitate roadway pavement	-	82,000	82,000
Hill St.: Kloss Ave.-end of Hill St.	Rehabilitate roadway pavement	-	44,000	44,000
Humboldt St.: Huron St.-Hill St.	Rehabilitate roadway pavement	-	20,000	20,000
Huron St.: Main St.-end of Huron St.	Rehabilitate roadway pavement	-	67,000	67,000
Jones St.: Prescott St.-Wells St.	Rehabilitate roadway pavement	-	21,000	21,000
Kachina Pl.: SR 69-Nancy Ln.	Rehabilitate roadway pavement	-	328,000	328,000
McAllister Dr.: Dewey Rd.-Manzanita Blvd.	Rehabilitate roadway pavement	-	51,000	51,000
Sunhill Trail: Cherry Siding Ln.-end of Sunhill Trail	Rehabilitate roadway pavement	-	14,000	14,000
Tanya Blvd.: Clearview Dr.-end of Tanya Blvd.	Rehabilitate roadway pavement	-	51,000	51,000
Valley High Dr.: Antelope Dr.-Pony Pl.	Rehabilitate roadway pavement	-	54,000	54,000
Wells St.: Old Black Canyon Hwy.-end of Wells St.	Rehabilitate roadway pavement	-	39,000	39,000
Yavapai Dr.: Antelope Dr.-Manzanita Blvd.	Rehabilitate roadway pavement	-	107,000	107,000
Various locations as needed	Maintain roadway pavement ($200,000/year)	-	1,000,000	1,000,000
SR 69/SR 169 intersection	Add signal heads & protected left-turn phasing	-	5,000	5,000
SR 169/Kachina Pl. intersection	Modify traffic signal as needed	-	5,000	5000
Segments of Main St., Prescott St., Green Valley Way, Bradshaw Rd., Foothill Dr., Newtown Ave., Henderson Rd., Pony Pl., Horseshoe Ln., Kachina Pl., Prescott Dells Ranch Rd., Rocky Hill Rd., Tonto Dr., Cranberry Rd., Wicklow Pl., and Dewey Rd.	Update federal functional classification	-	-	-
Town-wide	Coordinate with private roadway owners, as appropriate, on potential roadway easements or right-of-way dedications where roadway improvements are needed	-	-	-
Town-wide	Develop and adopt traffic impact guidelines and development policies	-	-	-

Table 13 – Recommended Near-term Improvement Projects (continued)

Project Location	Improvement Description	Right-of-Way Cost ($)	Construction Cost ($)	Total Cost ($)
Other Modes of Travel Projects				
Town-wide	Develop and adopt access management guidelines	-	-	-
Town-wide	Coordinate with regional transit representatives on transit opportunities	-	-	-
Corral St.: Prescott St.-Humboldt Elementary School	Construct sidewalk along roadway[1]	-	110,000 - 180,000	110,000 - 180,000
Hecla St.: Prescott St.-Humboldt Elementary School	Construct sidewalk along roadway[1]	-	110,000 - 170,000	110,000 - 170,000
Huron St.: Main St.-end of Huron St.	Construct sidewalk along roadway[1]	-	200,000 - 310,000	200,000 - 310,000
Main St.: SR 69-Third St.	Construct sidewalk along roadway[1]	-	260,000 - 410,000	260,000 - 410,000
Prescott St.: Main St.-Old Black Canyon Highway	Construct sidewalk along roadway[1]	-	250,000 - 380,000	250,000 - 380,000
Vicinity of Humboldt Elementary School	Apply for Safe Routes to School grant	-	400,000	400,000
Subtotal Near-term Projects Cost Estimate = $3,325,000 – $3,845,000		**-**	**3,325,000 - 3,845,000**	**3,325,000 - 3,845,000**

1: Low end of construction cost is for sidewalk without curb and gutter; high end of construction cost is for sidewalk with curb and gutter.

Table 14 – Recommended Mid-term Improvement Projects

Project Location	Improvement Description	Right-of-Way Cost ($)[1]	Construction Cost ($)	Total Cost ($)
Roadway Projects				
Area 1 Alternatives: Henderson Rd./Martha Way Curve	Realign roadway with larger radius curve[2]	0 - 9,000	50,000 - 150,000	52,000 - 150,000
Area 2 Alternatives: Henderson Rd./Pony Pl./Horseshoe Ln.	Connect Henderson Rd. to Horseshoe Ln.[2]	0 - 190,000	520,000 - 820,000	520,000 - 1,010,000
Area 4 Alternatives: Powerline Rd./Rocky Hill Rd./Martha Way	Realign and upgrade to all-weather roadway[2,3]	0 - 520,000	2,300,000 - 3,900,000	2,300,000 - 4,380,000
Area 5 Alternatives: Dewey Rd.	Realign and upgrade to all-weather roadway[2,3]	0 - 340,000	790,000 - 2,500,000	790,000 - 2,840,000
Cranberry Rd.: Smoki Trail-Tonto Dr.	Upgrade to all-weather roadway[3]	0 - 5,000	80,000 - 120,000	80,000 - 125,000
Dewey Rd.: 500' east of Stump Rd.-Prescott Dells Ranch Rd.	Upgrade to all-weather roadway[3]	0 - 170,000	460,000 - 650,000	460,000 - 820,000
Martha Way: 350' north of Rocky Hill Rd.-Rocky Hill Rd.	Upgrade to all-weather roadway[3]	0 - 20,000	30,000 - 50,000	30,000 - 70,000
Prescott Dells Ranch Rd.: Rocky Hill Rd.-SR 69	Upgrade to all-weather roadway[3]	0 - 220,000	170,000 - 420,000	170,000 - 640,000
Rocky Hill Rd.: 0.5 miles east of Martha Way-Prescott Dells Ranch Rd.	Upgrade to all-weather roadway[3]	0 - 210,000	590,000 - 830,000	590,000 - 1,040,000
Various locations as needed	Maintain roadway pavement ($200,000/year)	-	1,000,000	1,000,000
SR 69/Main St. intersection	Conduct traffic signal warrant study and construct signal (low end of cost range) or roundabout (high end of cost range) if warranted	-	500,000 - 1,000,000	500,000 - 1,000,000
Prescott St. at the Agua Fria River	Construct an all-weather river crossing	0 - 15,000	1,080,000	1,080,000 - 1,095,000
Segments of Green Valley Way, Bradshaw Rd., Foothill Dr., Prescott Dells Ranch Rd., Rocky Hill Rd., Tonto Dr., Cranberry Rd., Wicklow Pl., and Dewey Rd.	Update federal functional classification after recommended roadway improvements have been constructed	-	-	-

1: Low end of right-of-way cost is for easement/dedication; high end of right-of-way cost is for purchase.
2: Construction cost range reflects the differing costs of alignment alternatives that were considered.
3: Low end of construction cost is for unpaved roadway with improved grading and drainage; high end of construction cost is for paved asphalt roadway.
4: Low end of construction cost is for sidewalk without curb and gutter; high end of construction cost is for sidewalk with curb and gutter.

Table 14 – Recommended Mid-term Improvement Projects (continued)

Project Location	Improvement Description	Right-of-Way Cost ($)[1]	Construction Cost ($)	Total Cost ($)
Other Modes of Travel Projects				
Prescott St.: Old Black Canyon Hwy-Green Valley Way/Sierra Dr.	Construct sidewalk along roadway[4]	-	320,000 - 500,000	320,000 - 500,000
Lazy River Dr.: Sierra Dr.-east Town boundary	Construct shared-use trail along roadway	-	1,040,000	1,040,000
Newtown Ave./Henderson Rd./Horseshoe Ln./Kachina Pl.: west Town boundary-SR 69	Construct shared-use trail along roadway	-	3,110,000	3,110,000
Rocky Hill Rd./Tonto Dr.: Newtown Ave.-SR 69	Construct shared-use trail along roadway	-	3,950,000	3,950,000
Martha Way: Rocky Hill Rd.-Henderson Rd.	Construct shared-use trail along roadway	-	540,000	540,000
Town-wide	Coordinate with regional transit representatives on transit opportunities	-	-	-
Subtotal Mid-term Projects Cost Estimate = $16,530,000 - $23,310,000		**0 - 1,699,000**	**16,530,000 - 21,660,000**	**16,530,000 - 23,310,000**

1: Low end of right-of-way cost is for easement/dedication; high end of right-of-way cost is for purchase.
2: Construction cost range reflects the differing costs of alignment alternatives that were considered.
3: Low end of construction cost is for unpaved roadway with improved grading and drainage; high end of construction cost is for paved asphalt roadway.
4: Low end of construction cost is for sidewalk without curb and gutter; high end of construction cost is for sidewalk with curb and gutter.

Table 15 – Recommended Long-term Improvement Projects

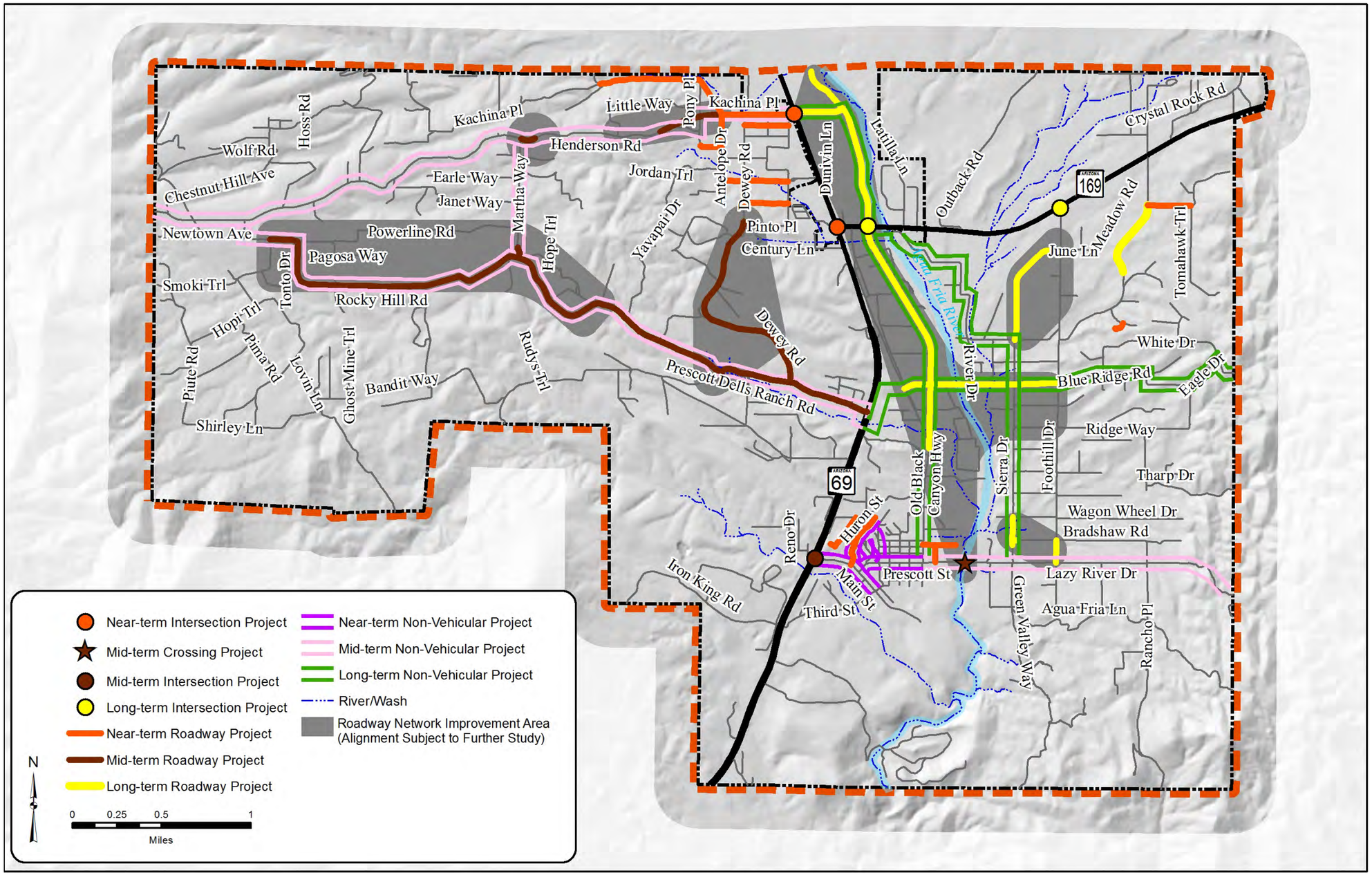
Project Location	Improvement Description	Right-of-Way Cost ($)[1]	Construction Cost ($)	Total Cost ($)
Roadway Projects				
Area 3 Alternatives: Prescott Valley New Development Connection	Construct new all-weather roadway[2,3]	0 - 820,000	800,000 - 1,240,000	800,000 - 2,060,000
Area 6 Alternatives: New Road West of Agua Fria River	Construct new all-weather roadway[2,3]	0 - 720,000	460,000 - 2,000,000	460,000 - 2,720,000
Area 7 Alternatives: Sierra Dr. North Extension	Construct new all-weather roadway[2,3]	0 - 180,000	240,000 - 580,000	240,000 - 760,000
Area 8 Alternatives: Additional Agua Fria River Crossing	Construct new low-flow river crossing[2,3]	0 - 140,000	800,000 - 1,100,000	800,000 - 1,220,000
Area 9 Alternatives: Sierra Dr./Foothill Dr. Connections	Construct new all-weather roadway[2,3]	0 - 150,000	80,000 - 180,000	80,000 - 300,000
Meadow Rd.: Meadow Ranch Pl.-Tanya Blvd.	Upgrade to all-weather roadway[3]	0 - 120,000	230,000 - 360,000	230,000 - 480,000
Various locations as needed	Maintain roadway pavement ($200,000/year)	-	2,000,000	2,000,000
SR 169/future development intersection	Conduct traffic signal warrant study and construct signal (low end of cost range) or roundabout (high end of cost range) if warranted	-	500,000 - 1,000,000	500,000 - 1,000,000
SR 169/Foothill Dr.	Conduct traffic signal warrant study and construct signal (low end of cost range) or roundabout (high end of cost range) if warranted	-	500,000 - 1,000,000	500,000 - 1,000,000
All functionally classified roadways	Update federal functional classification from rural to urban when the Town reaches a population of 5,000	-	-	-

1: Low end of right-of-way cost is for easement/dedication; high end of right-of-way cost is for purchase.
2: Construction cost range reflects the differing costs of alignment alternatives that were considered.
3: Low end of construction cost is for unpaved roadway with improved grading and drainage; high end of construction cost is for paved asphalt roadway.

Table 15 – Recommended Long-term Improvement Projects (continued)

Project Location	Improvement Description	Right-of-Way Cost ($)[1]	Construction Cost ($)	Total Cost ($)
Other Modes of Travel Projects				
Town-wide	Coordinate with regional transit representatives on transit opportunities	-	-	-
Blue Ridge Rd.: Sierra Dr.-east Town boundary	Construct shared-use trail along roadway	-	430,000	430,000
Deer Pass Rd.: SR 69-Sierra Dr.	Construct shared-use trail along roadway	0 - 20,000	340,000	340,000 - 360,000
Old Black Canyon Hwy./New Roadway: Prescott St.-SR 169	Construct shared-use trail along roadway	-	620,000	620,000
Quarterhorse Ln.: River Dr.-Meadow Rd.	Construct shared-use trail along roadway	-	470,000	470,000
River Dr.: SR 169-Quarterhorse Ln.	Construct shared-use trail along roadway	-	300,000	300,000
SR 169: New Roadway East of Old Black Canyon Hwy.-River Dr.	Construct shared-use trail along roadway	-	40,000	40,000
Agua Fria River: SR 169-Kachina Pl.	Construct shared-use trail along river	0 - 38,000	230,000	230,000 - 268,000
Kachina Pl.: SR 69-Agua Fria River	Construct shared-use trail along roadway	0 - 20,000	120,000	120,000 - 140,000
Sierra Dr.: Lazy River Dr.-Quarterhorse Ln.	Construct shared-use trail along roadway	-	1,000,000	1,000,000
Subtotal Long-term Projects Cost Estimate = $9,160,000 - $15,168,000		**0 - 2,208,000**	**9,160,000 - 13,010,000**	**9,160,000 - 15,168,000**
Total of Near-term, Mid-term, and Long-term Project Cost Estimates = $29,015,000 - $42,323,000				

1: Low end of right-of-way cost is for easement/dedication; high end of right-of-way cost is for purchase.
2: Construction cost range reflects the differing costs of alignment alternatives that were considered.
3: Low end of construction cost is for unpaved roadway with improved grading and drainage; high end of construction cost is for paved asphalt roadway.



Projects not shown in Improvement Plan (Figure 17)

Short-term Timeframe

- Install curve warning signs with 10 mph plaque at Henderson Rd/Martha Way Curve
- Update federal functional classifications
- Develop and adopt traffic impact guidelines and development policies
- Develop and adopt access management guidelines
- Coordinate with regional transit representatives on transit opportunities
- Apply for Safe Routes to School grant
- Coordinate with private roadway owners, as appropriate, on potential roadway easements or right-of-way dedications where roadway improvements are needed

Mid-term Timeframe

- Maintain existing paved roads
- Update federal functional classifications after recommended roadway improvements have been constructed
- Coordinate with regional transit representatives on transit opportunities

Long-term Timeframe

- Maintain existing paved roads
- Update federal functional classifications from rural to urban when the Town reaches a population of 5,000
- Coordinate with regional transit representatives on transit opportunities

Source: Kimley-Horn and Associates, Inc.

Figure 17 – Improvement Plan

6.1 Traditional Revenue Sources

The Town has traditionally used the Arizona Highway User Revenue Fund (HURF), developer impact fees, and grants to fund transportation improvements in the study area. HURF can be used for capital improvements or for operations and maintenance while impact fees and grants can typically only be used for capital improvements. The Town also has a local general fund that can be utilized for transportation improvements. These various funding sources are described in more detail below.

6.1.1 Highway User Revenue Fund (HURF)

HURF is primarily derived from gasoline and vehicle license taxes. HURF is allocated by defined percentages to the State, counties, cities, and towns. The State receives 50.5 percent of the HURF dollars to be used statewide. Cities and towns receive 27.5 percent, cities with a population over 300,000 receive an additional 3 percent, and counties receive 19 percent. The city and county distribution is based on population and gasoline sales.

Per the approved fiscal year (FY) 2011-2012 Town budget, the Town anticipates receiving $243,000 in HURF revenue in FY 2011-2012. The Town plans to apply all of its FY 2011-2012 HURF revenue to pavement preservation projects.

ADOT's *Arizona HURF Process & Results FY2012-2021*, published in October 2011, projects that statewide HURF revenue will increase at an average annual compound growth rate of 3.1 percent between FY 2012 and FY 2021. The Town's population is anticipated to grow at an average annual compound growth rate of 2.0 percent between 2011 and 2031 (per Working Paper 1). Because HURF distributions are influenced by population growth, for purposes of this study it is assumed that HURF distributions to the Town will grow at an average annual compound growth rate of 2.0 percent over the next twenty years.

6.1.2 Developer Impact Fees

Impact fee programs require developers to pay for the capital infrastructure needs of the community that are attributed to their respective proposed developments. Per the approved FY 2011-2012 Town budget, the Town anticipates receiving $18,900 in impact fees in FY 2011-2012.

A recently enacted State law places new requirements on how impact fees can be assessed. The Town may have to modify its impact fee structure to comply with the new law, which could translate into reduced impact fee revenue for the Town.

6.1.3 Grants

The Town has historically relied heavily on competitive grant programs to secure funding for projects. Per the approved FY 2011-2012 Town budget, the Town anticipates receiving $2.1 million in grants in FY 2011-2012 from a variety of sources.

6.1.4 Local General Funds

While the Town's local general fund can be utilized for capital improvements or operations and maintenance, the Town's policy in recent years has been to use the local general fund for expenditures such as salaries, benefits, utilities, and facilities that cannot be funded through HURF or impact fees.

