Ganado/Burnside Area Traffic Circulation Study

FINAL REPORT

December 2015

ADOT

JACOBS

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1. INTRODUCTION

The *Ganado/Burnside Area Traffic Circulation Study* is a joint effort by Apache County District II, Ganado Chapter of the Navajo Nation, and the Arizona Department of Transportation (ADOT) to identify and address the most critical current and future transportation needs within Ganado and Burnside. The study was funded by Federal Highway Administration's (FHWA) State Planning and Research Program and administered through ADOT's Multimodal Planning Division's Planning Assistance for Rural Areas (PARA) program. The primary goal of this study was to develop a transportation improvement plan that promotes safety and mobility, enhances economic vitality, improves community livability, encourages environmental and cultural sensitivity, and supports current and planned economic development. Ultimately, the study resulted in a set of phased improvement projects that address the most critical transportation needs of the study roadways over the next 5-, 10-, and 20-year horizon periods. The study also includes recommendations for updates to the Tribal Transportation Improvement Program (TTIP).

Technical Advisory Committee

The study was guided by a Technical Advisory Committee (TAC). The role of the TAC was to provide guidance, support, advice, suggestions, recommendations, and to perform document reviews throughout the study process. TAC members included representatives from:

- Apache County District II
- Ganado Chapter
- Ganado Chapter Farm Board
- Ganado Chapter Planning Department
- Ganado Unified School District
- Ganado Fire District
- BIA Fort Defiance Agency
- Navajo Transit System
- Navajo Nation Division of Transportation
- Navajo Nation Division of Economic Development
- Navajo Nation Division of Community Development
- Navajo Nation Division of Public Safety
- Navajo Nation Division of Agriculture
- Navajo Nation Historic Preservation Office
- Sage Memorial Hospital
- Indian Health Service
- Arizona Department of Health Services
- FHWA Arizona Division
- Northern Arizona Council of Governments (NACOG)
- ADOT Holbrook District Office
- ADOT Multimodal Planning Division

Stakeholders

To develop a thorough understanding of the issues, deficiencies, and needs, the study team identified and interviewed a core group of stakeholders. The stakeholders included representatives from Navajo Nation divisions and offices, Apache County District II, BIA Western Regional Office, Sage Memorial Hospital, Ganado Unified School District, NACOG, and ADOT divisions. The first set of stakeholder interviews was conducted on Tuesday, March 3, 2015 and the second set on August 11, 2015. At each stakeholder meeting, a questionnaire was given to participants and a roundtable discussion took place to identify key issues within the study area.

STUDY AREA OVERVIEW

Formally established in 1901, today Ganado is a major center for education, healthcare, and government services on the Navajo Nation. Also due to recent growth along N15 near Burnside and within Ganado, the study area's roadways have experienced numerous "growing pains." As a developing community with several safety, congestion, and circulation issues, it is critical that the community develop a plan to improve safety and mobility for all transportation modes while maintaining its cultural heritage and quality of life.

Located at the crossroads of ancient trade routes, the Ganado/Burnside study area is comprised of the major regional corridors of SR 264, US 191, N15, and N27, as well as a network of paved and unpaved local roadways. These major corridors provide access for local residents, as well as regional connections for tourists, commuters, and heavy trucks to Chinle, Window Rock, Interstate 40, and other activity centers. Locally, the Hubbell Trading Post, the oldest operating trading post on the Navajo Nation, generates significant tourist traffic. Figure 1.1 provides an overview of the Ganado/Burnside area and the study roadways.

PURPOSE AND NEED

The primary purpose for this study was to develop a comprehensive, long-range transportation plan that provides guidance to the Ganado Chapter, Navajo Nation, Apache County District II, and ADOT when making future land use and multimodal transportation decisions. The need for this study stemmed directly from the desire of the Ganado Chapter and Apache County District II to increase economic vitality, improve community livability, and enhance transportation conditions along the area's major routes. Recommendations from this study will enable the Ganado Chapter, Apache County District II, Navajo Nation, and ADOT to facilitate safer and more efficient infrastructure for the traveling public and guide the development along the study roadways. The purpose of the project is demonstrated with the following statements of need:

Why is This Plan Needed?

ADDRESS SAFETY AND OPERATIONAL NEEDS
The roadway network needs to be evaluated to identify solutions to improve safety, mobility, and to optimize traffic operations

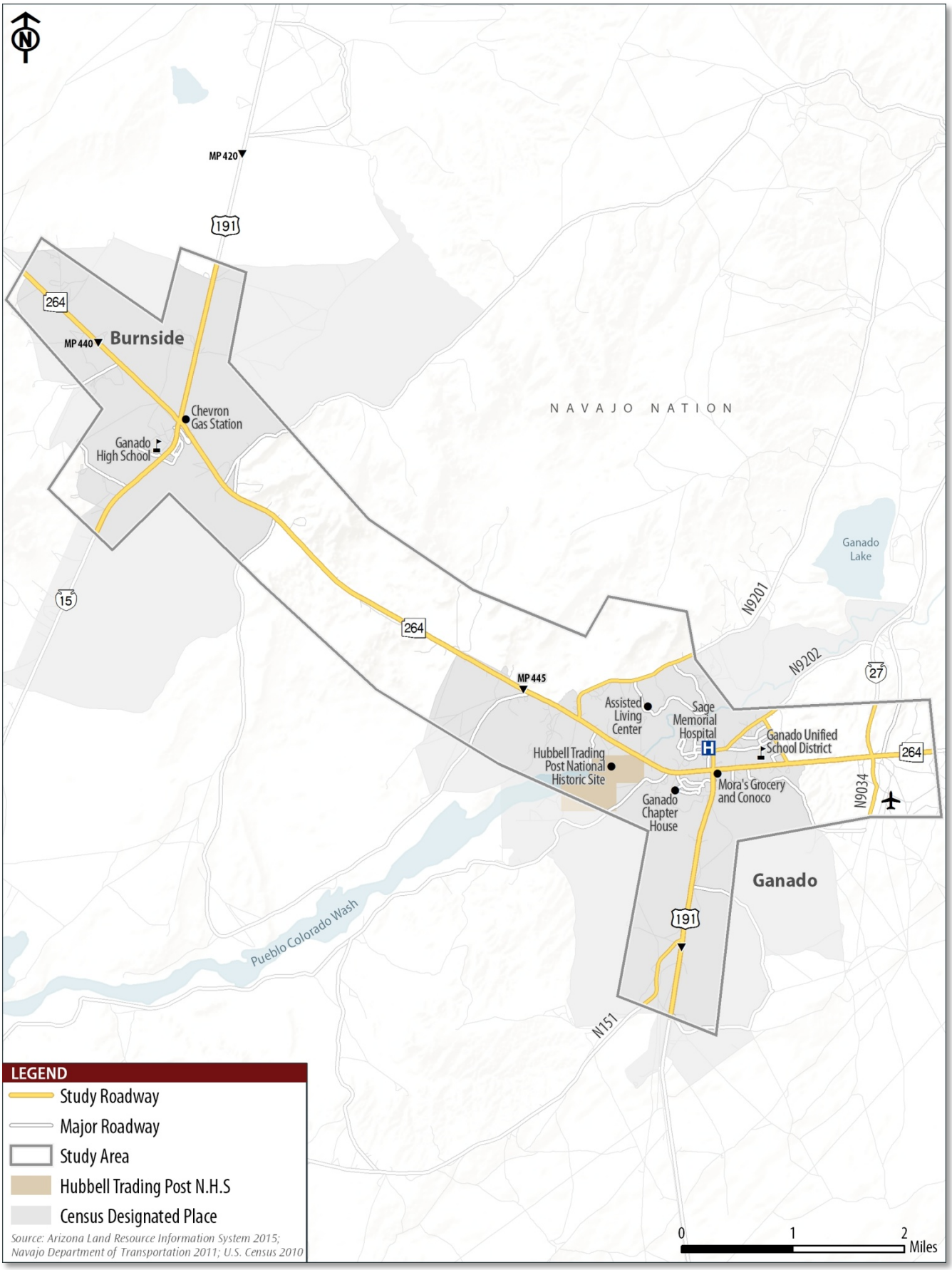
PROVIDE PEDESTRIAN, BICYCLE, AND TRANSIT OPTIONS
Improvements are necessary to provide continuous and safe multimodal travel options between activity centers

PLANNED LAND USE AND FUTURE GROWTH
Planned growth will require updated facilities to accommodate traffic and to promote multimodal transportation

PROMOTE ECONOMIC GROWTH AND COMMUNITY LIVABILITY
Develop a plan for investments that strengthens local businesses, spurs business growth, encourages activities, and promotes tourism

- **Address Safety, Mobility, and Operational Needs.** The current roadway network needed to be evaluated to identify solutions to improve safety and mobility, optimize traffic operations, develop maintenance procedures, and to enhance the overall streetscaping. Key issues included:
  - Existing roadway and intersection design is not optimal, commuter and school bus traffic often causes congestion and unsafe conditions.
  - Roadways need to be upgraded to meet BIA design standards.
  - Roadways lack shoulders which limit vehicles from pulling over or yielding to emergency vehicles.
  - Vehicles travel at high speeds, particularly in school zones, causing unsafe driving and walking conditions.
  - The area has limited pedestrian walkways, crosswalks, bicycle facilities, and trails.
- **Provide Bicycle, Pedestrian, and Trail Connections Between Activity Centers.** Sidewalks and bike paths are limited and unsafe within numerous locations of the study area. Improvements are necessary to provide continuous and safe connections between business and activity centers for residents and for recreational purposes.

Figure 1.1. Study Area



- **Promote Economic Growth and Community Livability.** A plan for transportation investments that encourages economic growth while maintaining the cultural and historic nature of the study area is needed. Transportation investments that provide multimodal, transportation choices and connections at the local and regional level that can spur business growth and job creation, provide much needed transportation for the underserved area, encourage physical activity, and promote tourism.
- **Accommodate Planned Growth.** As development occurs within the study area, the demand for safe transportation options will significantly increase and will require upgrades to facilities to accommodate traffic and to promote multimodal transportation.

GOALS AND OBJECTIVES

With the overall goal to improve safety and mobility, the primary goals and objectives of this study were:

PRESERVE TRANSPORTATION INFRASTRUCTURE

- Identify roads that need pavement preservation and safety enhancements
- Recommend operational improvements to existing intersections and access to activity centers

IMPROVE CONNECTIVITY AND MOBILITY

- Increase the connectivity of all modes
- Increase access to activity centers
- Provide alternative routes

ENHANCE SAFETY FOR ALL MODES

- Conduct traffic analysis to determine future traffic conditions
- Recommend roadway safety elements
- Improve access management

FOSTER LIVABILITY, QUALITY OF LIFE AND SUSTAINABLE DEVELOPMENT

- Coordinate with desired community development patterns
- Support area economic developments

INCREASE MULTIMODAL OPTIONS

- Identify areas that need sidewalks, multi-use paths, and bike routes
- Enhance non-automobile modes for travel and recreation

OPTIMIZE INVESTMENT STRATEGIES

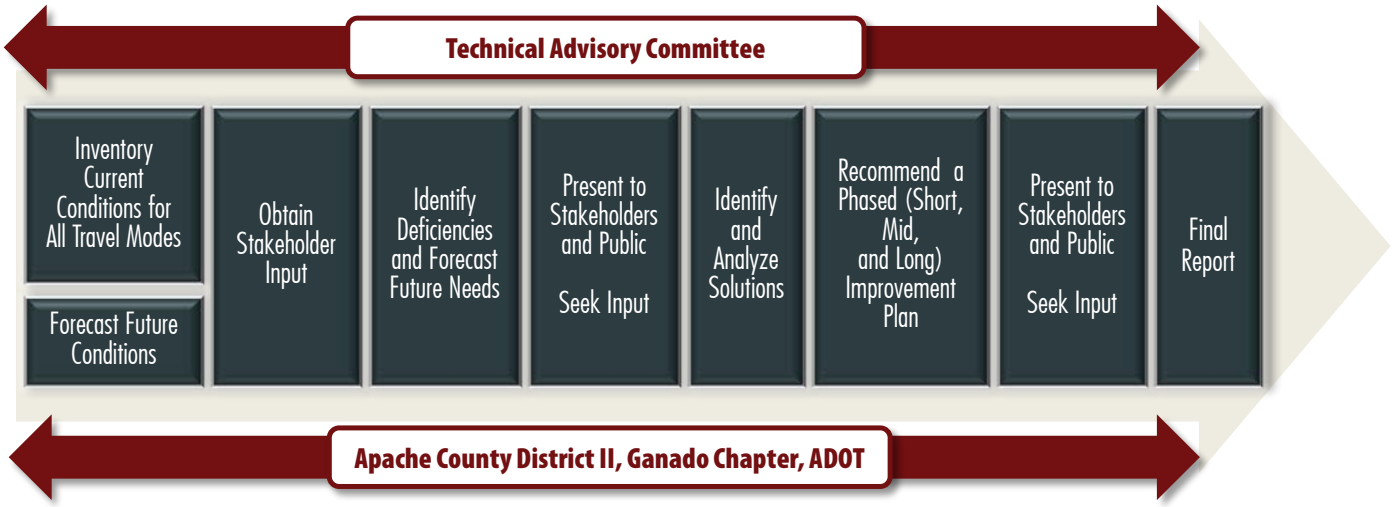
- Consider cost-effectiveness and constructability
- Identify funding sources and strategies

STUDY PROCESS

The development of a transportation plan is a technical, collaborative process that involves local jurisdictions, regional agencies, stakeholders, and the general public. For this study, a multi-stage process is followed to ultimately develop a regionally cohesive improvement plan. Throughout the process, the study team maintained consistent contact with the TAC, and stakeholders and conducted extensive public outreach efforts. Figure 1.2 illustrates the process that was utilized for this study.

Working Paper 1: Existing and Future Conditions inventoried and analyzed the existing and future conditions in the study area, including existing transportation system deficiencies, issues, and needs. The First Public Open House was conducted on May 27, 2015 to present existing and projected transportation conditions and issues. *Working Paper 2: Draft Transportation Improvement Plan* evaluated and identified improvement projects that address the needs and deficiencies identified in Working Paper 1. The second Public Open House was conducted on September 30, 2015 to present the Draft Transportation Improvement Plan. Chapter 6 provides a summary of the public outreach process.

Figure 1.2. Study Process



TRIBAL TRANSPORTATION PROGRAM (TTP)

Jointly administered by the U.S. Department of Transportation, FHWA and BIA, the Tribal Transportation Program (TTP), formerly known as the Indian Reservation Roads (IRR) program, addresses the transportation needs of Tribal governments by providing safe and adequate transportation and public road access to and within Indian Reservations, Indian lands, and Alaska Native Village communities. Under the Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), the TTP generally continues the IRR program, but, includes two additional 2% takedowns for bridge replacement and safety projects.

Under the TTP, the previous Indian Reservation Roads Inventory (IRRI) changed names to National Tribal Transportation Facility Inventory (NTTFI). The NTTFI is a comprehensive national inventory of tribal transportation facilities that are eligible for financial assistance under the TTP. In order to obtain proper funding, it is imperative that the NTTFI accurately reflects the conditions of the tribal roadways.

2. PREVIOUS STUDIES, REPORTS, AND PLANS

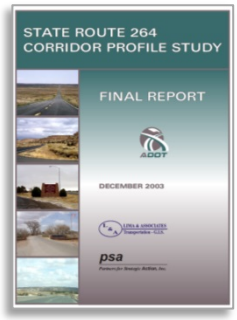
This chapter presents a review of studies, plans, and programs relevant to this study. Review of completed and current planning efforts often provides an insight into previously identified transportation issues and potential transportation improvements. This chapter also summarizes approved future transportation improvements within the study area.

ONGOING AND COMPLETED STUDIES

1999 US Highway 191 Engineering Feasibility Study

This study was originally conducted to evaluate different alternatives to provide a four-lane divided highway and to improve safety and operational capacity on US 191 from Burnside Junction (MP 417.5) to MP 427. Major recommendations included:

- From MP 417.55 to 417.74 – widen roadway to a five-lane fringe urban roadway with four lanes and continuous left turn lane and 8 FT shoulders.
- From MP 417.74 to 427.0 – widen roadway to a four-lane roadway with a 46 FT wide median dividing the travel lanes.



2003 State Route 264 Corridor Profile Study

Identified as a transportation corridor of statewide significance, ADOT conducted this study in order to have a strategic plan for improving the corridor's multimodal transportation system.

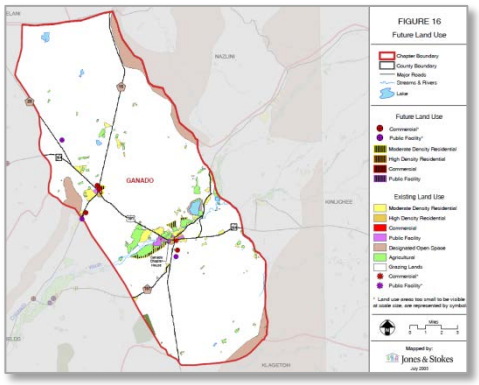
- SR 264 from Burnside to Ganado is projected to operate at a 2020 level of service D and has the highest crashes rates along the corridor. Within our study area widening shoulders, reducing traffic congestion, and improving structures were identified as high priorities along the corridor.
- Major recommendations included:

Location (MP)	Recommended Improvement
SR 264/ US 191 North Intersection	Intersection illumination, widen intersection for turn lanes, install pedestrian signage, potential transit stop at Chevron Gas Station and Standing Rock
441.0 - 441.8	Widen to Five-Lane Cross Section with Curb/Gutter/Sidewalk
441.8 – 444.7	Widen to Four-Lane Divided Cross Section
444.23	Bridge Rehabilitation
444.7 – 446.2	Widen to Five-Lane Cross Section with Shoulders
446.2 – 446.89	Widen to Five-Lane Cross Section with Curb/Gutter/Sidewalk, potential transit stop in front of Ganado Post Office
446.2	Bridge Rehabilitation
440.9 – 447.6	Pavement Rehabilitation and Guardrail Replacement
SR 264/US 191 Highway South Intersection	Intersection illumination
446.89 – 447.6	Widen to Five-Lane Cross Section with Curb/Gutter/Sidewalk
447.6 – 448.6	Widen to Five-Lane Cross Section with Shoulders
Corridor Wide	Bus bays with shelters should be constructed at all major "road stops" and for school buses, Conduct park-and-ride feasibility study to determine if transit demand in Ganado warrants the service

2003 Navajo Nation Community Land Use Plan – Ganado Chapter

The Community Land Use Plan (CLUP) for Ganado Chapter includes a land use, utility, and transportation system plan that the Chapter can utilize to guide development. Major relevant findings and recommendations included:

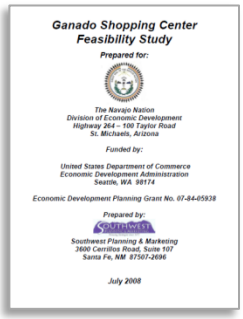
- Most of the Ganado residents reside in either (1) Central Ganado corridor, from just west of the Chapter House through the Sage Hospital and schools area, to the area south of Ganado Lake; or (2) near Burnside Junction.
- Potential growth areas were identified as:
  - Burnside Junction site is suitable for a mixed use site that could accommodate up to 135 homes as well as administration buildings for the Sage Memorial Hospital. The development would require two access roads – one entering from SR 264 and one from US 191.
  - East Ganado Site (northwest of N27 and SR 264) is a 10 acre site that would accommodate 27 homes as well as ancillary buildings for the Sage Memorial Hospital.
  - Potential for residential land along the SR 264 and US 191 South corridors.
  - Commercial development is recommended to be concentrated at the two activity centers of Central Ganado and Burnside Junction. Developments requested by Chapter members included businesses that provide employment opportunities, a bank, hotels and restaurants, supermarket, and other commercial properties.
- Local priority roadway improvements include the Ganado North Mesa Road (N9201), Ganado Loop Access Road, and the Old Round Top Road (N9202).



2004 State Route 264 Feasibility Study

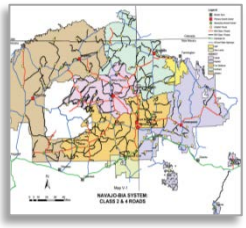
This Feasibly Study was conducted to prepare a long-range plan to upgrade SR 264 from Burnside Junction eastward through Ganado to the intersection with Kinlichee Chapter House Road (MP 441.1 to MP 452.4). Major relevant findings and recommendations included:

- SR 264 is the primary link for local residents in Ganado and Burnside and serves as the Main Street for the communities. In addition, the route is a major regional travel corridor for tourists going to Hubble Trading Post and Canyon de Chelly National Monument.
- The pedestrian overpass on SR 264 is rarely utilized, as students and residents cross the highway at-grade. Non-climbable fencing is not feasible in the area; therefore, it was recommended to remove the overpass.
- Burnside Junction (MP 441.1 – MP 441.8) – widen to a four-lane roadway with a center turn lane.
- MP 441.8 – MP 444.7 – widen to a four-lane divided highway with a 4 6 FT median.
- MP 444.7 – MP 448.7 – widen to a four-lane roadway with a center continuous left-turn lane.
- East of Ganado (MP 448.7 – MP 452.4) – widen to a four-lane divided highway a 46 FT median.



2008 Ganado Shopping Center Feasibility Study

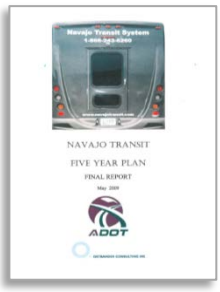
The Navajo Nation Division of Economic Development conducted this study to determine the feasibility of a shopping center in Ganado as a potential economic opportunity for reducing spending in other towns, increasing tax revenue, and creating local jobs. The study evaluated the northwest quadrant of the SR 264 and US 191 intersection in Burnside. Analysis found that the market area, which includes nearby Chapters within 12 miles, can support a commercial space that includes a grocery store, hardware and automotive supply store, a laundry, fast food and family restaurant, medical office, and other retail businesses. In a community-wide survey, respondents commented that they shop 3 to 4 times a month and typically drive to Gallup or Window Rock for shopping purposes.



2009 Navajo Nation Long Range Transportation Plan

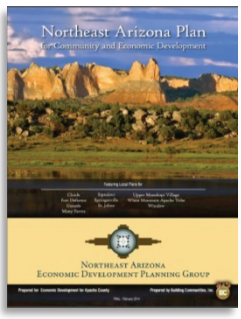
The 2009 Navajo Nation Long Range Transportation Plan identified the Navajo Nation's multimodal transportation needs for the next 20 years, in conjunction with development strategies for implementing improvements. The study was based on a comprehensive analysis of existing and future transportation needs throughout the Navajo Nation. The Ganado area was identified in the study as a secondary growth center within the Nation. Key study findings and recommendations include:

- Ganado Airport mostly serves medical transportation to and from the Sage Memorial Hospital. A master plan and initial design (2008) for a 6,600' x 75' paved runway has been completed.
- Sidewalks and pedestrian crosswalks are needed on SR 264 at milepost 446.9.
- Fencing is needed on US 191 from Klagetoh to Ganado.
- SR 264 from N27 to the Hubble Trading Post has one of the highest crashes rates in the Nation. In addition the intersections of SR 264/US 191 North and SR 264/US 191 South were identified as intersections with significant safety concerns.
- Numerous residential and commercial developments are planned in both Ganado and Burnside.



2009 Navajo Transit System Five-Year Plan

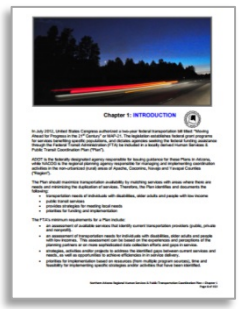
The Navajo Transit System Five-Year Plan was a Nation-wide assessment of the current transit needs and service deficiencies of the Nation. The Transit Plan provides a roadmap for future transit services to better accommodate current users and for future ridership in the coming years. The study analyzed ridership characteristics within the Nation and found that the majority of riders were adults that utilized transit for employment purposes. The study identifies Ganado as potential location for a transit center. The goal of the transit center would be to have a meeting place for riders and drivers to meet.



2013 Ganado Economic Development Strategic Plan and 2014 Northeast Arizona Plan for Community and Economic Development

Conducted by the Northeast Arizona Economic Development Planning Group to develop a Regional Sustainability Plan for Northeast Arizona, this study provides a strategic plan for the next three to five-years. Key study findings included:

- Based on a community meeting education development, pass-through visitor services, cultural and local/regional tourism, and attractions were the primary sectors the public would like to pursue.
- The studies steering committee determined that the four strategies that would most advance the economic conditions and overall quality of life in Ganado are: attracting government funding, business recruitment, cultural tourism, and pass-through visitor services.



2014 Northern Arizona Regional Human Services & Public Transportation Coordination Plan

NACOG completed this study in order to compile with MAP-21's regulations that agencies seeking federal funding assistance through the Federal Transit Administration be included in a locally derived Human Services Coordination Plan. Potential human service transportation activities in the study area include :

- Toyei Industries is a residential program located in Ganado that provides day treatment, home, and community based services. Transportation needs for the program include access to therapeutic programs, education trips, medical needs and emergency transportation.
- Annie Wauneka Life Care (AWLC) is a non-profit organization in Ganado and Cornfields that provides community-based, non-skilled care services to Navajo adults. AWLC provides transportation for a variety of client needs, including shopping, community activities, medical, and home visits.

PROGRAMMED AND SCOPED PROJECTS

ADOT's Multimodal Planning Division publishes the Arizona State Transportation Improvement Program (STIP), which identifies priority transportation projects that utilize federal funds over a five-year timeframe. The ADOT MPD Planning and Programming section compiles the STIP from a list of projects from regional transportation improvement programs (TIP). Table 2.1 lists the improvement projects included in the *2015-2019 State Transportation Improvement Program.* The Five-Year Program acts as a guiding document for future projects and designates the allocation of local, state, and federal funding for projects. Funding of the Five-Year Program is generated primarily through the gasoline and vehicle license tax. No projects were listed in the N*ACOG Regional Transportation Improvement Program* or the *Five-Year Airport Capital Improvement Program* for the study area.

Table 2.1. ADOT State Transportation Improvement Program FY 2015 – 2019

Year	Project Location	Type of Improvement, Equipment, Structure, etc.	Total Costs
2016	SR 264: MP 441 – MP 450	Fence and Cattle Guards & Turn Lanes	$800,000
2016	SR 264: MP 441 – MP 450	Pavement Preservation	$4,000,000
2016	SR 264: MP 441 – MP 450	Construct Shoulder Widening	$10,300,000
2016	SR 264: Ganado Wash Bridge	Bridge Replacement	$5,000,000

Source: ADOT Multimodal Planning Division

Note: Please note that the above projects are based on the current ADOT STIP. Some of the projects scheduled may already be complete.

Table 2.2 lists the roadway improvement projects in the study area as identified in the Tribal Transportation Program

Table 2.2. Tribal Transportation Program FY 2015 – 2019

Year	Project Location	Type of Improvement	Total Costs
2015	N15: Burnside to Greasewood Springs	Install Fencing	$5,100,000
2017	N15: SR 154 to Cornfields-Sunrise	Grade, Drain, and Surfacing (Pavement) Construction	$10,530,000

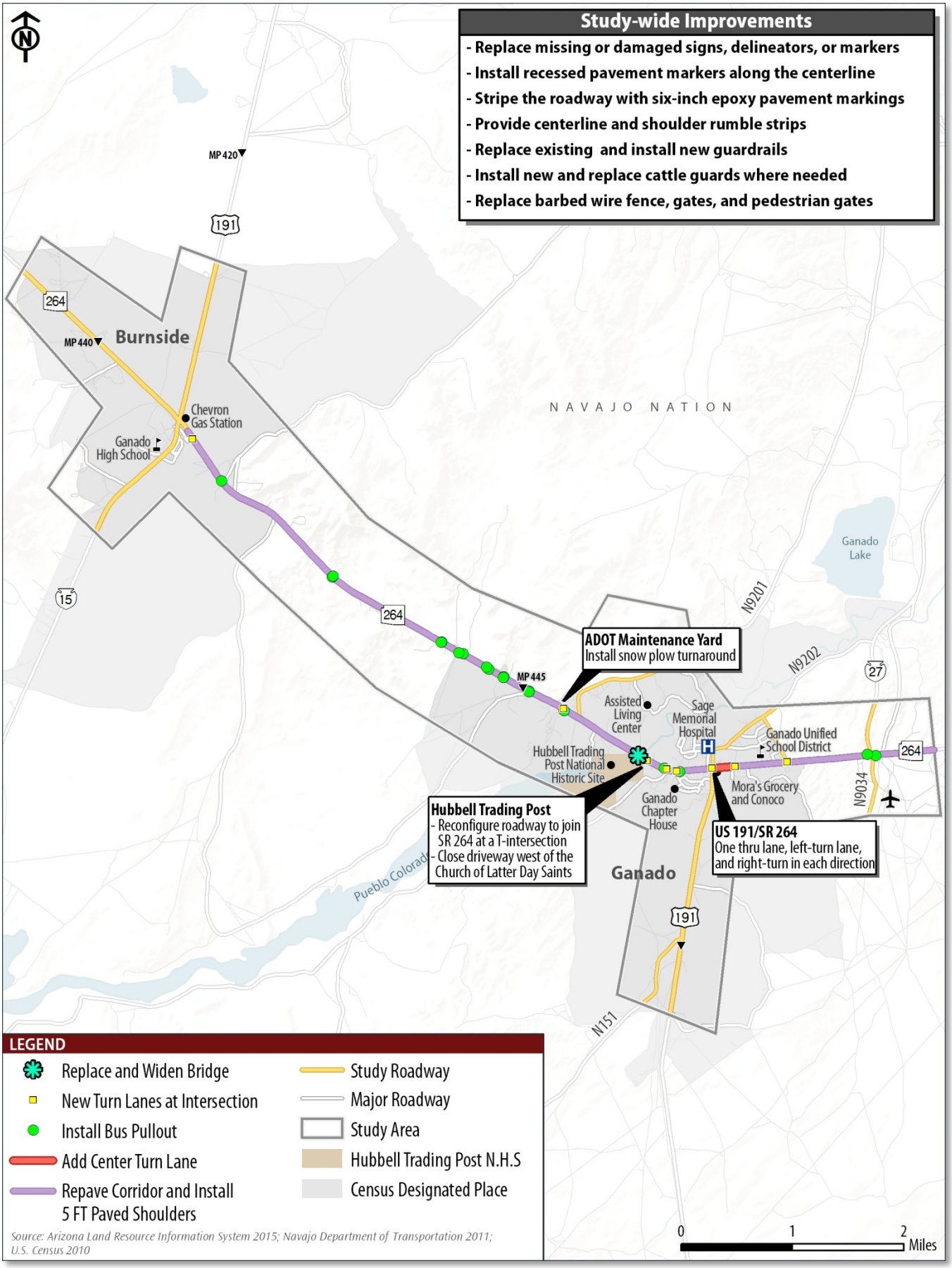
Source: ADOT Multimodal Planning Division

PROGRAMMED SR 264 IMPROVEMENTS

ADOT is currently in the beginning phases of conducting a safety and pavement preservation project on SR 264 from MP 441 to MP 459.0. With the ultimate purpose of improving roadway conditions and the overall safety of the corridor, these improvements seek to reduce the frequency and severity of crashes. Figure 3.2 summarizes the programmed improvements on SR 264. The project consists of:

- Overlaying 2.5 inch asphalt concrete overlay and 0.5 inch asphalt concrete friction course
- Widening existing shoulders to 5 FT
- Widening roadway to include a center turn-lane: US 191 intersection to the Ganado Unified School District School entrance
- Include exclusive turn-lanes
  - One right-turn lane in each direction at:
    - County Road 420
    - Ganado Unified School District Entrance
    - Cedar Hills Road
    - County Road 427
    - ADOT Maintenance Yard
    - Eastern Entrance to Mustang Gas
  - One left-turn lane and right-turn lane in each direction at:
    - County Road 420
    - Ganado Unified School District Entrance
    - US 191/ SR 264 intersection
    - County Road 427
- Reconfiguring the entrance to Hubbell Trading Post and Church of Latter Day Saints to include:
  - Closing current roadway west of the Church of Latter Day Saints entrance
  - Realignment of roadway to join SR 264 at a T-intersection
- Constructing a new Ganado Wash Bridge
- Constructing eight eastbound and nine westbound bus pullouts
- Installing a snow plow/bus turnaround at the ADOT Maintenance yard
- Installing centerline and shoulder rumble strips
- Flattening of side slopes
- Providing delineators and recessed pavement markers
- Installing new cattle guards and replacing barbed wire fencing
- Extending existing drainage pipes for the widened roadway
- Clearing roadside vegetation

Figure 2.1. Scheduled SR 264 Improvements

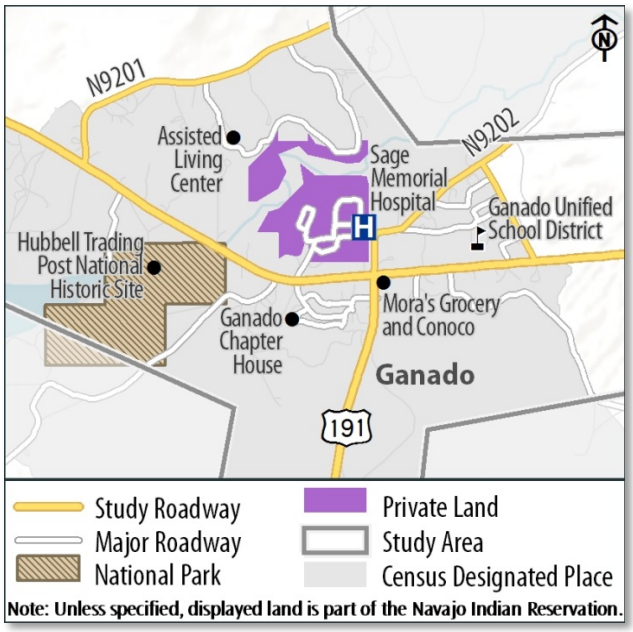


3. LAND USE AND SOCIOECONOMIC CONDITIONS

LAND OWNERSHIP

The entire study area is located within the Navajo Nation Indian Reservation. Land within the Navajo Nation is primarily communally owned and administered by the Nation's government; however, customary land users may lease land for home sites, grazing, and other uses. Organizations such as the BIA, other federal agencies, churches and other religious organizations, and businesses, may also lease land. Additional land owners in the study area include:

- Located adjacent to N427 south of SR 264, is the National Park Service owned and maintained Hubbell Trading Post National Historic Site.
- Sage Memorial Hospital occupies over 109 acres of private land northwest of the SR 264 and US 191 South intersection.