6.2 Revenue Opportunities

Based on revenue projections and identified transportation needs, it is apparent that the Town likely will not have sufficient revenue to complete all of the recommended improvements in this study. Additional revenue sources will need to be secured if the recommended improvements are to be constructed within

the recommended timeframes. Public sector revenue opportunities, including existing and new revenue sources, are described in **Table 16**.

Table 16 – Local, State, and Federal Revenue Opportunities

Local	
Bonds	Municipal bonds are securities that are issued for the purpose of financing the infrastructure needs of the issuing municipality. These needs vary greatly but can include schools, streets and highways, bridges, hospitals, public housing, sewer and water systems, power utilities, and various public projects. Municipal bonds may be general obligations of the issuer or secured by specified revenue.
General Funds	In public sector accounting, the primary or catchall fund of a government. It records all assets and liabilities of the entity that are not assigned to a special purpose fund. It provides the resources necessary to sustain the day-to-day activities and thus pays for all administrative and operating expenses. General funds generally receive revenue from sources such as state-shared income and sales taxes, local sales tax, and licensing fees.
Property Tax	A municipality or county can levy a property tax for general purposes or for a specific purpose that has a time limit or can extend until rescinded or revised. The property tax amount is based on a percentage of the assessed value of the property.
Sales Tax	A municipality or county can levy a sales tax for general purposes or for a specific purpose such as transportation, it can have a time limit or can extend until rescinded or revised. A sales tax is charged at the point of purchase for certain goods and services. The tax amount is usually calculated by applying a percentage rate to the taxable price of a sale and adding the tax to the price at the point of sale.
Impact Fees	A fee imposed on property developers by municipalities for the new infrastructure that must be built or increased due to new property development. These fees are designed to offset the impact of the additional development and residents on the municipality's infrastructure and services.
Community Facilities Districts	The Arizona Community Facilities District Act addresses a critical issue for developers: the financing of increasingly costly infrastructure requirements without unduly burdening the developer. The law authorizes bonds to be issued and repaid with a mechanism that taxes (or assesses) only the lands directly benefiting from the new infrastructure. This allows community development which would otherwise be unfeasible due to the prohibitive costs. All community facilities districts are required to be included within an incorporated city or town.
Improvement Districts	An improvement district allows a local government agency to levy and collect special assessments on property that is within the boundaries of the improvement district for the purpose of making infrastructure improvements within the improvement district.
Regional Transportation Authorities	The board of supervisors of a county with a population of four hundred thousand or fewer persons but more than two hundred thousand persons may establish a regional transportation authority in the county. The membership of the authority consists of each municipality in the county, the county, and any other members of the regional council of governments. The regional transportation authority can levy a tax for regional transportation services.

Table 16 – Local, State, and Federal Revenue Opportunities (continued)

Yavapai County Flood Control District	The Yavapai County Flood Control District (YCFCD) has levied a secondary property tax on parcels within Yavapai County. YCFCD utilizes this tax to fund projects related to flood control in the unincorporated portions of the County as well as to contribute to the funding of local municipal flood control projects in partnership with the local jurisdictions. The focus of flood control projects is on drainage improvements, but it can also include correlated transportation improvements. YCFCD has signed intergovernmental agreements with the local jurisdictions related to partnering on flood control projects funded in part by the YCFCD tax. The typical arrangement is for the local jurisdiction to fund the project design and be responsible for bidding, inspecting, and administering the construction of the project, with the YCFCD contributing funds to the project construction cost, but the nature of the partnership between the local jurisdiction and YCFCD is negotiable. YCFCD funds projects annually, so local jurisdictions need to notify YCFCD of proposed projects in the January/February timeframe in order for the proposed projects to be considered for implementation in the next fiscal year that starts July 1. YCFCD typically contributes $75,000-$100,000 to each approved local project, but the contribution amount is negotiable and can be stretched over several years to fund larger projects. Ideally, YCFCD would like to see a 5-year program of proposed flood control projects by each local jurisdiction so that YCFCD can better manage the programming of projects.
State	
Highway User Revenue Fund (HURF)	The State of Arizona taxes motor fuels and collects a variety of fees and charges relating to the registration and operation of motor vehicles on the public highways of the state. These collections include gasoline and use fuel taxes, motor carrier fees, vehicle license tax, motor vehicle registration fees, and other miscellaneous fees. This revenue is deposited in the Arizona HURF and then distributed to the cities, towns, counties, and the State Highway Fund.
Federal	
Surface Transportation Program (STP)	The Surface Transportation Program (STP) provides flexible funding that may be used by states and localities for projects on federal-aid highways (including the National Highway System, urban arterials and collectors, and rural arterials and collectors except for rural minor collectors), bridge projects on any public road functionally classified higher than a rural minor collector, transit capital projects, and intra-city and intercity bus terminals and facilities. A local funding match is typically required. http://www.fhwa.dot.gov/safetealu/factsheets/stp.htm
State Planning and Research (SPR) - Planning Assistance for Rural Areas Program (PARA)	The PARA program provides funding to address a broad range of local and regional planning issues related to roadways and other modes of travel. The PARA program was developed and is managed by ADOT, but the funding for the program comes from the SPR program operated by FHWA. PARA funds are limited to planning applications and may not be used for the design or construction of transportation facilities. Eligible applicants include tribal governments and cities, towns, and counties located outside transportation management area boundaries. No local funding match is currently required. http://www.fhwa.dot.gov/hep/sprt.htm http://www.fhwa.dot.gov/planning/rural/ http://www.azdot.gov/mpd/systems_planning/PDF/PARA/PARAs.asp

Table 16 – Local, State, and Federal Revenue Opportunities (continued)

Highway Safety Improvement Program (HSIP)	The goal of the HSIP funding program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads through the implementation of infrastructure-related highway safety improvements. Each state's Strategic Highway Safety Plan (SHSP) identifies the state's key safety needs and guides HSIP investment decisions. States with SHSPs that meet the requirements of 23 USC 148 may obligate HSIP funds for projects on any public road or publicly owned bicycle and pedestrian pathway or trail. Each state must have an SHSP to be eligible to use up to 10 percent of its HSIP funds for other safety projects under 23 USC (including education, enforcement and emergency medical services). It must also certify that it has met its railway-highway crossing and infrastructure safety needs. The core HSIP program also requires the development and implementation of a Railway-Highway Crossing Program and High Risk Rural Road Program. A local funding match is typically required. http://safety.fhwa.dot.gov/hsip/
Community Development Block Grant Program (CDBG)	The Arizona Department of Housing administers the federal CDBG program for non-entitlement areas (i.e., communities with a population below 50,000). Communities receiving CDBG funds from the State may use the funds for many kinds of community development activities including, but not limited to: • acquisition of property for public purposes; • construction or reconstruction of streets, sidewalks, pathways, water and sewer facilities, neighborhood centers, recreation facilities, and other public works; • public services; and • planning activities. A local funding match is typically required. http://portal.hud.gov/hudportal/HUD?src=/program_offices/ comm_planning /communitydevelopment/programs
High Risk Rural Road Program (HRRRP)	Each state's apportionment of HSIP funds is subject to a set-aside for construction and operational safety improvements on high-risk rural roads. A high-risk rural road is defined as any roadway functionally classified as a rural major or minor collector or rural local road on which the crash rate for fatalities and incapacitating injuries exceeds the statewide average for those functional classes of roadways; or that will likely have increases in traffic volume that will lead to a crash rate for fatalities and incapacitating injuries that exceeds the statewide average for those functional classes of roadways. A local funding match is typically required. http://safety.fhwa.dot.gov/local_rural/training/fhwasa10012/chap_1.cfm
Highway Bridge Program	The Highway Bridge Program provides funding to enable states to improve the condition of their highway bridges through replacement, rehabilitation, and systematic preventive maintenance. Eligible activities are expanded to include systematic preventive maintenance on Federal-aid and non-Federal-aid highway systems. States may carry out projects for the installation of scour countermeasures or systematic preventive maintenance without regard to whether the bridge is eligible for rehabilitation or replacement. A local funding match is typically required. https://www.fhwa.dot.gov/bridge/hbrrp.htm

Table 16 – Local, State, and Federal Revenue Opportunities (continued)

Transportation Enhancement (TE) Program	The goal of this program is to strengthen the cultural, aesthetic, and environmental aspects of the Nation's intermodal transportation system. A State's TE funding is derived from a set-aside from its annual STP apportionment. TE funding is eligible for use on all functionally classified roadways, including rural minor collectors and local roads. This funding source is designated to provide funding for capital projects that enhance existing surface transportation system. Successful projects must fulfill one of twelve specific goals. The TE Program is a reimbursement program. Project sponsors must be prepared to pay for all costs incurred and then request reimbursement for expenditures as specified. There is a required minimum 5.7 percent hard cash local match. The maximum grant amount for individual local projects is $750,000. http://www.fhwa.dot.gov/environment/transportation_enhancements/
Federal Emergency Management Agency (FEMA) Grant Program	The Arizona Division of Emergency Management administers several FEMA pre-disaster and post-disaster grant programs. The goal of these programs is to prevent and mitigate hazards. Grant programs include the following: • Pre-Disaster Mitigation Program; • Hazard Mitigation Grant Program; • Flood Mitigation Assistance Program; • Repetitive Flood Claims Program; and • Severe Repetitive Loss Program. A local funding match is typically required. http://www.fema.gov/government/grant/index.shtm
Safe Routes to School (SRTS) Program	The goal of the SRTS Program is to enable and encourage children to walk and bicycle to school. The program accomplishes this by facilitating the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution near schools. Eligible projects must meet the following two criteria: • Funding is only for elementary and middle schools; and • Programs and projects must be within a 2-mile radius of the school. Funding is given in the form of reimbursement once a project is implemented. There is no required local match. Funding can be provided for planning assistance, non-infrastructure projects, infrastructure projects, and materials and regional support projects. The maximum grant amount for individual local projects is $400,000. http://safety.fhwa.dot.gov/saferoutes/
Federal Transit Administration (FTA) Section 5307 Transit Program	The 5307 Program provides grants for urbanized areas (50,000 or greater population) for transit capital investments and operating expenses. A local funding match is typically required. http://fta.dot.gov/grants/13093_3561.html
FTA Section 5309 Transit Program	The 5309 Program provides funding for capital investment grants of $75 million or less (small starts). Grants are for capital costs associated with bus corridor improvements and bus rapid transit. A local funding match is typically required. http://fta.dot.gov/grants/13094_3557.html
FTA Section 5310 Transit Program	The 5310 Program provides funds to transit projects for the elderly and disabled. Funds are allocated to each state on a formula basis and then the state allocates to eligible recipients, which include public bodies and private, non-profit organizations. Capital costs, as well as costs associated with contracted services, are eligible expenses. A local funding match is typically required. http://fta.dot.gov/grants/13093_3556.html

Table 16 – Local, State, and Federal Revenue Opportunities (continued)

FTA Section 5311 Transit Program	The 5311 Program provides funds to support costs associated with public transportation in non-urbanized areas. Funds are allocated to each state on a formula basis and then the State allocates to eligible recipients, which include public bodies and private, non-profit organizations. Both capital and operating costs are eligible expenses. A local funding match is typically required. http://fta.dot.gov/grants/13093_3555.html
FTA Section 5316 Transit Program	The 5316, or Job Access and Reverse Commute (JARC), Program provides federal funding for transit-related capital, operating, and planning projects. The purpose of the program is to provide new or expanded service to enable welfare recipients and low-income individuals to access places of employment. The funding from this program can be used for a variety of purposes including shuttle service, expanded fixed-route service, and guaranteed-ride-home services. A local funding match is typically required. http://fta.dot.gov/grants/13093_3550.html
FTA Section 5317 Transit Program	The 5317, or New Freedom, Program provides federal funding and is designed to create and improve transportation facilities that go beyond the ADA standards for persons with disabilities. Funds are competitively distributed based on the population of persons with disabilities, and are intended for capital and operating expenses for new public transportation services and new public transportation alternatives beyond those required by ADA. A local funding match is typically required. http://fta.dot.gov/grants/13093_3549.html

Sources: *ADOT, USDOT, FTA, and FHWA*

6.3 Town Development Policies

Town development policies should be adopted that spell out developers' responsibilities related to transportation and other infrastructure improvements. These policies should address topics such as roadway easements, right-of-way dedications, and the construction of half-street improvements adjacent to proposed developments.

6.4 Agency Coordination and Partnering

Many of the recommended improvements cross jurisdictional boundaries or impact multiple agencies. Successful implementation of the recommended improvements will require agency coordination and partnering from planning, design, construction, and funding standpoints. Agencies that should be included in the coordination and partnering efforts, as applicable, include the Town, Prescott Valley, Yavapai County, ADOT, CYMPO, FHWA, Humboldt Elementary School District, Bureau of Land Management, Arizona State Land Department, and Arizona Game and Fish Department.

6.5 Title VI Impacts

The U.S. Department of Transportation regulations related to disadvantaged, or Title VI, populations (i.e., minority, low-income, and elderly populations) state that in determining the site or location of transportation facilities, selection cannot be made with the purpose or effect of excluding persons from, denying them the benefits of, or subjecting them to discrimination under any program to which this regulation applies. According to the regulations, a project using federal funds cannot be implemented that will cause disproportionately high and adverse impacts to disadvantaged populations.

The Dewey-Humboldt PARA Transportation Study is a long-range multimodal planning study that addresses the transportation needs in the study area for the near-term, mid-term, and long-term transportation planning horizons. The recommended improvements are expected to improve the overall transportation system of the study area and benefit the study area as a whole. Recommended improvement projects were not selected based on the population that would be impacted, but rather were selected to

address an identified transportation need. More detailed analysis will be needed for individual design projects that are federally-funded to ensure that there are no disproportionately high and adverse impacts to disadvantaged populations.

Appendix A – Construction Cost Estimates

Upgrade Existing Unpaved Roadway to All-weather Roadway - Level Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2030204	EMBANKMENT	CU.YD.	7,040	$7.00	$49,280
2030301	ROADWAY EXCAVATION	CU.YD.	2,347	$10.00	$23,470
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$80,750**
	DRAINAGE CONSTRUCTION	10%			$8,075
				Drainage Construction Subtotal	**$8,075**
				Roadway & Drainage Construction Subtotal	**$88,825**
	Unidentified Item Allowance (25%)				$ 22,300
				Subtotal	**$111,125**
	Water Supply/Dust Palliative (2%)				$ 2,300
	Maintenance And Protection Of Traffic (5%)				$ 5,600
	Erosion Control (1%)				$ 1,200
	Contractor Quality Control (2%)				$ 2,300
	Construction Surveying And Layout (2%)				$ 2,300
				Other Item Subtotal	**$124,825**
	Mobilization (10%)				$ 12,500
				Construction Subtotal	**$ 137,325**
	Design (20%)				$ 27,500
	Construction Engineering and Contingencies (14%)				$ 19,300
	Indirect Cost Allocation (5.19%)				$ 7,200
				Construction Total	**$ 192,000**
	Utility Relocations				$ 10,000
TOTAL	**Upgrade Existing Unpaved Roadway to All-weather Roadway - Level Terrain**	**COST**			**$ 202,000**

Upgrade Existing Unpaved Roadway to All-weather Roadway - Rolling Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2030204	EMBANKMENT	CU.YD.	16,430	$7.00	$115,010
2030301	ROADWAY EXCAVATION	CU.YD.	9,387	$10.00	$93,870
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$216,880**
	DRAINAGE CONSTRUCTION	10%			$21,688
				Drainage Construction Subtotal	**$21,688**
				Roadway & Drainage Construction Subtotal	**$238,568**
	Unidentified Item Allowance (25%)				$ 59,700
				Subtotal	**$298,268**
	Water Supply/Dust Palliative (2%)				$ 6,000
	Maintenance And Protection Of Traffic (5%)				$ 15,000
	Erosion Control (1%)				$ 3,000
	Contractor Quality Control (2%)				$ 6,000
	Construction Surveying And Layout (2%)				$ 6,000
				Other Item Subtotal	**$334,268**
	Mobilization (10%)				$ 33,500
				Construction Subtotal	**$ 367,768**
	Design (20%)				$ 73,600
	Construction Engineering and Contingencies (14%)				$ 51,500
	Indirect Cost Allocation (5.19%)				$ 19,100
				Construction Total	**$ 512,000**
	Utility Relocations				$ 10,000
TOTAL	**Upgrade Existing Unpaved Roadway to All-weather Roadway - Rolling Terrain**	**COST**			**$ 522,000**

Upgrade Existing Unpaved Roadway to All-weather Roadway - Steep Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2030204	EMBANKMENT	CU.YD.	23,470	$7.00	$164,290
2030301	ROADWAY EXCAVATION	CU.YD.	14,080	$10.00	$140,800
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$313,090**
	DRAINAGE CONSTRUCTION	10%			$31,309
				Drainage Construction Subtotal	**$31,309**
				Roadway & Drainage Construction Subtotal	**$344,399**
	Unidentified Item Allowance (25%)				$ 86,100
				Subtotal	**$430,499**
	Water Supply/Dust Palliative (2%)				$ 8,700
	Maintenance And Protection Of Traffic (5%)				$ 21,600
	Erosion Control (1%)				$ 4,400
	Contractor Quality Control (2%)				$ 8,700
	Construction Surveying And Layout (2%)				$ 8,700
				Other Item Subtotal	**$482,599**
	Mobilization (10%)				$ 48,300
				Construction Subtotal	**$ 530,899**
	Design (20%)				$ 106,200
	Construction Engineering and Contingencies (14%)				$ 74,400
	Indirect Cost Allocation (5.19%)				$ 27,600
				Construction Total	**$ 739,100**
	Utility Relocations				$ 10,000
TOTAL	**Upgrade Existing Unpaved Roadway to All-weather Roadway - Steep Terrain**	**COST**			**$ 740,000**

Pave Existing Unpaved Roadway Using Chip-seal - Level Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	7,040	$7.00	$49,280
2030301	ROADWAY EXCAVATION	CU.YD.	2,347	$10.00	$23,470
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4040074	EMULSIFIED ASPHALT (CRS-2)	TON	26	$450.00	$11,880
4040162	COVER MATERIAL	CU.YD.	169	$40.00	$6,760
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$178,082**
	DRAINAGE CONSTRUCTION	10%			$17,808
				Drainage Construction Subtotal	**$17,808**
				Roadway & Drainage Construction Subtotal	**$195,890**
	Unidentified Item Allowance (25%)				$ 49,000
				Subtotal	**$244,890**
	Water Supply/Dust Palliative (2%)				$ 4,900
	Maintenance And Protection Of Traffic (5%)				$ 12,300
	Erosion Control (1%)				$ 2,500
	Contractor Quality Control (2%)				$ 4,900
	Construction Surveying And Layout (2%)				$ 4,900
				Other Item Subtotal	**$274,390**
	Mobilization (10%)				$ 27,500
				Construction Subtotal	**$ 301,890**
	Design (20%)				$ 60,400
	Construction Engineering and Contingencies (14%)				$ 42,300
	Indirect Cost Allocation (5.19%)				$ 15,700
				Construction Total	**$ 421,000**
	Utility Relocations				$ 10,000
	TOTAL Pave Existing Unpaved Roadway Using Chip-seal - Level Terrain COST				**$ 440,000**

Pave Existing Unpaved Roadway Using Chip-seal - Rolling Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	16,430	$7.00	$115,010
2030301	ROADWAY EXCAVATION	CU.YD.	9,387	$10.00	$93,870
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4040074	EMULSIFIED ASPHALT (CRS-2)	TON	26	$450.00	$11,880
4040162	COVER MATERIAL	CU.YD.	169	$40.00	$6,760
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$314,212**
	DRAINAGE CONSTRUCTION	10%			$31,421
				Drainage Construction Subtotal	**$31,421**
				Roadway & Drainage Construction Subtotal	**$345,633**
	Unidentified Item Allowance (25%)				$ 86,500
				Subtotal	**$432,133**
	Water Supply/Dust Palliative (2%)				$ 8,700
	Maintenance And Protection Of Traffic (5%)				$ 21,700
	Erosion Control (1%)				$ 4,400
	Contractor Quality Control (2%)				$ 8,700
	Construction Surveying And Layout (2%)				$ 8,700
				Other Item Subtotal	**$484,333**
	Mobilization (10%)				$ 48,500
				Construction Subtotal	**$ 532,833**
	Design (20%)				$ 106,600
	Construction Engineering and Contingencies (14%)				$ 74,600
	Indirect Cost Allocation (5.19%)				$ 27,700
				Construction Total	**$ 742,000**
	Utility Relocations				$ 10,000
	TOTAL Pave Existing Unpaved Roadway Using Chip-seal - Rolling Terrain COST				**$ 760,000**

Pave Existing Unpaved Roadway Using Chip-seal - Steep Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	23,470	$7.00	$164,290
2030301	ROADWAY EXCAVATION	CU.YD.	14,080	$10.00	$140,800
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4040074	EMULSIFIED ASPHALT (CRS-2)	TON	26	$450.00	$11,880
4040162	COVER MATERIAL	CU.YD.	169	$40.00	$6,760
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$410,422**
	DRAINAGE CONSTRUCTION	10%			$41,042
				Drainage Construction Subtotal	**$41,042**
				Roadway & Drainage Construction Subtotal	**$451,464**
	Unidentified Item Allowance (25%)				$ 112,900
				Subtotal	**$564,364**
	Water Supply/Dust Palliative (2%)				$ 11,300
	Maintenance And Protection Of Traffic (5%)				$ 28,300
	Erosion Control (1%)				$ 5,700
	Contractor Quality Control (2%)				$ 11,300
	Construction Surveying And Layout (2%)				$ 11,300
				Other Item Subtotal	**$632,264**
	Mobilization (10%)				$ 63,300
				Construction Subtotal	**$ 695,564**
	Design (20%)				$ 139,200
	Construction Engineering and Contingencies (14%)				$ 97,400
	Indirect Cost Allocation (5.19%)				$ 36,100
				Construction Total	**$ 969,000**
	Utility Relocations				$ 10,000
	TOTAL Pave Existing Unpaved Roadway Using Chip-seal - Steep Terrain COST				**$ 979,000**

Pave Existing Unpaved Roadway Using Asphalt - Level Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	7,040	$7.00	$49,280
2030301	ROADWAY EXCAVATION	CU.YD.	2,347	$10.00	$23,470
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	1,540	$30.00	$46,200
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$205,642**
	DRAINAGE CONSTRUCTION	10%			$20,564
				Drainage Construction Subtotal	**$20,564**
				Roadway & Drainage Construction Subtotal	**$226,206**
	Unidentified Item Allowance (25%)				$ 56,600
				Subtotal	**$282,806**
	Water Supply/Dust Palliative (2%)				$ 5,700
	Maintenance And Protection Of Traffic (5%)				$ 14,200
	Erosion Control (1%)				$ 2,900
	Contractor Quality Control (2%)				$ 5,700
	Construction Surveying And Layout (2%)				$ 5,700
				Other Item Subtotal	**$317,006**
	Mobilization (10%)				$ 31,800
				Construction Subtotal	**$ 348,806**
	Design (20%)				$ 69,800
	Construction Engineering and Contingencies (14%)				$ 48,900
	Indirect Cost Allocation (5.19%)				$ 18,200
				Construction Total	**$ 486,000**
	Utility Relocations				$ 10,000
	TOTAL Pave Existing Unpaved Roadway Using Asphalt - Level Terrain COST				**$ 496,000**

Pave Existing Unpaved Roadway Using Asphalt - Rolling Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	16,430	$7.00	$115,010
2030301	ROADWAY EXCAVATION	CU.YD.	9,387	$10.00	$93,870
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	1,540	$30.00	$46,200
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$341,772**
	DRAINAGE CONSTRUCTION	10%			$34,177
				Drainage Construction Subtotal	**$34,177**
				Roadway & Drainage Construction Subtotal	**$375,949**
	Unidentified Item Allowance (25%)				$ 94,000
				Subtotal	**$469,949**
	Water Supply/Dust Palliative (2%)				$ 9,400
	Maintenance And Protection Of Traffic (5%)				$ 23,500
	Erosion Control (1%)				$ 4,700
	Contractor Quality Control (2%)				$ 9,400
	Construction Surveying And Layout (2%)				$ 9,400
				Other Item Subtotal	**$526,349**
	Mobilization (10%)				$ 52,700
				Construction Subtotal	**$ 579,049**
	Design (20%)				$ 115,900
	Construction Engineering and Contingencies (14%)				$ 81,100
	Indirect Cost Allocation (5.19%)				$ 30,100
				Construction Total	**$ 807,000**
	Utility Relocations				$ 10,000
	TOTAL Pave Existing Unpaved Roadway Using Asphalt - Rolling Terrain COST				**$ 817,000**

Pave Existing Unpaved Roadway Using Asphalt - Steep Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	-	$5,000.00	$0
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	23,470	$7.00	$164,290
2030301	ROADWAY EXCAVATION	CU.YD.	14,080	$10.00	$140,800
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	1,540	$30.00	$46,200
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	-	$5,000.00	$0
				Construction Subtotal	**$437,982**
	DRAINAGE CONSTRUCTION	10%			$43,798
				Drainage Construction Subtotal	**$43,798**
				Roadway & Drainage Construction Subtotal	**$481,780**
	Unidentified Item Allowance (25%)				$ 120,500
				Subtotal	**$602,280**
	Water Supply/Dust Palliative (2%)				$ 12,100
	Maintenance And Protection Of Traffic (5%)				$ 30,200
	Erosion Control (1%)				$ 6,100
	Contractor Quality Control (2%)				$ 12,100
	Construction Surveying And Layout (2%)				$ 12,100
				Other Item Subtotal	**$674,880**
	Mobilization (10%)				$ 67,500
				Construction Subtotal	**$ 742,380**
	Design (20%)				$ 148,500
	Construction Engineering and Contingencies (14%)				$ 104,000
	Indirect Cost Allocation (5.19%)				$ 38,600
				Construction Total	**$ 1,034,000**
	Utility Relocations				$ 10,000
	TOTAL Pave Existing Unpaved Roadway Using Asphalt - Steep Terrain COST				**$ 1,044,000**

Realign and Upgrade to All-weather Roadway - Level Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2030204	EMBANKMENT	CU.YD.	14,080	$7.00	$98,560
2030301	ROADWAY EXCAVATION	CU.YD.	4,693	$10.00	$46,930
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$233,490**
	DRAINAGE CONSTRUCTION	25%			$58,373
				Drainage Construction Subtotal	**$58,373**
				Roadway & Drainage Construction Subtotal	**$291,863**
	Unidentified Item Allowance (25%)				$ 73,000
				Subtotal	**$364,863**
	Water Supply/Dust Palliative (2%)				$ 7,300
	Maintenance And Protection Of Traffic (5%)				$ 18,300
	Erosion Control (1%)				$ 3,700
	Contractor Quality Control (2%)				$ 7,300
	Construction Surveying And Layout (2%)				$ 7,300
				Other Item Subtotal	**$408,763**
	Mobilization (10%)				$ 40,900
				Construction Subtotal	**$ 449,663**
	Design (20%)				$ 90,000
	Construction Engineering and Contingencies (14%)				$ 63,000
	Indirect Cost Allocation (5.19%)				$ 23,400
				Construction Total	**$ 627,000**
	Utility Relocations				$ 10,000
	TOTAL Realign and Upgrade to All-weather Roadway - Level Terrain COST				**$ 637,000**

Realign and Upgrade to All-weather Roadway - Rolling Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2030204	EMBANKMENT	CU.YD.	32,860	$7.00	$230,020
2030301	ROADWAY EXCAVATION	CU.YD.	18,773	$10.00	$187,730
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$505,750**
	DRAINAGE CONSTRUCTION	25%			$126,438
				Drainage Construction Subtotal	**$126,438**
				Roadway & Drainage Construction Subtotal	**$632,188**
	Unidentified Item Allowance (25%)				$ 158,100
				Subtotal	**$790,288**
	Water Supply/Dust Palliative (2%)				$ 15,900
	Maintenance And Protection Of Traffic (5%)				$ 39,600
	Erosion Control (1%)				$ 8,000
	Contractor Quality Control (2%)				$ 15,900
	Construction Surveying And Layout (2%)				$ 15,900
				Other Item Subtotal	**$885,588**
	Mobilization (10%)				$ 88,600
				Construction Subtotal	**$ 974,188**
	Design (20%)				$ 194,900
	Construction Engineering and Contingencies (14%)				$ 136,400
	Indirect Cost Allocation (5.19%)				$ 50,600
				Construction Total	**$ 1,357,000**
	Utility Relocations				$ 10,000
	TOTAL Realign and Upgrade to All-weather Roadway - Rolling Terrain COST				**$ 1,367,000**

Realign and Upgrade to All-weather Roadway - Steep Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2030204	EMBANKMENT	CU.YD.	46,940	$7.00	$328,580
2030301	ROADWAY EXCAVATION	CU.YD.	32,853	$10.00	$328,530
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$745,110**
	DRAINAGE CONSTRUCTION	25%			$186,278
				Drainage Construction Subtotal	**$186,278**
				Roadway & Drainage Construction Subtotal	**$931,388**
	Unidentified Item Allowance (25%)				$ 232,900
				Subtotal	**$1,164,288**
	Water Supply/Dust Palliative (2%)				$ 23,300
	Maintenance And Protection Of Traffic (5%)				$ 58,300
	Erosion Control (1%)				$ 11,700
	Contractor Quality Control (2%)				$ 23,300
	Construction Surveying And Layout (2%)				$ 23,300
				Other Item Subtotal	**$1,304,188**
	Mobilization (10%)				$ 130,500
				Construction Subtotal	**$ 1,434,688**
	Design (20%)				$ 287,000
	Construction Engineering and Contingencies (14%)				$ 200,900
	Indirect Cost Allocation (5.19%)				$ 74,500
				Construction Total	**$ 1,998,000**
	Utility Relocations				$ 10,000
	TOTAL Realign and Upgrade to All-weather Roadway - Steep Terrain COST				**$ 2,008,000**

Realign and Upgrade to All-weather Roadway Using Chip-seal - Level Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	14,080	$7.00	$98,560
2030301	ROADWAY EXCAVATION	CU.YD.	4,693	$10.00	$46,930
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4040074	EMULSIFIED ASPHALT (CRS-2)	TON	26	$450.00	$11,880
4040162	COVER MATERIAL	CU.YD.	169	$40.00	$6,760
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$330,822**
	DRAINAGE CONSTRUCTION	25%			$82,706
				Drainage Construction Subtotal	**$82,706**
				Roadway & Drainage Construction Subtotal	**$413,528**
	Unidentified Item Allowance (25%)				$ 103,400
				Subtotal	**$516,928**
	Water Supply/Dust Palliative (2%)				$ 10,400
	Maintenance And Protection Of Traffic (5%)				$ 25,900
	Erosion Control (1%)				$ 5,200
	Contractor Quality Control (2%)				$ 10,400
	Construction Surveying And Layout (2%)				$ 10,400
				Other Item Subtotal	**$579,228**
	Mobilization (10%)				$ 58,000
				Construction Subtotal	**$ 637,228**
	Design (20%)				$ 127,500
	Construction Engineering and Contingencies (14%)				$ 89,300
	Indirect Cost Allocation (5.19%)				$ 33,100
				Construction Total	**$ 888,000**
	Utility Relocations				$ 10,000
TOTAL	**Realign and Upgrade to All-weather Roadway Using Chip-seal - Level Terrain**	**COST**			**$ 898,000**

Realign and Upgrade to All-weather Roadway Using Chip-seal - Rolling Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	32,860	$7.00	$230,020
2030301	ROADWAY EXCAVATION	CU.YD.	18,773	$10.00	$187,730
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4040074	EMULSIFIED ASPHALT (CRS-2)	TON	26	$450.00	$11,880
4040162	COVER MATERIAL	CU.YD.	169	$40.00	$6,760
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$603,082**
	DRAINAGE CONSTRUCTION	25%			$150,771
				Drainage Construction Subtotal	**$150,771**
				Roadway & Drainage Construction Subtotal	**$753,853**
	Unidentified Item Allowance (25%)				$ 188,500
				Subtotal	**$942,353**
	Water Supply/Dust Palliative (2%)				$ 18,900
	Maintenance And Protection Of Traffic (5%)				$ 47,200
	Erosion Control (1%)				$ 9,500
	Contractor Quality Control (2%)				$ 18,900
	Construction Surveying And Layout (2%)				$ 18,900
				Other Item Subtotal	**$1,055,753**
	Mobilization (10%)				$ 105,600
				Construction Subtotal	**$ 1,161,353**
	Design (20%)				$ 232,300
	Construction Engineering and Contingencies (14%)				$ 162,600
	Indirect Cost Allocation (5.19%)				$ 60,300
				Construction Total	**$ 1,617,000**
	Utility Relocations				$ 10,000
TOTAL	**Realign and Upgrade to All-weather Roadway Using Chip-seal - Rolling Terrain**	**COST**			**$ 1,627,000**

Realign and Upgrade to All-weather Roadway Using Chip-seal - Steep Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	46,940	$7.00	$328,580
2030301	ROADWAY EXCAVATION	CU.YD.	32,853	$10.00	$328,530
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4040074	EMULSIFIED ASPHALT (CRS-2)	TON	26	$450.00	$11,880
4040162	COVER MATERIAL	CU.YD.	169	$40.00	$6,760
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$842,442**
	DRAINAGE CONSTRUCTION	25%			$210,611
				Drainage Construction Subtotal	**$210,611**
				Roadway & Drainage Construction Subtotal	**$1,053,053**
	Unidentified Item Allowance (25%)				$ 263,300
				Subtotal	**$1,316,353**
	Water Supply/Dust Palliative (2%)				$ 26,400
	Maintenance And Protection Of Traffic (5%)				$ 65,900
	Erosion Control (1%)				$ 13,200
	Contractor Quality Control (2%)				$ 26,400
	Construction Surveying And Layout (2%)				$ 26,400
				Other Item Subtotal	**$1,474,653**
	Mobilization (10%)				$ 147,500
				Construction Subtotal	**$ 1,622,153**
	Design (20%)				$ 324,500
	Construction Engineering and Contingencies (14%)				$ 227,200
	Indirect Cost Allocation (5.19%)				$ 84,200
				Construction Total	**$ 2,259,000**
	Utility Relocations				$ 10,000
TOTAL	**Realign and Upgrade to All-weather Roadway Using Chip-seal - Steep Terrain**	**COST**			**$ 2,269,000**

Realign and Upgrade to All-weather Roadway Using Asphalt - Level Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	14,080	$7.00	$98,560
2030301	ROADWAY EXCAVATION	CU.YD.	4,693	$10.00	$46,930
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	1,540	$30.00	$46,200
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$358,382**
	DRAINAGE CONSTRUCTION	25%			$89,596
				Drainage Construction Subtotal	**$89,596**
				Roadway & Drainage Construction Subtotal	**$447,978**
	Unidentified Item Allowance (25%)				$ 112,000
				Subtotal	**$559,978**
	Water Supply/Dust Palliative (2%)				$ 11,200
	Maintenance And Protection Of Traffic (5%)				$ 28,000
	Erosion Control (1%)				$ 5,600
	Contractor Quality Control (2%)				$ 11,200
	Construction Surveying And Layout (2%)				$ 11,200
				Other Item Subtotal	**$627,178**
	Mobilization (10%)				$ 62,800
				Construction Subtotal	**$ 689,978**
	Design (20%)				$ 138,000
	Construction Engineering and Contingencies (14%)				$ 96,600
	Indirect Cost Allocation (5.19%)				$ 35,900
				Construction Total	**$ 961,000**
	Utility Relocations				$ 10,000
	TOTAL Realign and Upgrade to All-weather Roadway Using Asphalt - Level Terrain COST				**$ 971,000**

Realign and Upgrade to All-weather Roadway Using Asphalt - Rolling Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	32,860	$7.00	$230,020
2030301	ROADWAY EXCAVATION	CU.YD.	18,773	$10.00	$187,730
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	1,540	$30.00	$46,200
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$630,642**
	DRAINAGE CONSTRUCTION	25%			$157,661
				Drainage Construction Subtotal	**$157,661**
				Roadway & Drainage Construction Subtotal	**$788,303**
	Unidentified Item Allowance (25%)				$ 197,100
				Subtotal	**$985,403**
	Water Supply/Dust Palliative (2%)				$ 19,800
	Maintenance And Protection Of Traffic (5%)				$ 49,300
	Erosion Control (1%)				$ 9,900
	Contractor Quality Control (2%)				$ 19,800
	Construction Surveying And Layout (2%)				$ 19,800
				Other Item Subtotal	**$1,104,003**
	Mobilization (10%)				$ 110,500
				Construction Subtotal	**$ 1,214,503**
	Design (20%)				$ 243,000
	Construction Engineering and Contingencies (14%)				$ 170,100
	Indirect Cost Allocation (5.19%)				$ 63,100
				Construction Total	**$ 1,691,000**
	Utility Relocations				$ 10,000
TOTAL	**Realign and Upgrade to All-weather Roadway Using Asphalt - Rolling Terrain**	**COST**			**$ 1,701,000**

Realign and Upgrade to All-weather Roadway Using Asphalt - Steep Terrain
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	8	$5,000.00	$40,000
2020201	SAW CUTTING	L.FT.	48	$4.00	$192
2030204	EMBANKMENT	CU.YD.	46,940	$7.00	$328,580
2030301	ROADWAY EXCAVATION	CU.YD.	32,853	$10.00	$328,530
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	1,570	$50.00	$78,500
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	1,540	$30.00	$46,200
6080101	MISCELLANEOUS WORK (SIGNS)	L.SUM	1	$2,500.00	$2,500
7041501	PAVEMENT MARKINGS	L.SUM	1	$5,500.00	$5,500
8050003	SEEDING (CLASS II)	ACRE	8	$5,000.00	$40,000
				Construction Subtotal	**$870,002**
	DRAINAGE CONSTRUCTION	25%			$217,501
				Drainage Construction Subtotal	**$217,501**
				Roadway & Drainage Construction Subtotal	**$1,087,503**
	Unidentified Item Allowance (25%)				$ 271,900
				Subtotal	**$1,359,403**
	Water Supply/Dust Palliative (2%)				$ 27,200
	Maintenance And Protection Of Traffic (5%)				$ 68,000
	Erosion Control (1%)				$ 13,600
	Contractor Quality Control (2%)				$ 27,200
	Construction Surveying And Layout (2%)				$ 27,200
				Other Item Subtotal	**$1,522,603**
	Mobilization (10%)				$ 152,300
				Construction Subtotal	**$ 1,674,903**
	Design (20%)				$ 335,000
	Construction Engineering and Contingencies (14%)				$ 234,500
	Indirect Cost Allocation (5.19%)				$ 87,000
				Construction Total	**$ 2,332,000**
	Utility Relocations				$ 10,000
	TOTAL Realign and Upgrade to All-weather Roadway Using Asphalt - Steep Terrain COST				**$ 2,342,000**

Construct 6' Sidewalk With Curb and Gutter (Both Sides of Street)
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2020201	SAW CUTTING	L.FT.	10,560	$3.00	$31,680
2030204	EMBANKMENT	CU.YD.	2,000	$20.00	$40,000
2030301	ROADWAY EXCAVATION	CU.YD.	1,000	$12.00	$12,000
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	260	$40.00	$10,400
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	260	$150.00	$39,000
9080109	CONCRETE SINGLE CURB (VERTICAL CURB)	L.FT.	10,560	$16.00	$168,960
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	63,360	$4.00	$253,440
				Construction Subtotal	**$555,480**
	DRAINAGE CONSTRUCTION	0%			$0
				Drainage Construction Subtotal	**$0**
				Roadway & Drainage Construction Subtotal	**$555,480**
	Unidentified Item Allowance (5%)				$ 27,800
				Subtotal	**$583,280**
	Water Supply/Dust Palliative (1%)				$ 5,900
	Maintenance And Protection Of Traffic (2%)				$ 11,700
	Erosion Control (1%)				$ 5,900
	Contractor Quality Control (2%)				$ 11,700
	Construction Surveying And Layout (2%)				$ 11,700
				Other Item Subtotal	**$630,180**
	Mobilization (12%)				$ 75,700
				Construction Subtotal	**$ 705,880**
	Design (20%)				$ 141,200
	Construction Engineering and Contingencies (14%)				$ 98,900
	Indirect Cost Allocation (5.19%)				$ 36,700
				Construction Total	**$ 983,000**
	Utility Relocations				$ -
	TOTAL Construct 6' Sidewalk With Curb and Gutter (Both Sides of Street) COST				**$ 983,000**

Construct 6' Sidewalk Without Curb and Gutter (Both Sides of Street)
ITEMIZED COST ESTIMATE

Kimley-Horn and Associates, Inc.