LAND USE

Integrating land use into transportation planning is essential so communities can support "smart growth" processes and promote sustainable development. Sustainable development improves mobility, supports economic growth, and ensures the financial stability of the transportation system. This approach helps maintain the quality of living for the people and the quality of the community as a whole and also reduces the need for roadway expansion. Existing land use data was compiled based on planning documents and a comprehensive field review. Figure 3.1 illustrates major activity centers and the existing land use per the *Ganado General Plan*. As shown in Figure 3.1, land use categories within the study area are:

- **Residential:** Approximately 14.6% of the study area is utilized for residential purposes. According to the *Ganado General Plan,* residential land uses include moderate density (between 100 and 500 persons per square mile) and high density (over 500 persons per square mile).
  - High density residential areas are located: southwest of SR 264/US 191 South intersection, on N9201, on N9202, and on N15
  - Moderate density residential areas are located: southwest of the Ganado High School, southwest of the ADOT Maintenance Yard, along SR 264 in Ganado, on N9201, and on N9202.
- **Commercial:** Commercial services in Ganado include the Hubbell Trading Post National Historic Site, Conoco Gas Station and Mora's Grocery at the SR 264/US 191 South intersection, and TJ's Automobile Repair south of SR 264 east of Ganado. While the Hubbell Trading Post is a United States National Park Service facility and a tourist attraction, it also contains retail operations for crafts and groceries. Burnside has a small commercial plaza northeast of the SR 264/US 191 North intersection that includes Burger King and Chevron Gas Station.
- **Public Facility:** Public facilities within the study area include the Ganado High School in Burnside, Ganado Unified School District, Northern Arizona University, ADOT maintenance facility, and Apache County District II Administration offices. The Navajo Nation facilities include the Chapter House, fire station, Navajo Head Start Program, and Navajo Housing Authority offices. The Sage Memorial Hospital complex is a 98 acre site on owned fee simple land leased by the hospital.

- **Agriculture:** According to the *Ganado General Plan* agricultural land occupies roughly 270 acres of the study area. While agricultural land is scattered throughout the study area, a large continuous land area southwest of Ganado is designated as agricultural.
- **Designated Open Space:** Located southwest of the Ganado High School, Navajo Nation Department of Fish and Wildlife has established a Designated Open Space area. This area is noted in the Ganado General Plan as an area of high sensitivity.

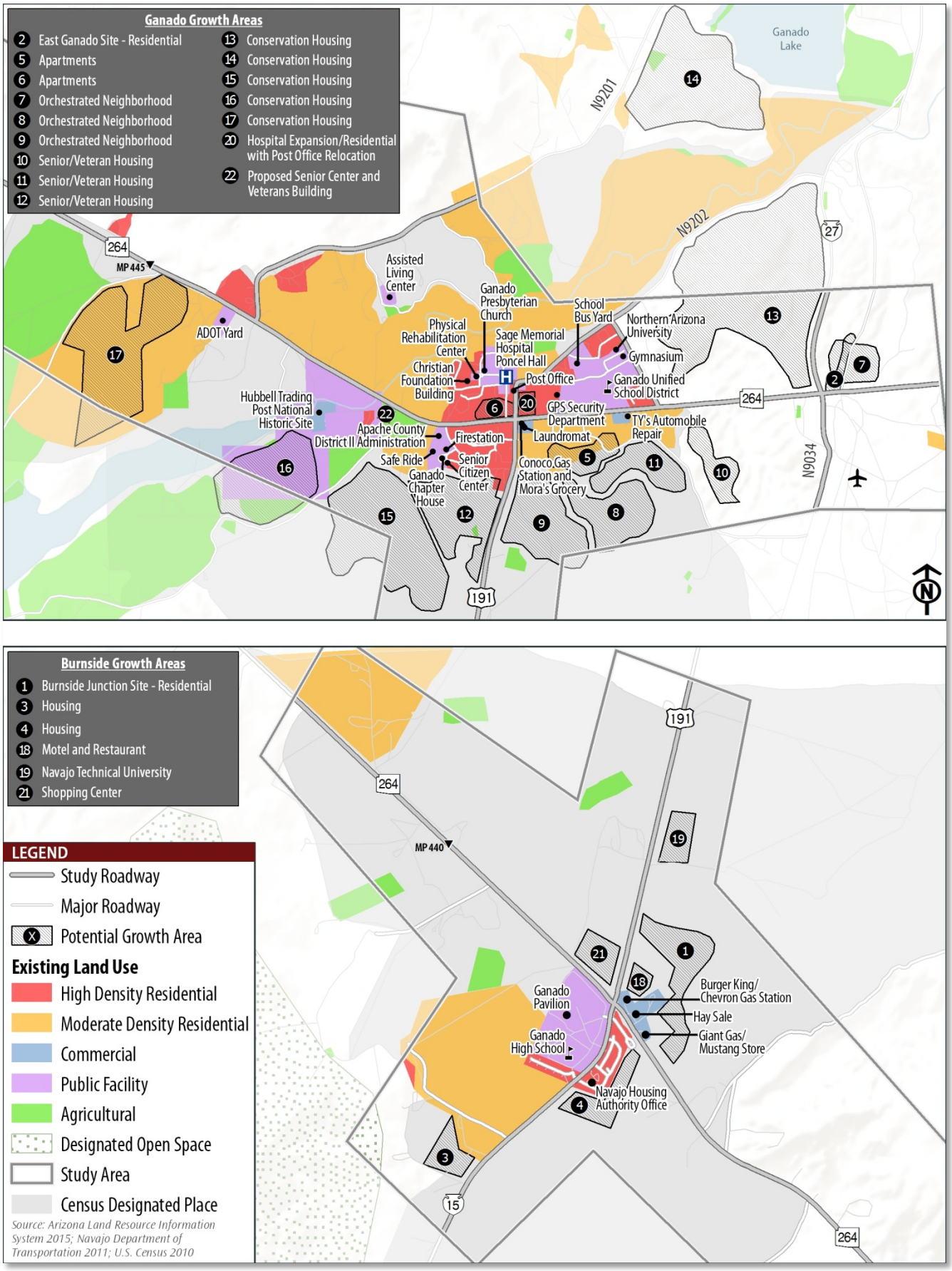
Planned Developments

Based on input received from local stakeholders and TAC members, planned developments and potential timeframes for development were identified. Table 3.1 presents potential future developments within the study area, while Figure 3.1 illustrates the locations of the planned developments.

Table 3.1. Potential Study Area Developments

#	Proposed Development	Location	Units	Timeframe
1	Residential - Burnside Junction Site	Northeast of Burger King and Chevron	20-30	10-20 years
2	Residential - East Ganado Site	Northeast corner of SR 264 / N9034 Intersection	27	Unknown
3	Housing	Southwest of Ganado High School	Unknown	0-5 years
4	Housing	South of Navajo Housing Authority Office	Unknown	Unknown
5	Apartments	Southeast of Conoco Gas Station	57	Unknown
6	Apartments	Northwest corner of SR 264 / US 191 South Intersection	57	Unknown
7	Orchestrated Neighborhood	Northeast corner of SR 264 / N9034 Intersection	14	Unknown
8	Orchestrated Neighborhood	Southeast of Conoco Gas Station	41	Unknown
9	Orchestrated Neighborhood	South of Conoco Gas Station	69	Unknown
10	Senior/Veteran Housing	Southeast of TY's Automobile Repair	73	Unknown
11	Senior/Veteran Housing	South of TY's Automobile Repair	96	Unknown
12	Senior/Veteran Housing	South of Ganado Chapter House	191	Unknown
13	Conservation Housing	West of N27	185	Unknown
14	Conservation Housing	East of N9201 (outside of study)	82	Unknown
15	Conservation Housing	Southwest of Ganado Chapter House	82	Unknown
16	Conservation Housing	South of Hubbell Trading Post	63	Unknown
17	Conservation Housing	West of ADOT Yard	174	Unknown
18	Motel and Restaurant	North of Burger King	Unknown	0-5 years
19	Navajo Technical University	East of US 191 in Burnside	Unknown	Unknown
20	Possible Hospital Expansion/ Residential with Post Office Relocation	Northeast corner of SR 264 / US 191 South Intersection	20	0-5 years
21	Shopping Center	Northwest corner of SR 264 / N15 Intersection	33 acres	1-2 years

Figure 3.1. Existing Land Use and Proposed Developments



SOCIOECONOMIC CONDITIONS

A review of existing population and employment was conducted to understand the demographic characteristics of the Ganado/Burnside area. As identified by the US Census Bureau, Table 3.2 summarizes the population and occupied housing unit growth trends from 2000 to 2010 for the study area, Ganado Census Designated Place (CDP), Burnside CDP, Apache County, and the State of Arizona. It is evident that the population has dramatically decreased since the 2000 Census. As shown in the Table, the Ganado/Burnside area has lost nearly 21 percent of the population recorded in the 2000 US Census. This significant decrease in population may be attributed to Navajo Nation members moving to urban areas to seek employment or errors in reporting. According to the US Census Bureau, the entire Navajo Nation lost three percent of their population.

Table 3.2. Population and Occupied Housing Unit Growth Trends

Geographic Area	Population		Population Growth	Occupied Housing Units		Housing Units Growth
	2000	2010		2000	2010	
Study Area	2,258	1,854	-17.89%	625	561	-10.25%
Ganado CDP	1,505	1,210	-19.60%	422	372	-11.85%
Burnside CDP	632	537	-15.03%	173	160	-7.51%
Apache County	69,423	71,518	3.02%	19,971	22,771	14.02%
State of Arizona	5,130,632	6,392,017	24.59%	1,901,327	2,380,990	25.23%

Source: 2010 US Census, 2000 US Census

Figures 3.2 and 3.3 illustrate the total population and occupied housing units per square mile, respectively. As illustrated in Figure 3.2, population densities are highest at the housing developments surrounding Ganado High School, north of the Ganado Unified School District, and along SR 264 in Ganado. Additionally, high concentrations of populations are located along N151, N9201, and west of Burnside. Areas with a lower housing density but higher population density suggest that the areas are comprised of dwelling units with a high occupancy rate.

Employment Overview

As a sovereign Nation, the Navajo Nation is responsible for the economic development, financial solvency, and general welfare of its members. ReferenceUSA data was compiled to identify primary employment industries and current employment levels within the study area. Based on the ReferenceUSA database, there are approximately 1,406 employees within the study area. Ganado Unified School District is cited as the largest employer within the community with 350 employees, while Sage Memorial Hospital employs over 280 persons. According to ReferenceUSA, the largest type of employers within the area are educational and health services.

Major Employer	Employees
Ganado Unified School District	350
Sage Memorial Hospital	284
R H Mike Enterprises (Owner of Burger King)	45
Annie Wauneka Life Care	32
Safe Ride Services Inc.	32

Source: ReferenceUSA 2014

Figure 3.2. Total Population per Square Mile

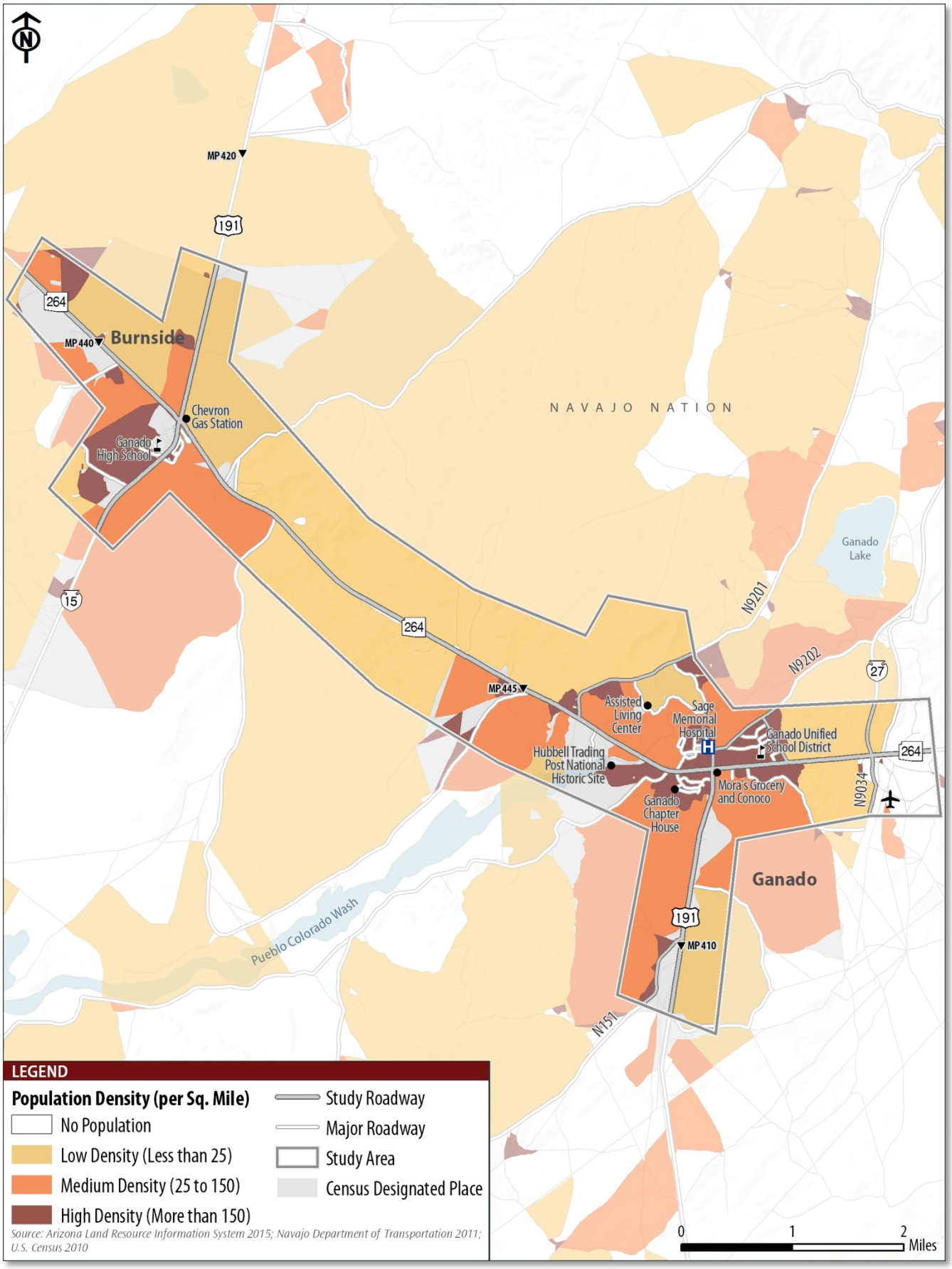
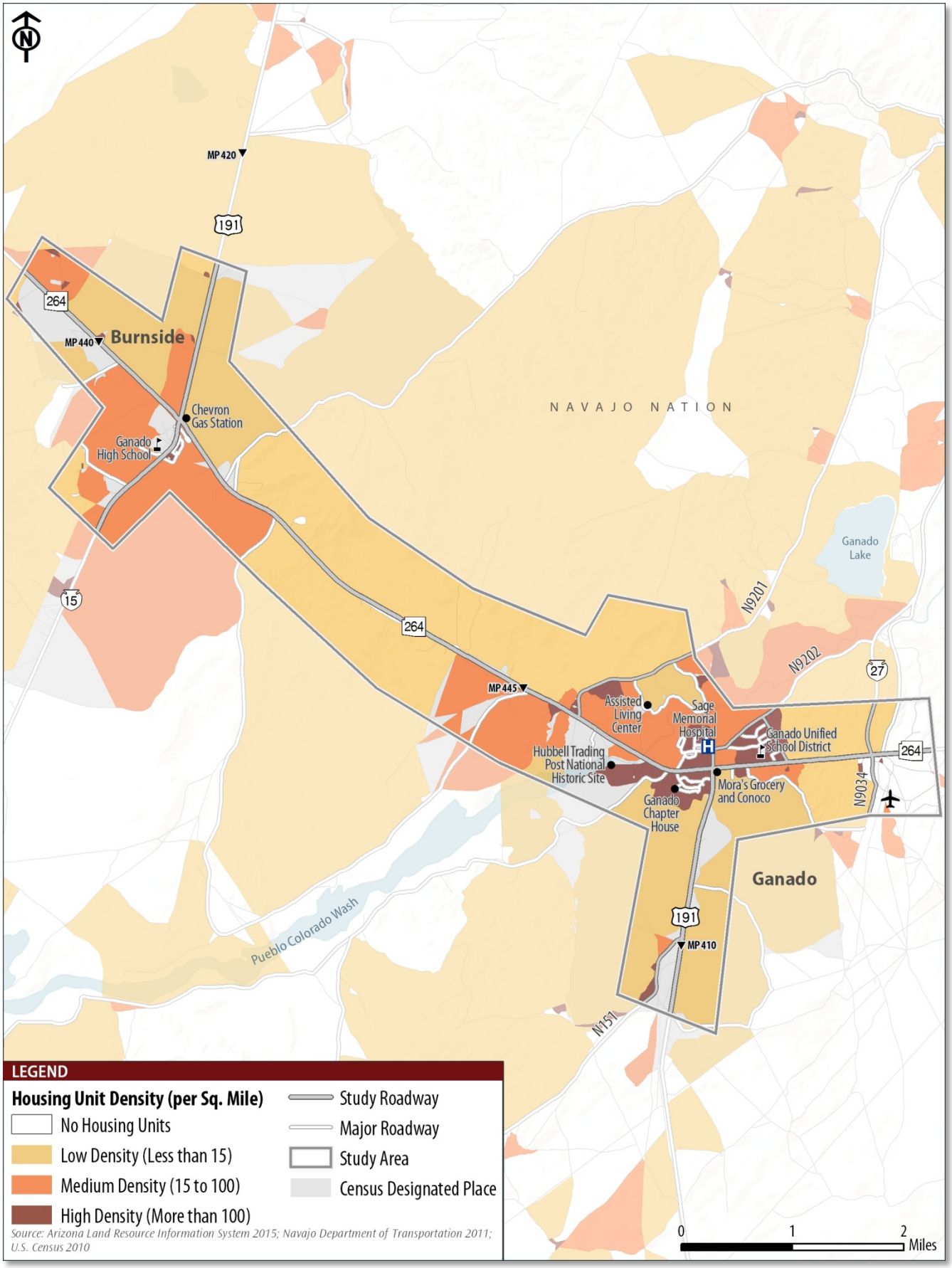


Figure 3.3. Total Occupied Housing Units per Square Mile



4. EXISTING AND FUTURE TRANSPORTATION CONDITIONS

ROADWAY CHARACTERISTICS

The Ganado/Burnside study area consists of about 20 miles of paved and unpaved roadways, including:

- **SR 264:** ADOT-maintained east-west highway that serves as a local connector between Burnside and Ganado as well as a major regional corridor between Tuba City and Window Rock. SR 264 is currently scheduled for pavement preservation and roadway widening to provide paved shoulders with rumble strips, installing new guardrails, and installing new signage and cattle guards as needed.
- **US 191:** ADOT-maintained north-south highway that serves as a major regional corridor that connects the study area to I-40 to the south and Chinle to the north. US 191 is also utilized to access a residential area along N151 as well as the Ganado Cemetery.
- **N15:** north-south roadway which connects SR 264 to SR 77. Within the study area, N15 serves as the main corridor to access the Ganado High School, Ganado High School employee housing, and the Navajo Housing Authority's residential development area.
- **N27:** connects SR 264 to Ganado Lake and Nazlini. N27 is heavily utilized by utility trucks as well as commuters. The roadway also provides an alternative route to Chinle.
- **N151:** unpaved local roadway that provides access to a residential area as well as to farming areas.
- **N9201:** unpaved local roadway that provides access from SR 264 to residential areas and the Ganado Assisted Living Center.
- **N9202:** unpaved local roadway that primarily serves as a local connector for residents to access N27, Ganado Unified School District, employment centers, the US Post Office, and residential areas.
- **N9034:** unpaved local roadway that provides access to the Ganado Airport.
- **County Road 420:** paved roadway that provides access for residents and students to the Ganado Unified School District.

Functional Classification

Functional classification is the process by which streets and highways are grouped into classes according to their role of moving traffic through a roadway network. Planners and engineers utilize this hierarchy to establish a roadway's design standards, speed, capacity, access management features, and land use development. Functional classification also impacts a roadway's eligibility for federal transportation funds for road improvements and maintenance. Roads within the Navajo Nation are classified by both FHWA and BIA functional classification system.

FHWA Functional Classification

Federal Functional Classification is assigned to all public roads using federal guidelines and is approved by FHWA. Although tribal governments primarily receive funding through BIA, in order to qualify for federal funds, roadways must be federally classified as a minor collector or above. Roadways that do not have a FHWA-approved functional classification are deemed ineligible for federal funding. Figure 4.1 illustrates the FHWA provided functional classification within the study area. Based on FHWA-approved functional classifications, the following roadways within the study are federally classified:

- **Rural Minor Arterial:** SR 264
- **Rural Major Collector:** US 191 South of SR 264, US 191 North of SR 264, N15
- **Rural Minor Collector:** N27

BIA Functional Classification

Roadway functional classification data was obtained from the existing BIA NTTFI roadway inventory. Table 4.1 provides a list of the BIA functional classification types and definitions and Figure 4.2 illustrates the BIA classified routes within the study area. BIA and the Navajo Nation owned and maintained roadways have specific guidelines for the functional classification of roadways. Based on BIA-approved functional classifications, the following roadways are classified:

- **Rural Minor Arterial:** SR 264, US 191, N15, N27
- **Rural Major Collector:** N9201, N9202, N151
- **Rural Minor Collector:** N9034

Table 4.1. BIA Functional Classification Definition

Class	Description
1	Major arterial roads providing an integrated network with characteristics for serving traffic between large population centers, generally without stub connections and having average daily traffic volumes of 10,000 vehicles per day or more with more than two lanes of traffic.
2	Rural minor arterial roads providing an integrated network having the characteristics for serving traffic between large population centers, generally without stub connections. May also link smaller towns and communities to major resort areas that attract travel over long distances and generally provide for relatively high overall travel speeds with minimum interference to through traffic movement. Generally provide for at least inter-county or inter-state service and are spaced at intervals consistent with population density. This class of road will have less than 10,000 vehicles per day.
3	Streets located within communities that serve residential areas.
4	Rural major collector road is collector to rural local roads.
5	Rural local road that is either a section line and/or stub type roads, make connections within the grid of the TTP system. This class of road may serve areas around villages, into farming areas, to schools, tourist attractions, or various small enterprises. Also included are roads and motorized trails for administration of forests, grazing, mining, oil, recreation, or other use purposes.
6	City minor arterial streets that are located within communities, and serve as access to major arterials.
7	City collector streets that are located within communities and serve as collectors to the city local streets.
8	This class encompasses all non-road projects such as paths, trails, walkways, or other designated types of routes for public use by foot traffic, bicycles, trail bikes, snowmobiles, all-terrain vehicles, or other uses to provide for the general access of non-vehicular traffic.
9	This classification encompasses other transportation facilities such as public parking facilities adjacent to TTP routes and scenic byways, rest areas, and other scenic pullouts, ferry boat terminals, and transit terminals.
10	This classification encompasses airstrips that are within the boundaries of the TTP system grid and are open to the public. These airstrips are included for inventory and maintenance purposes only.
11	This classification indicates an overlapping or previously inventoried section or sections of a route and is used to indicate that it is not to be used for accumulating needs data. This class is used for reporting and identification purposes only.

Source: Bureau of Indian Affairs

Figure 4.1: FHWA Functional Classification

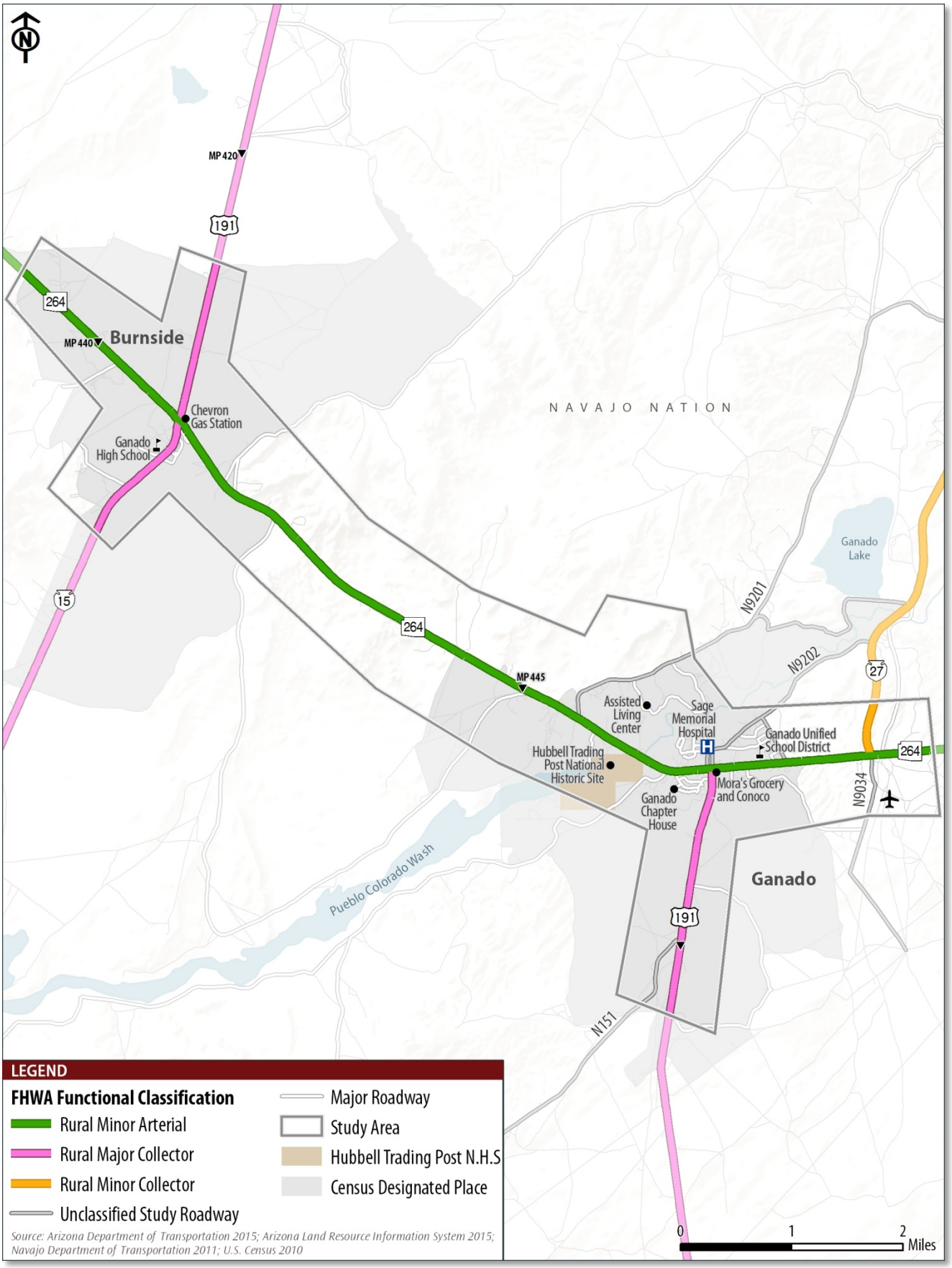
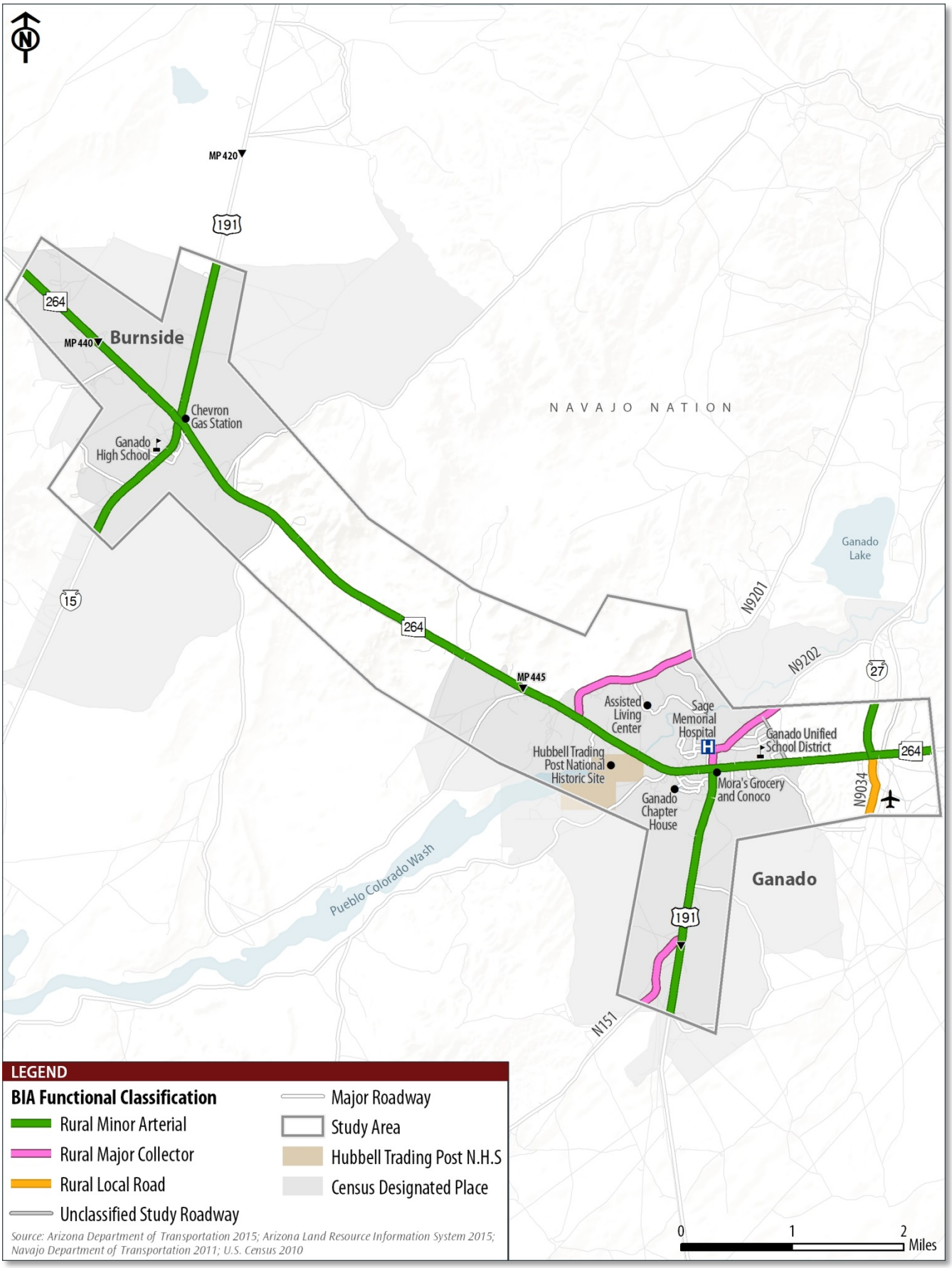


Figure 4.2: BIA Functional Classification



Number of Lanes

Based on NTTFI data and observations made during the field review, Figure 4.3 illustrates the number of lanes for major roadways in the study area. The majority of study roadways are two lanes, expect for:

- **Two Lanes with Center Turn Lane**
  - N15 (Ganado High School to 0.3 mi south of SR 264)
- **Two Lanes with Passing Lane**
  - SR 264 Eastbound (MP 441.1 to MP 442.7)
  - SR 264 Westbound (MP 442.7 to MP 444)
  - SR 264 Eastbound (MP 447.7 to MP 448.7)

Posted Speed Limits

Posted speed limits on study roadways range from 25 MPH on the local roadways to 65 MPH on SR 264 and US 191. The only school zone speed reduction in the study area is on County Road 420 by Ganado Unified School District. Figure 4.3 illustrates posted speed limits and school zones within the study area. Several stakeholders cited that the actual travel speeds are much higher than the posted speed limits and that some form of enforcement is required to improve safety. As shown in the Figure, speed limits on US 191 and N27 do not reduce approaching their intersection with SR 264. Reducing the speed limit and installing community gateway signage would alert drivers they are approaching an intersection and developed areas and need to slow down. Additionally, there are no designated school zones on SR 264 at Ganado Unified School District and on N15 at Ganado High School.

Roadway Surface

Pavement conditions for ADOT owned facilities were obtained from the ADOT Pavement Management System. The FHWA rates pavement conditions with the International Roughness Index (IRI). This index is a statistic used to estimate the amount of roughness in a measured longitudinal profile. Based on the IRI values for the study area shown in Figure 4.4, the majority of SR 264 and US 191 roadway conditions are either good to fair condition except for the following segments:

- **SR 264:** MP 440.8 to MP 441.1; MP 445 to MP 445.05; MP 446.2 to MP 446.3; MP 448.7 to MP 448.8
- **US 191:** MP 410.6 to MP 410.7; MP 410.8 to MP 411.0; MP 411.2 to MP 411.6

FHWA International Roughness Index Rating Classification

Condition Term Categories	IRI Rating	
	Interstate	Other
Very Good	< 60	< 60
Good	60 – 94	60 – 94
Fair	95 – 119	95 – 170
Mediocre	120 – 170	171 – 220
Poor	> 170	> 220

It is important to note that SR 264 is scheduled for pavement preservation by ADOT; therefore improving conditions. The remaining study roadway conditions were determined through visual inspection during the field review. These roads include: N15, N27, N9201, N9202, County Road 420, N9034, N151, and N15. Roadway conditions at the time of the roadway inventory were defined as:

Good condition:

- *Paved Road:* Like new pavement with few defects as perceived by field reviewers, no signs of cracking and pavement deterioration, no maintenance is required as cracks are barely visible or well-sealed, liquid asphalt is barely noticeable.
- *Unpaved Road:* Road surface is smooth and not damaged by water, there are no depressions or upheavals and drainage is in good condition, no maintenance is required. Dust is not severe and does not obstruct visibility. Corrugations, ruts, and potholes are not deep. Wet conditions cause road to be muddy but do not cause a loss of steering.

Fair condition:

- *Paved Road:* Slight rutting, and/or cracking, and/or roughness that became noticeable by field reviewers. Cracking in different directions is more than ¼ in wide. The road may also be bumpy from corrugations but not enough to reduce vehicle speed, and may have some pavement raveling.
- *Unpaved Road:* The surface may be bowl shaped or may have water present on the surface. Soil particles may be found on the road surface and the vehicle may experience bumps due to corrugation, ruts, and potholes. Dust produces a moderately thick cloud which partially obstructs visibility. There are drainage issues and the road becomes muddy and requires vehicle speed reduction during wet conditions.

Poor condition:

- *Paved Road:* Multiple cracks, and/or potholes, and/or roughness, and/or bleeding are apparent on roadway. Cracks in different directions are preventing easy steering of the vehicle. Roadway may be uncomfortable to vehicle occupants and drivers may need to correct direction or avoid road defects. Corrugated ripples cause vehicle to reduce speed and rutting prevents easy steering of the vehicle. Previous fixes on the road are deteriorated and require maintenance.

Poor pavement conditions on N9202

- *Unpaved:* Large amounts or evidence of water and/or severe surface depressions or upheavals. Water damage has washed away surface material leaving sharp rocks. Loose dirt creates severe dust that obstructs visibility and causes traffic to slow down or stop. Corrugations, ruts, and potholes may be large and deep and cause vehicle handling issues. Drainage is poor, and wet conditions may make the road hazardous or impassable.