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2030204	EMBANKMENT	CU.YD.	2,000	$20.00	$40,000
2030301	ROADWAY EXCAVATION	CU.YD.	1,000	$12.00	$12,000
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	260	$40.00	$10,400
4060006	ASPHALTIC CONCRETE (3/4" MIX)	TON	260	$150.00	$39,000
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	63,360	$4.00	$253,440
				Construction Subtotal	**$354,840**
	DRAINAGE CONSTRUCTION	0%			$0
				Drainage Construction Subtotal	**$0**
				Roadway & Drainage Construction Subtotal	**$354,840**
	Unidentified Item Allowance (5%)				$ 17,800
				Subtotal	**$372,640**
	Water Supply/Dust Palliative (1%)				$ 3,800
	Maintenance And Protection Of Traffic (2%)				$ 7,500
	Erosion Control (1%)				$ 3,800
	Contractor Quality Control (2%)				$ 7,500
	Construction Surveying And Layout (2%)				$ 7,500
				Other Item Subtotal	**$402,740**
	Mobilization (12%)				$ 48,400
				Construction Subtotal	**$ 451,140**
	Design (20%)				$ 90,300
	Construction Engineering and Contingencies (14%)				$ 63,200
	Indirect Cost Allocation (5.19%)				$ 23,500
				Construction Total	**$ 629,000**
	Utility Relocations				$ -
	TOTAL Construct 6' Sidewalk Without Curb and Gutter (Both Sides of Street) COST				**$ 629,000**

Construct 6' Unpaved Shared-Use Path/Trail - Level Terrain (Both Sides of Street)

Kimley-Horn and Associates, Inc.

ITEMIZED COST ESTIMATE

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	2	$4,000.00	$8,000
2030204	EMBANKMENT	CU.YD.	7,040	$20.00	$140,800
2030301	ROADWAY EXCAVATION	CU.YD.	2,347	$12.00	$28,158
				Construction Subtotal	**$176,958**
	DRAINAGE CONSTRUCTION	0%			$0
				Drainage Construction Subtotal	**$0**
				Roadway & Drainage Construction Subtotal	**$176,958**
	Unidentified Item Allowance (5%)				$ 8,900
				Subtotal	**$185,858**
	Water Supply/Dust Palliative (1%)				$ 1,900
	Maintenance And Protection Of Traffic (2%)				$ 3,800
	Erosion Control (1%)				$ 1,900
	Contractor Quality Control (2%)				$ 3,800
	Construction Surveying And Layout (2%)				$ 3,800
				Other Item Subtotal	**$201,058**
	Mobilization (12%)				$ 24,200
				Construction Subtotal	**$ 225,258**
	Design (20%)				$ 45,100
	Construction Engineering and Contingencies (14%)				$ 31,600
	Indirect Cost Allocation (5.19%)				$ 11,700
				Construction Total	**$ 314,000**
	Utility Relocations				$ -
TOTAL	**Construct 6' Unpaved Shared-Use Path/Trail - Flat Terrain (Both Sides of Street)**	**COST**			**$ 314,000**

Construct 6' Unpaved Shared-Use Path/Trail - Rolling Terrain (Both Sides of Street)

Kimley-Horn and Associates, Inc.

ITEMIZED COST ESTIMATE

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	2	$4,000.00	$8,000
2030204	EMBANKMENT	CU.YD.	16,430	$20.00	$328,600
2030301	ROADWAY EXCAVATION	CU.YD.	9,387	$12.00	$112,638
				Construction Subtotal	**$449,238**
	DRAINAGE CONSTRUCTION	0%			$0
				Drainage Construction Subtotal	**$0**
				Roadway & Drainage Construction Subtotal	**$449,238**
	Unidentified Item Allowance (5%)				$ 22,500
				Subtotal	**$471,738**
	Water Supply/Dust Palliative (1%)				$ 4,800
	Maintenance And Protection Of Traffic (2%)				$ 9,500
	Erosion Control (1%)				$ 4,800
	Contractor Quality Control (2%)				$ 9,500
	Construction Surveying And Layout (2%)				$ 9,500
				Other Item Subtotal	**$509,838**
	Mobilization (12%)				$ 61,200
				Construction Subtotal	**$ 571,038**
	Design (20%)				$ 114,300
	Construction Engineering and Contingencies (14%)				$ 80,000
	Indirect Cost Allocation (5.19%)				$ 29,700
				Construction Total	**$ 796,000**
	Utility Relocations				$ -
TOTAL	**Construct 6' Unpaved Shared-Use Path/Trail - Rolling Terrain (Both Sides of Street)**	**COST**			**$ 796,000**

Construct 6' Unpaved Shared-Use Path/Trail - Steep Terrain (Both Sides of Street)

Kimley-Horn and Associates, Inc.

ITEMIZED COST ESTIMATE

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2010011	CLEARING AND GRUBBING	ACRE	2	$4,000.00	$8,000
2030204	EMBANKMENT	CU.YD.	23,470	$20.00	$469,400
2030301	ROADWAY EXCAVATION	CU.YD.	16,427	$12.00	$197,118
				Construction Subtotal	**$674,518**
	DRAINAGE CONSTRUCTION	0%			$0
				Drainage Construction Subtotal	**$0**
				Roadway & Drainage Construction Subtotal	**$674,518**
	Unidentified Item Allowance (5%)				$ 33,800
				Subtotal	**$708,318**
	Water Supply/Dust Palliative (1%)				$ 7,100
	Maintenance And Protection Of Traffic (2%)				$ 14,200
	Erosion Control (1%)				$ 7,100
	Contractor Quality Control (2%)				$ 14,200
	Construction Surveying And Layout (2%)				$ 14,200
				Other Item Subtotal	**$765,118**
	Mobilization (12%)				$ 91,900
				Construction Subtotal	**$ 857,018**
	Design (20%)				$ 171,500
	Construction Engineering and Contingencies (14%)				$ 120,000
	Indirect Cost Allocation (5.19%)				$ 44,500
				Construction Total	**$ 1,194,000**
	Utility Relocations				$ -
TOTAL	**Construct 6' Unpaved Shared-Use Path/Trail - Steep Terrain (Both Sides of Street)**	**COST**			**$ 1,194,000**

Kimley-Horn and Associates, Inc.

Install 2 Signs
ITEMIZED COST ESTIMATE

Project Location: Dewey-Humboldt

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
	WARNING SIGN PANEL	SQ FT	18	$13.00	$234
	SIGN POST (PERFORATED) (2 1/2S)	LF	20	$8.00	$160
	FOUNDATION FOR SIGN POST (CONCRETE)	EACH	2	$150.00	$300
				Construction Subtotal	**$694**
	Unidentified Item Allowance (5%)				$ 100
				Construction Subtotal	**$ 794**
	Construction Engineering and Contingencies (14%)				$ 200
		TOTAL Install 2 Signs COST			**$ 994**

Construction Cost Estimate - Roadway Network Improvements

Alternative	Project Location	Project Description	Terrain	Length (ft)	New Roadway (ft)	Pave Exst Roadway (ft)	Low Flow River Crossing Cost ($)	Minimum Curve Radius	Posted Speed (mph)	Maximum Grade	Structure Impact	Parcel Impact	ROW Required (sq ft)	Cost of Full Take ($)	Special Parcel Impacts	Alternative ROW Cost ($) Min	Alternative ROW Cost ($) Max	Alternative Construction Cost Unpaved ($) Min	Alternative Construction Cost ($) Max	Alternative Cost Total Min ($)	Alternative Cost Total Max ($)	Area ROW Cost Min ($)	Area ROW Cost Max ($)	Area Construction Cost Min ($)	Area Construction Cost Max ($)	AREA TOTAL COST MIN ($)	AREA TOTAL COST MAX ($)
1 EX	Area 1 Alternatives: Henderson Rd./Martha Way Curve	Realign roadway with larger radius curve	LEVEL					155'	-	0%	0	0	-	-	-	0	0										
1A	Area 1 Alternatives: Henderson Rd./Martha Way Curve	Realign roadway with larger radius curve	LEVEL	410	410	0		465	40	0%	0	1	8,890	$ -	-	0	9000	X	$76,000	$76,000	$85,000	$0	$9,000	$50,000	$150,000	$50,000	$150,000
1B	Area 1 Alternatives: Henderson Rd./Martha Way Curve	Realign roadway with larger radius curve	LEVEL	270	270	0		250	30	0%	0	1	1,975	$ -	-	0	2000	X	$50,000	$50,000	$52,000	$0	$9,000	$50,000	$150,000	$50,000	$150,000
1C	Area 1 Alternatives: Henderson Rd./Martha Way Curve	Realign roadway with larger radius curve	LEVEL	816	816	0		250	30	0%	0	1	-	$ -	-	0	0	X	$150,000	$150,000	$150,000	$0	$9,000	$50,000	$150,000	$50,000	$150,000
2 EX	Area 2Alternatives: Henderson Rd./Ponly Pl./Horseshoe Ln.	Connect Henderson Rd to Horseshoe Ln	ROLLING		0			50'	-	6%	0	0	-	-	BLM Parcel	0	0				$0	$0						
2A	Area 2Alternatives: Henderson Rd./Ponly Pl./Horseshoe Ln.	Connect Henderson Rd to Horseshoe Ln	ROLLING	1607	1607	0		350'	25	10%	1	10	77,913	$ 57,902	BLM Parcel	0	140000	X	$520,000	$520,000	$660,000	$0	$190,000	$520,000	$820,000	$520,000	$1,010,000
2B	Area 2Alternatives: Henderson Rd./Ponly Pl./Horseshoe Ln.	Connect Henderson Rd to Horseshoe Ln	ROLLING	2545	2545	0		350'	25	10%	1	8	127,249	$ 57,278	BLM Parcel	0	190000	X	$820,000	$820,000	$1,010,000	$0	$190,000	$520,000	$820,000	$520,000	$1,010,000
2C	Area 2Alternatives: Henderson Rd./Ponly Pl./Horseshoe Ln.	Connect Henderson Rd to Horseshoe Ln	ROLLING	1912	1912	0		350'	25	10%	0	11	95,637	$ -	BLM Parcel	0	100000	X	$620,000	$620,000	$720,000	$0	$190,000	$520,000	$820,000	$520,000	$1,010,000
3EX	Area 3 Alternatives: Prescott Valley New Development Connection	Construct new paved roadway	LEVEL		0			-	-	0%	0	0	-	-	-	0	0			$0	$0						
3A	Area 3 Alternatives: Prescott Valley New Development Connection	Construct new paved roadway	LEVEL	6605	6605	0		-	25	0%	2	22	330,531	$ 475,239	-	0	810000	$810,000	$1,220,000	$810,000	$2,030,000	$0	$820,000	$800,000	$1,240,000	$800,000	$2,060,000
3B	Area 3 Alternatives: Prescott Valley New Development Connection	Construct new paved roadway	LEVEL	6705	6705	0		-	25	0%	2	19	335,263	$ 475,239	-	0	820000	$820,000	$1,240,000	$820,000	$2,060,000	$0	$820,000	$800,000	$1,240,000	$800,000	$2,060,000
3C	Area 3 Alternatives: Prescott Valley New Development Connection	Construct new paved roadway	LEVEL	6546	6546	0		-	25	0%	2	17	326,162	$ 475,239	-	0	810000	$800,000	$1,210,000	$800,000	$2,020,000	$0	$820,000	$800,000	$1,240,000	$800,000	$2,060,000
4 EX	Area 4 Alternatives: Powerline Rd./Rocky Hill Rd./Martha Way	Realign and pave roadway	STEEP		0			45'	-	16%	0	0	-	-	BLM Parcel	0	0				$0	$0						
4A	Area 4 Alternatives: Powerline Rd./Rocky Hill Rd./Martha Way	Realign and pave roadway	STEEP	8803	4303	4500		350	25	13%	0	59	439,643	$ -	BLM Parcel	0	440000	$2,300,000	$2,800,000	$2,300,000	$3,240,000	$0	$520,000	$2,300,000	$3,900,000	$2,300,000	$4,380,000
4B	Area 4 Alternatives: Powerline Rd./Rocky Hill Rd./Martha Way	Realign and pave roadway	STEEP	9423	8023	1400		350	25	13%	0	24	471,159	$ -	-	0	480000	$3,300,000	$3,900,000	$3,300,000	$4,380,000	$0	$520,000	$2,300,000	$3,900,000	$2,300,000	$4,380,000
4C	Area 4 Alternatives: Powerline Rd./Rocky Hill Rd./Martha Way	Realign and pave roadway	STEEP	10417	3622	6795		350'	25	13%	0	35	519,584	$ -	-	0	520000	$2,400,000	$3,000,000	$2,400,000	$3,520,000	$0	$520,000	$2,300,000	$3,900,000	$2,300,000	$4,380,000
5EX	Area 5 Alternatives: Improved Dewey Rd.	Realign and pave roadway	STEEP		0			80'	-	13%	0	0	-	-	-	0	0			$0	$0						
5A	Area 5 Alternatives: Improved Dewey Rd.	Realign and pave roadway	STEEP	6699	4699	2000		350	25	13%	0	36	334,991	$ -	-	0	340000	$2,100,000	$2,500,000	$2,100,000	$2,840,000	$0	$340,000	$790,000	$2,500,000	$790,000	$2,840,000
5B	Area 5 Alternatives: Improved Dewey Rd.	Realign and pave roadway	STEEP	3332	1332	2000		350	25	10%	0	22	116,598	$ -	-	0	120000	$790,000	$990,000	$790,000	$1,110,000	$0	$340,000	$790,000	$2,500,000	$790,000	$2,840,000
5C	Area 5 Alternatives: Improved Dewey Rd.	Realign and pave roadway	STEEP	4391	4391	0		800'	25	13%	0	23	219,528	$ -	BLM Parcel	0	220000	$1,680,000	$1,950,000	$1,680,000	$2,170,000	$0	$340,000	$790,000	$2,500,000	$790,000	$2,840,000
6EX	Area 6 Alternatives: New Road West of Agua Fria River	Construct new paved roadway	LEVEL		0			-	-	-	0	0	-	-	-	0	0				$0	$0						
6A	Area 6 Alternatives: New Road West of Agua Fria River	Construct new paved roadway	LEVEL	3739	3739	0		1000'	35	0%	0	5	186,968	$ -	-	0	190000	$460,000	$690,000	$460,000	$880,000	$0	$720,000	$460,000	$2,000,000	$460,000	$2,720,000
6B	Area 6 Alternatives: New Road West of Agua Fria River	Construct new paved roadway	LEVEL	7011	7011	0		1000'	35	0%	0	7	350,594	$ -	-	0	360000	$900,000	$1,300,000	$900,000	$1,660,000	$0	$720,000	$460,000	$2,000,000	$460,000	$2,720,000
6C	Area 6 Alternatives: New Road West of Agua Fria River	Construct new paved roadway	LEVEL	10618	10618	0		1000'	35	0%	2	16	530,924	$ 181,759	-	0	720000	$1,300,000	$2,000,000	$1,300,000	$2,720,000	$0	$720,000	$460,000	$2,000,000	$460,000	$2,720,000
7EX	Area 7 Alternatives: Sierra Dr. North Extension	Construct new paved roadway	LEVEL		0			130'	-	0%	0	0	-	-	-	0	0			$0	$0						
7A	Area 7 Alternatives: Sierra Dr. North Extension	Construct new paved roadway	LEVEL	3441	2786	655				0%	2	8	142,897	$ 29,000	-	0	180000	$370,000	$580,000	$370,000	$760,000	$0	$180,000	$240,000	$580,000	$240,000	$760,000
7B	Area 7 Alternatives: Sierra Dr. North Extension	Construct new paved roadway	LEVEL	2706	2401	305		-	25	0%	2	5	121,413	$ 29,000	-	0	160000	$310,000	$470,000	$310,000	$630,000	$0	$180,000	$240,000	$580,000	$240,000	$760,000
7C	Area 7 Alternatives: Sierra Dr. North Extension	Construct new paved roadway	LEVEL	2143	1838	305		350'	25	0%	2	4	93,307	$ 29,000	-	0	130000	$240,000	$370,000	$240,000	$500,000	$0	$180,000	$240,000	$580,000	$240,000	$760,000
8EX	Area 8 Alternatives: Additional Agua Fria River Crossing	Construct new paved low-flow river crossing	LEVEL		0			-	-	-	0	0	-	-	-	0	0				$0	$0						
8A	Area 8 Alternatives: Additional Agua Fria River Crossing	Construct new paved low-flow river crossing	LEVEL	4573	2355	2218	420,000	350'	25	0%	0	7	118,083	$ -	-	0	120000	$800,000	$1,100,000	$800,000	$1,220,000	$0	$140,000	$800,000	$1,100,000	$800,000	$1,220,000
8B	Area 8 Alternatives: Additional Agua Fria River Crossing	Construct new paved low-flow river crossing	LEVEL	4218	2652	1566	420,000	350'	25	0%	0	13	128,397	$ -	-	0	130000	$810,000	$1,060,000	$810,000	$1,190,000	$0	$140,000	$800,000	$1,100,000	$800,000	$1,220,000
8C	Area 8 Alternatives: Additional Agua Fria River Crossing	Construct new paved low-flow river crossing	LEVEL	3924	2974	950	420,000	350'	25	0%	0	8	130,505	$ -	-	0	140000	$820,000	$1,060,000	$820,000	$1,200,000	$0	$140,000	$800,000	$1,100,000	$800,000	$1,220,000
9EX	Area 9 Alternatives: Sierra Dr./Foothill Dr. Connections	Construct new paved roadway	LEVEL		0			-	-	0%	0	0	-	-	-	0	0			$0	$0						
9A	Area 9 Alternatives: Sierra Dr./Foothill Dr. Connections	Construct new paved roadway	LEVEL	965	965	0		-	25	0%	0	0	3,886	$ -	-	0	10000	$120,000	$180,000	$120,000	$190,000	$0	$150,000	$80,000	$180,000	$80,000	$300,000
9B	Area 9 Alternatives: Sierra Dr./Foothill Dr. Connections	Construct new paved roadway	LEVEL	656	656	0		-	25	0%	0	0	-	$ -	-	0	0	$80,000	$130,000	$80,000	$130,000	$0	$150,000	$80,000	$180,000	$80,000	$300,000
9C	Area 9 Alternatives: Sierra Dr./Foothill Dr. Connections	Construct new paved roadway	LEVEL	789	789	0		380'	35	0%	1	1	14,600	$ 134,286	-	0	150000	$100,000	$150,000	$100,000	$300,000	$0	$150,000	$80,000	$180,000	$80,000	$300,000

Construction Cost Estimate - Paving of Existing Unpaved Roadways

Project Location	Project Description	Terrain	Parcel Impact	ROW Required (sq ft)	cost per sf	Total (miles)	Total (feet)	ROW Cost ($) Min	ROW Cost ($) Max	Construction Cost ($) Min	Construction Cost ($) Max	Total Cost ($) Min	Total Cost ($) Max
Cranberry Rd: Smoki Trail-Tonto Dr	Pave unpaved roadway	Rolling	1	4,990	$1.00	0.15	800	$ -	$5,000	$80,000	$120,000	$80,000	$125,000
Dewey Rd: 500' east of Stump Rd-Prescott Dells Ranch Rd	Pave unpaved roadway	Steep	24	165,000	$1.00	0.63	3,300	$ -	$170,000	$460,000	$650,000	$460,000	$820,000
Martha Way: 350' north of Rocky Hill Rd-Rocky Hill Rd	Pave unpaved roadway	Rolling	2	17,500	$1.00	0.07	350	$ -	$20,000	$30,000	$50,000	$30,000	$70,000
Meadow Rd: Meadow Ranch Place-Tanya Boulevard	Pave unpaved roadway	Rolling	3	115,000	$1.00	0.44	2,300	$ -	$120,000	$230,000	$360,000	$230,000	$480,000
Prescott Dells Ranch Rd: Rocky Hill Rd-SR 69	Pave unpaved roadway	Flat	23	222,500	$1.00	0.84	4,450	$ -	$220,000	$170,000	$420,000	$170,000	$640,000
Rocky Hill Rd: 0.5 miles east of Martha Way-Prescott Dells Ranch Rd	Pave unpaved roadway	Steep	18	210,000	$1.00	0.80	4,200	$ -	$210,000	$590,000	$830,000	$590,000	$1,040,000

Construction Cost Estimate - Bicycle and Pedestrian Facilities																
Project Location	Project Description	Length (LF)	Total Length (LF)	% Flat	% Rolling	%Steep	Unit Cost Flat Terrain Without Curb/Gutter ($)	Unit Cost Flat Terrain With Curb/Gutter ($)	ROW Length (LF)	ROW Width LF)	ROW Cost ($)	Construction Cost Min ($)	Construction Cost Max ($)	TOTAL COST MIN ($)	TOTAL COST MAX ($)
Corral Street – Prescott Street to Humboldt Elementary School	Construct sidewalk	920	920	100%	0%	0%	$119	$186	0	0	$0	$110,000	$180,000	$110,000	$180,000
Hecla Street – Prescott Street to Humboldt Elementary School	Construct sidewalk	900	900	100%	0%	0%	$119	$186	0	0	$0	$110,000	$170,000	$110,000	$170,000
Huron Street – Main Street to end of pavement	Construct sidewalk	1650	1650	100%	0%	0%	$119	$186	0	0	$0	$200,000	$310,000	$200,000	$310,000
Main Street – SR 69 to Third Street	Construct sidewalk	2170	2170	100%	0%	0%	$119	$186	0	0	$0	$260,000	$410,000	$260,000	$410,000
Prescott Street – Main Street to Old Black Canyon Hwy	Construct sidewalk	2030	2030	100%	0%	0%	$119	$186	0	0	$0	$250,000	$380,000	$250,000	$380,000
Prescott Street – Old Black Canyon Hwy to Green Valley Way/Sierra D	Construct sidewalk	2650	2650	100%	0%	0%	$119	$186	0	0	$0	$320,000	$500,000	$320,000	$500,000

Construction Cost Estimate - Trail Facilities

Project Location	Project Description	Length (LF)	Total Length (LF)	% Flat	% Rolling	%Steep	Unit Cost Flat Terrain ($)	Unit Cost Rolling Terrain ($)	Unit Cost Steep Terrain ($)	ROW Length (LF)	ROW Width (LF)	ROW Cost Min ($)	ROW Cost Max ($)	Construction Cost ($)	TOTAL COST MIN($)	TOTAL COST MAX($)
Agua Fria River: SR 169-Kachina Pl	Construct shared-use trail along river	3800	3800	100%	0%	0%	$59	$152	$225	3800	10	$0	$38,000	$230,000	$230,000	$268,000
Blue Ridge Rd: Sierra Dr-east Town boundary	Construct shared-use trail along roadway	7300	7300	100%	0%	0%	$59	$152	$225	0	0	$0	$0	$430,000	$430,000	$430,000
Deer Pass Rd: SR 69-Sierra Dr	Construct shared-use trail along roadway	5000	5000	90%	10%	0%	$59	$152	$225	2000	10	$0	$20,000	$340,000	$340,000	$360,000
Kachina Pl: SR 69-Agua Fria River	Construct shared-use trail along roadway	2000	2000	100%	0%	0%	$59	$152	$225	2000	10	$0	$20,000	$120,000	$120,000	$140,000
Lazy River Dr: Sierra Dr/Green Valley Way-east Town boundary	Construct shared-use trail along roadway	6820	6820	0%	100%	0%	$59	$152	$225	0	0	$0	$0	$1,040,000	$1,040,000	$1,040,000
Newtown Av/Henderson Rd//Horseshoe Ln/Kachina Pl: west Town bo	Construct shared-use trail along roadway	20500	20500	0%	100%	0%	$59	$152	$225	0	0	$0	$0	$3,110,000	$3,110,000	$3,110,000
Old Black Canyon Hwy/New Roadway: Prescott St-SR 169	Construct shared-use trail along roadway	10500	10500	100%	0%	0%	$59	$152	$225	0	0	$0	$0	$620,000	$620,000	$620,000
Quarterhorse Ln: River Dr-Meadow Rd	Construct shared-use trail along roadway	3100	3100	0%	100%	0%	$59	$152	$225	0	0	$0	$0	$470,000	$470,000	$470,000
River Dr: SR 169-Quarterhorse Ln	Construct shared-use trail along roadway	5050	5050	100%	0%	0%	$59	$152	$225	0	0	$0	$0	$300,000	$300,000	$300,000
Rocky Hill Rd/Tonto Dr: Newtown Avenue-SR 69	Construct shared-use trail along roadway	20950	20950	0%	50%	50%	$59	$152	$225	0	0	$0	$0	$3,950,000	$3,950,000	$3,950,000
Sierra Dr: Lazy River Dr-Quarterhorse Ln	Construct shared-use trail along roadway	6600	6600	0%	100%	0%	$59	$152	$225	0	0	$0	$0	$1,000,000	$1,000,000	$1,000,000
SR 169: New Roadway East of Old Black Canyon Hwy-River Drive	Construct shared-use trail along roadway	600	600	100%	0%	0%	$59	$152	$225	0	0	$0	$0	$40,000	$40,000	$40,000
Martha Way: Rocky Hill Rd.-Henderson Rd	Construct shared-use trail along roadway	3500	3500	0%	100%	0%	$59	$152	$225	0	0	$0	$0	$540,000	$540,000	$540,000

Appendix B – Traffic Impact Guidelines

Town of Dewey-Humboldt PARA Transportation Study

DRAFT
Traffic Impact Study Guidelines

Prepared by:

Kimley-Horn and Associates, Inc.

March 2012

TABLE OF CONTENTS

INDEX OF TABLES

1 INTRODUCTION

The purpose of a traffic impact study (TIS) is to assist Town of Dewey-Humboldt (Town) staff in understanding the demands and impacts placed on the Town's transportation network by proposed development. Development, such as new subdivisions and businesses, generate traffic. The traffic impact study will determine if additional investment in the transportation network is required as a result of the development, including new roads, traffic signals, or turn lanes.

A TIS is a planning tool to forecast demands on the transportation network, and to mitigate any negative impacts.

These guidelines will:

- Establish the conditions that determine the need for a TIS.
- Establish the minimum requirements for a TIS in terms of study area, study horizon and study contents.

These guidelines contain the following sections:

- Introduction (this section)
- Determining the Need for a Traffic Impact Study
- Categories for Traffic Impact Study
- Scope
- Certification
- Sample Table of Contents for a Traffic Impact Study
- Auxiliary Lanes

These guidelines were developed based on the following sources:

- *ADOT Traffic Engineering Policies, Guidelines, and Procedures – Section 240 – Traffic Impact Analyses*
- *Pima County Subdivision and Development Street Standards, Section 3.1.2 – Traffic Impact Studies, April, 2005*
- *MCDOT Traffic Impact Procedures*

Key definitions relating to TIS are:

Area of Significant Traffic Impact	The geographic area that includes the facilities significantly impacted by the site traffic.
Influence Area	The geographic area surrounding the site from which the development is likely to draw a high percentage (80% or more) of the total site traffic.
Mode Split	The estimation of the number of trips made by each mode (automobiles, pedestrian, transit, etc.)
Peak Hour	The single hour of a representative day when the traffic volume on the highway represents the most critical period for operation and the highest typical capacity requirements.

Peak Hour of Generator	The single hour of highest volume of traffic entering and exiting a site.
Traffic Generation	The estimation of the number of origins from and destinations to a site resulting from the land use activity on that site.
Traffic Generator	A designated land use (residential, commercial, office, industrial, etc.) or change in land use that generates vehicular and/or pedestrian traffic to and from the site.
Trip Assignment	The assignment of site plus non-site traffic to specific streets and highways.
Trip Distribution	The allocation of the site-generated traffic among all possible approach and departure routes.
Traffic Impact	The effect of site traffic on highway operations and safety.
Traffic Impact Analysis	A complete analysis includes an estimation of future traffic with and without the proposed generator, analysis of the traffic impacts, and recommended roadway improvements which may be necessary to accommodate the expected traffic.
Traffic Mitigation	The reduction of traffic impacts on roadways and/or intersections to an acceptable level of service by way of roadway construction improvements, the upgrade of existing traffic control devices, or the modification of the site plan.

2 DETERMINING THE NEED FOR A TRAFFIC IMPACT STUDY

A Traffic Impact Study (TIS) prepared by a registered Professional Engineer is required for any subdivision or commercial development which generates 100 or more gross trips during the morning or afternoon peak hour of the generator.

Table 1 shows the thresholds that would trigger the need for a TIS for some of the most common uses. Typical peak hour trips per unit for various land uses are included in the table. For uses not included in the table, the number of trips generated should be calculated using the latest edition of *Trip Generation*, published by the Institute of Transportation Engineers.

A TIS can also be required by the Town, even if the proposed development generates less than 100 trips in the peak hour, if there are existing traffic concerns in the local area (such as an offset intersection, or high accident rates), or if there are other traffic specific problems that may be aggravated by the proposed development.

Table 1 – Thresholds to Trigger Need for Traffic Impact Study

ITE Code	Land Use	Unit	Peak Hour Trips/Unit	Threshold
Residential				
210	Single Family	DU	1 .02	100 DU
220	Apartments	DU	0.67	150 DU
230	Condominium/Townhomes	DU	0.54	185 DU
240	Mobile Home	DU	0 .58	175 DU
250	Retirement Community	DU	0.34	295 DU
416	RV Park	Space	0.48	210 SPACES
Commercial And Industrial				
110	General Light Industrial	1,000 SF	1.08	93,000 SF
120	General Heavy Industrial	1,000 SF	0.68	147,000 SF
130	Industrial Park	1,000 SF	0.92	109,000 SF
150	Warehousing	1,000 SF	0.61	164,000 SF
430	Golf Course	Holes	4.59	22 holes
492	Racquet Club	Court	4.66	22 courts
493	Health Club	1,000 SF	4.3	24,000 SF
812	Lumber Store	1,000 SF	8.38	12,000 SF
816	Hardware/Paint Store	1,000 SF	11.18	9,000 SF
820	Shopping Center	1,000 SF	4.97	21,000 SF
831	Quality Restaurant	1,000 SF	10.82	10,000 SF
832	Sit Down High Turnover Restaurant	1,000 SF	19.38	5,000 SF
834	Fast Food (with drive-thru)	1,000 SF	72.74	1,500 SF
840	Vehicle Repair (Automobile Care Center)	1,000 SF	4.01	25,000 SF
841	New Car Sales	1,000 SF	2.97	34,000 SF
844	Gas Station	Pump	16.18	7 pumps
850	Supermarket (Grocery Store)	1,000 SF	12.25	8,000 SF
851	24-Hour Convenience Store	1,000 SF	65.24	1,500 SF
861	Discount Club	1,000 SF	6.46	16,000 SF
890	Furniture Store	1,000 SF	0.92	109,000 SF
911	Walk-in Bank	1,000 SF	42.02	2,500 SF
912	Drive-in Bank	1,000 SF	51.23	2,000 SF

Table 1 – Thresholds to Trigger Need for Traffic Impact Study (continued)

ITE Code	Land Use	Unit	Peak Hour Trips/Unit	Threshold
Offices				
710	General Office Building	1,000 SF	1.56	65,000 SF
720	Medical-Dental Office Buildings	1,000 SF	4.36	23,000 SF
730	Government Office	1,000 SF	11.03	10,000 SF
750	Office Park	1,000 SF	1.74	58,000 SF
760	Research & Development Center	1,000 SF	1.24	81,000 SF
770	Business Parks	1,000 SF	1.43	70,000 SF
Institutional				
520	Elementary school	Students	0.30	335 students
522	Middle/Junior High School	Students	0.46	220 students
530	High School	Students	0.46	220 students
560	Church	1,000 SF	9.49	11,000 SF
565	Day care center	Students	0.86	120 students

3 CATEGORIES FOR TRAFFIC IMPACT STUDY

Based on the size and phasing of the proposed development, the following categories of TIS have been established:

CATEGORY I. Small developments which generate 100 or more peak hour trips but less than 500 trips during the morning or afternoon peak hour.

CATEGORY II. Moderate size developments which generate 500 or more peak hour trips but less than 1,000 trips during the morning or afternoon peak hour.

CATEGORY III. Large single-phase developments which generate 1,000 or more trips during the morning or afternoon peak hour.

CATEGORY IV. Large multi-phase developments which generate 1,000 or more trips during the morning or afternoon peak hour.

The Town Public Works Director makes the final decision on requiring a TIS and determining whether the TIS falls within either of the categories.

A developer shall first estimate the number of vehicle trips generated by the development to determine if a TIS is required and the applicable category. The developer shall obtain concurrence from the Town Public Works Director on the number of trips generated by the development.

If a developer agrees to perform mitigation improvements as outlined by the Town Public Works Director, preparation of a TIS may be waived.

4 SCOPE

The level of detail needed for the TIS depends on the size of the development and its phasing. However, every TIS must address elements such as the study area, the study horizon, data collection requirements, capacity analysis, among others. Those elements are discussed here.

4.1 Study Area

The minimum study area shall be determined by project type and size in accordance with the criteria in **Table 2**. The study area for the proposed development shall include traffic signal controlled intersections, site access drives and major unsignalized intersections to ensure their operation and level of service are adequately assessed. Unsignalized intersections where at least one of the intersecting streets is a collector or arterial are considered major unsignalized intersections. The extent of the study area may be either enlarged or decreased depending on special conditions as determined by the Town Public Works Director.

4.2 Horizon Years

The study horizon years shall be determined by project type and size in accordance with the criteria in **Table 2**.

Table 2 – Criteria for Determining Study Requirements

Study Category	Development / Subdivision Characteristics	Study Horizons (a)	Minimum Study Area (b)
I	Small development 100-499 peak hour trips	1. Opening year	1. Site access drives 2. All signalized intersections and/or major unsignalized intersections within ¼ mile
II	Moderate development 500-999 peak hour trips	1. Opening year 2. 5 years after opening	1. Site access drives 2. All signalized intersections and / or major unsignalized intersections within ½ mile
III	Large single-phase development ≥ 1000 peak hour trips	1. Opening year 2. 5 years after opening 3. 20 years after opening	1. Site access drives 2. All signalized intersections and /or major unsignalized intersections within 1 mile
IV	Large multi-phase development ≥ 1000 peak hour trips	1. Opening year of each phase 2. 5 years after build-out 3. 20 years after build-out	1. Site access drives 2. All signalized intersections and /or major unsignalized intersections within 1 mile

a. Assume full occupancy and build-out for single phase developments.
b. An enlarged study area may be required

4.3 Analysis Time Period

Both the morning and afternoon weekday peak hours need to be analyzed. If the proposed project is expected to generate no trips or a very low number of trips during either the morning or evening peak periods the requirement to analyze such period may be waived by the Town Public Works Director. If the peak traffic hour in the study area occurs during a time period other than the normal peak travel periods, these peak hours shall also be analyzed.

4.4 Seasonal Adjustments

The traffic volumes for the analysis hours shall be adjusted for the peak season, if appropriate, in cases where seasonal traffic data are available. For example, if traffic counts were collected in a retirement community in the summer, and the peak traffic period occurs in the winter, the counts should be adjusted to winter months.

4.5 Data Collection Requirements

All data is to be collected in accordance with the latest edition of the ITE Manual of Transportation Engineering Studies or as directed by the Town Public Works Director, if not specifically covered in the ITE Manual.

- **Turning Movement Counts -** Turning movement counts shall be obtained for all existing cross-street intersections to be analyzed during the morning and afternoon peak periods and the peak hour of generator. Turning movement counts may be required during other periods as directed by the Town Public Works Director. Available turning movement counts may be extrapolated a maximum of three years with concurrence of the Town. The current and projected daily traffic volumes shall be presented in the report.
- **Daily Traffic Volumes** – Current and projected daily traffic volumes shall be presented in the report. Available daily count data may be obtained from the Town or by field data collection and extrapolated a maximum of two years with the concurrence of the Town.
- **Accident Data** – Traffic accident data shall be obtained from the Town or ADOT for the most current three year period available.
- **Roadway and Intersection Geometrics** – Roadway geometric information shall be obtained for all streets in the study area. This includes: roadway width, number of lanes, turning lanes, vertical grade, location of nearby driveways, and lane configuration at intersections.
- **Traffic Control Devices** – The location and type of traffic controls shall be identified. If appropriate, traffic volumes should be adjusted to account for seasonal variations. The use of seasonal adjustment factors should be approved by the Town.

4.6 Trip Generation

The latest edition of ITE's Trip Generation shall be used for selecting trip generation rates. The guidelines contained in Trip Generation shall be used to determine whether the average trip generation rate or equation should be used. Other rates may be used with the approval of the Town in cases where Trip Generation does not include trip rates for a specific land use category, or includes only limited data, or where local trip rates have been shown to differ from the ITE rates.

4.7 Trip Distribution and Assignment

Projected trips shall be distributed and added to the projected non-site traffic on the roadway network. The projected traffic volume must be shown for all roadways internal to the subdivision and for all other

roadways within the study area. The specific assumptions and data sources used in deriving trip distribution and assignment shall be documented in the study.

4.8 Capacity Analysis

Level of Service (LOS) shall be computed for signalized and major unsignalized intersections as identified in Table 2, in accordance with the latest edition of the Highway Capacity Manual. While the use of operational methodologies presented in the Highway Capacity Manual is desirable, analyses using the planning method are acceptable for dimensioning new facilities.

4.9 Traffic Signal Needs

An analysis of traffic signal needs shall be conducted for all arterial/arterial, arterial/major collector and major collector/major collector intersections within the study area for the opening year. Signal need evaluations must determine if an intersection meets the signal warrants included in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). If the warrants are not met for the opening year, they should be evaluated 5 years after opening for categories II, III and IV Traffic Impact Studies.

4.10 Accident Analysis

An analysis of three-year accident data within the study area shall be conducted to determine if the level of safety (in terms of accident rates) needs improvement due to the addition of site traffic.

4.11 Queuing Analysis

A queuing analysis shall be conducted for all turn lanes under stop or signal control within the study area to ensure that the expected queues can be accommodated in the storage length provided. Although there are several methods for estimating queue length, the following equations may be used:

For signalized intersections (for every cycle):

$$Queue\ length\ (ft) = 2 \cdot \left(25 \frac{ft}{veh}\right) \cdot \left(\frac{Volume\ (veh/hr)}{Cycles\ per\ hour}\right)$$

For unsignalized intersections (for a 2 minute period):

$$Queue\ length\ (ft) = \left(25 \frac{ft}{veh}\right) \cdot \left(\frac{Volume\ (veh/hr)}{30}\right)$$

4.12 Improvement Analysis

The roadways and intersections within the study area shall be analyzed with and without the proposed development to identify any projected impacts in regard to level of service and safety. The minimum design requirements for all intersections and roadway segments shall be LOS D with no intersection through lane movement falling below LOS D and no intersection turning movement falling below LOS E. If a TIS demonstrates that the impact of a development will bring the LOS below those thresholds during

the study horizon, mitigation alternatives to improve the LOS to at least those thresholds must be analyzed as part of the study. Common mitigation alternatives include capacity improvements, travel demand management and provision of alternative modes. If the performance of the existing intersection or roadway is already below those thresholds (e.g. below LOS D for through movements) the study must find alternatives to at least maintain the existing performance. The TIS must also evaluate the need for turning lanes on all major unsignalized intersections using the criteria presented in the section entitled "Scope".

4.13 Alternative Modes

In cases where pedestrian, transit, bicycle, golf cart or equestrian activity should be expected, the TIS must identify any conflict points between vehicles and any other mode. In those cases the study must also make recommendations to facilitate the operation of alternative modes and ensure the safety of their users, especially at the interface with the vehicular network. Particular attention should be paid to:

- Ensuring connectivity of pedestrian and bicycle systems.
- Providing safe non-motorized access to school for school children.