Based on field review the following paved and unpaved roadways were in poor condition:

- **N15:** Paved roadway in poor condition from 0.5 mile south of SR 264 intersection to study boundary
- **N27:** Paved roadway in fair condition
- **N151:** Unpaved roadway in poor condition
- **N9101:** Unpaved roadway in poor condition
- **N9102:** Paved roadway in poor condition from SR 264 intersection to 0.2 mile north of intersection
- **N9034:** Unpaved roadway in poor condition
- **County Road 420:** Unpaved roadway in poor condition

Figure 4.3. Number of Lanes and Posted Speed Limits

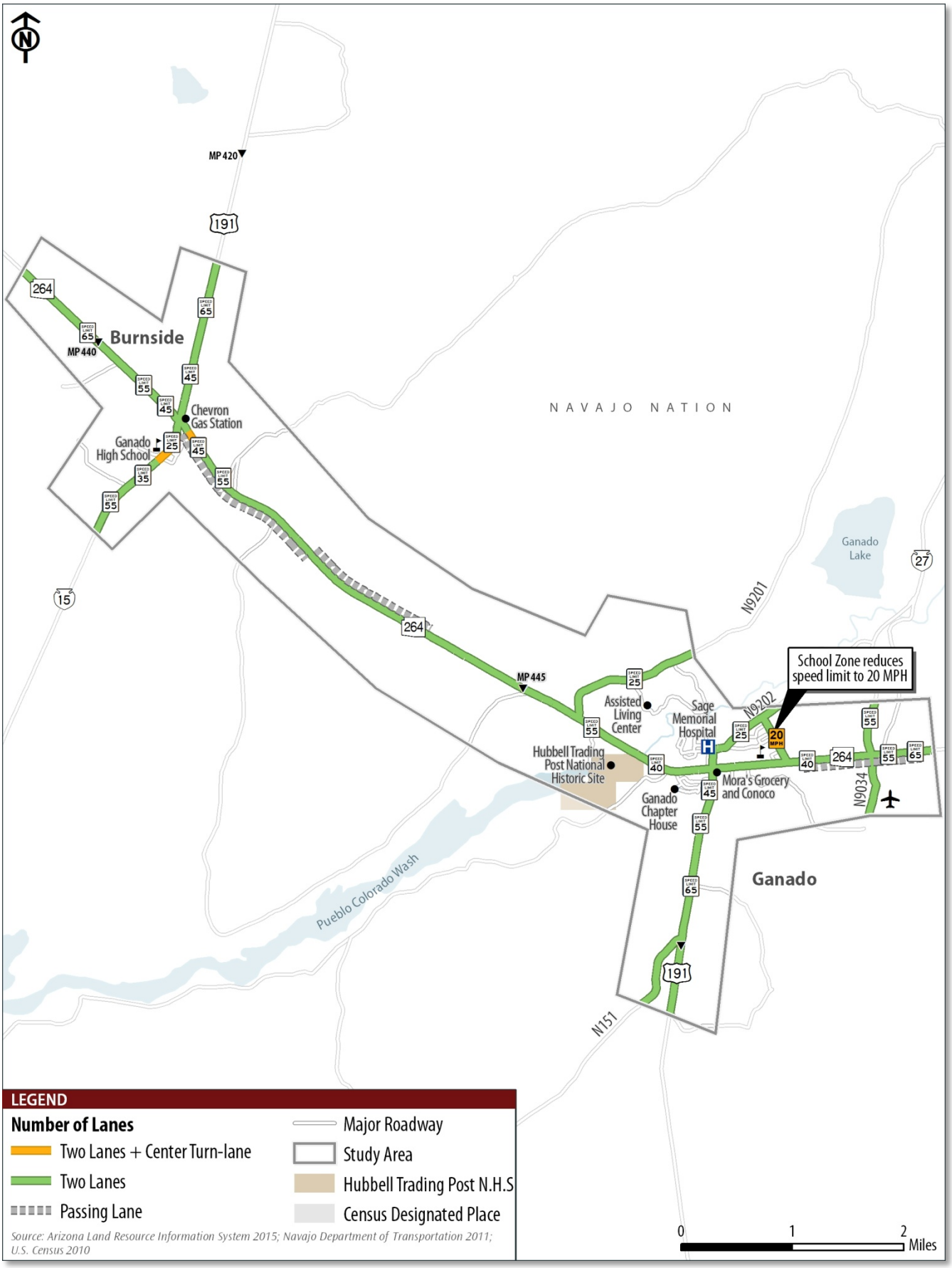
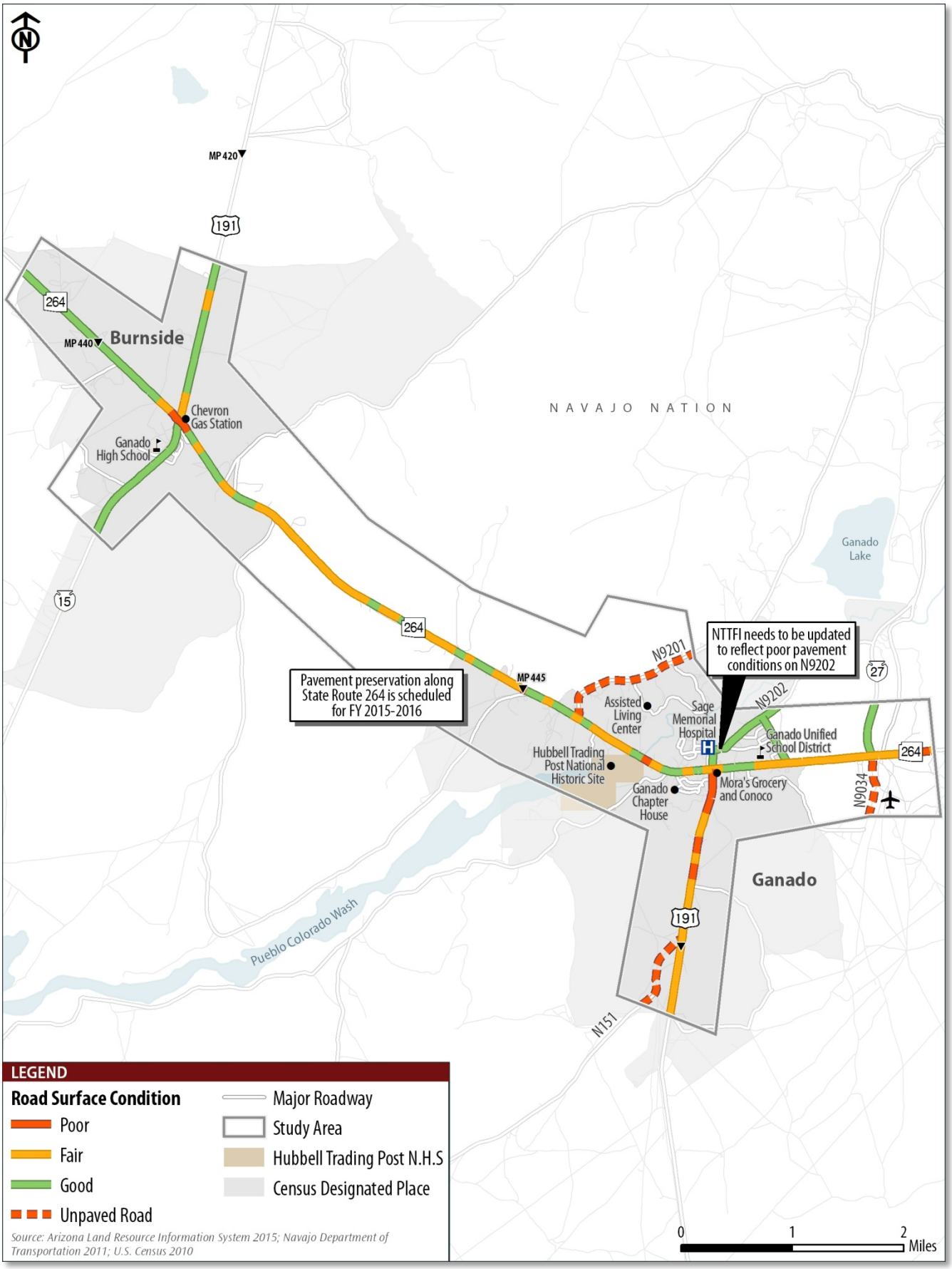


Figure 4.4. Road Surface Conditions



SR 264/US 191/ N15 Roundabout

Traffic Control

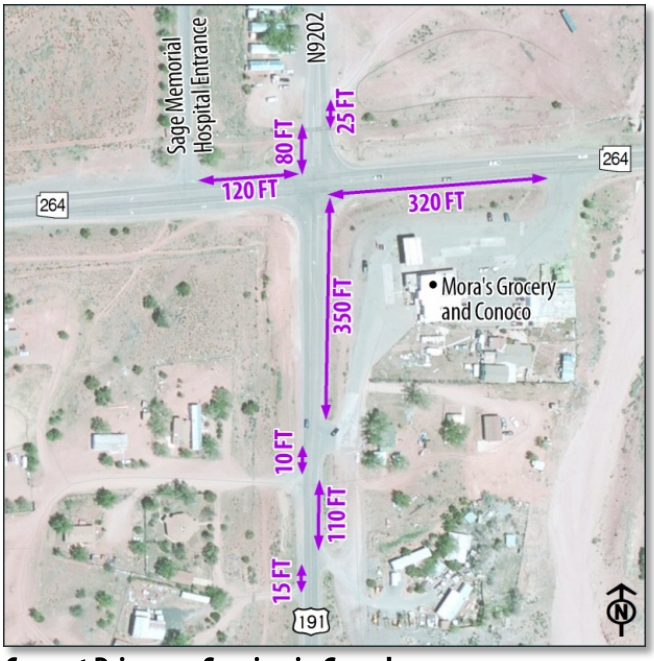
The usage of traffic control devices ensures orderly traffic flow at intersections and along roadway networks. Within the study area, there are no signalized intersections. Stop signs are the main way that the traffic is regulated, and are generally located at major intersections with SR 264 and US 191. The SR 264/US 191 North intersection is controlled by a one-lane roundabout. Stakeholders commented that from a vehicle perspective, the roundabout was an effective method of easily moving traffic through the intersection. In general, the stakeholders were in favor of the roundabout but felt it may be unsafe for pedestrians and especially students walking from Ganado High School to Burger King and Chevron Gas Station.

Access Management

Access management is a set of techniques used to proactively manage and regulate the design, spacing, and operation of intersections, driveways, and median openings along a roadway. Roadways with more access points and intersections have more opportunities for conflicts, and significant friction to through traffic, which contributes to congestion and crashes. The objective of access management is to provide access to enhance the flow of traffic on a corridor or roadway system by improving safety, capacity, and speed. The Ganado Chapter currently does not have an access management policy in place. Access to state highways, such as SR 264, is regulated by ADOT.

Effective access management strategies control the number of driveways, decrease the number of crashes, reduce travel time and traffic congestion, preserve the flow of traffic, and improve access to properties. Primary design techniques include increasing driveway spacing, utilizing turning lanes, grade separating intersections, traffic signals, and medians. Applying access management techniques can also enhance the livability of a community, improve pedestrian/bicyclist safety, enhance customer safety and convenience to businesses, provide additional areas for streetscaping, and promote efficient land and site design.

Access management guidelines for driveway spacing often range between 150 FT to over 300 FT. The Salt River Indian Community utilizes the City of Scottsdale's *Design Standards & Policies Manual* for managing access for high capacity corridors that provide commuter access to Scottsdale; minimum driveway spacing required by the City of Scottsdale includes 165 FT for minor collectors and 250 FT on minor arterials. The City of Somerton requires driveways along major arterials to have a minimum spacing of 200 FT in commercial and residential areas, while the City of Casa Grande requires a minimum driveway spacing of 200 FT on major arterials in commercial areas and 150 FT on minor arterials. Coconino County's Engineering Design and Construction Manual states that driveways are not permitted within 50 FT of a street intersection, 25 FT of a guardrail end, and within 100 FT of a bridge.



Current Driveway Spacing in Ganado

Within Ganado, driveway spacing on SR 264 and US 191 ranges between approximately 10 and 320 FT apart. The close driveway spacing increases potential conflicts, particularly coupled with limited sight distance issues at the intersections with SR 264 due to speeding vehicles. In Burnside, driveway spacing on SR 264, US 191, and N15 ranges from 115 to 395 FT, with most driveways on SR 264. Guidelines for minimum driveway or local street spacing should consider the speed of the roadway, stopping sight distance, and the elimination of right-turn conflicts in the area of the access points.

Current Driveway Spacing in Burnside

Street Lighting and Pavement Striping

Street lighting fixtures are only present at the roundabout at SR 264/US 191/N15 in Burnside and at the intersection of SR 264/US 191 South in Ganado. Stakeholders, however, have noted that the lighting near the SR 264/US 191 South intersection is insufficient for vehicles to properly see pedestrians and driveways. Lighting is also needed at the crosswalk on N15 adjacent to Ganado High School to improve motorist visibility of pedestrians. Based on the comprehensive field review, study team members noted that pavement striping along the paved roadways was generally faded and in need of maintenance. SR 264, US 191, N15, N27, N9202, and County Road 420 are in need of pavement striping, roadside reflectors, and lighting in order to increase night visibility for motorists.

Shoulder Conditions

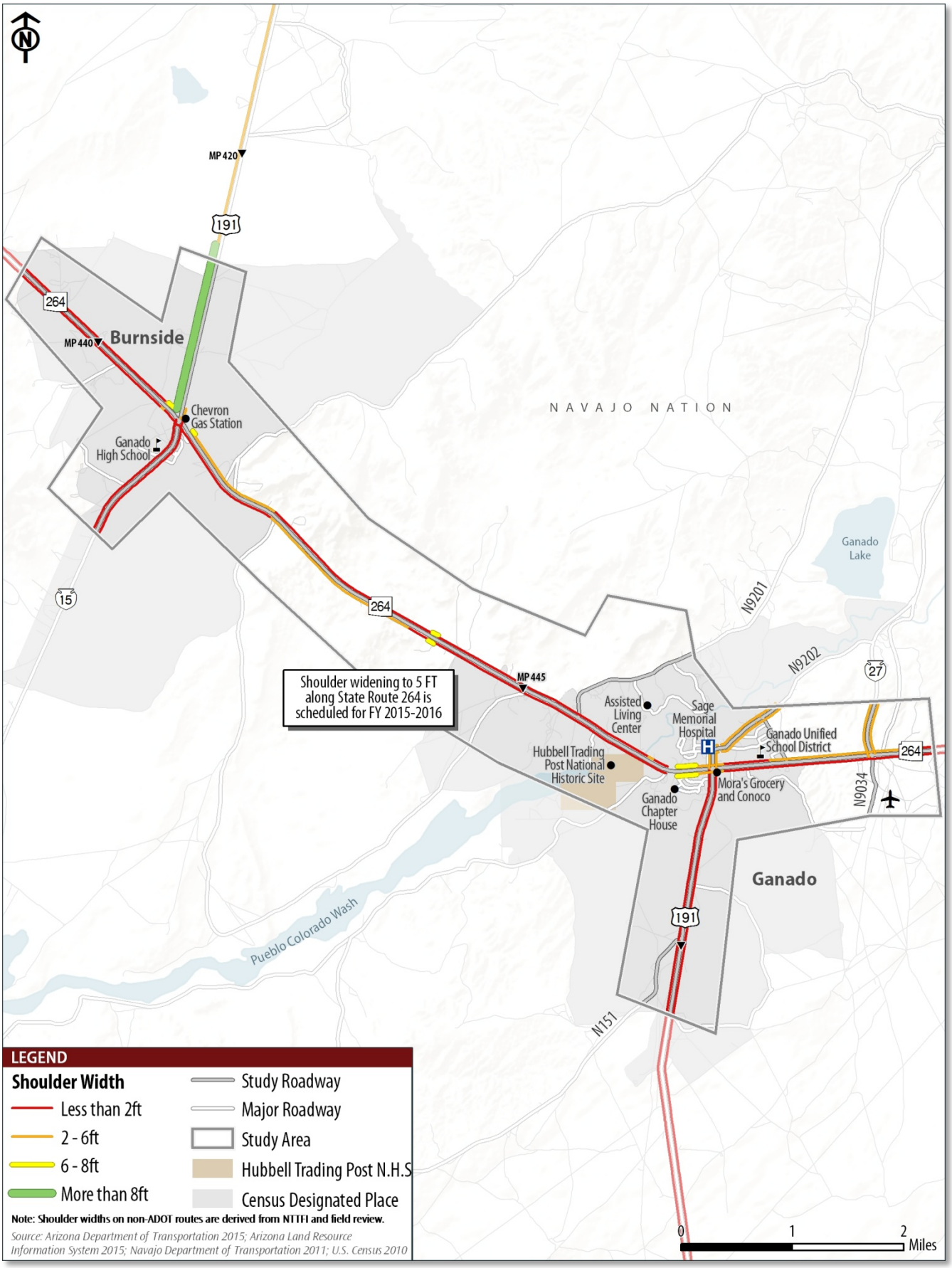
Roadside shoulders are an important safety feature that provide safe locations for disabled vehicles, allow vehicles to pull over for emergency service vehicles, and provide bicyclists and pedestrians with a safe buffer zone from vehicular traffic. Shoulder widths for the study roadways were compiled utilizing ADOT data for SR 264 and US 191, and field review observations for the tribal roads. According to the *Arizona Statewide Bicycle Pedestrian Plan*, bike lanes should be four feet in width to safely accommodate bicyclists. Based on ADOT and the NTTFI data the majority of the study roadways have shoulder widths less than 2 FT. It is important to note, however, that ADOT is scheduled to widen shoulders along SR 264 to 5 FT.

The NTTFI also inventories shoulder conditions. Based on the latest NTTFI and field review observations, several locations within the study area have shoulders that are in critical condition and need to be reconstructed for the safety of users and the protection of traffic lanes. Stakeholders commented that due to the narrow width and poor conditions of the shoulders, pedestrians are often required to utilize vehicle travel lanes. Based on the comprehensive field review, NTTFI data, and stakeholder input, areas with shoulders in critical condition include:

- SR 264 (MP 441.0 to MP 442.7)
- SR 264 (MP 447.1 to MP 448.7)
- US 191 (MP 411.0 to MP 411.5)
- N27

Figure 4.5 illustrates shoulder conditions within the study area.

Figure 4.5. Shoulder Conditions



Fencing and Cattle Guards

Fencing and cattle guards are used as roadway safety devices to prevent livestock and wildlife from crossing roadways. Crossing livestock can impede traffic and cause crashes, more frequently on two-lane roadways since passing opportunities are limited. Due to the Nation's open grazing policies, the addition of fencing and cattle guards may prevent vehicular crashes with livestock. Based on field observations and stakeholder input the majority of properties along SR 264 are fenced; however, a large amount of fencing needs to be rehabilitated.

Cattle guard filled with debris

Stakeholders commented that maintenance is needed on cattle guards to prevent livestock from entering the right-of-way. Due to high amount of winds which are present in the region, blowing dust becomes trapped inside of cattle guards. Over time, the dust fills up the cattle guard and allows livestock to cross without much effort, shown in image to the right. Stakeholders also commented that the cattle guards do not provide a safe means for pedestrians to cross.

Severe drainage problems on Cedar Hills Road

Drainage Conditions

In regions where rain and snow is frequent, it is important to have proper drainage on the roadways to prevent crashes and damage to infrastructure. Based on field review, NTTFI data, and stakeholder input the following roadways have drainage problems:

- N9201
- Cedar Hills Road (roadway to Ganado Chapter House)
- N151 (on roadway and intersection with US 191)
- N9034

BRIDGE CONDITIONS

ADOT bridge inventory data was accessed to determine the condition of structures along SR 264 and US 191. Within the study area, ADOT's Bridge Inventory identifies three structures along SR 264. Table 4.2 presents the sufficiency rating for each of these structures. As listed in the table, Ganado Wash Bridge (structure #1046) has a sufficiency rating of 25.9 and is eligible for replacement. As noted in Chapter 2, the structure is scheduled for replacement in 2016. As illustrated in the figure to the right, the bridge is not wide enough to accommodate pedestrian or bicycle traffic, forcing pedestrians/bicyclists to use the travel lanes to cross the bridge.

Ganado Wash Bridge #1046

For local Navajo Routes, the NTTFI includes bridge condition information based on structure inventory and appraisal. According to the NTTFI, Bridge N671, located on N9202 north of the SR 264/US 191/N9202 intersection, is shown in the NTTFI to be in excellent condition with no construction required.

Table 4.2. FHWA Bridge Condition Ratings

Type	Structure #	Route	Milepost	Name	Year Built	Length (FT)	Sufficiency Rating
Culvert	6357	SR 264	444.23	SPPA	1965	13.10	80
Bridge	1046	SR 264	446.20	Ganado Wash Bridge	2004	13.41	25.9
Bridge	1435	SR 264	447.10	Ganado Pedestrian Overpass	1986	N/A	N/A

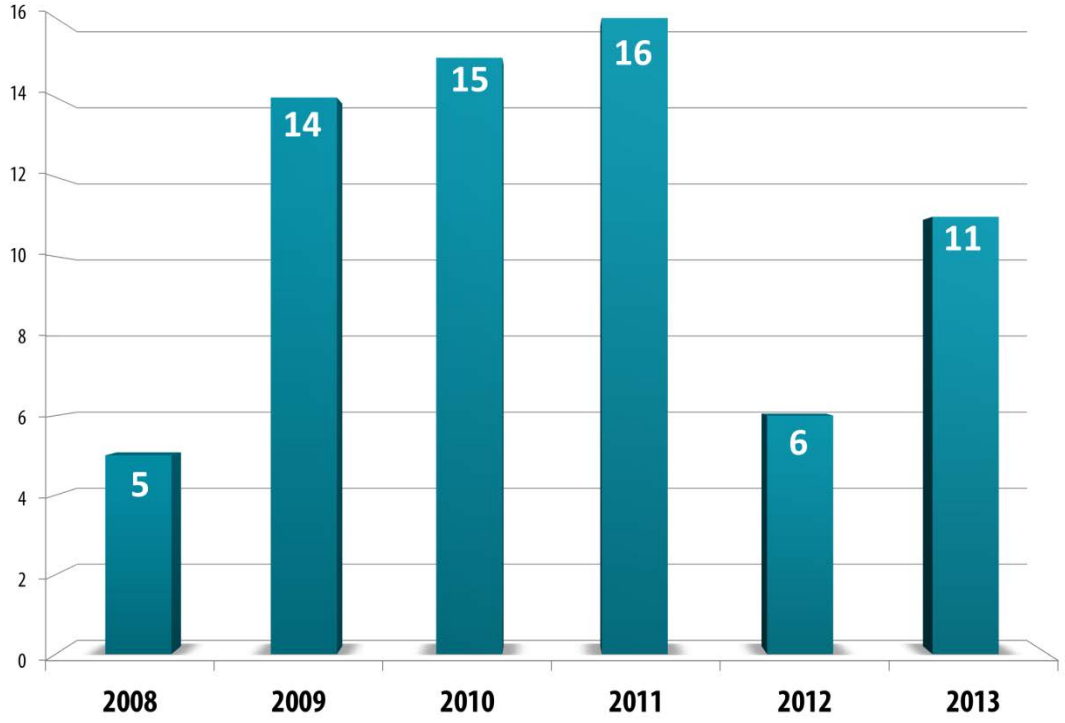
Source: ADOT Bridge Group

CRASH DATA ANALYSIS

Crash analysis was conducted for the study area to identify trends, patterns, predominant crash types, and high crash rate intersections and corridors. The purpose of the crash analysis is to discover safety hazard locations that need to be addressed to improve area safety.

Motor vehicle data was obtained from Navajo Department of Transportation for crashes occurring between September 2008 and September 2013. During the analyzed date range, a total of 67 crashes occurred within the study area. The number of crashes steadily increased from 2009 to 2011, dropping in 2012 by more than 50%, and increasing again in 2013. Figure 4.6 shows the number of crashes in each analysis year. The significant drop in crashes in 2012 may be attributed to the lack of reporting.

Figure 4.6. Crash Trends from September 2008 to September 2013



Source: Navajo Department of Transportation September 2008 – September 2013

Crash Locations

Identifying crash locations and the type of crashes for each roadway corridor aids in identifying deficiencies and developing safety improvement scenarios. Table 4.3 provides a summary of the number of crashes, crash rates, and the major cause of crashes along the study roadways. As shown in the table, approximately 43% of all crashes occurred on SR 264 between Burnside and Ganado, while over 38% occurred on SR 264 within Ganado (between N9201 and the eastern study boundary).

Figure 4.7 illustrates the locations of crashes within the study area by the number of crashes occurring at each location, and Figure 4.8 presents the overall crash density as well as the locations of fatal crashes. Based on review of the each crash characteristic and location, the following trends were identified for crashes recorded between September 2008 and September 2013.

Table 4.3. Crash Locations, Crash Rate, and Leading Crash Cause

Corridor	Total Crashes	Percent of All Crashes	Fatalities	Leading Crash Causes
SR 264: Western Study Boundary to US 191 North	1	1.5%	0	• Steering wheel malfunction causing motorist to run off road
SR 264: US 191 North to N9201	29	43.2%	0	• 21% were intersection related • 79% occurred when driver was going straight • 24% were rear-end collisions caused by motorists inattention for vehicles turning off SR 264 • 45% occurred in westbound lane
SR 264: N9201 to US 191 South	12	17.9%	0	• 58% were intersection related • 42% occurred when driver was making left/right turn • 58% occurred in eastbound lane
SR 264: US 191 South to Eastern Study Boundary	14	20.9%	2 (at N27 intersection)	• 64% were intersection related • 50% of all crashes occurred at N27 intersection • 43% involved failure to yield to ROW or running a stop sign
US 191: South of SR 264	5	7.5%	0	• 60% involved collisions with animals • 60% occurred in southbound lane • One pedestrian related crash
US 191: North of SR 264	2	3.0%	0	• Motorist swerved to miss bus stopped on side of road and sideswiped on-coming traffic • Motorist was passing in no passing zone and ran off road
N15: South of SR 264	2	3.0%	1 (Pedestrian related)	• Motorist under the influence of alcohol over-turned vehicle at curve in road • Motorist under the influence of alcohol hit pedestrian
N27: North of SR 264	1	1.5%	0	• Motorist under the influence of alcohol side-swiped on-coming vehicle
Sage Hospital Road	1	1.5%	0	• Motorist reversed vehicle at intersection rear-ending another vehicle

Source: Navajo Department of Transportation September 2008 – September 2013

Injury Severity

Approximately 53.7%, or 36 of 67 crashes, resulted in an injury or fatality along study roadways. Since 2008 a total of three fatal crashes occurred within the study area. Figure 4.8 provides an illustration of the location of crashes that resulted in a fatality. Two of the three fatal crashes reported occurred at the SR 264/N 27 intersection and were caused by the motorist running the stop sign or failing to yield to right-of-way.

Figure 4.7. Number of Crashes per Location

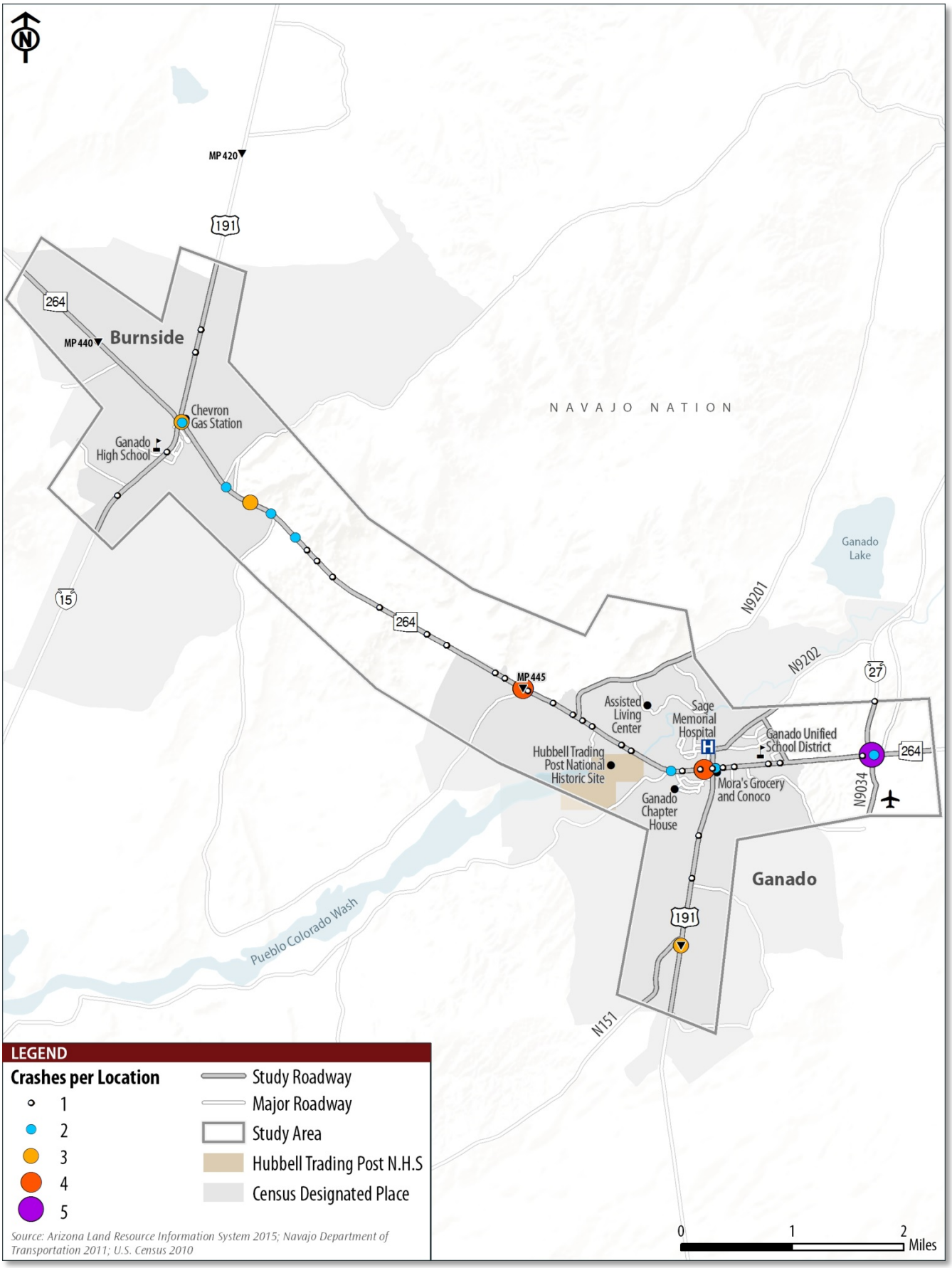
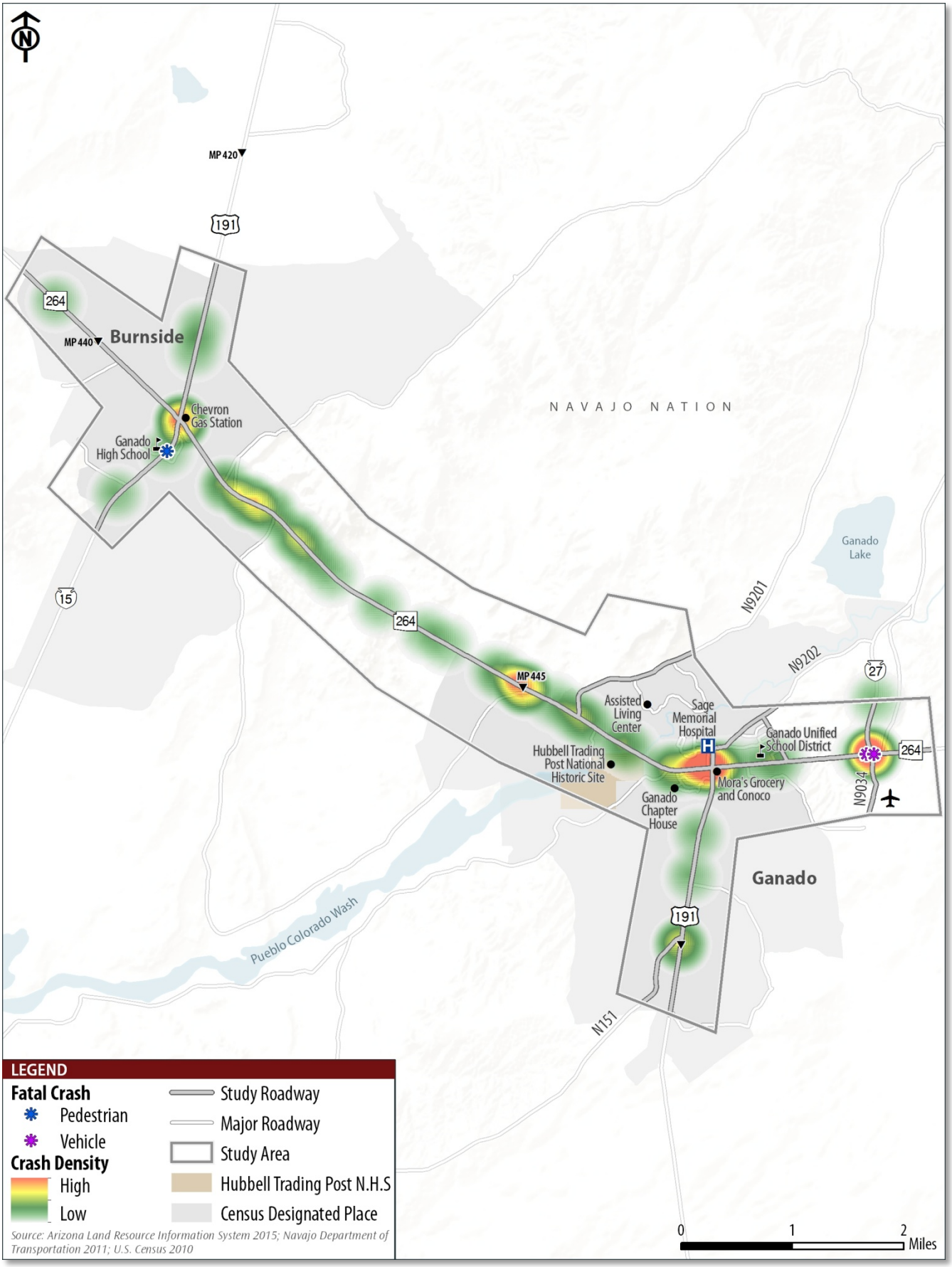


Figure 4.8. Crash Density and Fatal Crash Locations



Intersection Related Crashes

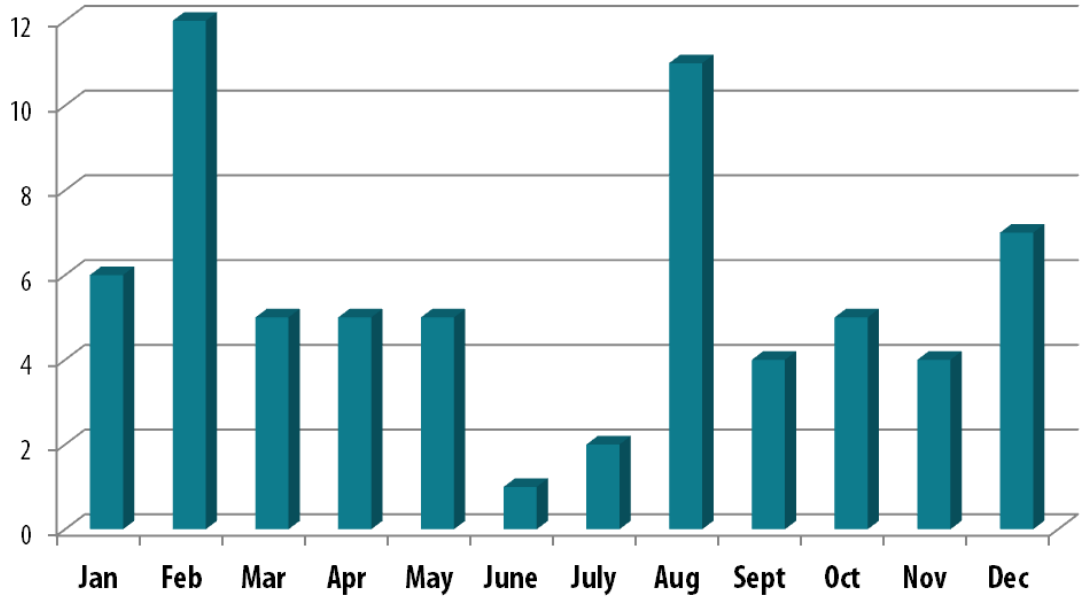
A total of 23 crashes (34% of all crashes) that occurred were identified as intersection related crashes. Intersections with a high number of crashes include:

- **SR 264/US 191 South:** 31% of all intersection related crashes occurred at this intersection. Crashes were predominately cited as "failure to yield to ROW".
- **SR 264/N27:** 31% of all intersection related crashes occurred at this intersection. Crashes were predominately cited as "failure to yield to ROW" and "ran stop sign".