5 CERTIFICATION

The TIS shall be prepared under the supervision of a registered Professional Engineer (Civil). The final report shall be signed and sealed.

6 SAMPLE TABLE OF CONTENTS FOR TIS

Table 3 presents a sample table of contents for a TIS. The table of contents may be modified to better fit the needs of the particular study, but the TIS should at least address the points presented in the section entitled "Scope".

Table 3 – Sample Table of Contents for Traffic Impact Study

1. INTRODUCTION AND SUMMARY
a. Purpose of report and study objectives
b. Executive Summary
- *· Site location and study area*
- *· Development description*
- *· Principal findings*
- *· Conclusions/Recommendations*

2. PROPOSED DEVELOPMENT (Site and Nearby)
a. Site location
b. Land use and intensity
c. Site plan (must be legible)
- *· Access geometrics*

d. Development phasing and timing

3. STUDY AREA CONDITIONS
a. Study area
- *· Area of significant traffic impact*
- *· Influence area*

b. Land use
- *· Existing land use*
- *· Anticipated future development*

c. Site accessibility
- *· Existing and future area roadway system*
- *· Site circulation*

4. ANALYSIS OF EXISTING CONDITIONS
a. Physical characteristics
- *· Roadway characteristics*
- *· Traffic control devices*
- *· Transit service*
- *· Pedestrian/bicycle facilities*
- *· Existing transportation demand management*

b. Traffic volumes
- *· Daily, morning and afternoon peak periods, and others as required*

c. Level of service
- *· Morning peak hour, afternoon peak hour, and others as required*

d. Safety related deficiencies
e. Data sources

5. PROJECTED TRAFFIC
a. Site traffic forecasting (each horizon year)
- *· Trip generation*
- *· Mode split (if applicable)*
- *· Pass-by traffic (if applicable)*
- *· Trip distribution*
- *· Trip assignment*

b. Non-site traffic forecasting (each horizon year)
- *· Projections of non-site traffic*

c. Total traffic (each horizon year)

6. TRAFFIC AND IMPROVEMENT ANALYSIS
a. Site access
b. Level of service analysis
- *· Without project including programmed improvements (each horizon year)*
- *· With project including programmed improvements (each horizon year)*

c. Roadway improvements
- *· Improvements by Town or others to accommodate non-site traffic*
- *· Additional alternative improvements to accommodate site traffic*

d. Traffic safety
- *· Sight distance*
- *· Acceleration/deceleration lanes, auxiliary lanes*
- *· Adequacy of location and design of driveway access*

e. Alternative modes considerations
- *· Vehicle/pedestrian conflict points*
- *· Vehicle/bicycle conflict points*
- *· Vehicle/Golf Cart*

f. Traffic control needs
h. Traffic signal needs (base plus 5-year horizon)
i. Transportation demand management

8. CONCLUSIONS

9. RECOMMENDATIONS
a. Roadway improvements
- *· Phasing*

b. Site access
c. Internal site circulation
d. Transportation demand management actions (if appropriate)
e. Other

10. APPENDICES
a. Traffic counts
b. Capacity analyses worksheets
c. Traffic signal needs studies
d. Queuing Analysis
e. Accident data summaries

11. FIGURES AND TABLES
a. Site location
b. Site plan
c. Existing transportation system
d. Existing daily volumes
e. Existing peak hour turning volumes
f. Future transportation system
g. Estimated site traffic generation (daily and peak period)
h. Directional distribution of site traffic (daily and peak period)
i. Site traffic (peak period)
j. Non-site traffic (peak period)
k. Total future traffic (daily and peak period)
l. Projected levels of service
m. Recommended improvements

7 AUXILIARY LANES

In order for the internal subdivision streets and the adjacent existing roadways to operate safely and efficiently, it is necessary to evaluate the need for channelization of traffic movements, especially at major unsignalized intersections. The warrants outlined here shall be followed for unsignalized intersections that provide access to new subdivisions or developments and for major unsignalized intersections internal to the subdivision or development. The warrants apply both to subdivisions and developments that require TIS, and to those that do not.

Left Turn Lane Warrants

The methodology presented here applies to all subdivision or development access points where a left turn must be executed from a two-lane roadway to enter the subdivision. The intent is to identify locations where lack of left turn lanes presents a potential safety concern. The need for an exclusive left turn lane can be determined from **Table 4** if the following parameters are known:

- ADT - The two-way average daily traffic on the roadway from which the left turn is executed.
- LT - Number of left turns in the peak hour. If a TIS for the subdivision is not available, the number of left turns can be estimated based on the number of trips generated by the subdivision or development in the peak hour (using the trip generation rate from *Trip Generation 4* or **Table 4**) divided by the number of access points where left turns are (or will be) permitted, as shown in the following equation:

  LT = (0.5 x Trip Generation) / Access Points

  For residential subdivisions this simplifies to:

  LT = (0.5 x Dwelling Units) / Access Points

Table 4 shows the maximum number of left turn movements allowed in the peak hour without a dedicated left turn lane. If those values are exceeded for any ADT and speed combination, a left turn lane shall be provided. The posted speed in the table refers to the posted speed limit on the roadway from which the left turn is executed.

An exclusive left turn lane will also be required regardless of the size of the subdivision or development, if an access point to the subdivision is located in an area where sufficient stopping sight distance is not provided on the major roadway. If the roadway shoulders or any pedestrian or bicycle facilities are affected by the addition of a left turn lane they must be replaced.

Table 4 – Maximum Left turn Volume in the Peak Hour without a Left Turn Lane

Posted Speed (mph)	ADT (2-way)			
	<2,500	***2,500 – 5,000***	***5,000-10,000***	***>10,000***
< 35	75	50	30	15
40-50	75	40	20	10
>55	75	30	10	5

Source: Pima County Subdivision and Development Street Standards

Right Turn Lane Warrants

The methodology presented here applies to all subdivision or development access points where a right turn must be executed from a collector or arterial to enter the subdivision. The intent is to identify locations where the lack of right turn lanes presents a potential safety concern. The need for an exclusive right turn lane can be determined from **Table 5** if the following parameters are known:

- ADT- The bi-directional average daily traffic on the roadway from which the rights turn is executed.
- RT - Number of right turns in the peak hour. If a TIS for the subdivision is not available, the number of right turns can be estimated based on the number of trips generated by the subdivision or development in the peak hour (using the trip generation rate from Trip Generation or Table 1) divided by the number of access points where right turns are (or will be) permitted, as shown in the equation below:

  RT = (0.5 x Trip Generation) / Access Points

  For residential subdivisions this simplifies to:

  RT = (0.5 x Dwelling Units) / Access Points

Table 5 shows the maximum number of right turn movements allowed in the peak hour without a dedicated right turn lane. If those values are exceeded, a right turn lane shall be provided.

Table 5 – Peak Hour Volume Warrant for Right Turns

ADT (2-way)	Maximum Peak Hour Right Turn Volume (without Right Turn Lane)
2,500 -5,000	100
5,000 – 10,000	70
>10,000	40

Appendix C – Excerpts from the ADOT *State Route 69 Access Management Plan*

3. SR 69 ACCESS MANAGEMENT PLAN

The SR 69 Access Management Plan is described in this section. The specifics of the Plan are presented in the following discussions and are shown on the aerial photos in the Appendix to this report. The Plan identifies the locations of 30 traffic signals in the 33 miles of SR 69 between I-17 and Prescott. Fourteen of these are existing and nine more have been planned in accordance with the 1992 SR 69 Access Management Study. The remaining seven are in locations where development has occurred and signals will someday be warranted.

Aerial photos at the end of this report illustrate the existing access points on SR 69. The photos also show the locations of traffic signals, median breaks and frontage roads. Design for the widening of SR 69 to a four lane divided highway have been completed for two sections of SR 69; from Big Bug Creek to Mayer (MP 268-271) and from Poland Junction to Humboldt (MP 276-279). For these sections the planned access points, median breaks, and frontage roads after construction (according to design plans provided by ADOT) are shown on the aerials.

A list of all streets with posted street names on SR 69 is provided in Tables 1 and 2. The tables identify the location of existing signals and the distance between the signals. The location of signals (when warranted and funded) that would be allowed under the SR 69 Access Management Plan is also shown.

General Access Management Policies

The general policies of the SR 69 Access Management Plan are as follows:

- Traffic signals will only be installed at major intersections when warranted.
- Major intersections should conform to the typical geometrics shown in Figure 9.
- Only right-in, right-out and left-in access will be permitted at non-major intersections.
- Non-major intersections should conform to the typical geometrics shown in Figure 10.
- Exclusive left and right turn lanes on SR 69 will be required at all intersections.
- If needed, a local street network should be constructed to provide access to streets with signalized intersections on SR 69 as part of land use development.

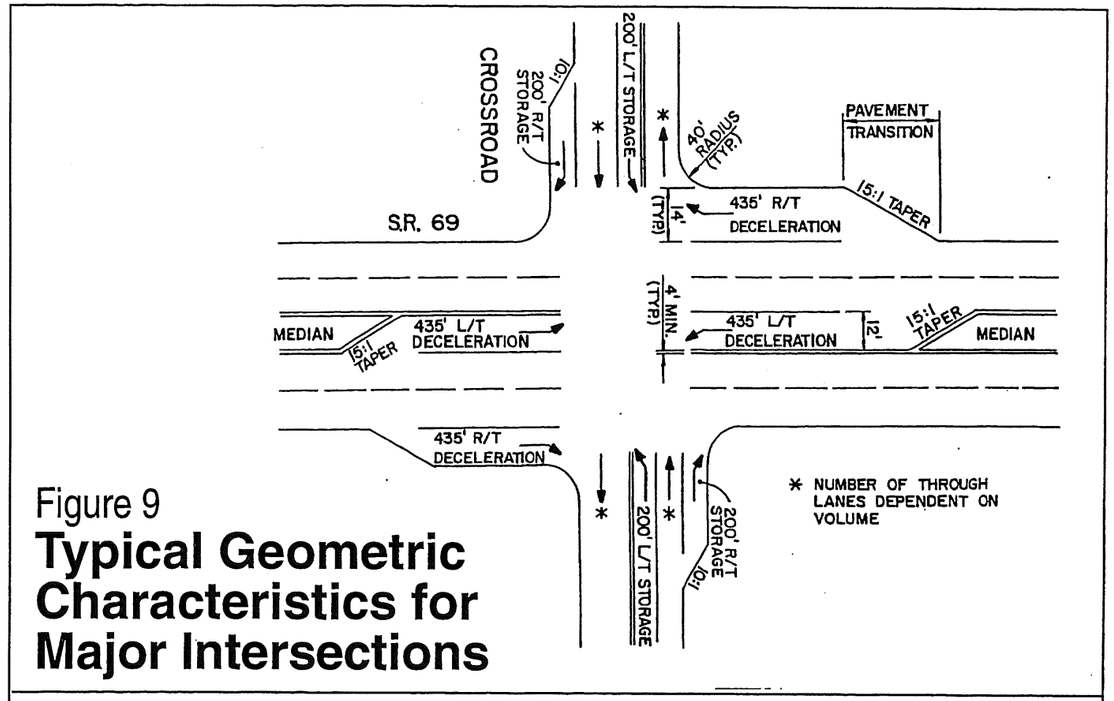


Figure 9
Typical Geometric Characteristics for Major Intersections

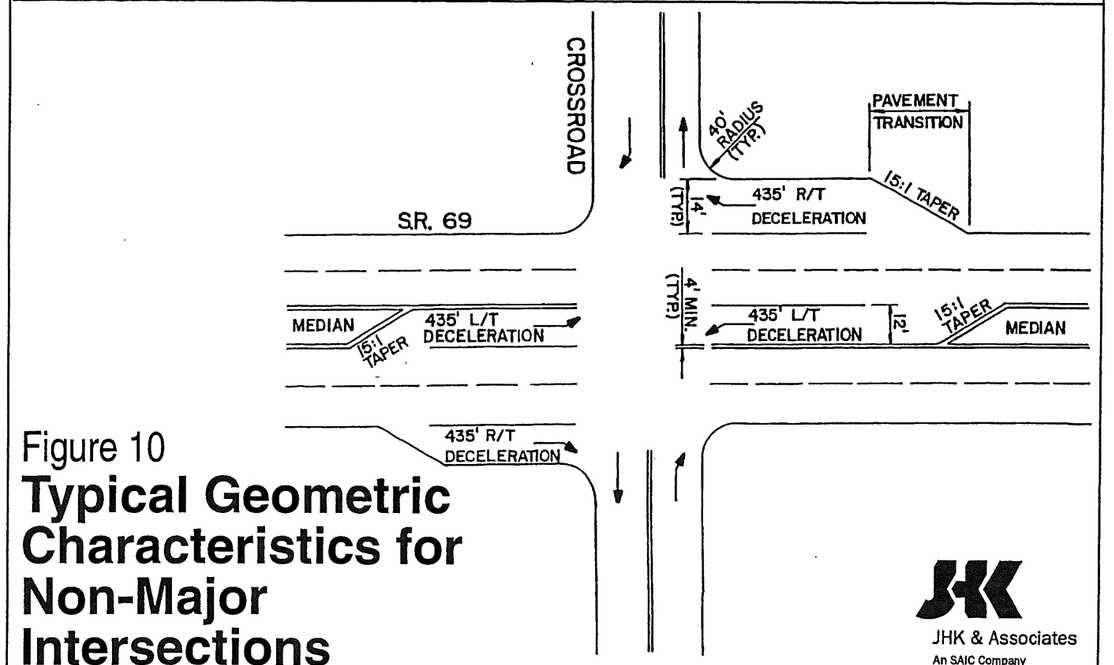


Figure 10
Typical Geometric Characteristics for Non-Major Intersections

- Existing driveway access points should be eliminated or consolidated as redevelopment occurs.
- No new driveway access will be permitted.
- Access will not be allowed on the ramps at the SR 69/I-17 and SR 69/SR 89 traffic interchanges.

Prescott to SR 169 Access Management

Since 1992, access to SR 69 has been based upon the Access Management Study prepared by DMJM for the Arizona Department of Transportation. Under this study, access was allowable at one-quarter mile spacing in urban areas and one-half mile spacing in rural areas. There are 14 traffic signals on SR 69, 12 of these between the SR69/SR89 junction in Prescott and Navajo Drive in Prescott Valley. In addition, there are nine new signals being planned, one at Holiday Drive just east of Frontier Village, two in Diamond Valley, at Robin Drive and Diamond Drive, four in Prescott Valley: at Santa Fe, Mendecino Drive, and at two new locations approximately one-half mile north of Santa Fe and one mile south of Mendecino, and two more between Prescott Valley and SR 169 at Bradshaw Mountain Road and Kachina Place. Recognizing the difficulty of removing existing signals and the fact that development plans have been based upon the 1992 access guidelines, all of these signals will be allowed under the 1996 Plan.

In addition, under the 1996 Plan, one location between Prescott and SR 169 has been identified for the installation of a traffic signal when warranted, the proposed SR 69/SR 89 connector road. The SR69/SR89 connector road, currently under design by the City of Prescott, is intended to become an alternative route around the SR69/SR89 junction and will need to be signalized.

When the planned and the "when warranted" signals are installed there will be 24 traffic signals located between the SR 169 intersection and Prescott—a distance of 15 miles. Spacing between adjacent signals will range from one-third mile to nearly two miles. Except for the stretch between the future road being planned by Prescott Valley and Fain Road, a distance of 1.7 miles, there is no location where signal spacing is more than one mile. With the possible exception of adding one new signal in the future road segment. No other signals will be allowed between Prescott and SR 169 under the 1996 Access Management Plan.

Source: ADOT State Route 69 Access Management Plan

Table 1. State Route 69 - Traffic Signal Locations - Prescott to SR 169

Milepost	Crossroad Name	Planned Traffic Control		
		Signal Locations (1)	Spacing from Previous Signal	
			Existing	Planned
295.9	Heather Heights Road	existing signal	3/4 mile	3/4 mile
295.5	Frontier Village West	existing signal	1/3 mile	1/3 mile
295.1	Frontier Village East	existing signal	1/3 mile	1/3 mile
294.7	Prescott Canyon Road			
294.5	Grant Street			
294.3	Holiday Drive	planned signal		3/4 mile
293.6	proposed 69 / 89 connector road	signal when warranted		3/4 mile
293.3	Lee Boulevard	existing signal	1 2/3 mile	1/3 mile
293.0	Walker Road	existing signal	1/4 mile	1/4 mile
292.0	Old Black Canyon Hwy / Sunrise Blvd.	existing signal	1 mile	1 mile
291.6	Robin Drive	planned signal		1/2 mile
291.2	Turquoise Road / Rhinestone Drive			
291.1	Ramada Drive			
291.0	Onyx Drive			
290.7	Diamond Drive	planned signal		1 mile
290.2	future road	planned signal		1/2 mile
289.7	Santa Fe	planned signal		1/2 mile
289.5	Prescott E. Highway	existing signal	2 1/2 miles	1/4 mile
289.0	Valley View Drive			
288.7	Glassford Hill Road/ Castle View	existing signal	3/4 mile	3/4 mile
288.2	Lake Valley Road	existing signal	1/2 mile	1/2 mile
287.8	Windsong Road	existing signal	1/3 mile	1/3 mile
287.6	Yavapai Road			
287.4	Robert Road	existing signal	1/4 mile	1/4 mile
287.2	Navajo Drive	existing signal	1/4 mile	1/4 mile
286.9	Truwood Drive			
286.2	Mendecino Drive	planned signal		1 mile
285.1	future road	planned signal		1 mile
283.4	Fain Road / Prescott CC Blvd.	existing signal	3 3/4 miles	1 3/4 miles
282.7	Lynx Creek Blvd.			
282.3	Bradshaw Mountain Road	planned signal		1 mile
281.8	Kachina Place	planned signal		1/2 mile
281.0	SR 169	existing signal	2 1/4 miles	3/4 mile

(1) Traffic signals not permissible unless so designated.

SR 169 to I-17 Access Management

There are currently no traffic signals on SR 69 south of the SR 169 intersection. If signals are installed, the minimum spacing between them should be one mile. This Access Management Plan has identified six possible locations where signals could be installed when warranted—Main Street in Humboldt, Collins Drive in Poland Junction, Main Street, Central Avenue, an unnamed road where a median break is being provided in Mayer, and Spring Lane in Spring Valley. Signal spacing under this concept ranges from one mile to over four miles. Other traffic signals may also be warranted as the area develops, however spacing should be kept at a minimum of one mile.

With the implementation of Yavapai County's Regional Roads Program which could ultimately include a controlled access roadway in the relocated Fain Road, SR 89A, and Glassford Hill Road Extension corridors, it may be desirable to some day convert the I-17 to SR 169 segment of SR 69 to a controlled access roadway. Thus, as the area develops, right-of-way should be reserved for the possibility of future traffic interchanges. It will also be important to maintain intersection spacing at a minimum of one mile and preferably two miles throughout this segment of the corridor—both for efficient operation of the highway when signalized and to provide acceptable intersection spacing if the highway is converted to a controlled access roadway.

Table 2. State Route 69 - Traffic Signal Locations - SR 169 to Cordes Junction

Milepost	Crossroad Name	Planned Traffic Control		
		Signal Locations (1)	Spacing from Previous Signal	
			Existing	Planned
279.5	Orange Rock Road			
279.3	Klasse Avenue			
279.2	Main Street (Humboldt)	signal when warranted (2)		1 3/4 mile
278.6	Old Black Canyon Highway			
275.2	Poland Road			
275.1	Collins Drive	signal when warranted (2)		4 miles
273.2	Finley Road			
271.9	Main Street (Mayer)	signal when warranted (2)		3 1/3 miles
270.6	Central Avenue	signal when warranted (2)		1 1/3 mile
269.6	unnamed road (new median break)	signal when warranted (2)		1 mile
267.1	Old Sycamore Road			
266.0	Rocking LK Lane			
265.8	Lazy T Trail			
265.2	Spring Lane	signal when warranted (2)		4 1/3 miles

(1) Traffic signals not permissible unless so designated.
(2) Right-of-way should be preserved for the possibility of a future traffic interchange.