SR 264/US 191 North: 18% of all intersection related crashes occurred at this intersection. All but one crash at the intersection occurred after the installation of the roundabout.Road and Weather Conditions

The majority of the crashes were cited as occurring during a clear day with dry roadway conditions. 15% of all crashes were cited as occurring on wet, snow, slush, or ice covered roadways. Winter weather conditions season may be a significant factor in the high number of crashes occurring during the winter months. As shown in Figure 4.9, approximately 43% of all crashes took place between November and February. A high number of crashes also occurred in August, which may be attributed to increased tourist traffic.

Figure 4.9. Crash Trends by Month (September 2008 to September 2013)



Source: Navajo Department of Transportation September 2008 – September 2013

Supplemental Ganado Fire District Crash Data

Additional crash records were provided by the Ganado Fire Department District for motor vehicle crash service calls in 2014. According to the data provided, the Fire District responded to 19 motor vehicle crashes within the study area, with 13 of the crashes resulting in an injury. Six of the crashes occurred in Burnside (primary at the roundabout and near the Mustang Gas Station), five crashes occurred along SR 264 between Ganado and Burnside, and seven crashes occurred between the Hubbell Trading Post and the eastern study boundary. Additionally, there was one pedestrian related motor vehicle crash at the Hubbell Trading Post.

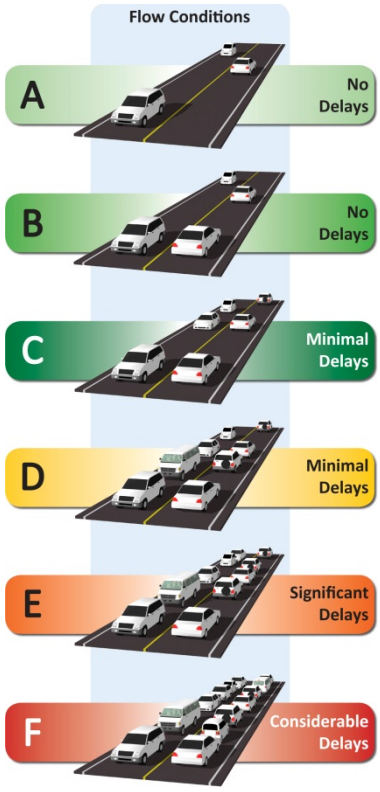
EXISTING TRAFFIC CONDITIONS

Traffic and turning movement counts were recorded and summarized by Navajo Department of Transportation in February 2015 as part of this study's process. Daily traffic counts were collected at 13 locations along the study roadways and five turn movement counts for the AM/PM peak one hour periods for the critical intersections. To account for the seasonal increase of tourists to the region, seasonal factors were applied to existing traffic counts and then modeled for annual average daily traffic (AADT). This data was compared against ADOT's traffic counts for validation purposes. Figure 4.11 displays the existing daily traffic volumes. Key observations noted in the Figure include:

- SR 264 has the highest amount of traffic within the study area, particularly within Ganado.
- Traffic volumes reduce greatly on SR 264 west of the SR 264/US 191/N15 intersection.
- As a major regional corridor connecting Ganado to I-40, US 191 experiences heavy traffic volumes south of Ganado.
- N9202, linked to SR 264 and located north of Ganado Unified School District also carried a considerable amount of traffic.

Level of Service

Figure 4.10. Level of Service



Traffic congestion levels of study roadways were estimated using traffic count data. The degree of traffic congestion is commonly expressed in terms of Level of Service (LOS). LOS is a measurement of traffic congestion conditions defined by the Transportation Research Board's (TRB) Highway Capacity Manual (HCM). HCM 2010 software was utilized to estimate roadway LOS and intersection LOS. In addition to the traffic counts, data such as number of lanes, functional classification, speed, and roadway geometrics were compiled to determine LOS. Each level of service is given a letter grade based on its level of congestion, ranging from "A" through "F", with LOS A representing free flowing traffic conditions where vehicles experience minimal delays and LOS F representing failure conditions where vehicles experience long delays. Figure 4.10 is an illustration of the LOS types. Road segment LOS is characterized by the HCM as follows:

- **LOS A:** Best, free flow operations (on uninterrupted flow facilities) and very low delay (on interrupted flow facilities). Freedom to select desired speeds and to maneuver within traffic is extremely high.
- **LOS B:** Flow is stable, but presence of other users is noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within traffic.
- **LOS C:** Speed is becoming affected by the presence of other users. Maneuvering within traffic requires substantial vigilance on the part of the user.
- **LOS D:** High density but stable flow. Speed and freedom to maneuver are severely restricted. The driver is experiencing a generally poor level of comfort and convenience.
- **LOS E:** Flow is at or near capacity. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within traffic is extremely difficult. Comfort and convenience levels are extremely poor.
- **LOS F:** Worst, facility has failed, or a breakdown has occurred.

In general for rural areas, LOS A and B represent no congestion, LOS C and D represent moderate congestion, and LOS E and F represent severe congestion.

Current Roadway Level of Service

Figure 4.11 displays the existing LOS for the study roadways. Road segments performing at a LOS B or worse include:

- **LOS B:**
  - SR 264: Western study boundary to N9201
  - US 191: North and south of SR 264
  - N15: Study area limits to SR 264
  - N9202: North of SR 264 to study area boundary
- **LOS C:**
  - SR 264: N9201 to N9202
- **LOS D:**
  - SR 264: N9202 to eastern study boundary

Current Intersection Level of Service

Utilizing the turning movement count data, LOS conditions were estimated for major intersections within the study area. Figure 4.12 displays the current lane configuration and traffic control type at each intersection and Figure 4.13 displays the turn movement volumes. Figure 4.14 displays the overall intersection LOS, and the LOS at each turn movement for each leg/approach for each intersection. Table 4.4 summarizes the intersection LOS analysis.

Table 4.4. Existing Intersection Level of Service Summary

Intersection	Level of Service	
	AM	PM
SR 264/N27/N9034	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better	• All approaches operate at LOS B or better
US 191/N151	• All approaches operate at LOS B or better	• All approaches operate at LOS B or better
SR 264/US 191/N9202	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS C • Northbound approach is LOS D • All other approaches operate at LOS B or better
SR 264/N9201	• All approaches operate at LOS B or better	• Southbound approach is LOS C • All other approaches operate at LOS B or better
SR 264/US 191/N15	• All approaches operate at LOS B or better • Overall intersection is LOS A	• All approaches operate at LOS B or better • Overall intersection is LOS A

Figure 4.11. Existing Average Daily Traffic Volumes and Level of Service

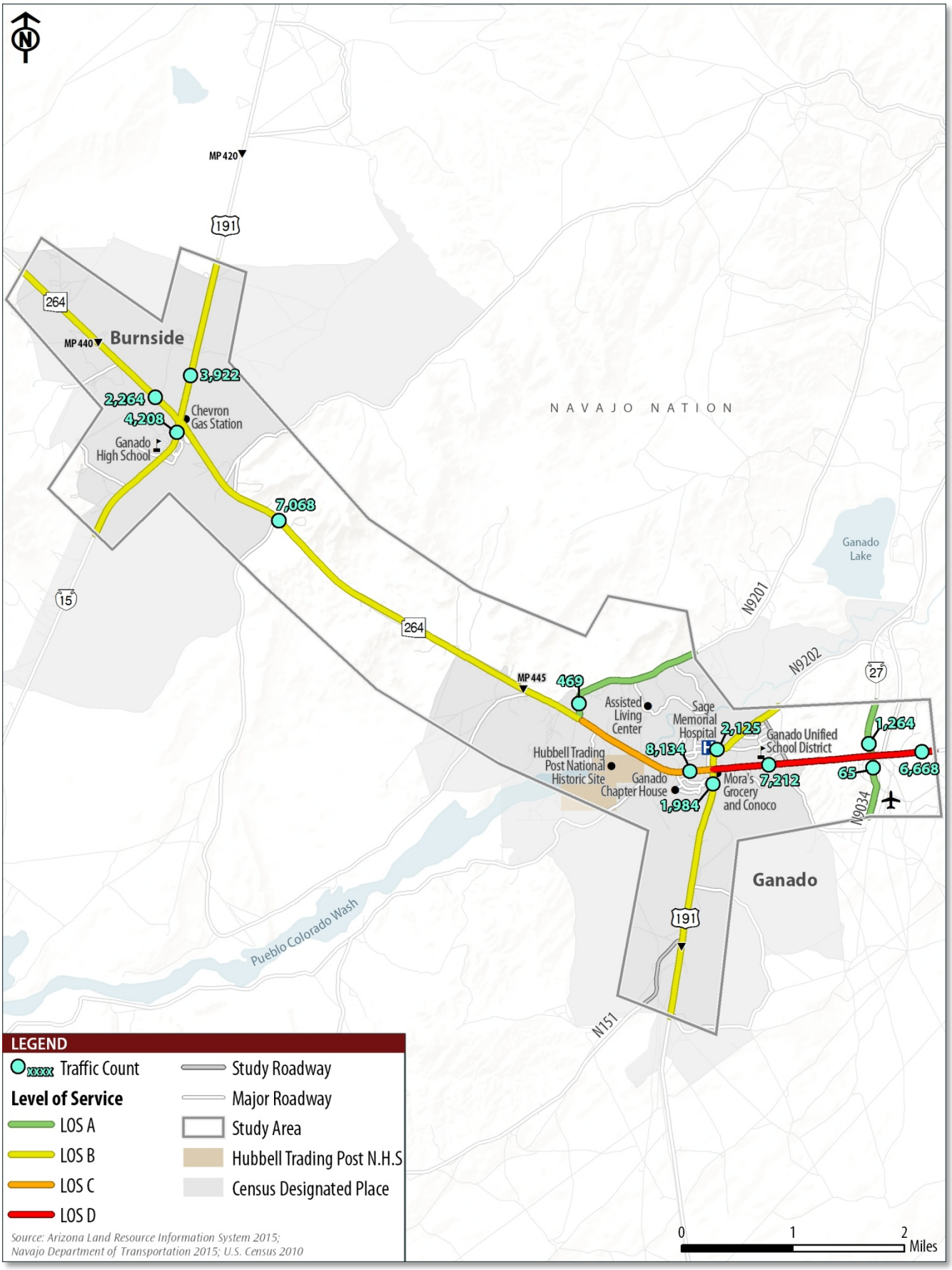


Figure 4.12. Existing Intersection Lane Configuration

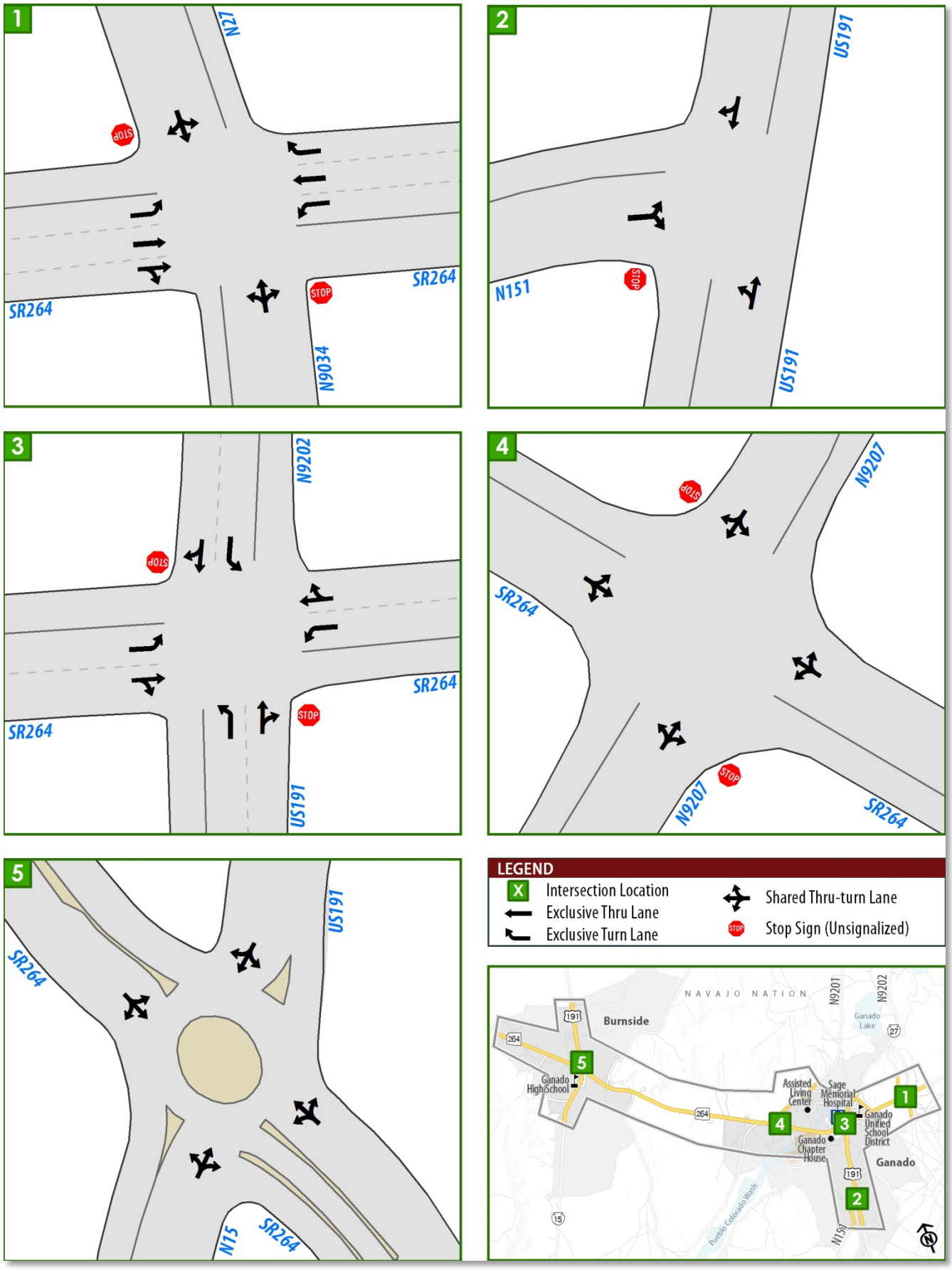


Figure 4.13. Existing Intersection Turning Movement Volumes

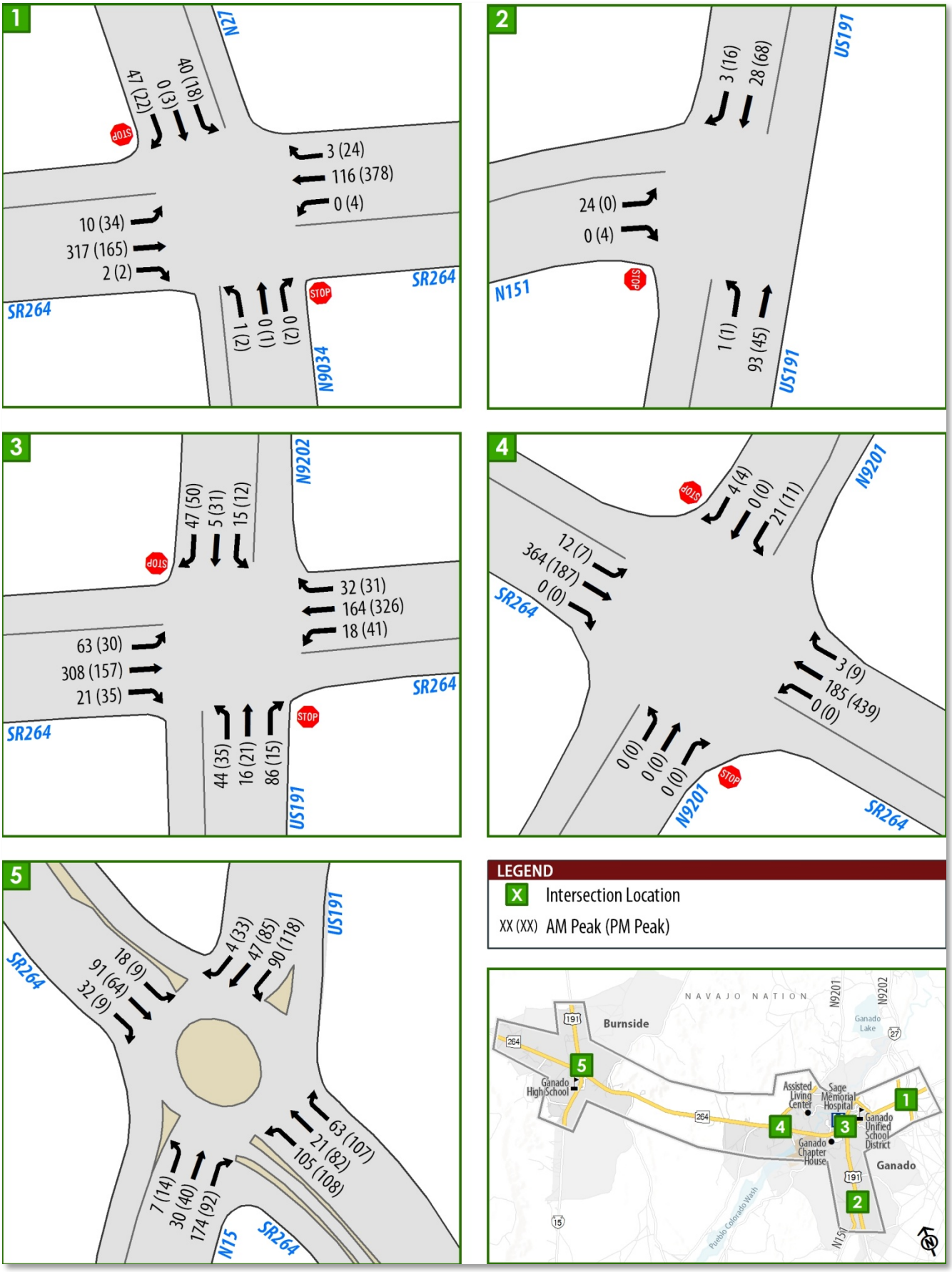
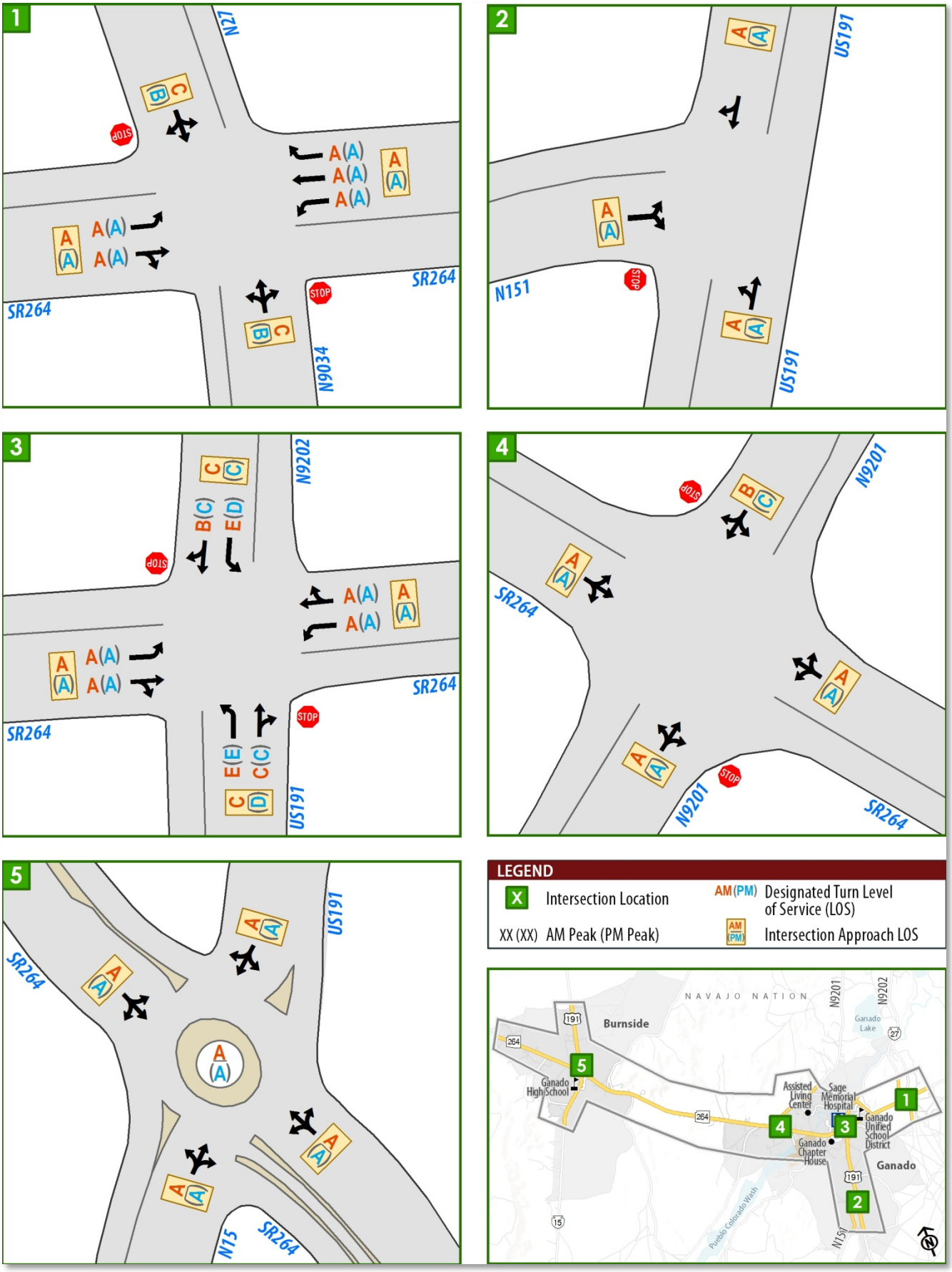


Figure 4.14. Existing Intersection Level of Service



FUTURE TRAFFIC CONDITIONS

The primary purpose of forecasting traffic volumes is to estimate the additional travel demand added to existing roadways and to forecast congestion levels due to projected growth in population and employment. In addition, this analysis provides valuable insight into potential transportation solutions. A 2% per year growth rate was utilized to forecast future traffic volumes. The forecasts represent traffic volumes without any roadway improvements (No-Build scenario) while using future socioeconomic/growth projections. This analysis helps evaluate how roadways perform in the future if no improvements are made.

Projected 2020 Roadway Level of Service

Figure 4.15 displays the projected 2020 daily traffic volumes and the LOS for the current roadway network with projected 2020 socioeconomic/growth projections, *if no roadway improvements are made (No-Build)*. Traffic volumes and LOS results in this section represent annual average daily traffic conditions. Road segments performing at a LOS B or worse include:

- **LOS B:**
  - SR 264: Western study boundary to N15
  - US 191: North and south of SR 264
  - N15: Study area limits to SR 264
  - N9202: North of SR 264 to study area boundary
- **LOS C:**
  - SR 264: N15 to N9201
- **LOS D:**
  - SR 264: N9201 to eastern study boundary

Projected 2020 Intersection Level of Service

Based on the projected 2020 daily traffic volumes, intersection turn movement volumes were estimated using *NCHRP Report 255* methods. Figure 4.16 displays the projected 2020 turn movement volumes and Figure 4.17 displays the overall intersection LOS, and the LOS at each turn movement for each leg/approach for each intersection. Table 4.5 summarizes the intersection LOS analysis.

Table 4.5. Projected 2020 Intersection Level of Service Summary

Intersection	Level of Service	
	AM	PM
SR 264/N27/N9034	• Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better
US 191/N151	• All approaches operate at LOS B or better	• All approaches operate at LOS B or better
SR 264/US 191/N9202	• Southbound approach is LOS C • Northbound approach is LOS D • All other approaches operate at LOS B or better	• Southbound approach is LOS D • Northbound approach is LOS E • All other approaches operate at LOS B or better
SR 264/N9201	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better
SR 264/US 191/N15	• All approaches operate at LOS B or better • Overall intersection is LOS A	• All approaches operate at LOS B or better • Overall intersection is LOS A

Figure 4.15. 2020 Projected Average Daily Traffic Volumes and Level of Service

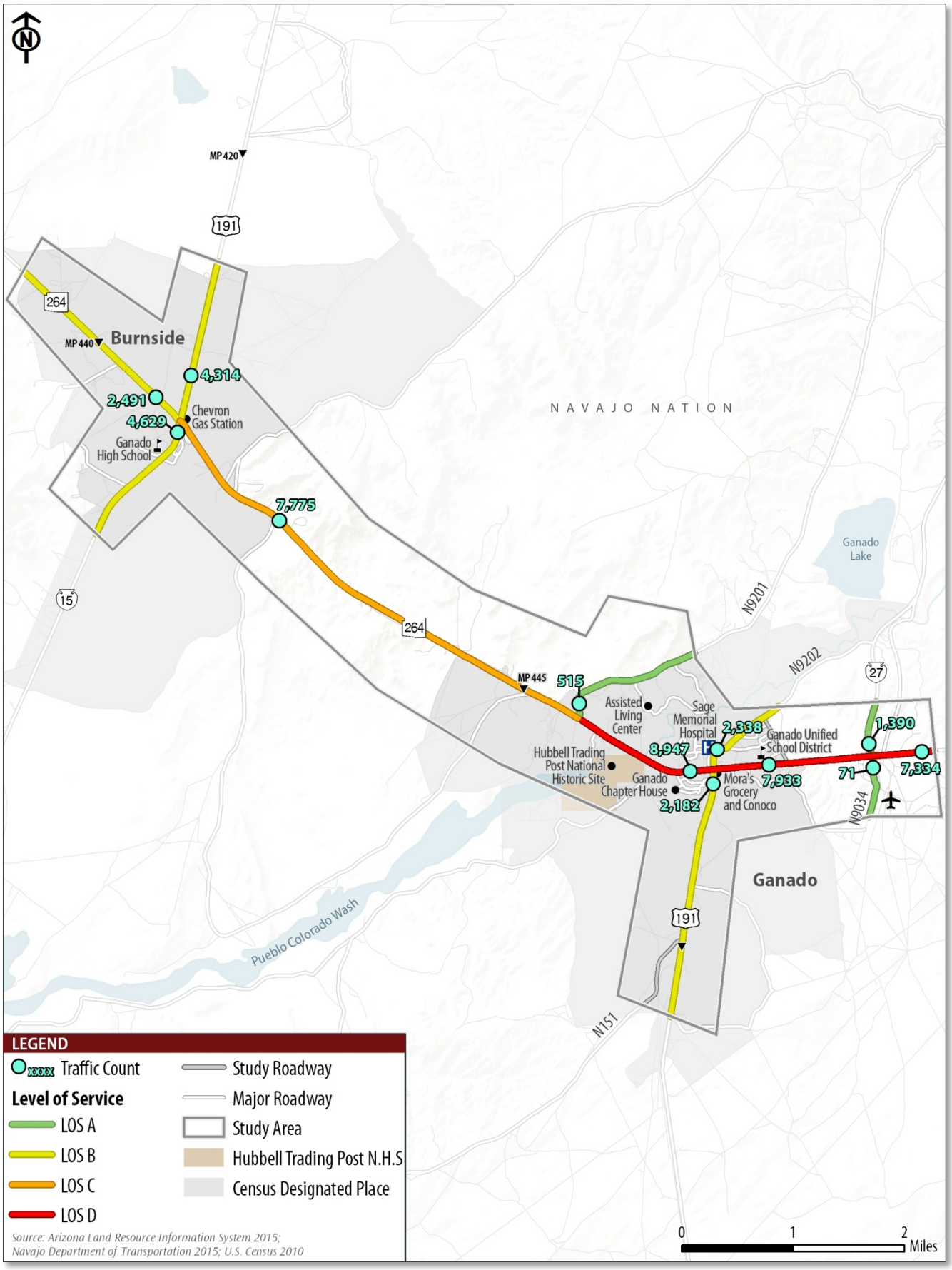


Figure 4.16. 2020 Intersection Turning Movement Volumes

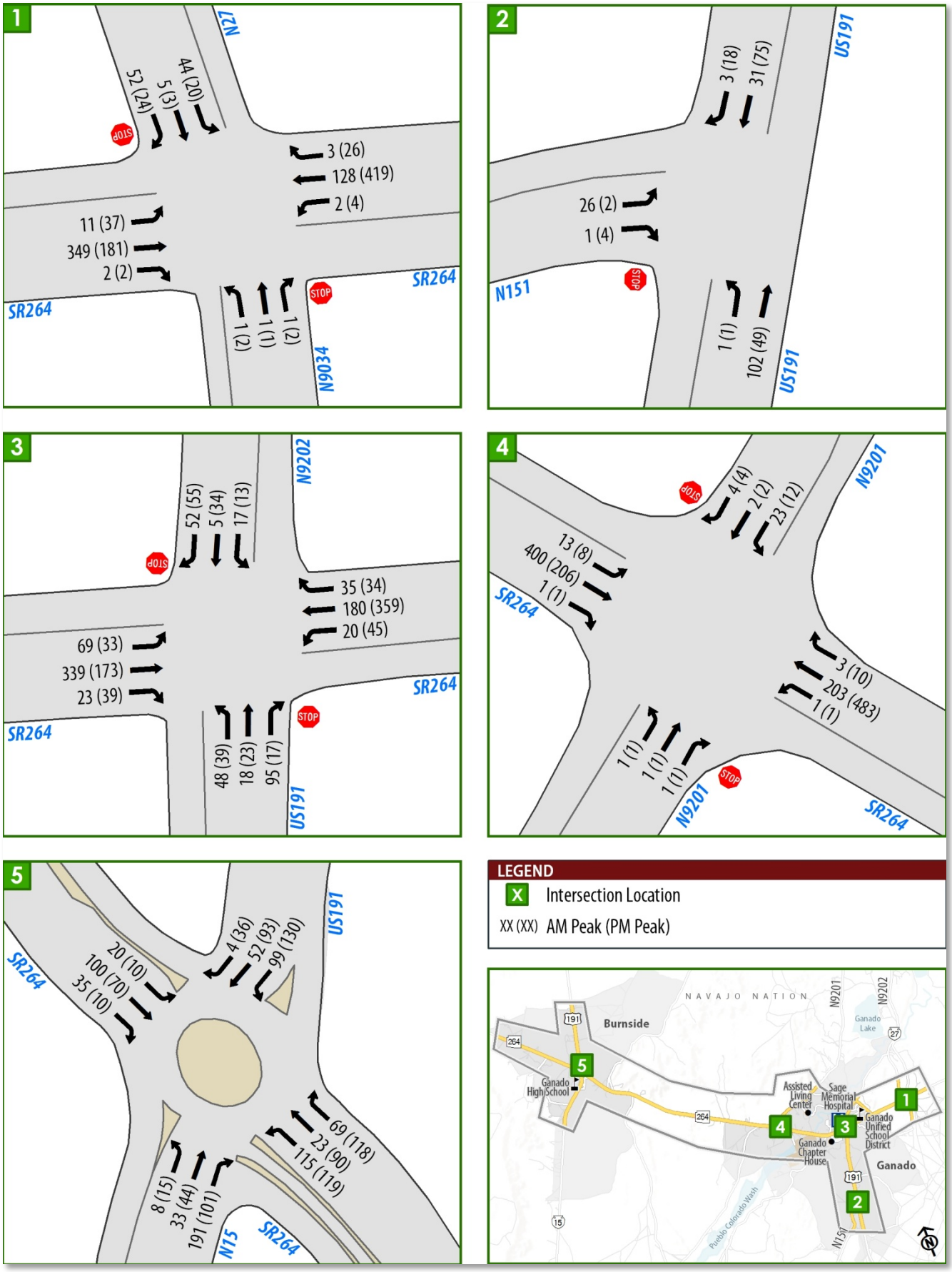
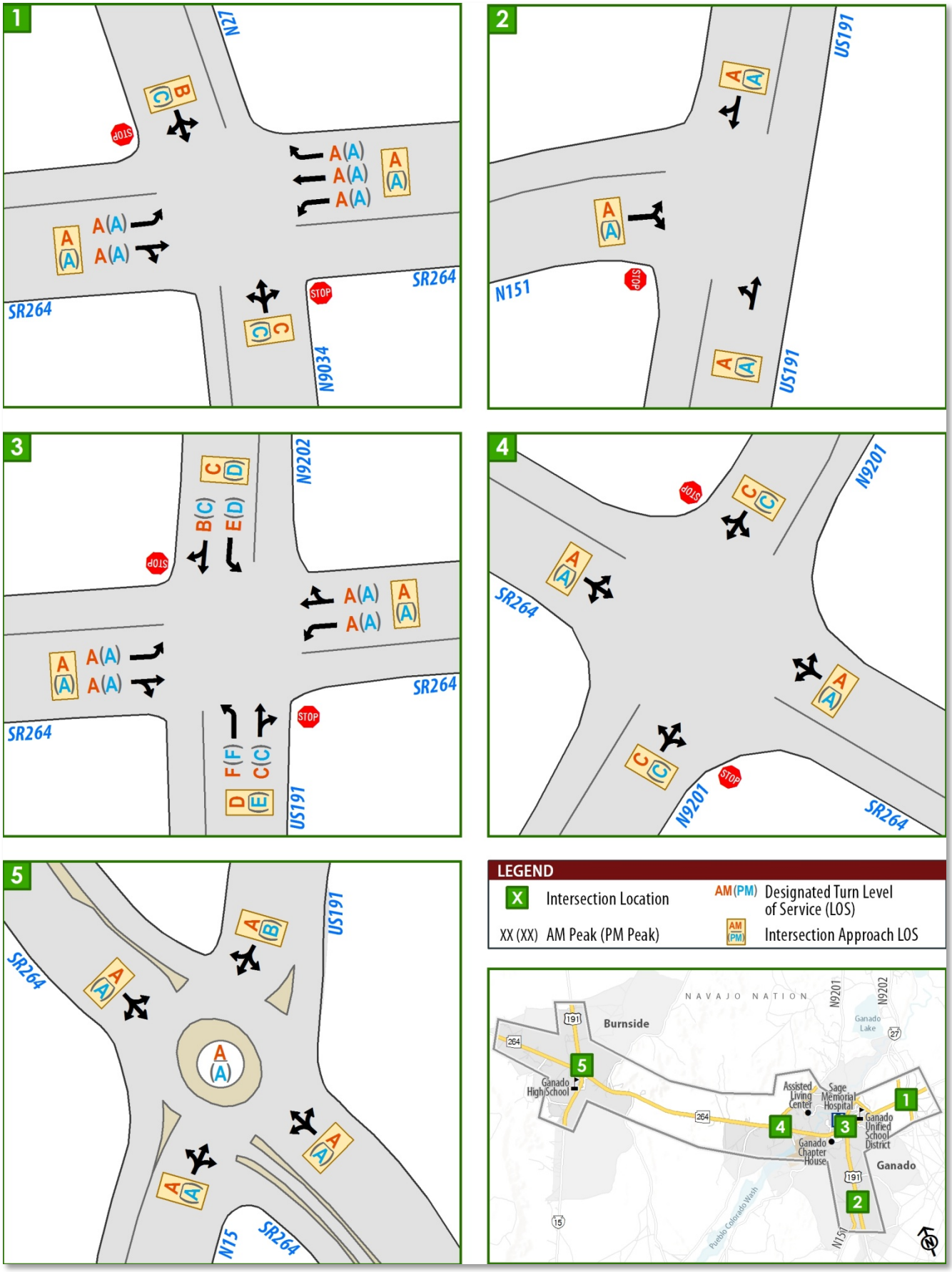


Figure 4.17. 2020 Intersection Level of Service



Projected 2025 Roadway Level of Service

Figure 4.18 displays the projected 2025 daily traffic volumes and the LOS for the current roadway network, *if no roadway improvements are made (No-Build)*. Traffic volumes and LOS results in this section represent annual average daily traffic conditions. Road segments performing at a LOS B or worse include:

- **LOS B:**
  - SR 264: Western study boundary to N15
  - US 191: South of SR 264
  - N9202: North of SR 264 to study area boundary
- **LOS C:**
  - SR 264: N 15 to N9201
  - US 191: North of SR 264
  - N15: Study area limits to SR 264
- **LOS D:**
  - SR 264: N9201 to eastern study boundary

Projected 2025 Intersection Level of Service

Based on the projected 2025 daily traffic volumes, intersection turn movement volumes were estimated using *NCHRP Report 255* methods. Figure 4.19 displays the projected 2025 turn movement volumes and Figure 4.20 displays the overall intersection LOS, and the LOS at each turn movement for each leg/approach for each intersection. Table 4.6 summarizes the intersection LOS analysis.