4. IMPLEMENTATION

Access control techniques can be implemented with two basic legal powers: police power and eminent domain. The first power allows a state to restrict individual power for public welfare. The second power allows a state to take property for public use provided an owner is compensated for his loss. Police power is sufficient authority for most access control techniques associated with highway operations, driveway location, and driveway design. Most states have adequate power to effectively control access. As long as reasonable access is provided, access regulation can be implemented and enforced.[1]

The SR 69 Access Management Plan can be implemented through a cooperative effort among ADOT, City of Prescott, the Town of Prescott Valley, and Yavapai County. ADOT has the authority through police power to prevent the unauthorized use and abuse to state highways (ARS28-108A (19) and administrative rule R17-3-712). The local jurisdictions, through land use and zoning regulations can ensure that development along the highway conforms to the Access Management Plan.

Plan Adoption

The first step in implementing the SR 69 Access Management Plan will be the adoption of the plan by ADOT and by the jurisdictions through which the roadway passes. Thus, the Plan needs to be adopted by the State Board of Transportation, the Yavapai County Board of Supervisors, the Prescott City Council, and the Prescott Valley Town Council.

Land Use

In order to maintain the traffic signal spacing called for the Plan, it will be important to plan and develop the land along SR 69 in patterns with which a local roadway system can be developed to provide access to streets which have or will have traffic signals at their intersection with SR 69. Land use plans will be instrumental in defining the land use patterns in the corridor. The adopted SR 69 Access Management Plan will provide guidance from a transportation perspective in the development of these land use plans.

[1] Source: National Cooperative Highway Research Program Report 348, Access Management Guidelines for Activity Centers.

Access Application Procedure

The police power to grant or deny access to SR 69 rests with ADOT's District Engineer in Prescott. Thus, the district should be brought into any discussion of new access to the highway early in the development process. It is suggested that the following access application procedure be followed:

- The county or municipality informs ADOT of pending developments as soon as possible. This should occur through written notification to the District Engineer.
- ADOT and the municipality agree on the access which will be allowed under the Access Management Plan.
- Following ADOT Traffic Impact Study Guidelines, a traffic impact study is prepared by the developer for the development. In addition to the information required under the guidelines, the impact study should include the type of access requested relative to the allowable access, the type of proposed traffic control, the distance to the nearest traffic signal on SR 69 in both directions, alternative access available, and the need, if required, for any variances to the Access Management Plan.
- The ADOT District Permits Engineer, in coordination with the ADOT Regional Traffic Engineer and local government, approves or denies access.

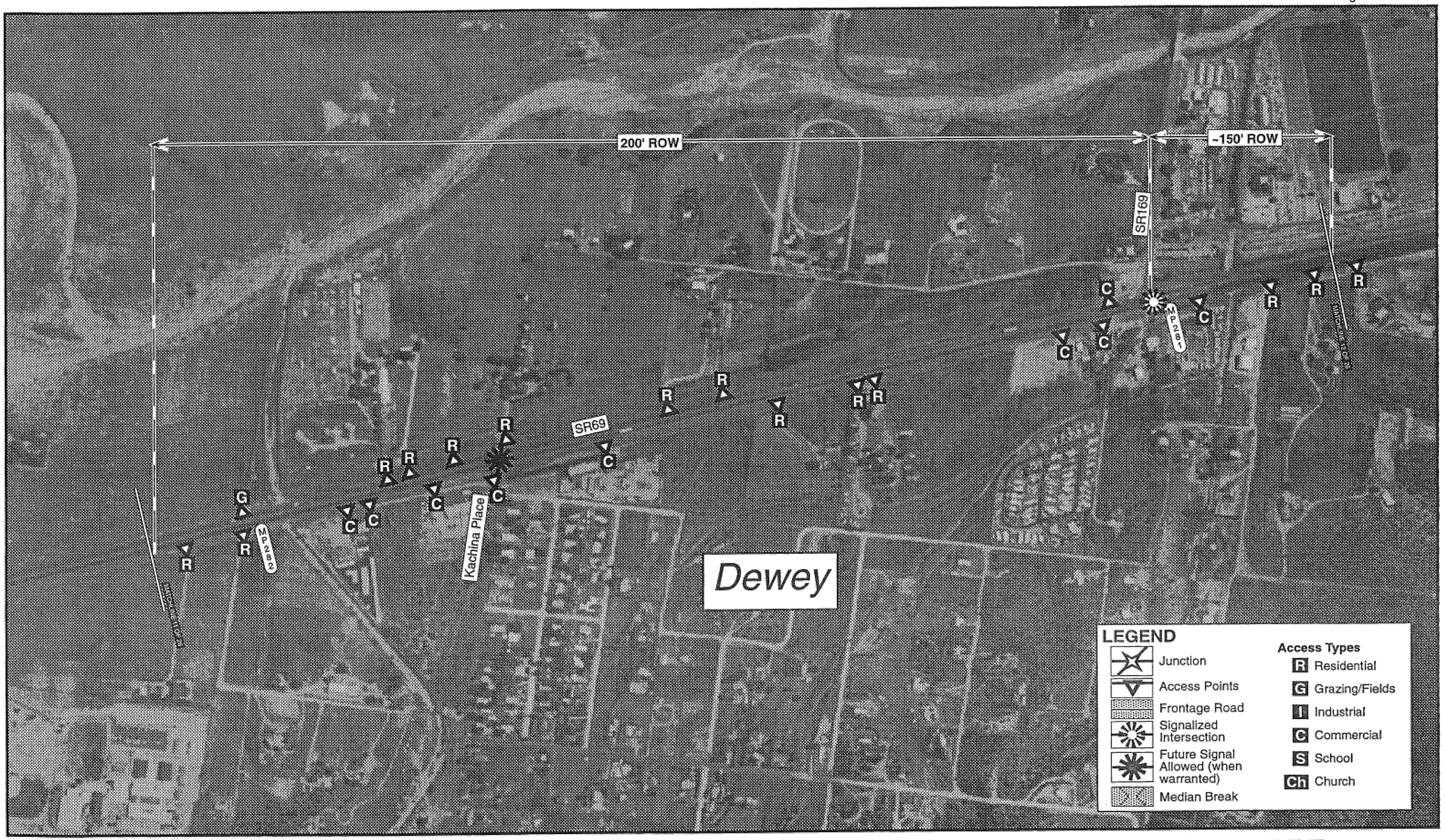
Site Specific Issues

- Although not specifically located as part of the Access Management Plan, raised medians may be needed to alleviate safety concerns at some locations. Possible locations include Frontier Village and Prescott Valley. The option of raised medians should be considered as part of safety studies at these and other locations.

- When the traffic signal is installed at Holiday Drive, the feasibility of eliminating the existing commercial driveways on SR 69 to Coca-Cola, U-Haul, Calvery Chapel, Alpine Car Audio, and Smith Electric and providing these businesses with access to Holiday Drive should be investigated. If possible this access should be extended across Grant Street to provide access to Holiday Drive for the commercial properties north of Grant Street.

- If a controlled access roadway were to be constructed between I-17 and SR 169 and traffic interchanges were to be constructed at the six locations specified in the Plan, approximately seven existing businesses and one mobile home park would be impacted. The possibility of a controlled access roadway in this corridor should be considered during the access application procedure for any new development.

Source: ADOT State Route 69 Access Management Plan



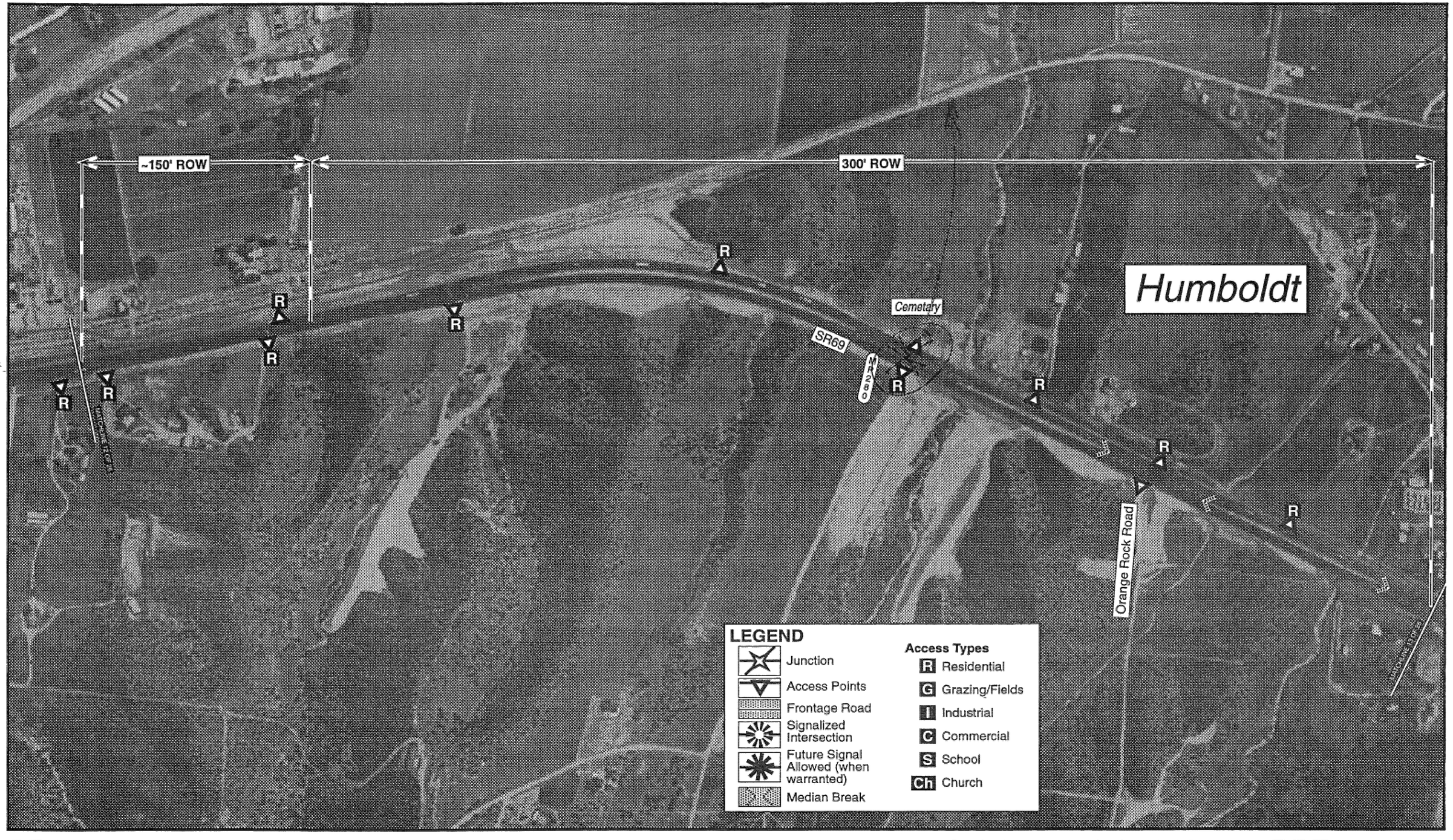
SR69
Panel 12 of 27

Scale (approx.) 1 inch = 480 feet
Flight: October 20, 1995

JHK & Associates
An SAIC Company

Photo 226A

Source: ADOT State Route 69 Access Management Plan



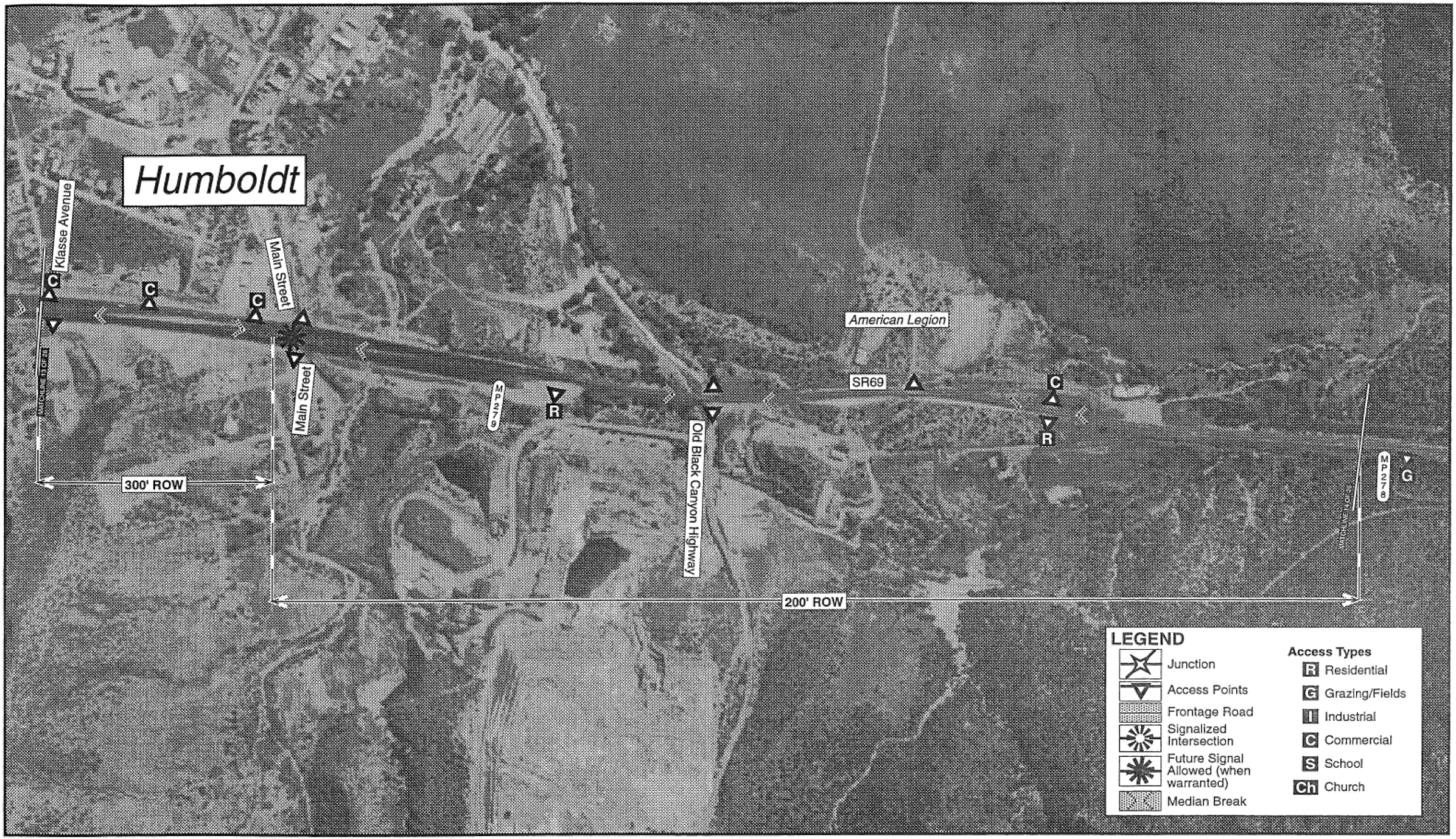
SR69
Panel 13 of 27

Scale (approx.) 1 inch = 480 feet
Flight: October 20, 1995

JHK & Associates
An SAIC Company

Photo 2268

Source: ADOT State Route 69 Access Management Plan



SR69
Panel 14 of 27

Scale (approx.) 1 inch = 480 feet
Flight: October 20, 1995

JHK & Associates
An SAIC Company

Photo 228A

Appendix D – Excerpts from the ADOT *State Route 169 Access Management Plan*

3. SR 169 ACCESS MANAGEMENT PLAN

The SR 169 Access Management Plan is described in this section. The specifics of the Plan are presented in the following discussions and are shown on the aerial photos in the Appendix to this report.

General Access Management Policies

The general policies of the SR 169 Access Management Plan are as follows:

- Traffic signals will only be installed at major intersections when warranted.
- Major intersections should conform to the typical geometrics shown in Figure 5.
- Exclusive left and right turn lanes on SR 169 will be required at all intersections.
- A local street network should be constructed to provide access to streets with intersections on SR 169 as part of land use development.
- Existing driveway access points should be eliminated or consolidated as redevelopment occurs.
- No new driveway access will be permitted.
- Any median openings at other than dedicated roads would have to be applied for through the Regional Traffic Engineer.

SR 69 to Foothills Drive

From SR 69 to just east of Foothills Drive, SR 169 should be improved to a four lane divided highway with a raised median. Median breaks should be allowed at the following four locations:

1) At the commercial driveway (Young's Farm) approximately 0.2 miles from SR 69.
2) At the fire station (for emergency vehicles only).
3) At River Drive. River Drive and Outback Road should be realigned north of the medical center.
4) At Foothills Drive.

To implement the Access Plan through this section of SR 169, existing driveways or access points not at the median breaks should be closed and connected to the median breaks through a local street system. If any of these driveways are not closed then left turns in and

Source: ADOT State Route 169 Access Management Plan

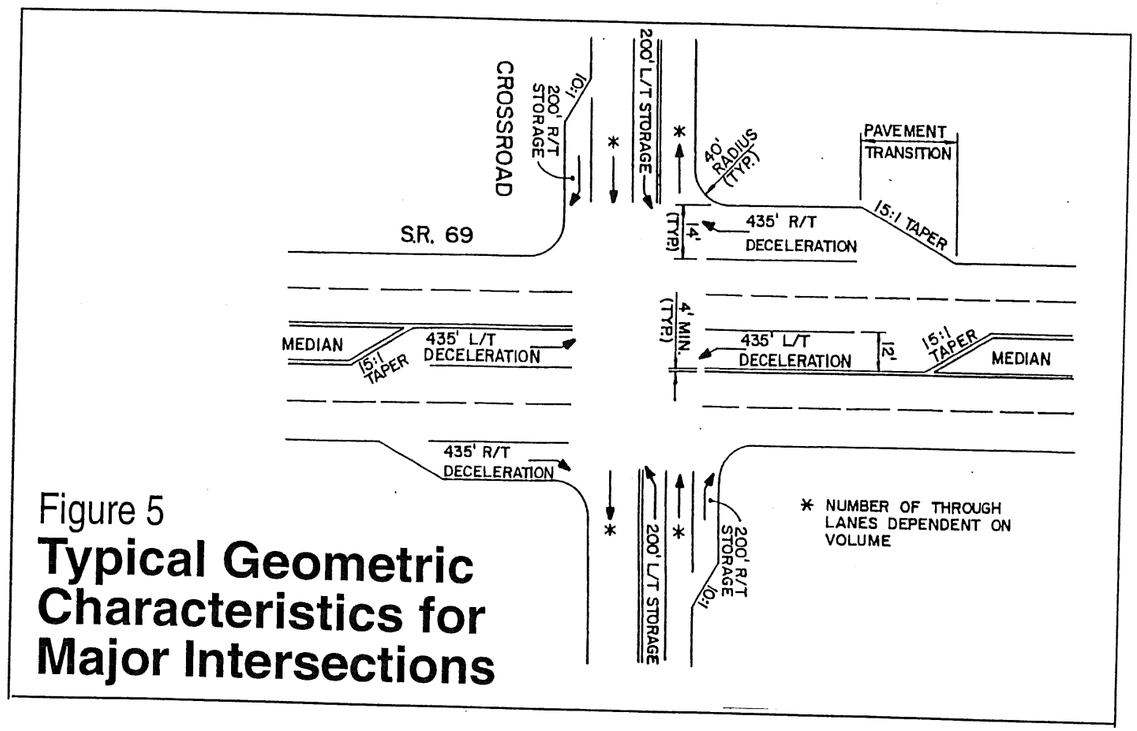


Figure 5
Typical Geometric Characteristics for Major Intersections

Table 1. State Route 169 - SR 69 to Foothills Drive

Milepost	Side of Road	Crossroad Name or Type of Access	Access to	Implementation Measure (1)
0.1	west	driveway	residential	RIRO
0.1	east	Old Black Canyon Hwy.	residential	RIRO
0.1	west	driveway	house	RIRO
0.2	east	driveway	commercial	RIRO
0.3	east	River Drive	residential	relocate to north of medical center
0.3	west	driveway	house	local roads to realigned Outback Road
0.3	west	driveway	commercial	local roads to realigned Outback Road
0.4	east	driveway	fire station	median break
0.4	east	driveway	medical center	local roads to relocated River Drive
0.7	west	Outback Road	residential	realign w/relocated River Dr. (median break)
0.7	east	driveway	residential	local roads to relocated River Drive
0.8	west	driveway	house	local roads to realigned Outback Road
1.3	east	Foothills Drive	residential	median break and "tee" into SR 169

(1) If access points are not connected to major intersection locations then only right turns in and right turns out (RIRO) will be allowed; no left turns will be permitted.

out of that driveway will be prohibited. Table 1 summarizes the existing access points and the measures required to implement the Access Plan at each access point location. The aerial photos illustrate the proposed measures.