Table 4.6. Projected 2025 Intersection Level of Service Summary

Intersection	Level of Service	
	AM	PM
SR 264/N27/N9034	• Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better
US 191/N151	• All approaches operate at LOS B or better	• All approaches operate at LOS B or better
SR 264/US 191/N9202	• Southbound approach is LOS D • Northbound approach is LOS E • All other approaches operate at LOS B or better	• Southbound approach is LOS D • Northbound approach is LOS F • All other approaches operate at LOS B or better
SR 264/N9201	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better
SR 264/US 191/N15	• All approaches operate at LOS B or better • Overall intersection is LOS A	• All approaches operate at LOS B or better • Overall intersection is LOS A

Figure 4.18. 2025 Projected Average Daily Traffic Volumes and Level of Service

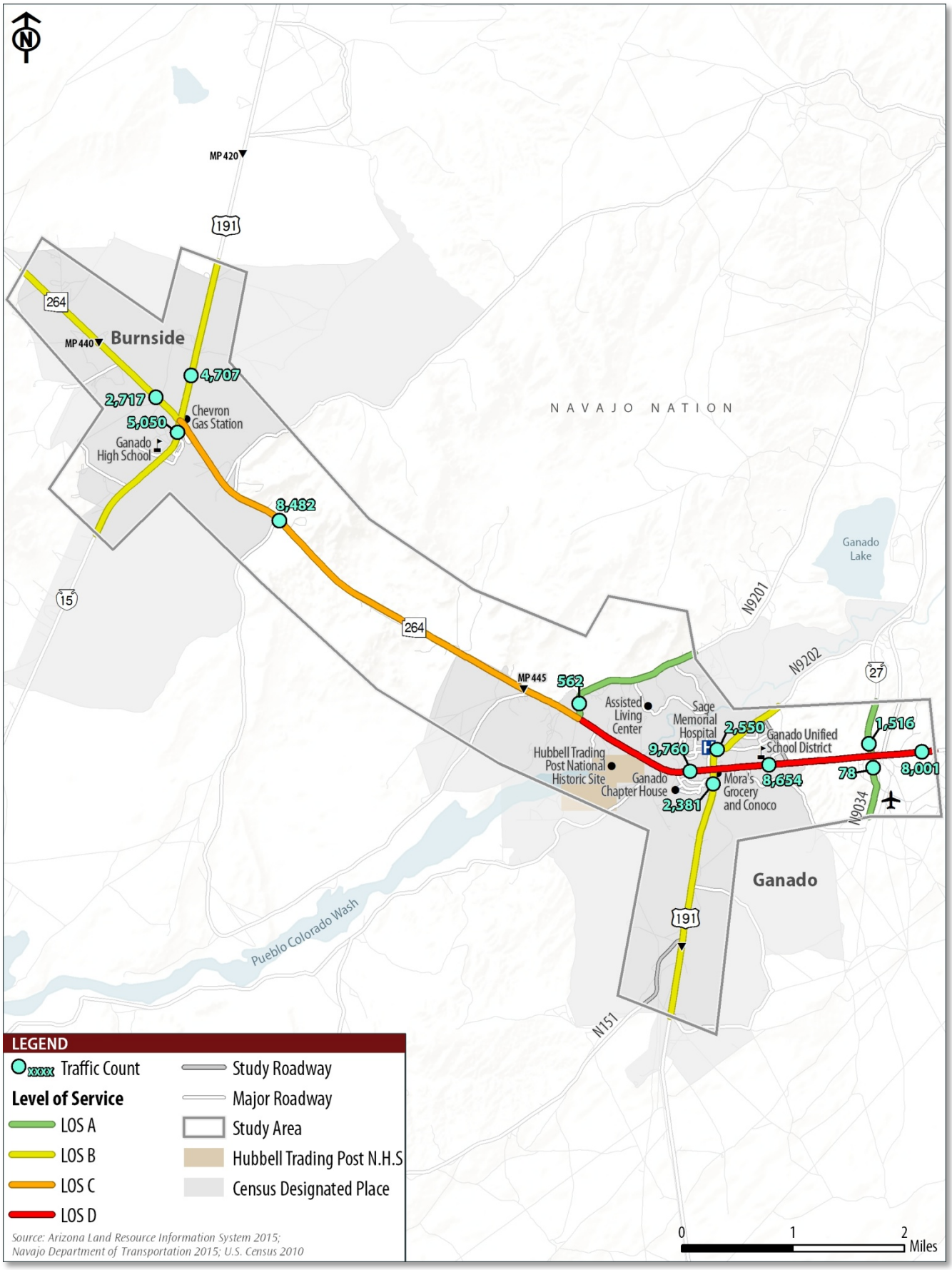


Figure 4.19. 2025 Intersection Turning Movement Volumes

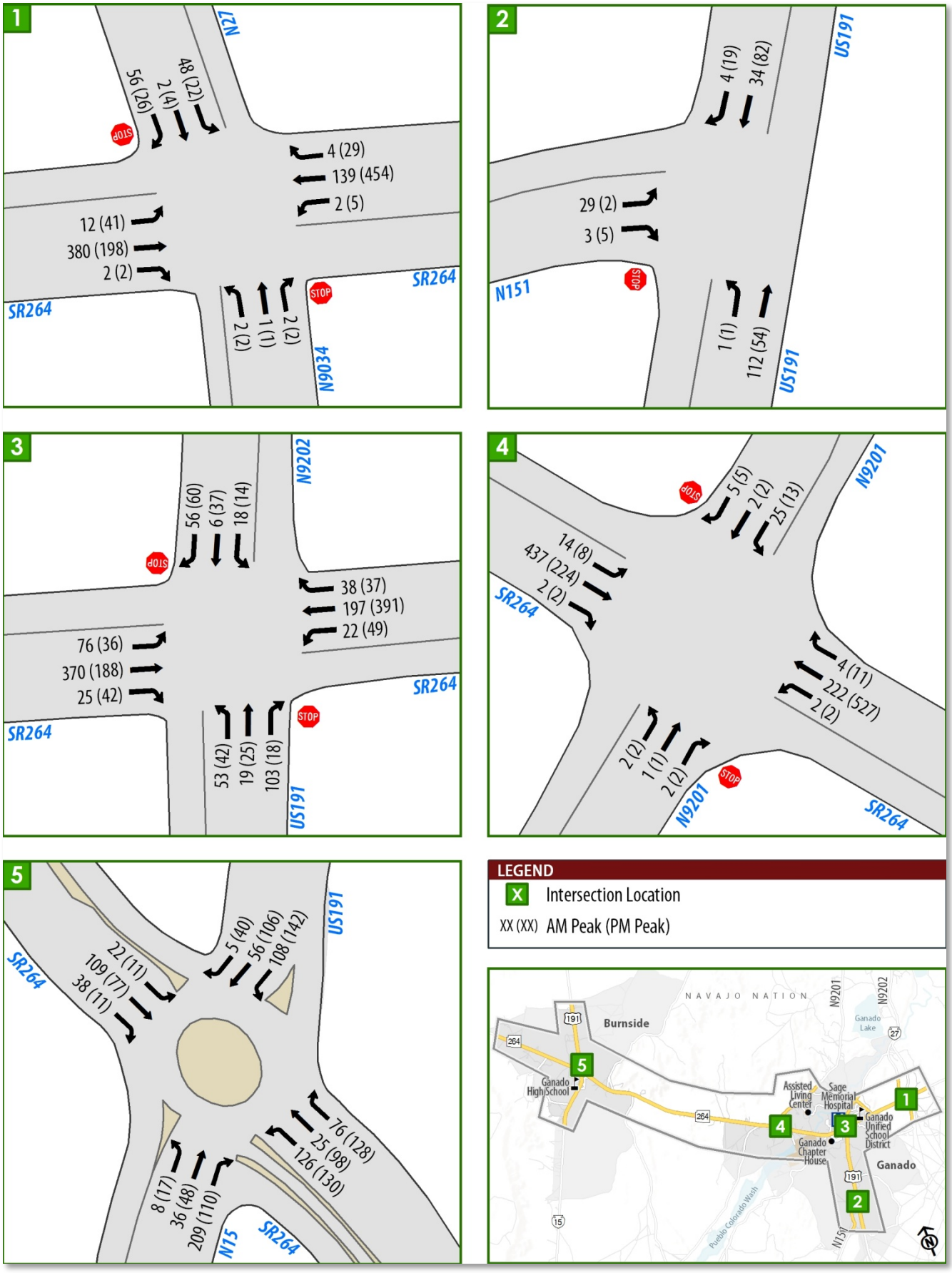
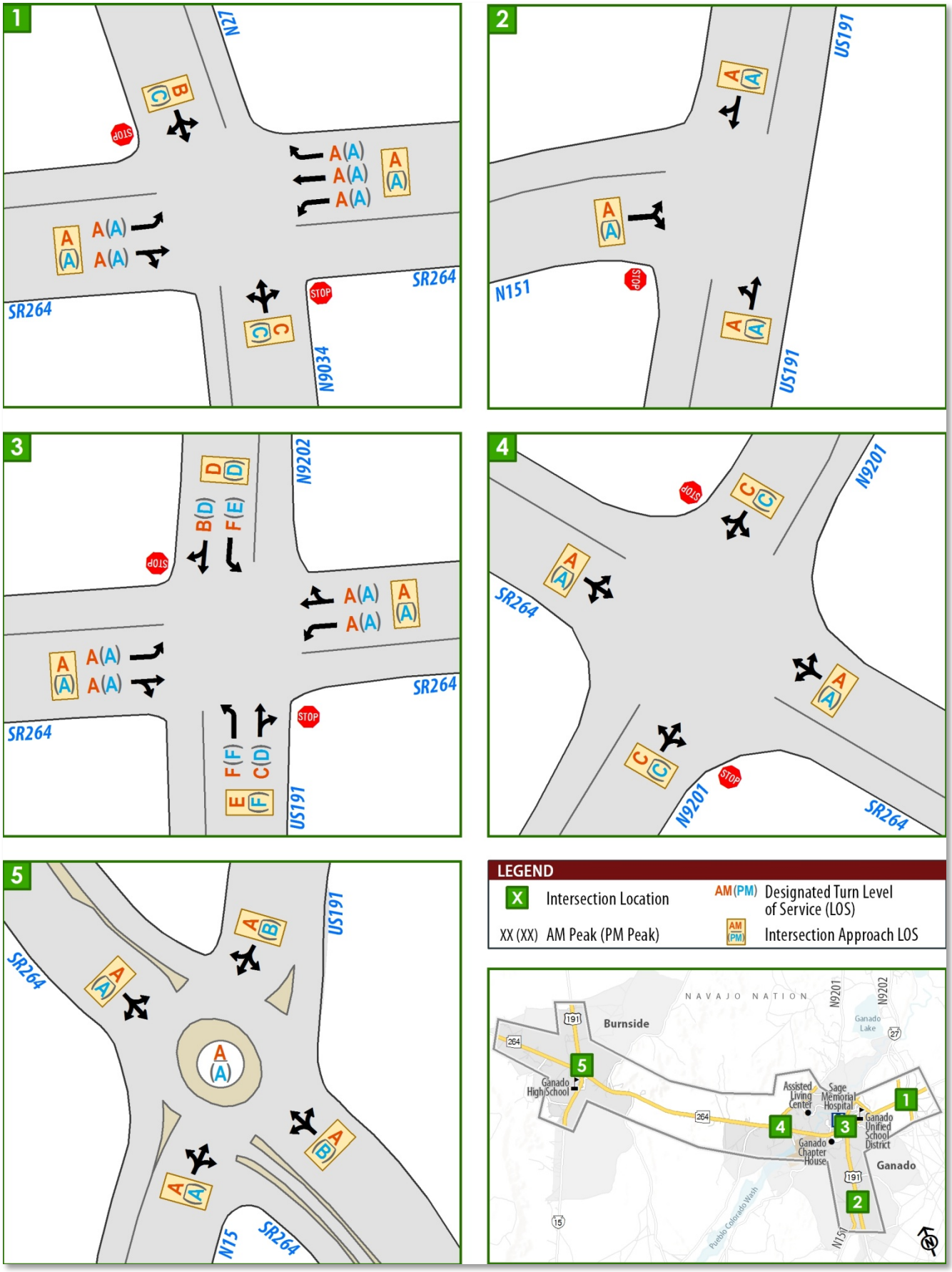


Figure 4.20. 2025 Intersection Level of Service



Projected 2035 Roadway Level of Service

Figure 4.21 displays the projected 2035 daily traffic volumes and the LOS for the current roadway network, *if no roadway improvements are made (No-Build)*. Traffic volumes and LOS results in this section represent annual average daily traffic conditions. Road segments performing at a LOS B or worse include:

- **LOS B:**
  - SR 264: Western study boundary to N15
  - US 191: South of SR 264
  - N9202: North of SR 264 to study area boundary
- **LOS C:**
  - SR 264: N15 to N9201
  - US 191: North of SR 264
  - N15: Study area limits to SR 264
- **LOS D:**
  - SR 264: N9201 to eastern study boundary

Projected 2035 Intersection Level of Service

Based on the projected 2035 daily traffic volumes, intersection turn movement volumes were estimated using *NCHRP Report 255* methods. Figure 4.22 displays the projected 2035 turn movement volumes and Figure 4.23 displays the overall intersection LOS, and the LOS at each turn movement for each leg/approach for each intersection. Table 4.7 summarizes the intersection LOS analysis.

Table 4.7. Projected 2035 Intersection Level of Service Summary

Intersection	Level of Service	
	AM	PM
SR 264/N27/N9034	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better
US 191/N151	• All approaches operate at LOS B or better	• All approaches operate at LOS B or better
SR 264/US 191/N9202	• Southbound approach is LOS F • Northbound approach is LOS F • All other approaches operate at LOS B or better	• Southbound approach is LOS F • Northbound approach is LOS F • All other approaches operate at LOS B or better
SR 264/N9201	• Southbound approach is LOS C • Northbound approach is LOS C • All other approaches operate at LOS B or better	• Southbound approach is LOS D • Northbound approach is LOS C • All other approaches operate at LOS B or better
SR 264/US 191/N15	• All approaches operate at LOS B or better • Overall intersection is LOS A	• Southbound approach is LOS C • All other approaches operate at LOS B or better • Overall intersection is LOS B

Figure 4.21. 2035 Projected Average Daily Traffic Volumes and Level of Service

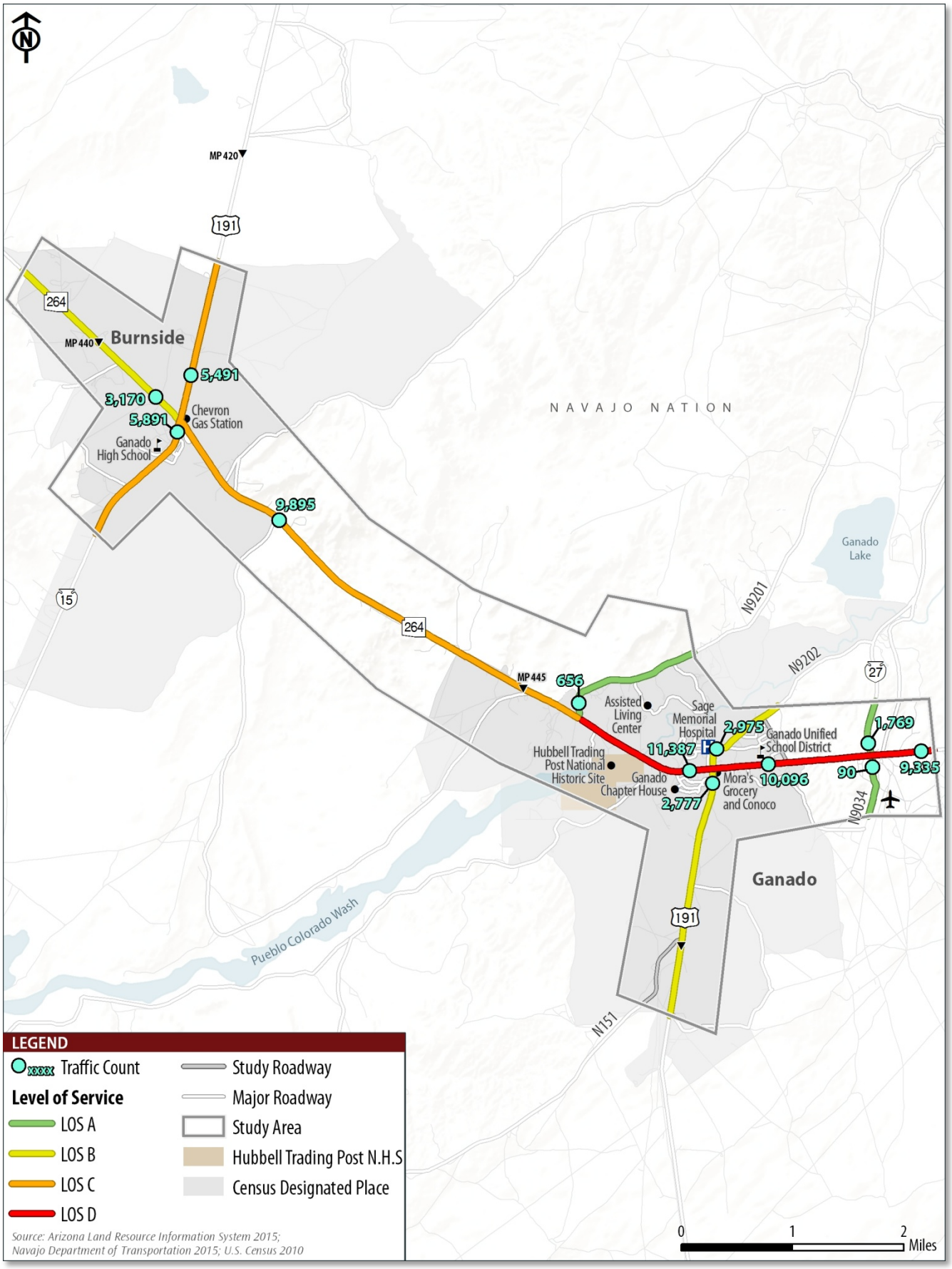


Figure 4.22. 2035 Intersection Turning Movement Volumes

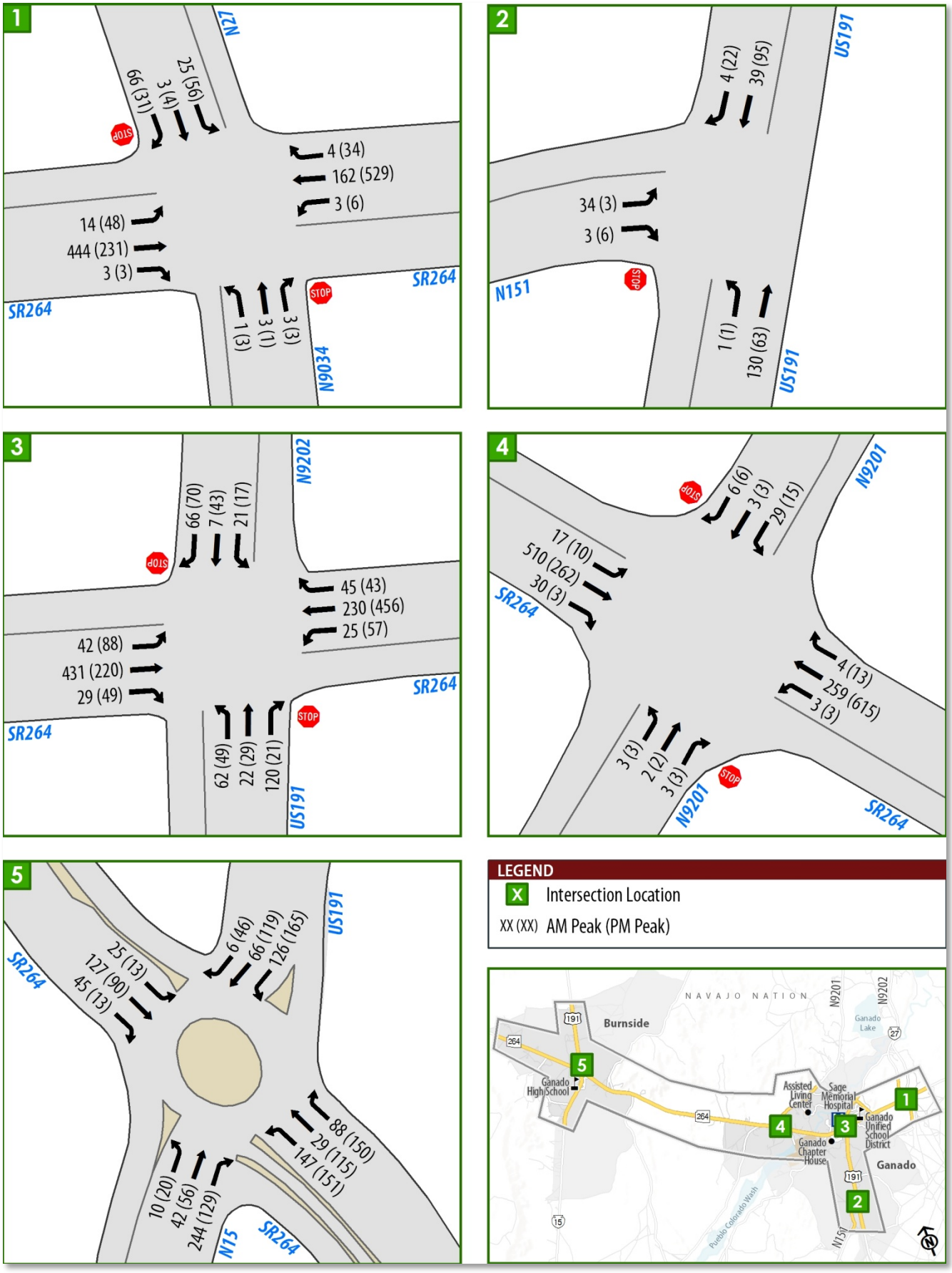
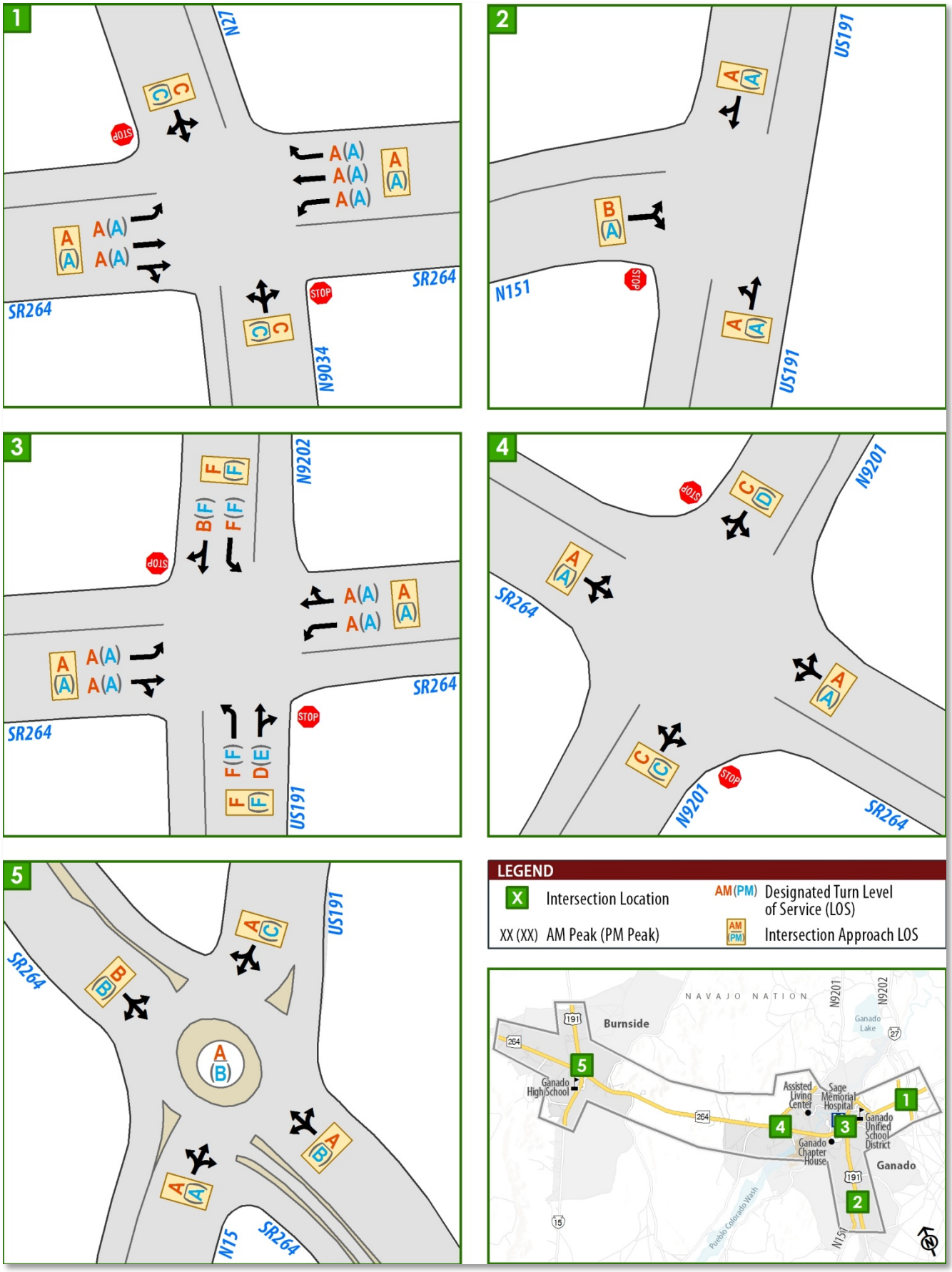


Figure 4.23. 2035 Intersection Level of Service

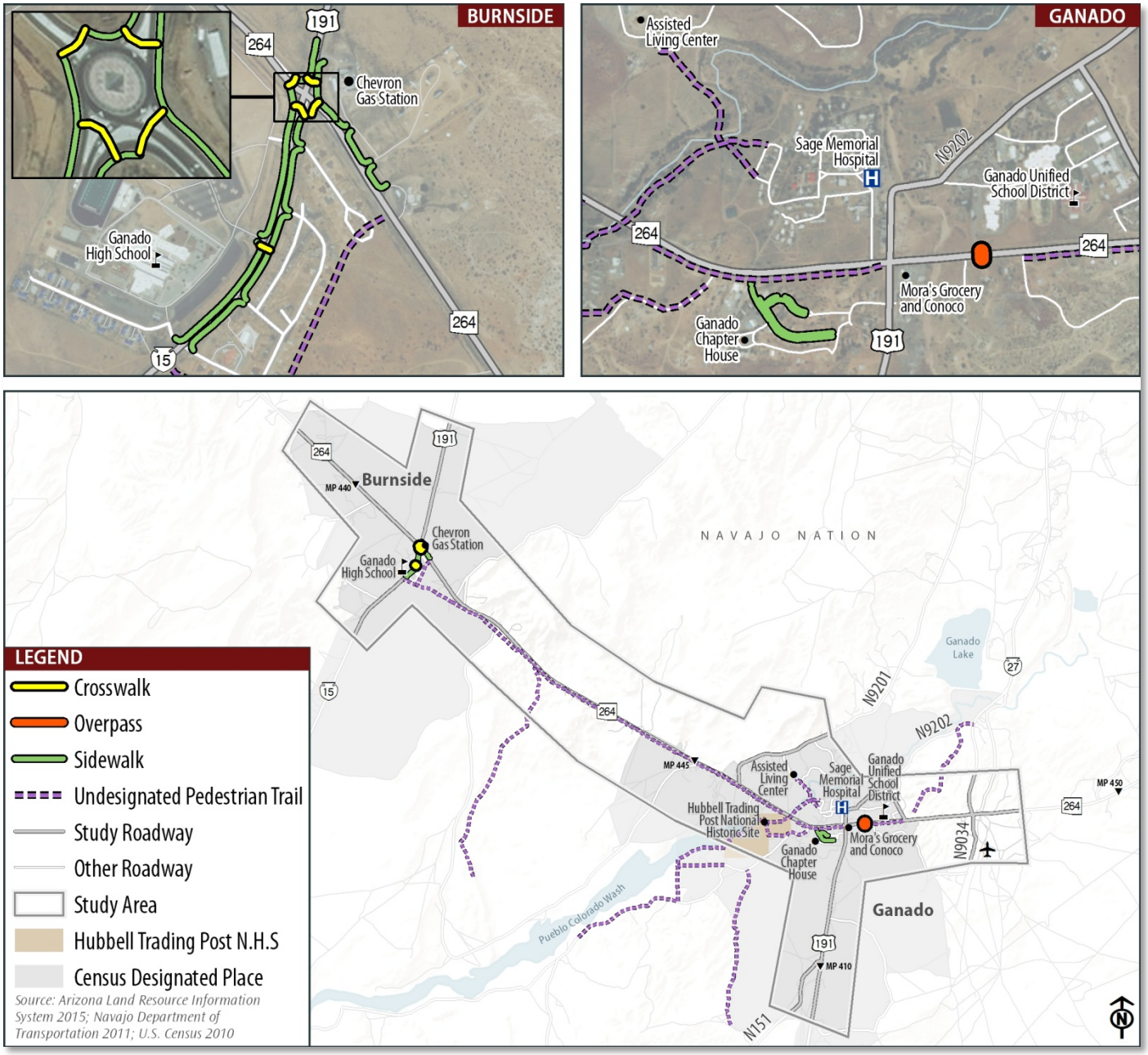


OTHER MODES OF TRANSPORTATION

Existing Pedestrian, Bicycle, and Trail Facilities

Alternative modes of transportation are an important aspect of the multimodal transportation network as they provide mobility for those not able to operate without access to a vehicle. Figure 4.24 provides an overview of existing pedestrian, bicycle, and trail facilities in the study area. Sidewalks are currently only constructed along N15 near Ganado High School, adjacent to the SR 264/US 191/N15 intersection, and in the residential area near the Ganado Chapter House. Sidewalk conditions range from good to poor condition, and most have overgrown vegetation that needs to be cut back. Older sidewalks located near the Ganado Chapter House are in poor condition and are not ADA compliant. Due to the lack of sidewalks, pedestrians utilize roadway shoulders for exercise and to access activity centers and residential areas.

Figure 4.24. Existing Pedestrian Facilities in Burnside and Ganado



Existing Transit Services

Navajo Transit System (NTS) currently provides transit services within and to/from the Ganado/Burnside study area. NTS also provides fixed-route transit services to 41 Navajo Chapters. The fare for the transit service is $2.00 per person for a full day pass. Table 4.8 provides an overview of routes that service the study area, as well as the approximate departure times for local bus stop locations. Within the study area the following routes are available:

- **Route 1 - Tuba City to Fort Defiance:**
  - O Service available Monday - Thursday only
  - O Stops include: Mustang Gas Station and US Post Office in Ganado
- **Route 2 - Steamboat to Fort Defiance**
  - O Service available Sunday - Saturday
  - O Stops include: Mustang Gas Station and US Post Office in Ganado
- **Route 8 - Chinle to Ganado to Tsaile**
  - O Service available Sunday - Saturday
  - O Stops include: Mustang Gas Station and US Post Office in Ganado
- **Route 9 - Dilkon to Fort Defiance**
  - O Service available Sunday - Saturday
  - O Stops include: Mustang Gas Station and US Post Office in Ganado, and optional service to Ganado Chapter House or Apache County District Office

Table 4.8. Navajo Transit System (NTS) Routes and Stops within Study Area

Route	AM Service			PM Service		
	Mustang Store (Burnside)	Ganado Chapter House/Apache County Office	Post Office (Ganado)	Post Office (Ganado)	Ganado Chapter House/Apache County Office	Mustang Store (Burnside)
Route 1	8:50AM		9:00AM	3:45PM		3:55PM
Route 2	6:45AM		7:00AM	6:10PM		6:15PM
Route 8	6:38AM and 6:55AM	6:42AM	6:45AM	6:00PM	5:55PM	5:45PM and 6:10PM
Route 9	6:37AM		6:53AM	6:00PM		6:10PM

Source: Navajo Transit System

Key input from TAC members and stakeholders, as well as observations made during the field review, included:

- There are no designated bus stops; rather the NTS currently picks-up/drops-off passengers in the parking lots of the Mustang Store, US Post Office, Ganado Chapter House, and the Apache County District Office.
- Stakeholders commented that the NTS transit routes are often utilized by residents to commute between Ganado and Burnside.
- Stakeholders noted the NTS transit service is heavily utilized and buses are often overcrowded. Passengers are not allowed to stand in the bus; therefore, potential passengers are often required to find other means to reach their destination (i.e., walk, hitchhikes, etc.) when buses are overcrowded.
- School buses pick-up students at specific locations along the shoulders of SR 264 and US 191. Parents picking-up/dropping-off students pull over along the roadways and cause safety and congestion issues.

Aviation Conditions

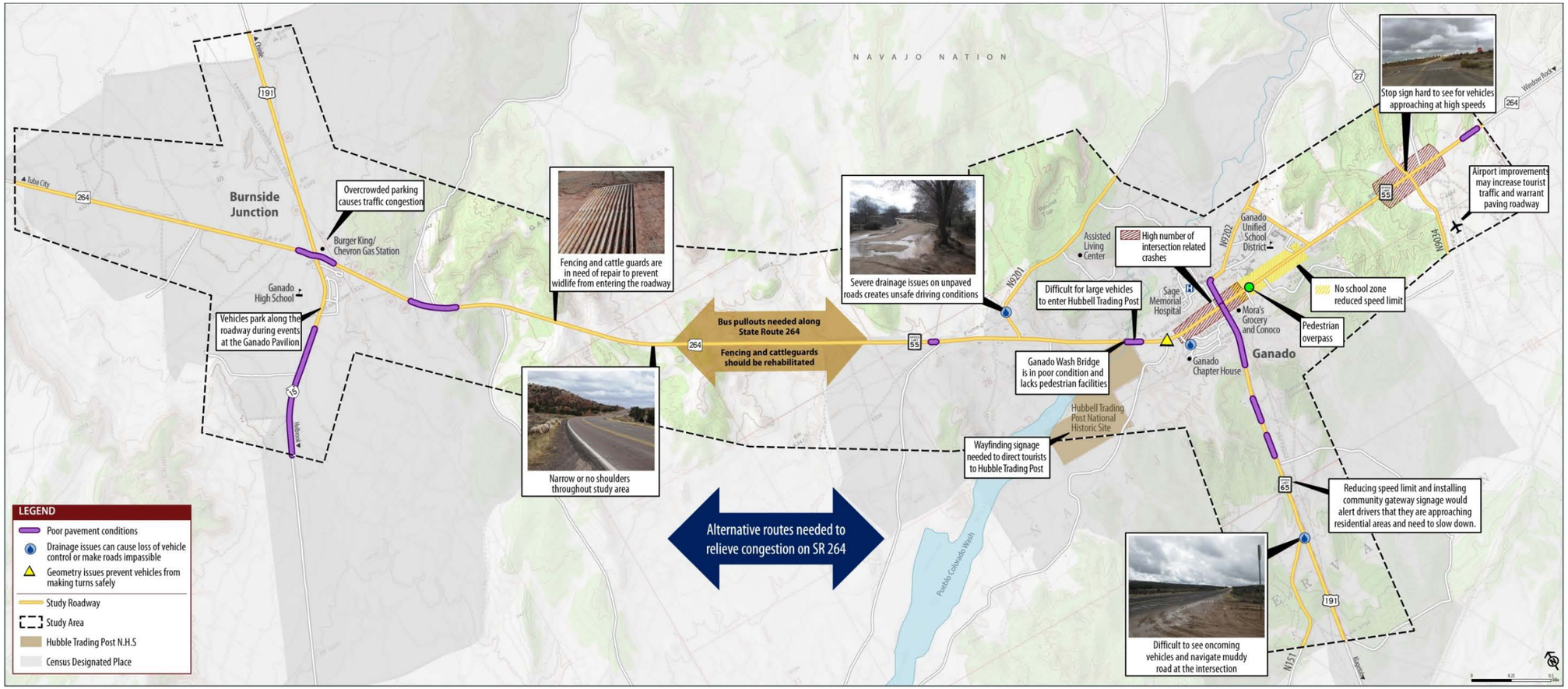
In order to gain a better understanding of all of the factors contributing to the regional transportation conditions, it is important to consider air travel. Located along N9304 is the Ganado Airport which primarily serves medical transportation to and from Sage Memorial Hospital. The Ganado Airport covers approximately 47 acres and has one runway designated 18/36 with a dirt surface measuring 4,500 by 80 FT. According to the *2000 Arizona State Aviation Needs Study*, the Ganado Airport has multiple obstructions and issues that require mitigation in order to safely accommodate air traffic , including: no line of sight between runway ends, water on runway and gulleys after heavy rain, livestock present.

A master plan and initial design for a 6,600' x 75' paved runway was completed in 2008. The design called for paving the runway; installing runway lighting; constructing a 250 SQ. FT. building, pilot waiting area, rest room, and installing utilities.

TRANSPORTATION ISSUES, DEFICIENCIES, AND NEEDS SUMMARY

Based on the inventory and analysis of existing conditions, transportation system deficiencies and issues were identified. These issues and deficiencies formed the basis for the development of the transportation improvement plan. Figure 4.25 is a summary of the major roadway issues in the study area and Figure 4.26 is a summary of issues for the transit, pedestrian, and bicycle modes. Working Paper 1 provides a detailed review of issues, deficiencies, and needs within the study area.

Figure 4.25. Roadway Issues and Needs Summary



STUDY AREA ISSUES AND CONCERNS

GANADO AREA

- Severe congestion expected as area develops
- No right-turn lanes on SR 264
- Access management issues on SR 264 and US 191
- High motor vehicle speeds approaching community on SR 264 and US 191
- Sight distance issues on SR 264 cross-streets

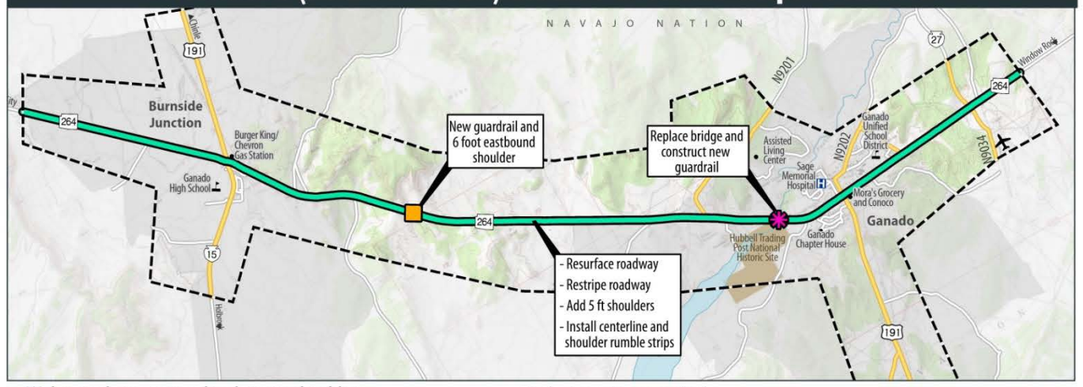
BURNSIDE AREA

- Future growth may increase congestion
- Signage needed to warn motorists of upcoming intersections
- Lack of street lighting

STUDY AREA WIDE

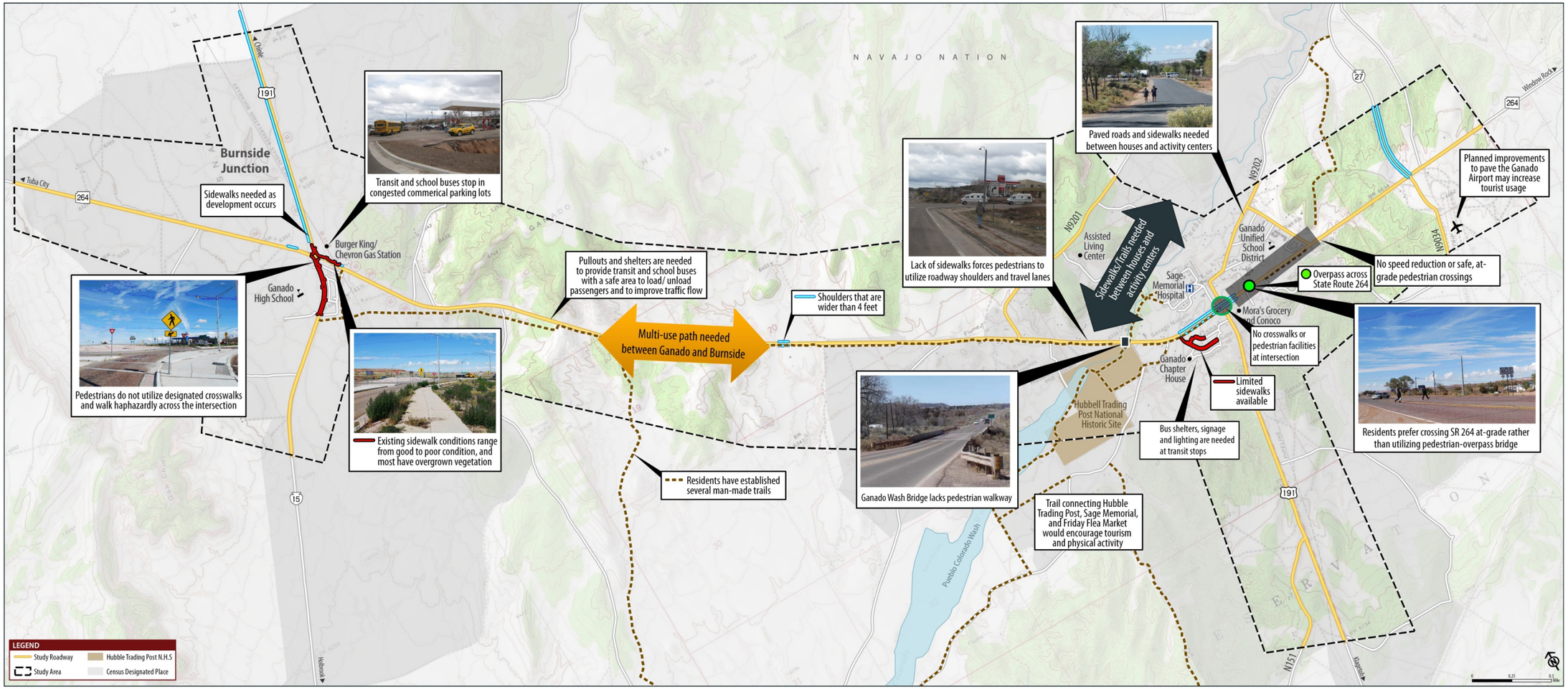
- Paved roads in fair to poor condition with narrow shoulders and faded striping
- Unpaved roads connecting homes to SR 264 are often impassable during adverse weather
- Lack of street lighting and pedestrian facilities
- Street addressing signage needed

Scheduled (FY 2016-2017) SR 264 Corridor Improvements



- Widen roadway to provide adequate shoulders
- Install recessed pavement markers along centerline
- Install new cattle guards
- Replace existing guardrail
- Replace fencing, gates, and pedestrian gates
- Replace any missing or damaged signs, delineators, or markers

Figure 4.26. Pedestrian, Bicycle, and Transit Summary of Issues and Needs



Study Area Wide Concerns

PEDESTRIAN, BICYCLE, TRAIL

- Lack of street lighting
- No bicycle facilities
- Limited sidewalks and crosswalks
- Narrow shoulders force pedestrians to use travel lanes
- Majority of residents walk to activity centers
- High motor vehicle speeds, especially near school zones
- Pedestrians have difficulty crossing cattle guards
- No official trail system in the study area

EXISTING TRANSIT SERVICES

- Bus shelters, signage and lightning are needed at transit and school bus stop locations
- Navajo Transit service is utilized significantly to commute between Ganado and Burnside
- Transit buses are often overcrowded
- Bus shelters and pull-outs needed along SR 264 and US 191 to allow student buses to safely load/unload passengers.

5. EVALUATION OF IMPROVEMENTS

This chapter presents the initial improvement concepts and the criteria used for evaluating recommendations for the study area. Initial concepts were developed based on deficiencies and needs identified in the existing conditions analyses, future land use, socioeconomics, traffic conditions, and the goals and objectives established by the study team and the TAC at the onset of the study.

POTENTIAL ROADWAY IMPROVEMENTS

Based on traffic analysis, summarized in Chapter 4, capacity improvements are needed along SR 264 and at select intersections to accommodate future traffic demand. In order to enhance safety and to adhere to BIA standards, the following safety and general roadway improvements were evaluated: roadway widening; roadway pavement treatments; street cross-section enhancements; safety features; and traffic calming measures. The following section presents a summary of the different safety and capacity enhancements evaluated to identify the most effective improvements for the study area.

Roadway Widening

Capacity related improvement projects, such as widening existing roadways or constructing new roadways were evaluated to identity potential projects to alleviate existing or projected traffic congestion. As illustrated in Chapter 4, if no roadway improvements are made to SR 264 the corridor will operate as a LOS C from US 191 North to N9201 and LOS D from N9202 to the eastern study boundary. Widening SR 264 to two travel lanes in each direction east of US 191 would improve traffic conditions to LOS A. No additional capacity related projects are needed within the study area.

Roadway Surface Treatments

On-going, road maintenance is critical to the overall safety of the Ganado/Burnside area's transportation network. Maintaining a road's pavement condition can lessen maintenance costs on vehicles, improve overall safety, and provide motorists with a smoother, more comfortable ride. Pavement improvement projects include:

- **Pavement Rehabilitation:** Minor rehabilitation consists of non-structural enhancements to eliminate age-related, top-down surface cracking that develops in flexible pavements due to environmental exposure. Major rehabilitation consists of structural enhancements that both extend the service life of existing pavement and/or improve its load-carrying capability. Surface treatment methods include microsurfacing, chip seal, slurry seal, and crack seal.
- **Pavement Reconstruction:** Complete removal and replacement of the existing pavement structure. Required when a pavement has either failed or has become functionally obsolete. Reconstruction is also warranted when pavement needs to be widened to meet BIA standards.

Figure 5.1 illustrates roadways in need of pavement maintenance, rehabilitation, and reconstruction.

Roadway Shoulders

Shoulders provide lateral support for the roadway, space for emergency storage of disabled vehicles, recovery area for drivers who have left the travel lane, maintenance activities, bicyclists, and for law enforcement activities. Shoulders also store water during storms, preventing water from spreading onto the travel lanes. Shoulders are typically earth, granular, or paved with asphalt or concrete. According to the FHWA's *Engineering Measures for Improved Pedestrian Safety*, providing shoulders of at least 4 FT provides a 71% reduction in "walking along the roadway" crashes. ADOT Roadway Design Guidelines recommend an 8 FT shoulder on rural two-lane highways with a design hour volume (DHV) greater than 200 vehicles per hour (VPH) and 6 FT for DHV less than 200 VPH. Figure 5.2 illustrates roadways identified for shoulder widening.

Unpaved Road Treatments

Paving road surfaces results in a number of benefits, including reduced vehicle maintenance, improved driving experience and safety, and reduced dust emissions. Gravel roads often have the advantage of lower construction and sometimes lower maintenance costs. If properly maintained, a gravel road can safely serve traffic for many years. Figure 5.1 illustrates unpaved roads that are in need of paving. Challenges and potential solutions to maintaining unpaved roadways are outlined in Table 5.1.

Table 5.1. Treatment and Maintenance Options for Unpaved Road Surfaces

Challenges	Possible Causes and Solutions
Longitudinal (lengthwise) erosion of the road surface	• *Flat or u-shaped road.* A crown or tilting of the road (super-elevation) is needed to shed water laterally off the outer edge(s) of the road surface. Keep the road graded with the proper crown. • *Small ridge of soil or grass growth along the outer edge of the road is preventing water from draining off the road surface.* Edge needs to be graded to remove this ridge. • *Water is traveling in a wheel rut.* Road needs to be re-graded and re-crowned. This problem often results from soft roads. • *Road ditch is not large enough and overflows onto road surface*. Install more frequent turnouts to allow water to drain from the road; if this is not possible the ditches need to be made larger.
Washboarding	• *Mainly due to poor road surface materials.* This will most likely result from a lack of fines and moisture. Check gradation of road material, and adjust as necessary. A grader should be used to remove washboarding and mix road materials. • *Alternative road surface materials may be necessary in certain high stress areas.* Consideration should be given to using soil stabilizers, these need to be selected based on the gradation and other factors.
Tire rutting on soft roads	• *Poor road base material does not drain efficiently.* Road base needs to be reconstructed with suitable soil materials, or consider using geotextiles. An option is to use soil stabilizers, these need to be selected based on the gradation and other factors. • *Road is too low and the base is in the water table.* Build road up above grade and/or install sub surface drains. • *Poorly drained native soils that may be unsuitable for typical gravel roads.* Consider using geotextiles or rock sandwiches, or restricting access for seasonal use only. • *Insufficient road base thickness*. Road base should be reconstructed, or consider using geotextiles or soil stabilizers. • *Insufficient ditching*. Ditches need to allow subsurface water to drain out of the road base. If road ditch is in a groundwater seep area, ditch may need to be rip rapped to prevent slumping.
Muddy or slippery road surface	• *Poor road surface material containing too many fines*. Good surface material needs to be added or blended with existing surface using appropriate grading equipment. • *Insufficient road tilting (super-elevation) or road crown, which allows water to sit on the road surface*. Road needs to be tilted or re-crowned to continuously to promote proper drainage.
Dust	• *Poor road surface material and low moisture content.* Apply new road surface material with the proper soil gradations, or use of calcium chloride or other chemical binding agent as a dust suppressant.
Too much loose gravel	• *Poor road surface material that lacks fines due to dusting, heavy traffic or erosion*. New road surface material is needed or the road needs to be re-graded and re-compacted.
Lateral erosion cutting across the road surface	• This most often occurs at a low spot by the road or where a ditch filled up and no longer functions; water builds up and eventually overflows and erodes the road and sediment that has settled in the ditch. The water needs to be conveyed to the other side of the road by means of a culvert, sub drainage, or ford.
Potholes	• Potholes usually result from road sections on poorly drained soils or from insufficient crown or road tilting. Rebuild the road with proper materials, or re-grade road to remove potholes, then re-crown or super-elevate.

Source: Gravel Road Maintenance Manual, A Guide for Landowners on Camp and Other Gravel Roads

Figure 5.1. Road Surface Treatment Projects

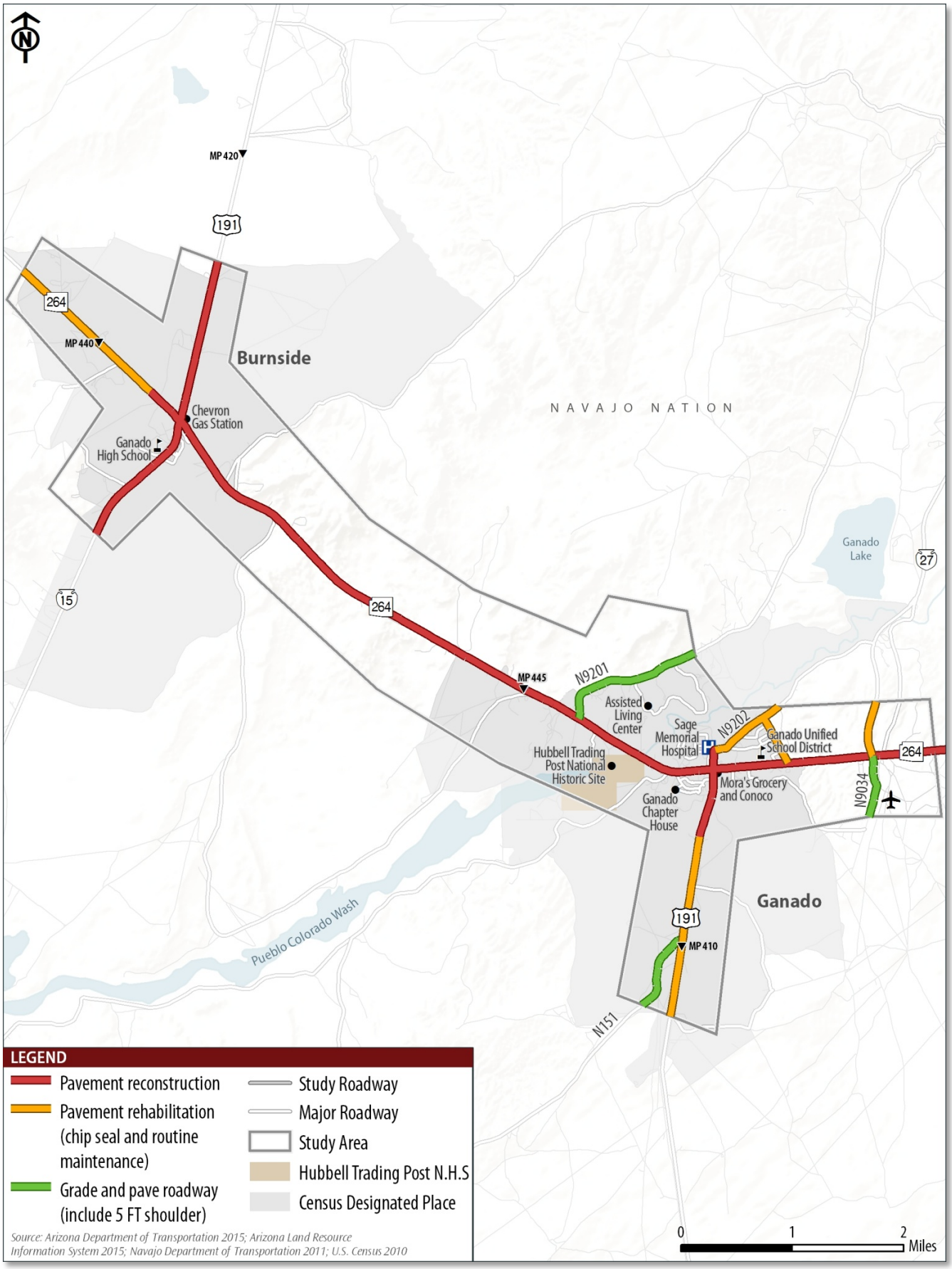
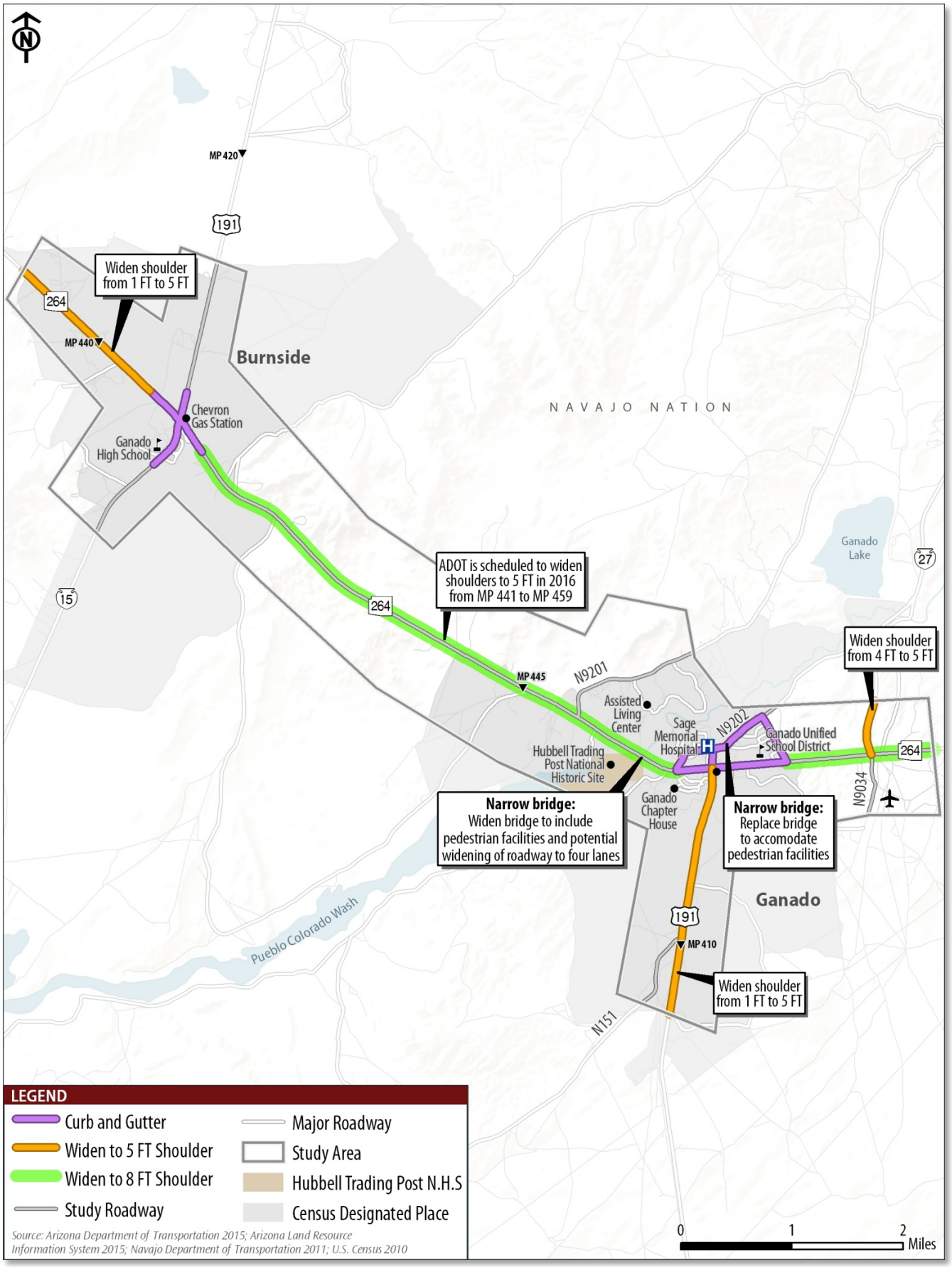


Figure 5.2. Shoulder Widening Projects



Street Cross-Sections

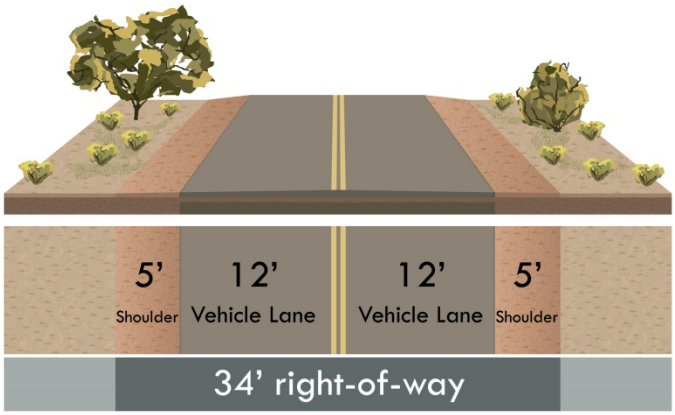
Roadway cross-sections provide the framework for designing and improving community roadways. A road's cross-section is based on several factors, including:

- Existing and future traffic volumes,
- Type of traffic that utilizes the facility,
- Function of the facility,
- Level of pedestrian, bicycle, and transit activity,
- Surrounding land use,
- Right-of-way (ROW) availability, and
- Proposed development surrounding the corridor.

To accommodate multiple transportation modes, many communities are utilizing "Complete Streets" initiatives to develop cross-sections to enhance the safety along roadways. According to the National Complete Streets Coalition, typical elements that make up a complete street include sidewalks, bicycle lanes, shared-use paths, and safe pedestrian crossings. Based on input from the TAC, stakeholders, and the public; cross-section concepts were developed for the study roadways that incorporate complete street elements where possible while maintaining the character of the community. Table 5.2 summarizes potential cross-sections within the study area.

Table 5.2. Street Cross-Sections

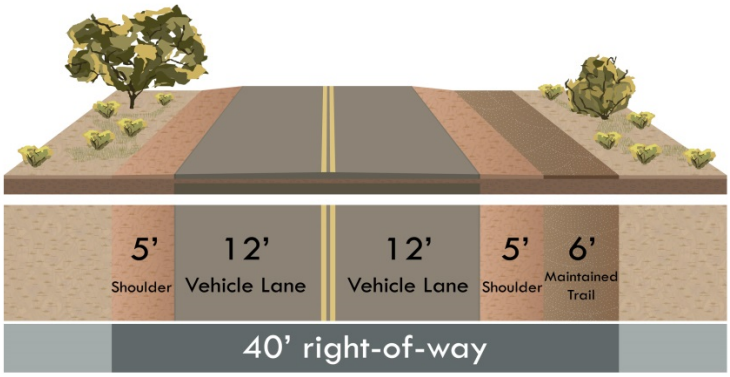
Rural Collector - Rural Area Corridor



Roadway Context:	• Provides local and regional access • Low to medium traffic volumes
Number of Lanes & Median:	One 12 FT lane in each direction
Right-of-Way Width:	34 FT
Street Elements:	5 FT shoulders on both sides of road
Pedestrian/Bike Facilities:	No pedestrian or bicycle facilities
Applicable Roadways:	• N15 south of Ganado High School • US 191 south of N 151 • N151 • N9204 • N9202 north of the Ganado Primary School • N9034 • N27

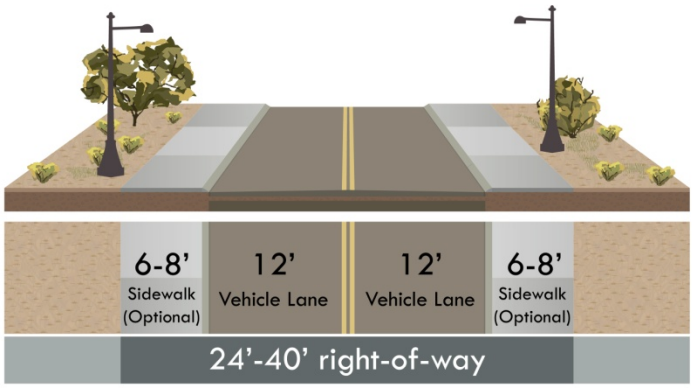
Table 5.2: Street Cross-Sections (continued)

Rural Collector - Partially Developed Corridor



Roadway Context:	• Provides local and regional access	• Low to medium traffic volumes
Number of Lanes & Median:	One 12 FT lane in each direction	
Right-of-Way Width:	40 FT	
Street Elements:	5 FT shoulders on both sides of road	
Pedestrian/Bike Facilities:	6 FT maintained trail in one direction	
Applicable Roadways:	US 191 (Ganado Cemetery to N151)	

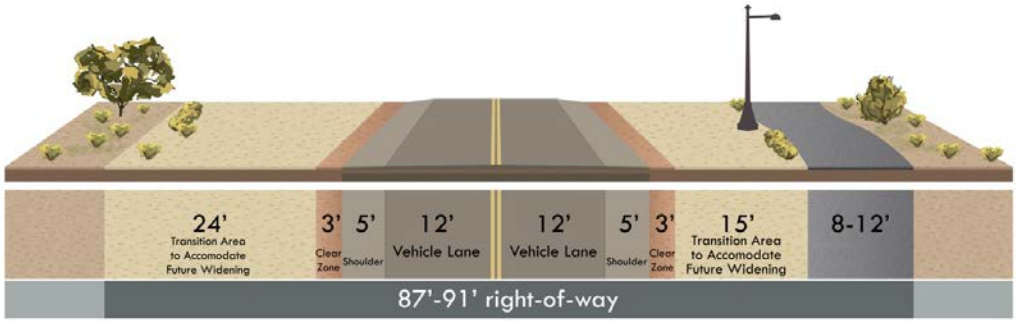
Rural Collector - Developed Corridor



Roadway Context:	• Provides local and regional access • Medium traffic volumes	• Located in developed corridor
Number of Lanes & Median:	One 12 FT lane in each direction	
Right-of-Way Width:	24 - 40 FT	
Street Elements:	• Street lighting	• Pedestrian crosswalks
Pedestrian/Bike Facilities:	6 - 8 FT sidewalks, if needed	
Applicable Roadways:	• N15 south of Ganado High School • US 191 (Ganado Cemetery to SR 264)	• N9202 north of the Ganado Primary School

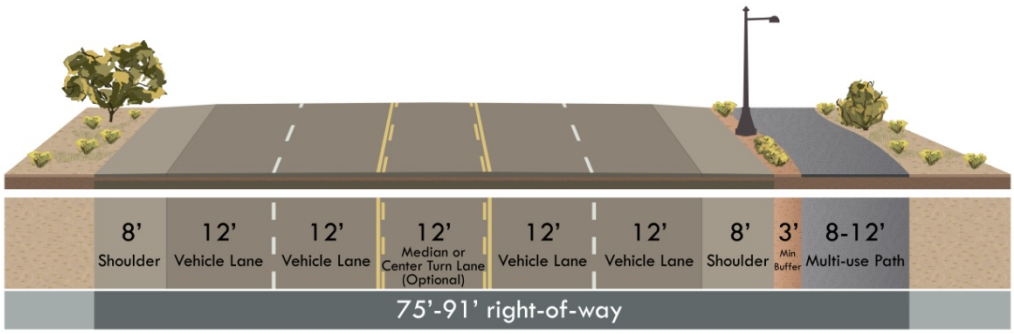
Table 5.2: Street Cross-Sections (continued)

Rural Arterial - Partially Developed Corridor (Short-Term)



Roadway Context:	• Moderate traffic volumes • Moderate pedestrian usage	• Rural corridor linking residential areas to community centers
Number of Lanes & Median:	One 12 FT lane in each direction	
Right-of-Way Width:	87- 91 FT	
Street Elements:	• 5 FT paved shoulders • 3 FT unpaved clear zone	• 15 - 24 FT transition area to allow for future roadway widening
Pedestrian/Bike Facilities:	8 - 12 FT shared multi-use path with lighting	
Applicable Roadways:	• SR 264 (Mustang Gas Station to County Road 427) • SR 264 (County Road 420 to N 27)	

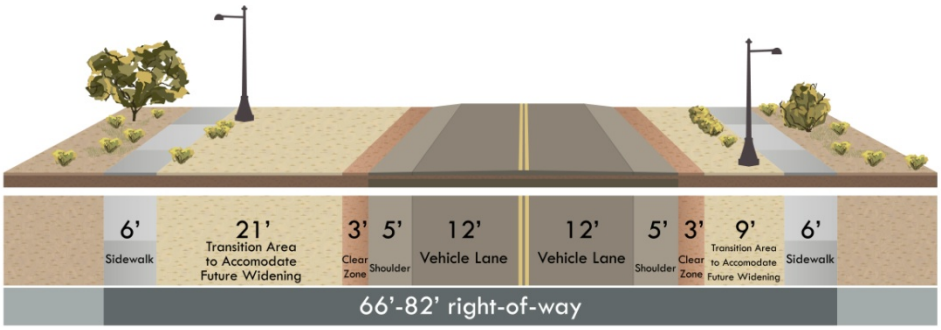
Rural Arterial - Partially Developed Corridor (Long-Term)



Roadway Context:	• Moderate traffic volumes • Moderate pedestrian usage	• Rural corridor linking residential areas to community centers
Number of Lanes & Median:	• Two 12 FT travel lanes in each direction	• 12 FT two-way center turn lane or median (optional)
Right-of-Way Width:	75 - 91 FT	
Street Elements:	• 8 FT paved shoulders • 3 FT landscape buffer	
Pedestrian/Bike Facilities:	8 - 12 FT shared multi-use path with lighting. Path can be shifted close to ROW fence line, if necessary to enhance safety	
Applicable Roadways:	• SR 264 (Mustang Gas Station to County Road 427) • SR 264 (County Road 420 to N 27)	

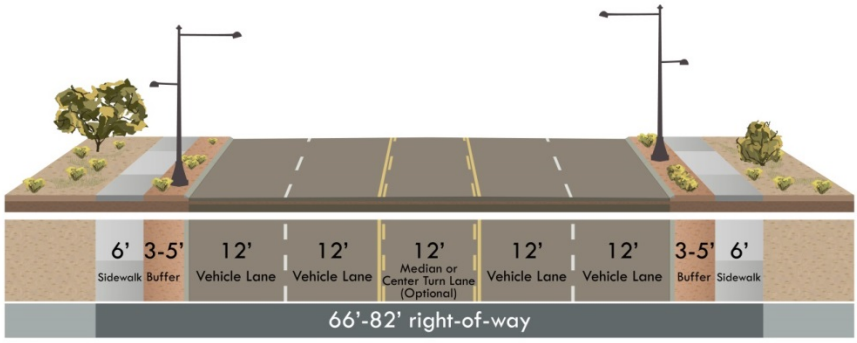
Table 5.2: Street Cross-Sections (continued)

Rural Arterial - Developed Corridor (Short-Term)



Roadway Context:	• Moderate to high traffic volumes • High amount of pedestrian traffic	• Located in developed corridor • Major roadway linking educational, residential, and commercial, land uses
Number of Lanes & Median:	One 12 FT lane in each direction	
Right-of-Way Width:	66 - 82 FT	
Street Elements:	• 5 FT paved shoulders • 3 FT unpaved clear zone • Street lighting	• 9 - 21 FT transition area to allow for future roadway widening
Pedestrian/Bike Facilities:	6 FT sidewalk in both directions	
Applicable Roadways:	SR 264(County Road 427 to County Road 420)	

Rural Arterial - Urban Developed Corridor (Long-Term)



Roadway Context:	• Moderate to high traffic volumes • High amount of pedestrian traffic	• Located in developed corridor • Major roadway linking educational, residential, and commercial, land uses
Number of Lanes & Median:	• Two 12 FT travel lanes in each direction	• 12 FT two-way center turn lane (optional)
Right-of-Way Width:	66 - 82 FT	
Street Elements:	• Curbed shoulders • 3 - 5 FT buffer zone	• Street lighting
Pedestrian/Bike Facilities:	6 FT sidewalk in both directions	
Applicable Roadways:	SR 264(County Road 427 to County Road 420)	

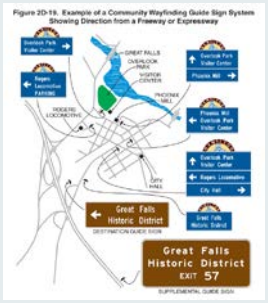
Roadside Safety Features

Based on stakeholder and public input, as well as a comprehensive roadway inventory; study area roadways currently have numerous safety issues that require improvement. Key issues identified in Chapter 4 include: horses entering the ROW, paved roadways lack pavement markings, nighttime vision is limited on roadways, and limited street and direction signs to aid in navigation. Table 5.3 provides a summary of potential safety enhancements that could be implemented to enhance safety on study area roadways.