Foothills Drive to Prescott National Forest Boundary

In the future, between Foothills Drive and the Prescott National Forest Boundary, SR 169 may become a divided four lane controlled access roadway with the possibility of future traffic interchanges. Major intersections will be restricted to two mile spacing and new driveways will not be allowed.

To implement the Access Plan through this section will require the realigning of roadways and consolidating of driveways. Major intersections should be restricted to the intersections of Wind River Drive/Clear View and Orme Road with SR 169. Access points not at a major intersection should be closed and connected to the intersection through a local street system. If any of these driveways are not closed then left turns in and out of that driveway will be prohibited allowing only right turns in and out (RIRO). Right turn deceleration and acceleration lanes should be constructed at these driveways. Table 2 summarizes the existing access points and the measure required to implement the Access Plan at each access point location. The aerial photos illustrate the proposed measures.

Prescott National Forest Boundary to I-17

In the future, SR 169 may become a divided four lane controlled access roadway between the Prescott National Forest Boundary and I-17. New access should not be allowed through this section. Left and right turn deceleration and right turn acceleration lanes should be constructed at each existing access point. Table 3 summarizes the existing access points and the measure required to implement the Access Plan at each access point location. The aerial photos illustrate the proposed measures.

Table 2. State Route 169 - Foothills Drive to Prescott National Forest Boundary

Milepost	Side of Road	Crossroad Name or type of access	Access to	Implementation Measure (1)
1.5	east	driveway	house	local road to Foothills Drive
1.5	west	driveway	house	local road to Foothills Drive
1.8	west	Wind River Drive	residential	realign to "tee" into SR 169
1.8	east	Clear View	residential	realign to "tee" into SR 169
2.0	west	driveway	house	RIRO or local road to Wind River Dr.
2.1	east	driveway	house	RIRO or local road to Clear View
2.2	east	driveway	house	RIRO or local road to Clear View
2.4	west	driveway	house	RIRO or local road to Wind River Dr.
2.5	west	driveway	industrial	RIRO or local road to Wind River Dr.
2.6	east	driveway	grazing	RIRO or local road to Clear View
2.6	east	driveway	grazing	RIRO or local road to Clear View
3.0	west	driveway	house	RIRO or local road to Wind River Dr.
3.6	east	driveway	grazing	RIRO or local road to Orme Road
3.6	west	driveway	grazing	RIRO or local road to Orme Road
4.2	west	driveway	house	RIRO or local road to Orme Road
4.3	west	driveway	grazing	RIRO or local road to Orme Road
4.3	east	driveway	grazing	RIRO or local road to Orme Road
4.8	west	driveway	residential	RIRO or local road to Orme Road
5.0	east	Orme Road	residential	continue to provide access
5.3	west	driveway	residential	RIRO or local road to Orme Road
5.6	west	driveway	residential	RIRO or local road to Orme Road
5.8	west	driveway	residential	RIRO or local road to Orme Road
5.9	west	driveway	residential	frontage/local road to Orme Road
5.9	east	driveway	residential	frontage/local road to Orme Road

(1) If access points are not connected to major intersection locations then only right turns in and right turns out (RIRO) will be allowed; no left turns will be permitted.

Table 3. State Route 169 - Prescott National Forest Boundary to I-17

Milepost	Side of Road	Crossroad Name or type of access	Access to	Implementation Measure (1)
6.5	west	driveway	grazing	continue to provide access
8.2	east	driveway	grazing	align with driveway across SR 169
8.2	west	driveway	grazing	align with driveway across SR 169
9.6	west	road	to Cherry	continue to provide access
9.6	east	driveway	grazing	align with road across SR 169
11.8	east	road	landfill	continue to provide access
13.1	east	driveway	grazing	continue to provide access
13.9	east	road	grazing	align with driveway across SR 169
13.9	west	road	grazing	align with driveway across SR 169
14.6	west	road	grazing	consolidate driveways
14.7	west	road	grazing	consolidate driveways
14.7	east	road	farm land	consolidate driveways

(1) Add left turn and right turn deceleration lanes and right turn acceleration lane at all access points.

4. IMPLEMENTATION

State Route 169 is an excellent candidate for access control. First, there are relatively few existing intersections and access drives beyond Milepost 3. Another opportunity is that approximately nine-miles of highway are within the Prescott National Forest. A third opportunity is that Yavapai County is currently preparing a community plan for the Dewey area which could be developed in conjunction with the concepts for access control for SR 169.

Full control of access is recommended from Milepost 3 to I-17. The segment of SR 169 under full access control would have a minimum of two-mile intersection spacing with no other access onto the highway. Some existing drives within the full access control segment may be difficult to link to existing roads or to a new frontage road. In these cases, the existing access points may be "grandfathered" to allow continuing access onto the SR 169. Partial access control is recommended on SR 169 between the SR 69 junction and Milepost 3.

In order to implement full access control along SR 169 local access rights must be acquired through compensation to the property owner or alternative access must be provided without unusual damage to the property owner. Only a one foot strip of right-of-way needs to be acquired to prohibit direct access to SR 169. This approach is similar to Lake Havasu City's approach to control access along SR 95. The acquisition of a one foot strip of right-of-way along SR 169 may be applicable to the property owned by State Lands and to the Prescott National Forest.

Access control techniques can be implemented with two basic legal powers: police power and eminent domain. The first power allows a state to restrict individual power for public welfare. The second power allows a state to take property for public use provided an owner is compensated for his loss. Police power is sufficient authority for most access control techniques associated with highway operations, driveway location, and driveway design. Most states have adequate power to effectively control access. As long as reasonable access is provided, access regulation can be implemented and enforced.[1]

[1] Source: National Cooperative Highway Research Program Report 348, Access Management Guidelines for Activity Centers.

The SR 169 Access Management Plan can be implemented through a cooperative effort between ADOT and Yavapai County. ADOT has the authority through police power to prevent the unauthorized use and abuse to state highways (ARS28-108A (19) and administrative rule R17-3-712). Yavapai County, through land use and zoning regulations can ensure that development along the highway conforms to the Access Management Plan. A partnership should be formed between these two agencies and the U.S. Forest Service to implement the Access Management Plan. The Central Yavapai Transportation Planning Organization (CYTPO) could be the coordinating body for this partnership.

Plan Adoption

The first step in implementing the SR 169 Access Management Plan will be the adoption of the plan by ADOT and by the jurisdictions through which the roadway passes. Thus, the Plan needs to be adopted by the State Board of Transportation and the Yavapai County Board of Supervisors.

Land Use

In order to maintain the intersection spacing called for the Plan, it will be important to plan and develop the land along SR 169 in patterns with which a local roadway system can be developed to provide access to streets which intersect with SR 169. Land use plans will be instrumental in defining the land use patterns in the corridor. The adopted SR 169 Access Management Plan will provide guidance from a transportation perspective in the development of these land use plans.

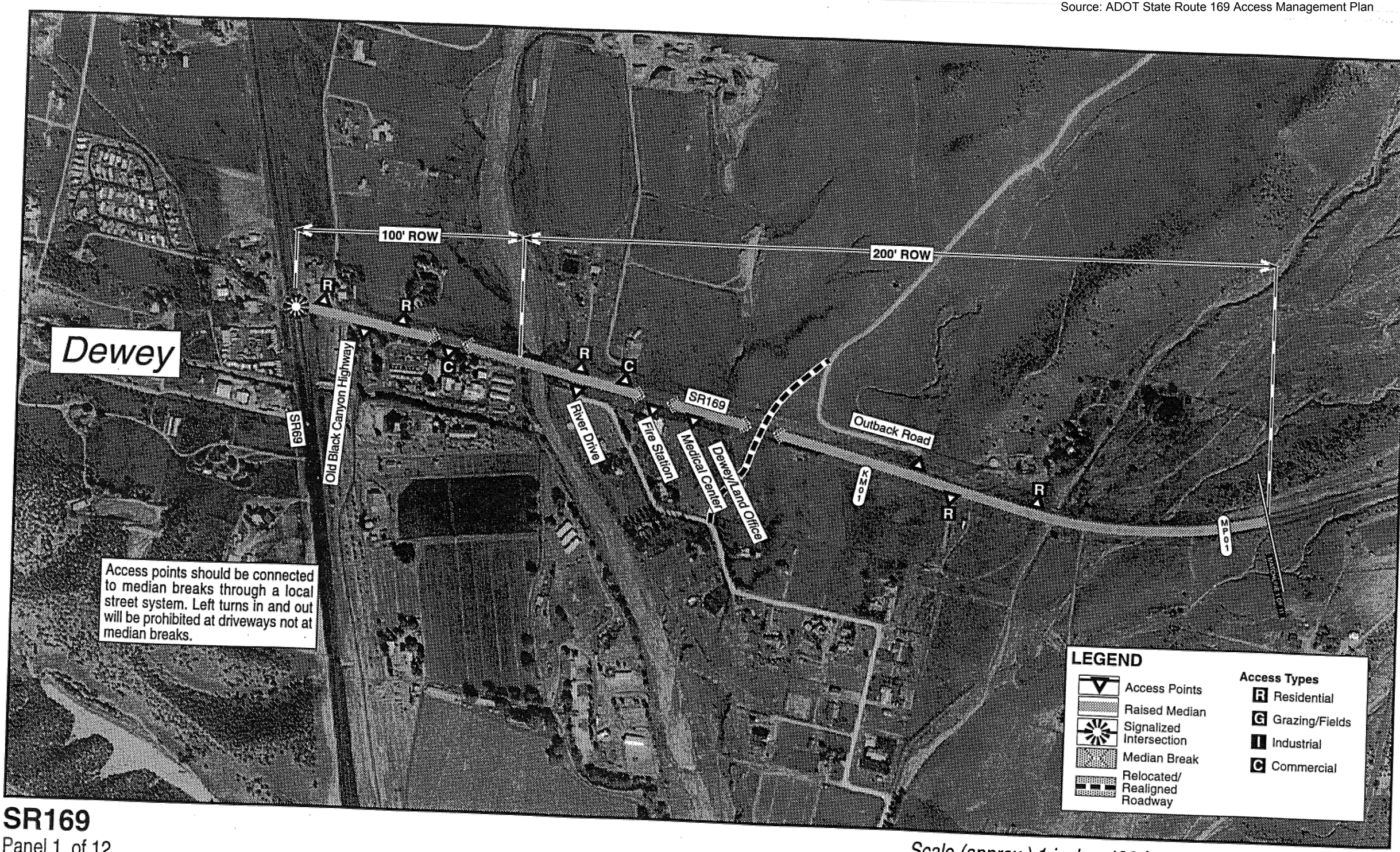
Access Application Procedure

The police power to grant or deny access to SR 169 rests with ADOT's District Engineer in Prescott. Thus, the district should be brought into any discussion of new access to the highway early in the development process. It is suggested that the following access application procedure be followed:

- The county or municipality informs ADOT of pending developments as soon as possible. This should occur through written notification to the District Engineer.

- ADOT and the municipality agree on the access which will be allowed under the Access Management Plan.
- Following ADOT Traffic Impact Study Guidelines, a traffic impact study is prepared by the developer for the development. In addition to the information required under the guidelines, the impact study should include the type of access requested relative to the allowable access, the type of proposed traffic control, the distance to the nearest intersection on SR 169 in both directions, alternative access available, and the need, if required, for any variances to the Access Management Plan.
- The ADOT District Permits Engineer, in coordination with the ADOT Regional Traffic Engineer, and local government, approves or denies access.

Source: ADOT State Route 169 Access Management Plan



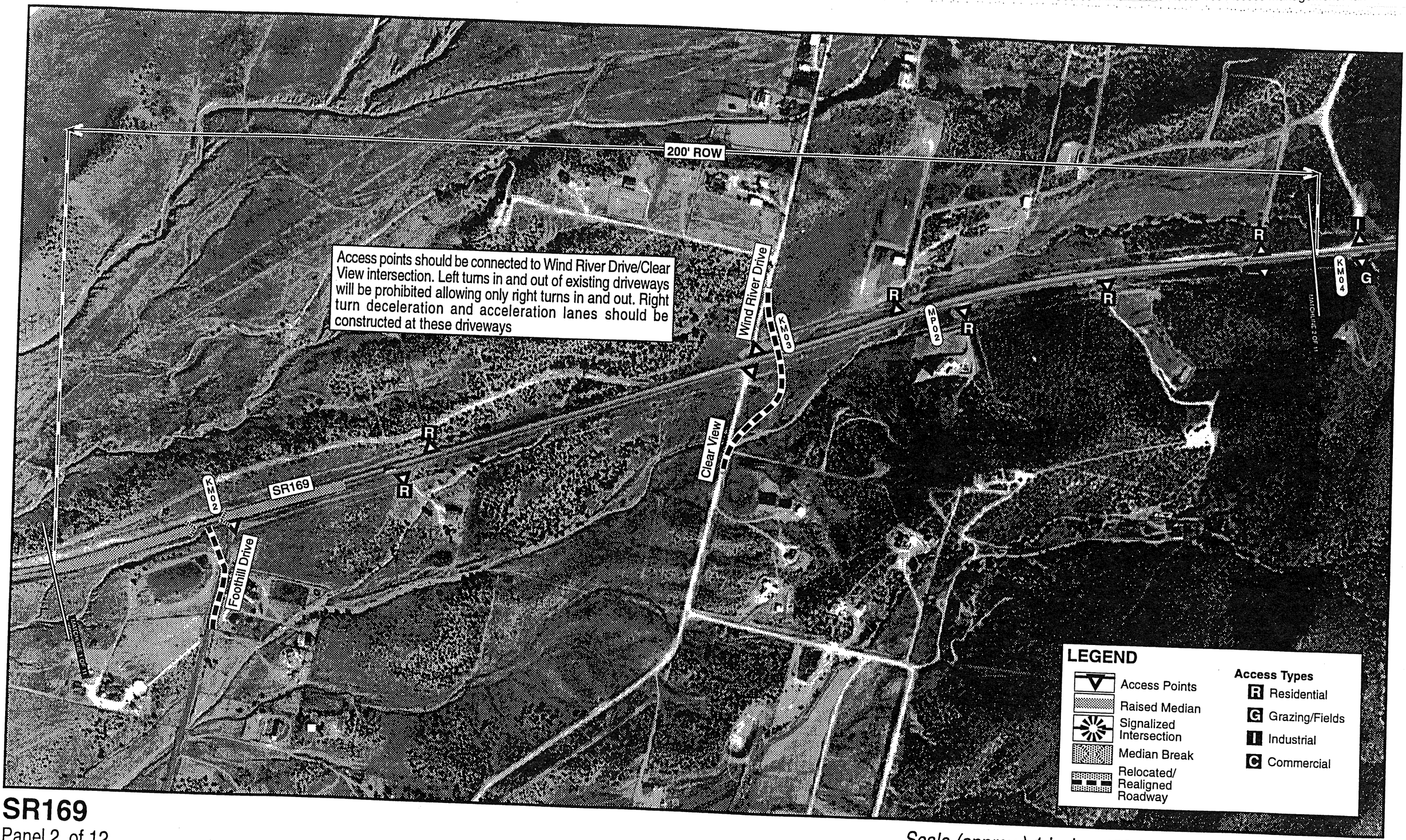
SR169

Panel 1 of 12

Scale (approx.) 1 inch = 480 feet
Flight: October 20, 1995

JHK & Associates
An SAIC Company

Source: ADOT State Route 169 Access Management Plan



SR169

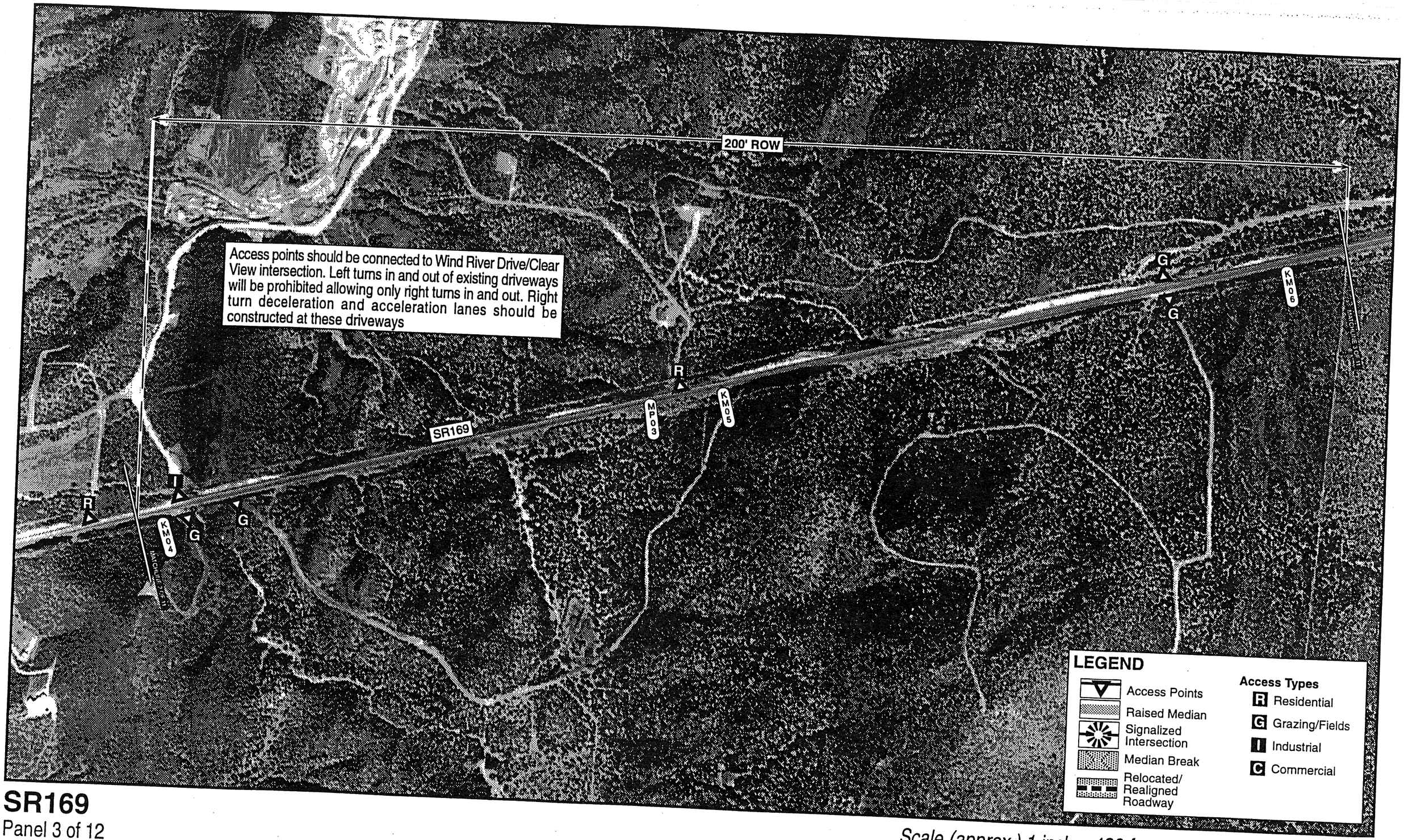
Panel 2 of 12

Scale (approx.) 1 inch = 480 feet
Flight: October 20, 1995

JHK & Associates
An SAIC Company

Photo 211B

Source: ADOT State Route 169 Access Management Plan



SR169

Panel 3 of 12

Scale (approx.) 1 inch = 480 feet
Flight: October 20, 1995

JHK & Associates
An SAIC Company