Table 5.3. Roadside Safety Improvement Options

Enhancement	Description	Considerations	Potential Locations
Clear Zones 	Unobstructed, traversable roadside area that allows drivers to regain control of their vehicle that has left the travel lane. Clear zones can reduce the severity of crashes and provide a safe recovery area rather than a crash.	• AASHTO provides a range of clear zone widths based on speed, traffic, and road side slope. • For low-speed rural collectors and rural local roads, a minimum clear zone of 10 feet is considered desirable.	• SR 264 • US 191 North • US 191 South
Permeable Fencing 	The primary purpose of a fence is to enclose livestock or to exclude or direct livestock/wildlife from entering a road's right-of-way. Woven wire fencing, referred to as "game fencing", is commonly used to enclose sheep pastures. Barbed wire fencing is the most cost-effective fencing material. AZGF recommends a maximum height of 42 inches and the bottom wire to be 18-20 inches off the ground to allow pronghorn and deer fawns to go under. AZGF recommends that fencing be located as far from the road as practicable. Additional information is located at: http://www.azgfd.gov/w_c/documents/110125_AGFD_fencing_guidelines.pdf	• According to the AZGF, barbed wire fences are effective at restraining livestock and if properly designed can be permeable to most wildlife. • According to the AZGF, to be permeable for deer and elk, the top and bottom wires of a barbed wire fence should be barbless. • To allow deer, pronghorn, and bighorn sheep to cross a fence (not elk or livestock), AZGF suggests a special ladder comprised of two 10 FT vertical wooden posts 20 inches apart.	• SR 264 • US 191 South
Funnel/Non Permeable Fencing 	Funnel fencing is installed to prevent wildlife/livestock from crossing high risk areas and guide them to safer crossings (underpass, bridge, and culvert) or to open areas with adequate visibility for motorists to avoid collisions. Additional information is located at: www.azgfd.gov/w_c/documents/110125_AGFD_fencing_guidelines.pdf and www.azdot.gov/docs/default-source/planning/wildlife_funnel_fencing_summary.pdf	• Deer can be excluded, funneled, or directed in a specific direction by use of a woven wire, 8 FT fence. • Pronghorn deer are capable of jumping, but prefer to go under fences; therefore, AZGF recommends a 5 FT, woven wire fence.	• SR 264 • US 191 South
Pavement Markers 	Reflective road markers, either raised pavement markers or delineator posts that communicate the road's alignment to motorists. Recessed pavement markers also alert drivers that they are crossing into the shoulder area or the opposite lane.	• Raised pavement markers are used to supplement standard pavement markings when a higher degree of nighttime visibility is warranted. • Solar powered, LED markers create a highly visible line of light directing motorists at night. • Post mounted delineators can be seen from up to 1,000 feet under normal conditions.	• SR 264 • US 191 North • US 191 South • N15 • N27

Table 5.3. Roadside Safety Improvement Options (continued)

Enhancement	Description	Considerations	Potential Locations
Rumble Strips 	Longitudinal rumble strips enhance safety by alerting drivers that their vehicle is leaving the travel lane. Additional information is located at: http://www.azdot.gov/business/engineering-and-construction/traffic/signing-and-marking-standard-drawings/current-test	• Recessed striping and rumple strips provide long-term delineation on routinely snow-plowed routes. • Traffic striping requires minimum levels of retroreflectivity.	• SR 264 • US 191 North • US 191 South • N15 • N27
Cattle guards 	Cattle guards are installed on fence lines to allow vehicles to pass, while preventing livestock from entering the right-of-way (ROW)	• According to the Navajo Department of Transportation, all livestock owners are responsible for keeping their livestock out of the ROW or fenced highway areas • "Virtual cattle guards" are light-dark pattern of lines and pavement resembles a true cattle guard to animals	• SR 264 • US 191 North • US 191 South • N15
Roadway Signage 	Traffic signs communicate rules, warnings, and guidance to drivers to safely and effectively navigate the roadway system.	• At horizontal curves, installing chevron signs and curve warning signs guide motorists on the road's alignment, particularly during nighttime driving. • A sign technician should review the placement of signs to ensure that the position is visible, particularly at night.	• SR 264 • US 191 North • US 191 South • N27 • N15 • N151
Wayfinding Signage 	Community wayfinding guide signs are part of a coordinated and continuous system of signs that direct tourists and other road users to key civic, cultural, visitor, and recreational attractions. Boundary area guide signs are informational guide signs placed at the boundaries of the geographical area of the wayfinding guide signing.	• To implement a wayfinding sign program involving state highways, a public agency must submit a Wayfinding Guide Sign System Plan to the appropriate ADOT District via the encroachment permit process for approval. • Vehicular directional signs shall be limited to three destinations per sign and shall not contain commercial advertising.	• SR 264 • US 191 North • US 191 South • N15 • N9202
Street Lighting 	For motor vehicles, installing street lighting improves driver's visibility and in turn can reduce the risk of traffic accidents and the severity of crashes. Good outdoor lighting can also create and encourage a pedestrian friendly environment by providing extended hours of light to utilize pedestrian facilities.	• Aesthetically, street light poles and fixtures can also create a defining visual characteristic to enhance a community's character. • If not properly designed and installed, however, light pollution caused by street and pedestrian lighting can increase glare for drivers and reduce sky visibility.	• SR 264 • US 191 North • US 191 South • N15 • N9202 • County Road 420 • Cedar Hills Drive

Bridge Improvements

Proposed bridge improvement projects were developed based on input received by stakeholders, review of existing conditions, scheduled improvements, and sufficiency ratings obtained from ADOT's bridge inventory and the NTTFI. According to ADOT's Bridge Inventory, the Ganado Wash Bridge (Structure #1046) is structurally deficient and is scheduled for replacement in 2016. Scheduled improvements to the Ganado Wash Bridge include: widen bridge to include two travel lanes in each direction, eastbound right-turn lane to access the Hubbell Trading Post, and paved shoulders.

Traffic Calming Measures

As identified in Chapter 4, travel speeds through the study area are generally much greater than actual posted speed limits. Traffic calming measures are often utilized to improve safety by encouraging motorists to reduce traveling speeds. Traffic calming is a self-enforcing traffic management approach that forces motorists to alter their speed or direction of travel. Research has found that installing traffic calming devices not only reduces automobile speeds but also the number and severity of crashes. Traffic calming devices can range from options that require no physical roadway modifications to major roadway alterations, such as roadway closures. Table 5.4 provides a summary of potential roadway enhancements that can be utilized in the study area to reduce traveling speeds.

Table 5.4. Traffic Calming Options

Traffic Calming Device	Description	Advantages	Considerations	Potential Locations
Speed Limit Pavement Markings 	Highly visible in-pavement markings, which are also visible at night, alerting drivers of speed limit.	• Inexpensive installation costs • Can be quickly installed	• Easily wears off and requires regular maintenance • Not visible on snow covered roads	• SR 264 (westbound entering Ganado and eastbound entering Burnside) • US 191 North • US 191 South • N 15
Transverse Lane Markings 	Pavement markings spaced to give drivers the perception that they are speeding up. This gives a driver the perception of going too fast or speeding up and encourages them to reduce their speed.	• Low cost to install • Cost-effective • Do not affect vehicle operation, pedestrians, or bicyclists	• Additional maintenance costs • Less effective in winter conditions	• SR 264 (westbound entering Ganado and eastbound entering Burnside) • US 191 North • US 191 South • N 15
In-Road/On-Road Rumble Strips 	Grooves or raised markers placed in/on the roadway surface that transmits sound and vibration to alert drivers to changing conditions.	• Low installation costs • Does not require any additional ROW	• Noise and vibration created by the rumble strips may affect the adjacent residences • Can interfere with snow plow operations	• SR 264 (westbound entering Ganado and eastbound entering Burnside) • US 191 North • US 191 South • N 15
Speed Hump or Table 	Raised pavement section requires motorists to drive at a reduced speed over an undulation.	• Speed reduction • Relatively inexpensive installation costs	• Increased maintenance costs • May slow emergency vehicle response times • Can interfere with snow plow operations	• SR 264 (near Ganado Primary School) • N 15(near Ganado High School)

Table 5.4. Traffic Calming Options (continued)

Traffic Calming Device	Description	Advantages	Considerations	Potential Locations
Community Gateways 	Gateway signs indicate to motorists that they are leaving a rural area and entering a city or town with increased pedestrian and motor vehicle traffic. Gateways should be placed in speed transition zones where a gradual reduction of speed is desired.	• Enhances streetscape • Personalized to reflect community	• May infringe on clear zones • Require on-going maintenance • Can be incorporated on pedestrian overpass	• SR 264 (westbound entering Ganado and eastbound entering Burnside) • US 191 North • US 191 South • N 15
Flashing Speed Feedback Signs 	Radar activated signs relay a vehicle's speed or displays messages such as "Slow Down" or "Reduce Speed".	• Do not affect vehicle operation, pedestrians, or bicyclists • Can be quickly implemented	• Moderate cost to purchase and install • Require regular maintenance and a power source • May encourage some drivers to speed • Speed radar trailers are portable devices that can be moved as needed	• SR 264 (westbound entering Ganado and eastbound entering Burnside) • US 191 North • US 191 South • N 15
Center Island Narrowing 	Post or landscaped islands typically located down the center of a roadway or at a roadway entrance.	• Provides a mid-block pedestrian refuge • Can improve the aesthetics of a roadway	• May restrict access to driveways in one direction	• N 15(near Ganado High School) • US 191 north (entering Ganado)
HAWK Pedestrian Beacon 	Pushbutton-activated, signalized, mid-block pedestrian crossing signal. The pedestrian hybrid beacon is used to warn and control traffic to assist pedestrians in crossing a street at a marked crosswalk.	• Provides a 'red' condition which requires vehicles to stop for pedestrians • Improves visibility of crossing and pedestrians	• High installation and maintenance costs	• SR 264 (near Ganado Primary School) • N 15 (near Ganado High School)
Roundabout or Traffic Circle 	Roundabouts require traffic to circulate counter clockwise around a center island at an intersection. Traffic circles are small islands placed in intersections, in which vehicles must slow-down in order to navigate the circle.	• Roundabout can moderate traffic speeds on arterial roadways • Less expensive than operating a traffic signal • Provides landscaping opportunities	• May require additional ROW to construct • Emergency vehicles and large trucks may have difficulty navigating	• SR 264/US 191/N 9202 intersection

POTENTIAL INTERSECTION IMPROVEMENTS

To address the existing deficiencies, future needs, and to enhance safety and mobility, preliminary improvement concepts were developed for the US 191/SR 264/Navajo Route 9202 intersection.

US 191/SR 264/Navajo Route 9202 Intersection – Concept 1: Signalized Intersection

As illustrated in the figure on the right, in Concept 1:

- Intersection is converted to a four-way, signalized intersection
- Signage and pavement markings are improved
- Pedestrian facilities are located throughout
- Crosswalks are incorporated on all legs of the intersection
- Incorporates ADA compliant ramps and street lighting
- Signal equipment to include walk push buttons

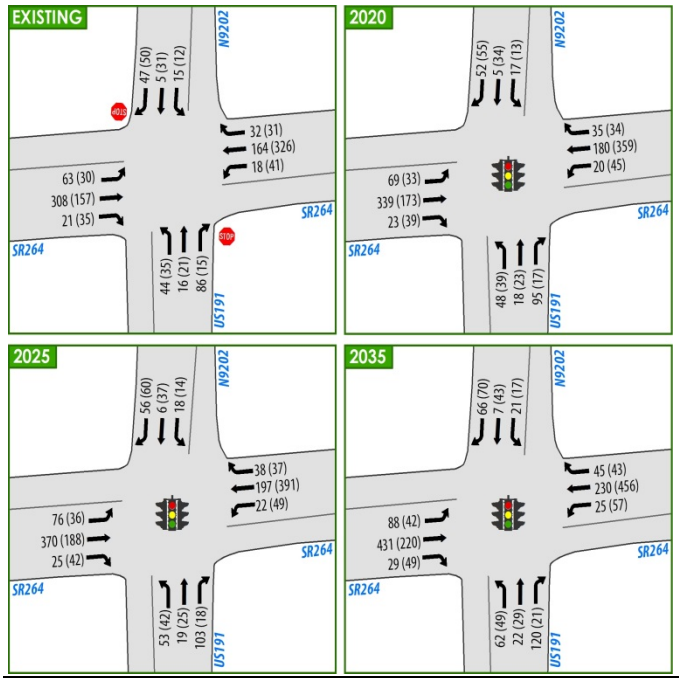
Advantages

- Low cost of implementation
- Improves safety for motorists and pedestrians
- No additional ROW required

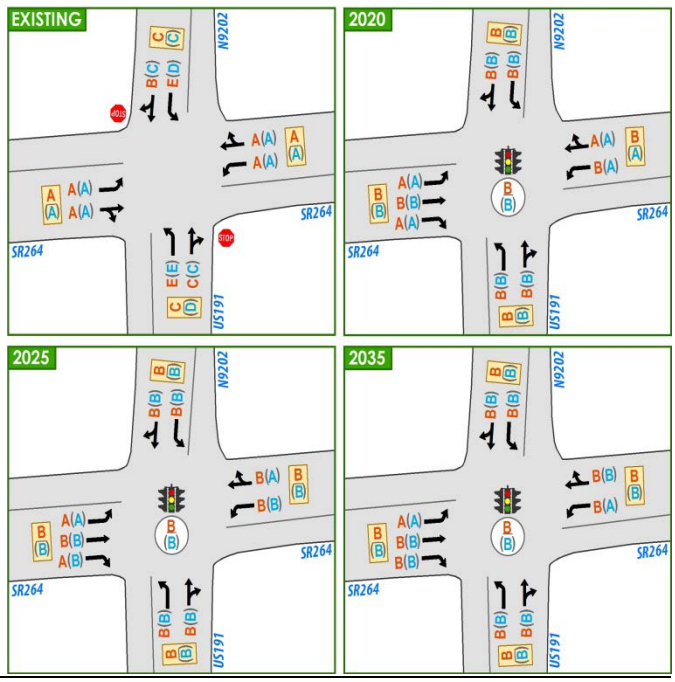
Disadvantages

- Current traffic volumes do not meet requirements for traffic signal. Warrants will likely be met by year 2020
- High maintenance costs
- May not reduce speeding, which is currently one of the issues

Traffic Volume



Level of Service



US 191/SR 264/Navajo Route 9202 Intersection – Concept 2: Roundabout

As illustrated in the figure on the right, in Concept 2:

- Intersection is converted to a one-lane roundabout
- Raised medians at the roundabout provide pedestrian crossing access
- Sage Memorial Hospital entrance converted to a right-in, right-out only
- Pedestrian facilities are located throughout
- Raised medians provide a safe refuge area for pedestrians crossing the road
- Crosswalks are incorporated on all legs of the intersection
- Incorporates ADA compliant ramps and street lighting

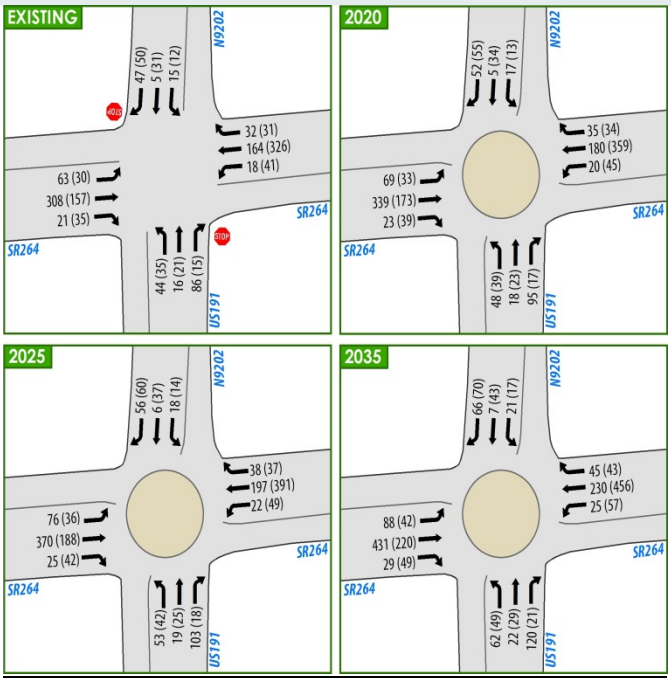
Advantages

- Forces drivers to slow down
- Reduces turning-movement conflicts at Sage Memorial Hospital entrance
- Lesser delays and backups at the intersection
- Provides opportunities for landscaping

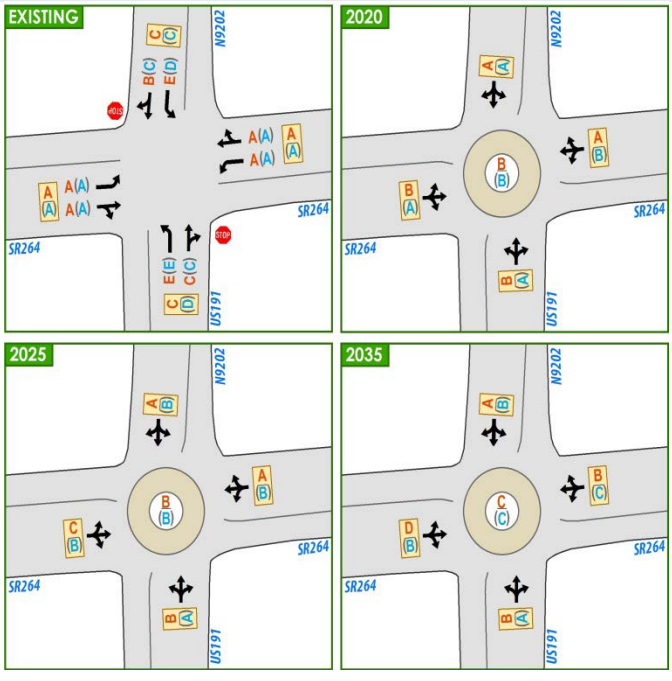
Disadvantages

- May require additional ROW
- High implementation costs
- Might need to be reconstructed if road is widened to four lanes
- Drivers unaccustomed to roundabouts may find the roundabout confusing

Traffic Volume



Level of Service



POTENTIAL PEDESTRIAN, BICYCLE, AND TRAIL IMPROVEMENTS

Alternative modes of transportation such as sidewalks, bike paths/routes, and trails (including equestrian) are an important aspect of the multimodal transportation network as they provide mobility for those not able to operate or without access to a vehicle, and also for recreational purposes. At the onset of the study, community members, stakeholders, and the TAC, all expressed interest in enhancing existing pedestrian facilities to allow pedestrians to safely walk between residential areas and activity centers. Developing a community-wide pedestrian and bicycle network can lead to many benefits, including:

- Lowering traffic congestion by reducing dependence on automobiles
- Enhancing residents quality of life through promoting healthier lifestyles
- Providing mobility for those without a vehicle or are unable to drive
- Improving community aesthetics while preserving the natural environment

According to the FHWA's *Engineering Measures for Improved Pedestrian Safety*, "walking along the roadway" crashes are reduced by 88% when sidewalks/walkways are constructed on both sides of a roadway. Table 5.5 and Figure 5.3 provide an overview of potential pedestrian, bicycle, and trail facilities that could enhance the study area's existing transportation network.

Figure 5.3. Pedestrian, Bicycle, and Trail Improvements

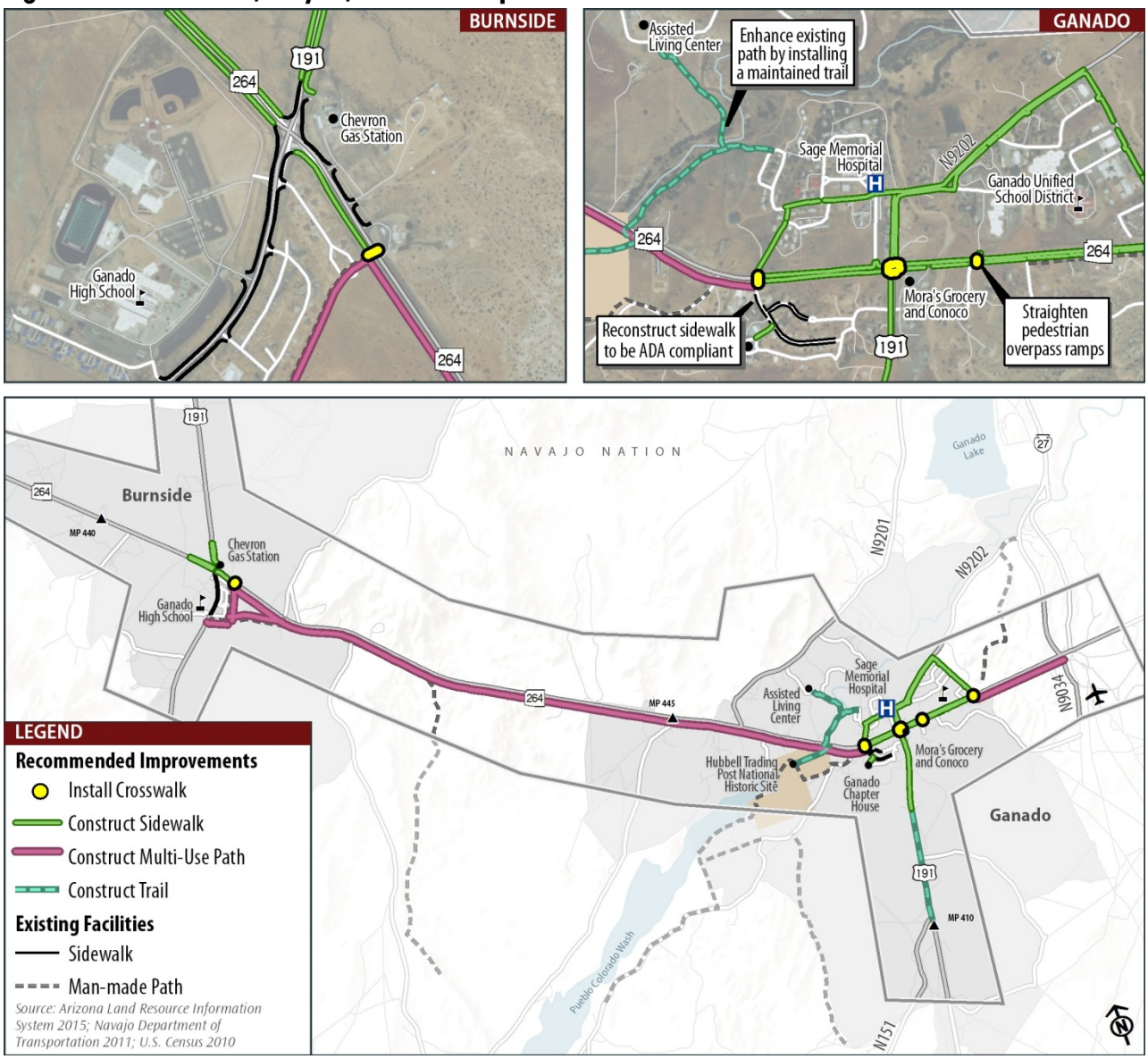


Table 5.5: Pedestrian, Bicycle, and Trail Improvement Options

Pedestrian Facility	Considerations	Applicable Locations	Illustration
Sidewalk Only	• Pedestrians have safe buffer zone from motor vehicles • Provides opportunity to enhance streetscaping	• SR 264 (West of US 191 North intersection to Mustang Gas Station) • SR 264 (Cedar Hills Road to County Road 420) • N9202 • County Road 420 • N 15 (South of SR 264 intersection) • Cedar Hills Road • Ganado Chapter House Road • US 191 (SR 264 to Ganado Cemetery) • Sage Memorial Hospital (Cedar Hills Road to N9202) • US 191 (North of SR 264)	
Asphalt shared-use-path offset from roadway	• Offset sidewalk provides a safe buffer zone from motor vehicles • Can be utilized by multiple modes, including bicyclists, in-line skaters, wheelchair users, etc. • Minimizes potential crossing conflicts with motor vehicles • Provides opportunity to enhance streetscaping	• SR 264 (Mustang Gas Station to Cedar Hills Road) • SR 264 (County Road 420 to N27) • Mustang Gas Station connecting to N15 south of NHA Housing development	
Scenic Trail	• Pathway that provides educational or scenic amenities • Promotes tourism • Increased construction and maintenance costs	• Hubbell Trading Post to the Assisted Living Center along the Ganado Wash connecting to Sage Memorial Hospital	
Unpaved, multi-use trail	• Trailside amenities provide additional recreational opportunities • Increased installation and maintenance costs	• US 191 (Ganado Cemetery to N151)	

POTENTIAL TRANSIT FACILITY IMPROVEMENTS

Successful transit systems open economic opportunities for local residents and businesses, enable residents without access to a transportation mode, link neighboring destinations, and generally enhance the quality of life of residents and the economic vitality of rural communities. Transit systems are comprised of the transit routes as well as the facilities that service the transit route and riders. Since the overall design of a transit stop affects operations and system efficiency, it is imperative that the design of a transit facility balance safe and convenient access with functionality. Factors to consider when identifying the location of a transit stop include operational issues, such as potential conflicts with motor vehicles; passenger accessibility; safety conditions; and ridership potential.

The Navajo Transit System (NTS) currently provides transit services within, to, and from the Ganado/Burnside study area. At present, the NTS provides services from three separate locations; however, the transit stops lack proper amenities. Table 5.6 provides an overview of potential transit facilities that could enhance the study area's existing transit network.

Table 5.6. Transit Facility Options

Pedestrian Facility	Considerations	Applicable Locations
Curbside Bus Platform 	• Minimum requirements of a bus stop are a sign and a clear, firm, and stable slip-resistant surface for boarding and lighting • Limited or no driveways should be located near the stop • Needs adequate curb space for the bus to pull out	• School and transit bus stops along SR 264 • Near the Ganado Primary School and Ganado High School • Mustang Gas Station
Bus Pullout 	• Reduces disruption of traffic along the roadway and increases passenger safety • More expensive and are often more difficult to locate than curb-side bus stops	• School bus stops along SR 264 • Mustang Gas Station
Bus Shelters 	• Provides a safe area of protection for passengers • Must meet ADA requirements • Shelters that only include a roof, no walls, provide little protection from the wind but are easier to maintain • Metal structures anchored to foundations can be relocated as needed (image on left)	• Mustang Gas Station • Ganado Chapter House • US Post Office

PRIORITIZATION OF IMPROVEMENT OPTIONS

Evaluation Criteria

Transportation system deficiency analysis and input from the public, stakeholders, and the TAC resulted in a comprehensive list of existing and future transportation issues and needs. Potential improvements identified were evaluated and prioritized to determine the projects/improvements that best serve the needs of the Ganado/Burnside area. Table 5.7 summarizes the criteria utilized to evaluate and to quantify the benefits of each potential transportation improvement option.

Table 5.7. Evaluation Criteria

Goal	Objective	Evaluation Criteria	Benefit Scale (High ⟷ Low)			
1. Safety	Reduce the number and severity of crashes	1.1: Does the project aid in reducing the number of injury and fatal crashes?	High	Med	Low	N/A
		1.2: Does the project improve safety in a high-crash location?	High	Med	Low	N/A
		1.3: Will the project reduce pedestrian and bicycle crashes?	High	Med	Low	N/A
	Ensure effective emergency response	1.4: Does the project improve emergency response times?	High	Med	Low	N/A
2. Infrastructure Preservation	Improve infrastructure reliability	2.1: Will the project enhance a critical corridor in the local or regional transportation network?	High	Med	Low	N/A
	Extend the life of existing infrastructure	2.2: Does the project contribute to the sustainability of current infrastructure?	High	Med	Low	N/A
3. Mobility and Accessibility	Reduce congestion and bottlenecks for all modes	3.1: Does the project aid in reducing congestion and improving travel times?	High	Med	Low	N/A
	Provide transportation mode options	3.2: Will the project provide transportation choices to community members without an automobile?	High	Med	Low	N/A
		3.3: Does the project improve or expand access to employment or activity centers?	High	Med	Low	N/A
4. Economic Development	Support current development and encourage economic growth	4.1: Is the project consistent with planned improvements and developments?	Yes	-	No	N/A
		4.2: Does the project enhance opportunities for development, tourism, or recreation?	Yes	-	No	N/A

Table 5.7. Evaluation Criteria (continued)

Goal	Objective	Evaluation Criteria	Benefit Scale (High ⟷ Low)			
5. Health, Environment, and Livability	Promote community health	5.1: Does the project provide facilities for residents to engage in physical activity?	Yes	-	No	N/A
	Protect natural and cultural environment	5.2: Does the project negatively impact the natural and cultural environment?	No	-	Yes	N/A
		5.3: Will the project require extensive environmental reviews/documentation?	No	-	Yes	N/A
	Improve quality of life	5.4: Does the project make positive contributions to quality of life, health, and liveability?	Yes	-	No	N/A
	Minimize negative impacts on Title VI population groups	5.5: What type of impacts will be imposed on protected Title VI population groups?	Positive	Neutral	Negative	N/A
6. Implementation Feasibility	Funding potential	6.1: Is the project included in the TTIP or the Tribal Transportation Priority List?	Yes	-	No	N/A
	Cost effectiveness and affordability	6.2: Does the project have reasonable capital costs to ensure construction feasibility?	Low	Med	High	N/A
		6.3: Does the project require high on-going operations or maintenance support?	Low	Med	High	N/A
7. Community Support	Reflects community vision	7.1: Does the project have documented local government or public support?	High	Med	Low	N/A

Improvement Project Prioritization

Capacity related and non-capacity improvement options were identified and evaluated based on the evaluation criteria presented in Table 5.7. Potential improvements were evaluated and prioritized to determine the projects/improvements that best serve the needs of the Ganado/Burnside study area, Navajo Nation, and Apache County District II. Working Paper 2 provides a detailed overview of the criteria utilized to quantify the benefits of each improvement option. Based on the results of the evaluation, projects were prioritized into short-, mid-, and long-term implementation phases:

- **Short-term (2015-2020) –** Short-term projects are typically projects needed to address the most critical needs and deficiencies and have a reasonable potential for obtaining funding. Short-term projects also include projects currently programmed in the Tribal Transportation Improvement Plan (TTIP) or State Transportation Improvement Plan (STIP).
- **Mid-term (2020-2025) –** More complex projects that improve safety, expand mobility and access, or address future development needs.
- **Long-term (2025-2035) –** High cost projects that require additional time to obtain funding or are not needed until build-out conditions.

For each project, planning level cost estimates were also developed based on typical per mile/foot construction costs in 2015 dollars.

6. STAKEHOLDER AND PUBLIC INPUT

Public involvement is essential to the broad acceptance and successful implementation of any transportation improvement plan. The goal of community outreach is to educate the public about the study, provide opportunities for input, and to create a process to build consensus in support of study recommendations. For this study, Phase 1 of the outreach focused on current transportation issues, problem areas, and needs; and Phase 2 focused on improvement recommendations for the problem areas identified in the first phase. This chapter presents public outreach efforts conducted during the first phase and stakeholder outreach efforts conducted during the second phase.

PUBLIC OUTREACH

Public involvement is the process of involving the public throughout the transportation planning process through meaningful communication with interested citizens. To ensure that transportation decisions reflect the public's best interests, public involvement is a critical component of the transportation planning process. To engage the public, the study work plan includes two public meetings to inform, discuss, and to seek input. Additionally, a project website was developed and hosted by ADOT to enable citizens and the public to access study documents and to submit comments or questions.

Phase 1 of public outreach efforts introduced the project to the public with a focus on existing and future conditions. The purpose of the meetings was to discuss the deficiencies and needs of the study area, and elicit input on the public's "vision" for the future for the Ganado/Burnside area. Phase 2 presented the draft transportation improvement plan in order to receive feedback and fine tune the study recommendations.

Each meeting commenced with a brief presentation and oversized boards were displayed to further communication information and to generate conversation between the public and study team members. Comment forms were also provided to each meeting attendee in order to obtain feedback and to document public input.

Phase 1

The Navajo Nation Ganado Chapter, Apache County District II, ADOT, and the study team hosted the first of two public meetings on May 27, 2015 at the Ganado Chapter House. In total, there were 29 participants at the meeting, not including study team members. The meeting commenced with a brief presentation of the study background, purpose of the meeting, study goals and objectives, summary of existing and future conditions, and key issues identified by the study team. Key comments received during the meeting included:

- Walking is a major mode of transportation and public health concern and proper facilities need to be developed to accommodate pedestrians.
- Existing major transportation issues in the area include:
    - High speed vehicles on SR 264 and US 191.
    - SR 264/US 191 South intersection experiences heavy traffic conditions throughout the day.
    - Dirt roads are not passable after adverse weather.
    - School buses do not have proper pullouts along SR 264.
    - Lack of safe shoulders, sidewalks/walking paths, street lighting, and crosswalks.
- Desired improvements on study roadways include:
    - Widen SR 264 to four-lanes and install turning lanes onto N9034.

- Intersection improvements are needed at the SR 264/ US 191 South intersection, including either converting the intersection to traffic signal or roundabout, installing pedestrian facilities, and installing street lighting. Five attendees preferred a roundabout and four attendees preferred a traffic signal at the intersection.
- Intersection warning device along US 191 South approaching Ganado.
- Longer turn lane and school zone signs along SR 264 near the Ganado Primary School.
- Crossing needed east of Burnside roundabout where the school bus stops.
- Additional transit stops are needed throughout the study area.
- Offset multiuse path along SR 264 Burnside Junction and Ganado to promote health and to improve pedestrian safety.

Technical Memorandum 2: Public Involvement Summary Report 1 provides a comprehensive summary of the first public meeting.

Phase 2

A second public meeting was hosted on September 30, 2015 at the Ganado Chapter House. The purpose of the meeting was to elicit input and feedback from the public on recommended improvement projects for the next 5, 10, and 20 years. In total, there were 36 members of the community present. A brief presentation was given and a comment form was provided to each attendee. The presentation provided an overview of the existing deficiencies and outlined recommended improvement projects. Oversized boards were displayed to illustrate the location of recommended improvements and to encourage conversation between the public and the study team. Comment forms provided to the attendees asked for feedback on intersection improvements, traffic calming measures, safety enhancements, and pedestrian/bike/trail improvements. Key comments received during the meeting included:

- The majority of participants were in favor of upgrading SR 264 to four lanes; however, many recommended widening the roadway in the short-term.
- Ten out of 18 comment forms received were in favor of upgrading the SR 264/US 191 intersection to a traffic signal. Proponents of the traffic signal stated that people are more likely to follow instructions of a stop light and that roundabouts are difficult to navigate for large vehicles. Supporters of the roundabout commented that a roundabout is the safer option and would force vehicles to slow down as they enter Ganado.
- Comments were received expressing concern that overweight vehicles have negative impacts on the local roadway network and that the vehicles have difficulty navigating roundabouts.
- Installing traffic calming measures, gateway treatments, and street lighting were highly favored by meeting attendees.
- Attendees were highly in favor of constructing multi-use paths and sidewalks to increase pedestrian safety and to encourage physical activity.
- Several participants commented that straightening the Ganado Unified School District pedestrian overpass may encourage pedestrian usage. One attendee also recommended installing a pedestrian overpass at the Ganado High School in Burnside.
- Comments were received suggesting that Park-n-Rides should be considered as part of the improvements, notably at the new shopping center and at the US Post Office.

Technical Memorandum 3: Public Involvement Summary Report 2 provides a comprehensive summary of the second public meeting.

AGENCY/STAKEHOLDER COORDINATION

To facilitate agency and stakeholder communication, the study team conducted meetings with the following groups:

- Technical Advisory Committee (TAC): Comprised of agency representatives, TAC meetings are held at key milestones throughout the project and allow agencies with vested interest in the project an opportunity to provide input and feedback.
- Stakeholders: These meetings help the study team understand the issues, concerns, and needs of the study area from the unique perspective of the stakeholders. Stakeholders for this study include utility companies, schools, fire and police, local Tribal staff, local business owners, and persons with vested interest in the project.

Phase 1

To develop a thorough understanding of the issues, deficiencies, and needs, the study team identified and interviewed a core group of stakeholders. Stakeholders for this study included utility companies, schools, fire and police, local tribal staff, local business owners, and persons with vested interest in the project. The first set of stakeholder interviews were conducted on March 3, 2015. A questionnaire was distributed to each stakeholder meeting and was followed up with an open discussion. These meetings helped the study team understand the issues, concerns and needs of the study area from the unique perspective of the stakeholders. Key comments received during the meetings included:

- Intersection safety is important to the residents due to high vehicle speeds and pedestrians.
- Pedestrian trails and sidewalks are needed both within Ganado/Burnside and between them.
- The bridge across Ganado Wash is too narrow for pedestrians and bicyclists, therefore people need to cross into vehicle lanes to go over the bridge.
- Lighting is needed throughout the study area to increase pedestrian and motorist safety.
- Although transit is available, it is often crowded.
- Speeding is an issue throughout the study area, and traffic calming is needed at entryways to the communities.
- Intersection warning signs are needed on N27 and other intersections.
- Insufficient animal mitigation infrastructure is allowing animals to cross into roadways.
- Turning lanes are needed to increase safety.
- Future improvements are planned that will impact traffic flow, such as Sage Memorial Hospital expansion, housing growth, commercial development in Burnside, and Ganado Airport renovation.
- New gas line is planned by NTUA between Ganado and Burnside.
- Four-lane highway needed to alleviate congestion.
- N9201 is plagued with issues regarding road integrity and safety during inclement weather; vehicles have trouble reaching Ganado Assisted Living Center.

Stakeholder Summary Report 1 provides a detailed list of the stakeholders, questionnaire distributed during the meeting, and a summary of the comments received.

Phase 2

The Navajo Nation Ganado Chapter, Apache County District II, ADOT, and the study team hosted a second set of meetings for stakeholders to provide input on improvements scenarios and to discuss improvement project phasing strategies. The meetings were held on August 11, 2015 at the Ganado Chapter House Conference Room. A questionnaire was also provided to each stakeholder. Key comments received during the meetings included:

- ADOT currently has the addition of 5 FT shoulders along SR 264 programmed for construction in 2016. Attendees commented that adding 8 FT shoulders to the road prism should be constructed now so the additional 3 FT of shoulder can be paved at a later date.
- US 191 is scheduled for re-paving.
- Ganado Airport is currently in the process of updating their Master Plan.
- The Holbrook District recommends that within the developed area of Ganado and Burnside that the street cross-section be altered to include curb and gutter and a sidewalk adjacent to the roadway.
- Raised rumble strips, raised crosswalks, and center islands on state highways should be reconsidered due to their impacts on snow plow operations.
- Attendees commented that motorists driving on US 191 South often are confused on how to continue onto US 191 North.
- Attendees approved of installing radar flashing speed signs, particularly in school zones; however, attendees also commented that ADOT Traffic Section may have a concern with flashing lights on a state highway.
- The straightening out of the Pedestrian Overpass on SR 264 was strongly supported by attendees. Attendees also recommended incorporating Gateway treatments to the overpass with the help of students, thereby giving them a sense of ownership and pride.
- Pedestrians and hitch hikers heavily utilize SR 264; therefore, pedestrian facilities, school bus pullouts, and shoulders need to be incorporated to improve safety along the corridor.
- Installing street lighting and street addressing signs was also supported. The Navajo Department of Transportation is conducting a street addressing system that should include street name sign recommendations.
- Proposed pedestrian and multi-use trail improvements were strongly endorsed. One attendee recommended utilizing magnesium chloride on trails, which was successfully utilized in Tsaile.
- It is recommended that the Chapter hire a Planner to assist in future funding applications and planning activities. Additionally, attendees recommended working with Community Development to combine funding resources.

Stakeholder Summary Report 2 provides a detailed list of the stakeholders, questionnaire distributed during the meeting, and a summary of the comments received.

7. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONCERNS

Inventory of the physical, natural, and cultural environment is an important component of the transportation planning process. When environmental conditions and concerns are reviewed in the early stages of the transportation planning process, transportation solutions can be developed to avoid or lessen the negative impacts on the natural environment. This chapter presents a review of environmental conditions within the study area.

TOPOGRAPHY AND GEOLOGY

Located between Balakai Mesa and Defiance Plateau, the study area is located at the southern tip of Ganado Mesa. The study area elevation ranges from 6,300 to 6,800 feet and encompasses a terrain with numerous hills. The majority of the study area is comprised of geological type Late Triassic (TrC) but also includes Pliocene to middle Miocene (Tsy), Holocene to latest Pleistocene (Qy), and Holocene to middle Pleistocene (Q). According to the Arizona Geological Survey (AZGS), TrC consists of colourful mudstone, such as in the Painted Desert, and less abundant lenses of sandstone conglomerate, deposited by large river systems. This unit typically is eroded into badlands topography and contains clays that are prone to shrink and swell.

Recommendations for Further Analysis

A geotechnical evaluation of soils will need to be conducted during the design phase of project implementation for roadway reconstruction, roadway widening, and realignment projects to determine pavement, slope protection, and structural needs. An analysis of drainage needs will also need to be performed during the design phase for improvements on Cedar Hills Road, N15, and when paving unpaved roadways.

VEGETATION

The Ganado/Burnside study area contains the following vegetation communities:

- Great Basin Desertscrub - dominated by the presence of sagebrush, blackbrush, shadescale, and grasses
- Great Basin Conifer Woodland - mainly comprised of medium sized conifers, the pinyon pine and juniper
- Plains and Great Basin Grassland - primarily composed of mixed or short-grass communities

No formal inventory of native plants was conducted; however, native plants may occur within the study area. Native plants include the Navajo Mountain phlox, Navajo sedge, a variety of cacti, and numerous tree species. The Navajo Natural Heritage Program (NNHP) maintains a comprehensive database of rare and protected plants on the Navajo Nation. According to the NNHP, there are 63 sensitive plant species in the Navajo Nation, of which 19 are classified as endangered. As improvements are identified during the next phase of the study a detailed review will be conducted to identify impacts on protected plant species. Figure 7.1 illustrates the vegetation communities present within the study area.

Recommendations for Further Analysis

Since recommended improvement projects are located along existing corridor, impacts to vegetation may be minimal; however, any roadway widening, reconstruction, or sidewalk/trail construction project has the potential to affect native plants. During the design phase, a detailed review will need to be conducted by the NNHP to identify impacts on protected plant species. Consideration during the design phase should be given to protecting native vegetation.

THREATENED AND ENDANGERED SPECIES

For the Navajo Nation, the NNHP collects, manages, and disseminates rare, threatened, and endangered species information for land-use planning to promote conservation. The Arizona Game and Fish Department (AGFD) Heritage Data Management System (HDMS) was accessed to determine special state species and threatened, endangered, and candidate species in the vicinity of the study area. Utilizing the HDMS online retrieval system, the following biological resources were identified:

- Critical habitat for Zuni bluehead sucker - northeast of the study area. In 2015, the US Fish and Wildlife Service extended the determination of the Zuni bluehead sucker as an endangered species.
- Section 10(j) area for the California condor – south of SR 260 and west of US 191 North. A Section 10(j) designation allow for the reintroduction of populations of listed species as "experimental populations" to determine if the experimental population is "essential" or "nonessential" for the continued existence of a species.

Recommendations for Further Analysis

Since recommended improvement projects are located along existing corridor, impacts to biological resources may be minimal. During the design and environmental overview phase of project implementation, a detailed biological analysis will need to be conducted to determine the specific presence/absence of projected species and potential mitigation measures by the NNHP. During the design process, coordination will need to occur with the NNHP, AZGFD, Apache County District II, and the Navajo Nation to incorporate elements to protect wildlife from roadway traffic and to allow for the safe wildlife movement across the study area. On-going communication is also recommended between the Ganado Chapter, Navajo Nation, AGFD, NNHP, and Apache County District II to coordinate mitigation measures to protect all environmentally sensitive species in the area during the construction phase.

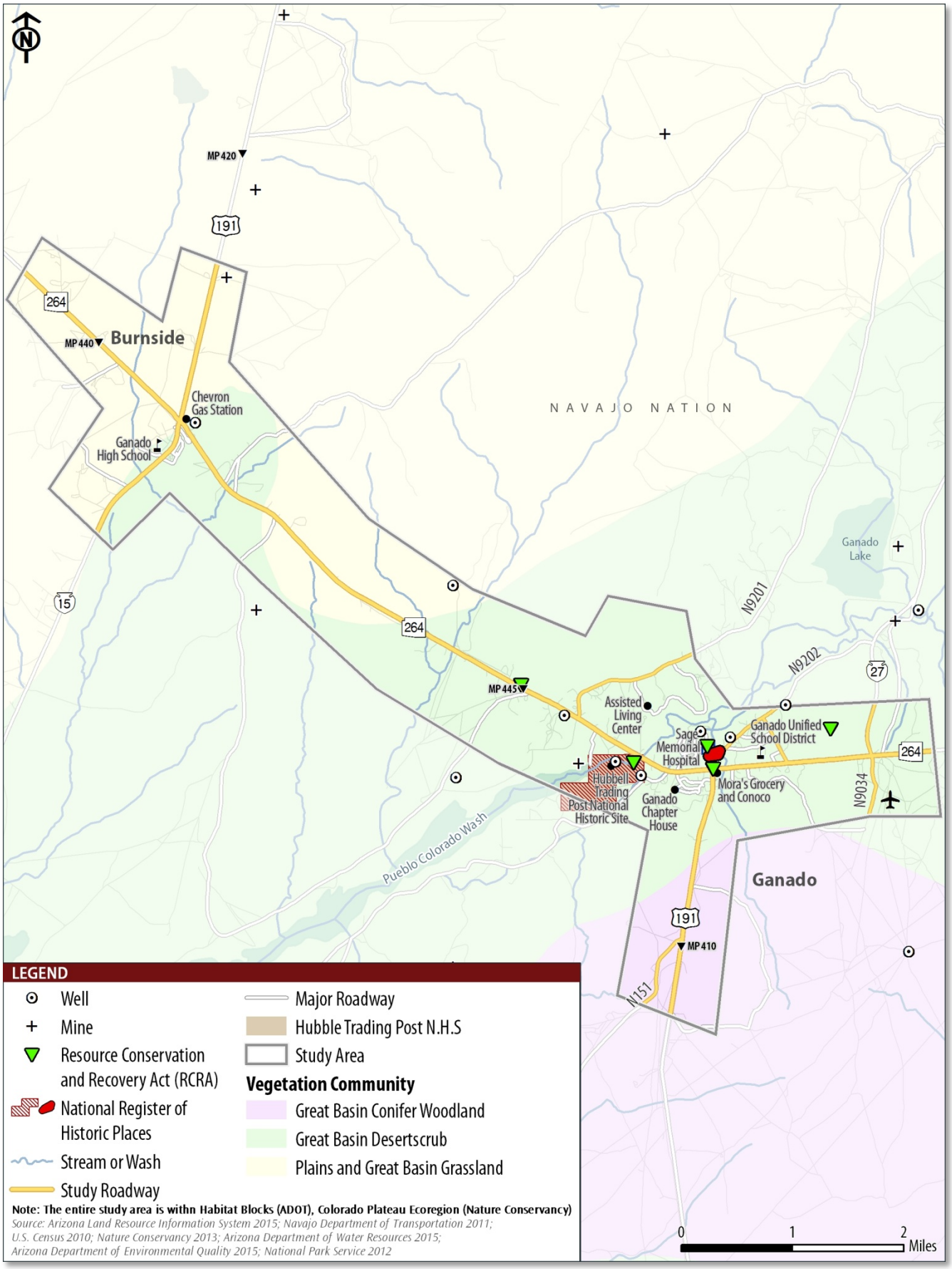
HYDROLOGY

Within the study area there is one major hydrological feature, Pueblo Colorado Wash, which runs northeast adjacent to the Hubbell Trading Post National Historic Site. After passing under the SR 264 Bridge, the wash continues between the Ganado Assisted Living Center and Sage Memorial Hospital. The U.S. Army Corps of Engineers (Corps) is authorized by Congress to provide flood protection, environmental stewardship, and civil works construction on the Reservation. Although flooding often occurs on the Navajo Nation, no federally sponsored flood control projects using the authority granted to the Corps have been constructed.

Floodplains

The Federal Emergency Management Agency (FEMA) has not conducted an official flood study of the Reservation to determine potential flood hazards; however, during the roadway inventory, flooding and drainage issues were identified on unpaved roadways throughout the study area.

Figure 7.1. Environmental Overview

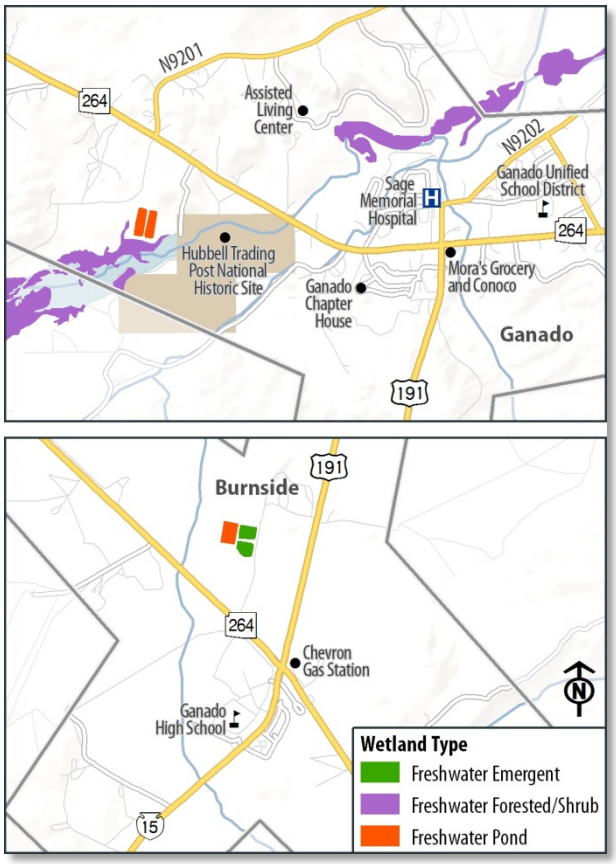


Wetlands

The United States Fish & Wildlife's National Wetlands Inventory indicates the following wetlands may be present in the study area:

- Freshwater forested/shrub wetlands may border the Pueblo Grande Wash
- Freshwater emergent wetlands may be present northwest of the SR 264/US 191 North intersection
- Freshwater pond wetlands may be present northwest of the SR 264/US 191 North intersection

Wetlands are defined by the Environmental Protection Agency (EPA) as lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Wetlands typically are areas where water covers the soil or is present at/near the surface of the soil year-round or during varying periods throughout the year.



Wells

Based on Arizona Department of Environmental Quality (ADEQ) and Arizona Department of Water Resources (ADWR) Well 55 database, there are eight wells within the study area. In Burnside, one well is located by the Burger King/Chevron Gas Station commercial area. Wells in Ganado are located near the Hubbell Trading Post, Sage Memorial Hospital, and at the Ganado Unified School District.

Figure 7.1 shows the locations of the wells, and hydrological features surrounding the study area.

Recommendations for Further Analysis

A drainage analysis will need to be conducted during the design phase of roadway widening, roadway paving, and realignment projects to determine the degree of impacts on the area's hydrological features and to identify potential mitigation measures. Control measures to alleviate flooding along Cedar Hills Road, Chapter House Road, and N15 will also need to be identified during the design phase. Coordination with the USFWS and EPA to identify and to incorporate elements that protect wetlands in and around the study area should also be conducted during the design phase. Furthermore, landscaping considerations should be given to incorporate low-water-use or desert adaptable planting that is consistent with EPA guidelines.

PRIME AND UNIQUE FARMLANDS

The Ganado/Burnside study area is in the Natural Resources Conservation Service's (NRCS) Soil Survey Geographic (SSURGO) database soil survey area AZ 715. According to the NRCS survey, the study area contains no soils that support prime or unique farmlands or farmlands of statewide or local importance.

Recommendations for Further Analysis

Recommended improvement projects are located along existing corridor and there are no prime or unique farmlands are located in the study area; therefore, impacts to farmlands are minimal.

NOISE IMPACTS

Maintaining accepe levels to preserve the character of open spaces, residential quiet zones, and recreational facilities should be considered when selecting a potential transportation improvement project. Schools, hospitals, residential development, and community uses requiring low noise levels are included in the list of potential noise-sensitive receptors.

There are numerous existing noise-sensitive receptors within the study area, including schools, Sage Memorial Hospital, community centers, religious facilities, and residential and housing communities. Potential future noise-sensitive receptors include possible Sage Memorial Hospital relocation facility, new residential and commercial developments, and the planned Apache County District II Administration Office. Potential noise generators within the study area include the major paved roadways, and the helicopter landing pad for the Sage Memorial Hospital. Future noise impacts may occur as a result of improvements on the airport adjacent to N9034 and as a result of commercial development.

Recommendations for Further Analysis

A detailed noise analysis study would need to be conducted to identify if potential noise levels exceed FHWA noise thresholds. During the design phase of roadway widening and roadway construction projects, noise-sensitive receivers should be modeled using the FHWA's approved Traffic Noise Model version 2.5 (TNM2.5) and validated against field measurements. Traffic noise impacts may occur as a result of future development; therefore, noise abatement measures should be assessed for all affected noise-sensitive receivers. Additionally, development of the Ganado Airport may significantly impact noise levels in the study area. Coordination will need to occur between the Ganado Chapter, Navajo Nation, FHWA, Ganado Airport, and Apache County District II to ensure that developments comply with ordinances and noise policies.

AIR QUALITY

Based on data provided by the ADEQ, air quality in the study area meets the National Ambient Air Quality Standards (NAAQS) set forth by the Clean Air Act (CAA) for criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO2), ozone, particulate matter less than or equal to 2.5 microns or 10 microns (PM2.5 and PM10, respectively), and sulfur dioxide (SO2).

Recommendations for Further Analysis

Increased motor vehicle and airport activity may impact air quality levels as development occurs within the Ganado/Burnside area; therefore, mitigation measures should be assessed to minimize air quality impacts. During the project implementation phase, proposed improvements along roadway corridors will require a detailed evaluation to identify the impacts with respect to the increase and decrease in criteria pollutants and mobile source air toxins. Coordination will need to occur between ADEQ, Ganado Chapter, the Navajo Nation, and Apache County District II to ensure that any proposed improvements comply with EPA ordinances and policies for air quality.

UTILITIES

The Navajo Tribal Utility Authority provides the Ganado/Burnside study area with a full range of utilities including electricity, water, wastewater, and natural gas. Navajo Sanitation also provides residential and commercial trash removal to the Ganado Chapter. Telephone service is provided by Navajo Communications Company, Inc., and cellular telephone service is available through private cellular companies. Stakeholders commented that a new natural gas line and a 4G cellular tower are planned to be constructed in the study area in the near future. Stakeholders also verified that telecommunications and gas utility lines are located on the north side of SR 264.

Recommendations for Further Analysis

The proposed improvements are primarily consistent in scope and scale of current facilities; however, during the design phase of roadway widening, sidewalk installation, and roadway paving additional investigations need to be made concerning the degree of impacts and to see if any relocation or service interruptions would need to be made. Coordination between utility companies, ADOT, Apache County District II, and the Ganado Chapter is imperative during the pre-design and design phase of project implementation.

HAZARDOUS MATERIALS

A regulatory database review of federal and state hazardous material databases was evaluated to identify the presence of hazardous materials in the study area. The review of the environmental databases revealed the following potential hazardous material sites:

- One Large Quantity Generator (LQG)
- Three Conditionally Exempt Small Quantity Generators (CESQG)
- Two Small Quantity Generator (SQG)
- Two National Pollutant Discharge Elimination System (NPDES) permits
- No superfund, solid waste landfills, or hazardous waste treatment, storage, and disposal (TSDFs) are located within the study area.

Recommendations for Further Analysis

The proposed improvements are primarily consistent in scope and scale of current facilities. A detailed evaluation based on right-of-way needs should occur during the DCR/EA phase of project development for any roadway widening, sidewalk installation, and roadway paving project. A corridor-level Preliminary Initial Site Assessment (PISA) will need to be conducted during the project design phase to identify issues and constraints related to hazardous sites in the area immediately adjacent to the corridor.

VISUAL RESOURCES

The visual character of the study area varies from open land with rolling hills, developed residential areas, and densely located commercial, public, and educational facilities. Owned and operated by the National Park Service, efforts should be made to preserve vistas and scenic resources surrounding the Hubbell Trading Post. No designated scenic roads or byways are located in the study area. In addition, the study area does not include land owned by the Bureau of Land Management, which is subject to a visual resource management system (VR) that assess the scenic value of an area and then establishes management objectives based on an acceptable level of visual preservation or disturbance.

Recommendations for Further Analysis

The proposed improvements are consistent in scope and scale with the current facility, adjacent land use, and the visual character of the communities. Vegetation removal and aesthetic treatment/landscaping should coordinate with the vision of the communities and follow ordinances set forth by the Navajo Nation, Apache County District II, and the Ganado Chapter. Where applicable, design consideration should be given to provide for vistas from the roadway and to incorporate cohesive planting design that allows for views of the surrounding landscape.

CULTURAL RESOURCES

Cultural resources are properties that reflect the heritage of local communities, states, and nations. Properties judged to be significant and to retain sufficient integrity to convey that significance are termed "historic properties" and are afforded certain protection in accordance with state, federal, and tribal legislation. The National Historic Preservation Act (NHPA) of 1966, as amended, defines historic properties as any prehistoric or historic sites, buildings, structures, districts (including landscapes) and objects included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Traditional cultural properties having heritage value for contemporary communities (often, but not necessarily, Native American groups) also can be determined eligible for, and listed in, the NRHP because of their association with historic cultural practices or beliefs that are important in maintaining the cultural identities of such communities.

Section 106 of the NHPA requires federal agencies to consider the potential effects of their undertakings on historic properties. Effects can be direct and result in physical alteration to the property, or indirect, as when the characteristics that qualify the property for NRHP listing are altered as a result of visual, auditory, or atmospheric intrusions. To be considered eligible for listing in the NRHP, a property must retain integrity of location, design, setting, materials, workmanship, feeling, and association and must also meet at least one of the following criteria:

- Criterion A - Associated with events that have made a significant contribution to the broad patterns of our history; or
- Criterion B - Associated with the lives of persons significant in our past; or
- Criterion C - Embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction; or
- Criterion D - Has yielded, or may be likely to yield, information important in prehistory or history

For this study, cursory archival research was conducted at the Navajo Nation Historic Preservation Department (NNHPD). The NNHPD, which operates under the authority of the Navajo Nation Cultural Resources Protection Act (NN-CRPA), participates as the Tribal Historic Preservation Office in the federal Section 106 review process (described above) on behalf of the Navajo Nation and advises federal, state, and tribal agencies and project sponsors on protection and management of cultural resources in a manner that reflects the unique

preservation concerns of the Navajo Nation. In addition to the NN-CRPA, any projects occurring on Navajo Nation lands require compliance with the following:

- Archaeological Resources Protection Act (ARPA), and
- American Indian Religious Freedom Act (AIRFA).

ARPA of 1979 (43 CRR § 6) has two fundamental purposes:

- To protect irreplaceable archaeological resources on public and Indian lands from unauthorized excavation, removal, damage, alteration, or defacement, and
- To increase communication and exchange of information among governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data that was obtained prior to the enactment of this Act.

ARPA regulations define an archaeological resource as "…any material remains of human life or activities which are at least 100 years of age, and which are of archaeological interest." These qualities must be assessed to determine whether a resource merits the protection provided for under this Act.

AIRFA of 1978 (Public Law 95-341) was passed by Congress to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise their traditional religions, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites. Thus, any site or place (prehistoric or historic) having religious, ceremonial, or sacred aspects or components needs to be evaluated within the context of this law.

The NNHPD records search identified approximately 171 prior cultural resources projects and 55 previously recorded or noted cultural resources in a search area within the general vicinity of Ganado that included segments of US 191, SR 264, N15, N202, N9201, N151, and N9034. Table 7.1 lists the number of cultural resource projects identified along three of the major routes (i.e. US 191, SR 264, and IR 15) in the project area and Table 7.2 lists the previously recorded cultural resources; these sites may require further work, if construction activities occur along study roadways. NRHP eligibility recommendations for the previously recorded cultural resources are unknown at this point in the study.

Table 7.1. Number of Cultural Resources Projects by Route Segment

Route	Segment	No. of Projects[1]
US 191	Ganado Quadrangle map	41
	Ganado Mesa Quadrangle map	13
SR 264	Ganado Quadrangle map (east of US 191 intersection)	42
	Ganado Quadrangle map (west of US 191 intersection)	76
	Ganado Mesa Quadrangle map	10
	Ganado Mesa SW Quadrangle map	38
IR 15	Cornfields Quadrangle map	17

1 Sixty-six of these projects were counted more than once because they overlapped several segments.
Source: Navajo Nation Historic Preservation Department

Table 7.2. Cultural Resources Sites

Site ID	Site ID	Site ID	Site ID	Site ID
AZ-P-13-26	AZ-P-20-24	AZ-P-13-2	NA13599	AZ-P-19-29
CASA-94-24	NA13593	AZ-K-2-3	AZ-P-20-49	19-40
AZ-P-14-7	1	AZ-P-14-1	AZ-P-20-138	AZ-K-6-24
AZ-P-14-6	2	92-11	AZ-P-20-66	Unnamed Great House 1
AZ-P-14-5	AZ-P-20-48	CSWTA-94-19	AZ-P-20-136	Unnamed Great House 2
AZ-P-14-4	Unnamed site	CSWTA-92	AZ-P-20-36	NA11356
526-1247	AZ-P-20-39	AZ-P-20-23	AZ-P-20-38	AZ-P-20-129
Unnamed cemetery	AZ-K-6-24	AZ-K-6-26	AZ-P-20-35	AZ-P-20-127
Wide Reed Ruins	AZ-K-6-29	AZ-P-20-142	AZ-P-20-27	AZ-P-20-144
AZ-P-20-9	AZ-K-5-25	AZ-P-20-143	AZ-P-20-153	AZ-P-20-141
NA13600	AZ-K-6-49	Hubbell Trading Post National Historic Site	AZ-P-20-157	AZ-P-20-129

Source: Navajo Nation Historic Preservation Department

Recommendations for Further Analysis

As project planning progresses, additional cultural resources research and inventory will be required to identify impacts on cultural resources. Efforts to obtain specific eligibility criteria and to arrive at definitive eligibility assessments, including assessing whether the portions of eligible properties subject to potential effects are contributing or non-contributing, also is required. It is probable that an agreement document (a memorandum of agreement or a programmatic agreement) will be developed to demonstrate Section 106 compliance. When a preferred alternative is defined, the lead agency would need to determine what effect construction of that alternative will have on historic properties. The three possible effect determinations are "no historic properties affected," "no adverse effect," and "adverse effect."

Historic properties that are on or near the preferred alternative are not always subject to adverse effects. Various strategies can be employed to completely avoid effects or to ensure that effects are minimized and therefore not adverse. If it is determined that historic properties would be adversely affected, it would be necessary to identify mitigation measures to ameliorate those effects to the extent possible. Such measures can include data recovery of archaeological sites and documentation of historic buildings and structures. If adverse effects to cultural resources valued for in-place preservation (typically those determined eligible under Criteria A, B, or C) cannot be avoided, a Section 4(f) alternatives evaluation would be required to explore the potential for a prudent and feasible alternative that would not result in a Section 4(f) use.

When project alternatives and an area of potential effects (APE) have been identified, impacts on historic properties would need to be evaluated. In addition, it would be necessary to conduct cultural resource surveys, according to current Arizona State Museum guidelines, for all portions of the APE that have not been previously surveyed or that were surveyed 10 years or more prior.

SECTION 4(F) AND SECTION 6(F) RESOURCES

Section 4(f) of the US Department of Transportation Act of 1966 and the Section 6(f) of the Land and Water Conservation Fund (LWCF) Act are intended to protect the nation's recreational resources from significant transportation-related impacts. Section 6(f) is a component of the LWCF Act of 1965 that protects recreational properties acquired or developed with LWCF Act funds that could be affected by transportation projects. No Section 6(f) properties have been identified in the study area.

Section 4(f) stipulates that the FHWA and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless there is no feasible alternative or the projects include all possible planning to minimize harm to the property. The "use" of Section 4(f) is defined in CFR Title 23, Part 771.135(p) as:

- When property is permanently incorporated into a transportation facility;
- When there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose; or
- When there is a constructive use of a Section 4(f) property. A constructive use of Section 4(f) resource occurs when the proximity impacts of a proposed project adjacent or nearby a Section 4(f) property results in a substantial impairment to the property's activities or features that qualify a resource for protection under Section 4(f).

A historic site is considered a Section 4(f) property if it is eligible for the National Register of Historic Places (NRHP) under Criterion A, B, or C if the site is associated with events that have made a significant contribution to the broad patterns of our history, associated with the lives of persons significant in our past, or embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a significant distinguishable entity whose components may lack individual distinction. Potential Section 4(f) properties within the study corridor proximity include:

- Hubbell Trading Post National Historic Site (NRHP)
- Sage Memorial Hospital (NRHP)
- Ganado Unified School District Gymnasium
- Ganado Pavilion
- Rodeo Grounds

Recommendations for Further Analysis

The proposed improvements are primarily consistent in scope and scale of current facilities; therefore, impacts to Section 6(f) and Section 4(f) properties are minimal.

ENVIRONMENTAL JUSTICE REVIEW (TITLE VI)

Title VI of the Civil Rights Act of 1964 and related statutes ensure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dictates that programs, policies, and activities identify and address, as appropriate, disproportionately high adverse human health and environmental effects on minority and low-income populations. Protected populations considered in this analysis include: minority, elderly, low-income, and disabled populations. Detailed analysis of the environmental justice conditions based on Census 2010, ACS 2006-2010, and Census 2000 data can be found in Working Paper 1. Key findings noted in Working Paper 1 include:

- *Population Age 65 and Older* - Within the Ganado/Burnside study area, approximately 9.1% of the total population is over the age of 65, which is significantly less than the Apache County estimate of 11.6%. The highest concentrations of elderly populations are located off US 191 North, N9201, N27, and near the Hubbell Trading Post.
- Minority Population - According to the 2010 US Census, approximately 97.9% of the total population within the study area are cited as being a minority.
- *Female Head of Households* - Female head of household populations are primarily located northwest of the SR 264/US 191 South intersection and northwest of the SR 264/US 191 North intersection.
- *Below Poverty Population* - According to the 2009-2013 ACS, approximately 32.8% of the study area's population is considered to be below the poverty level.
- *Disabled Population* - According to the 2000 U.S. Census, 15.5 % of the total population within the study area is disabled.

Multimodal transportation improvements would provide numerous positive impacts to environmental justice populations in the study area. Enhanced streetscaping that provides bicycle and pedestrian facilities would increase protected population's ease of access to local activity centers, places of employment, medical services, and community facilities. Additionally, incorporating transit services will provide protected populations even greater accessibility to local and regional activity centers, as well as employment centers.

Recommendations for Further Analysis

The potential positive and negative effects on the protected populations should be discussed in the environmental analysis of the design phase. Consideration should be given during the construction phase of project implementation on the impacts to minority-owned businesses, the mobility needs of the protected populations, and on residential parcels of protected populations. In addition, on-going outreach efforts need to be made to include meaningful participation by all residents, including low-income, disabled, below poverty and minority populations, throughout project development.

8. PLAN FOR IMPROVEMENTS

This chapter presents the draft Multimodal Transportation Plan for the Ganado/Burnside area for the short-, mid-, and long-term planning horizons. This transportation plan is the result of the deficiency analysis from Working Paper 1, Public Open House Input, and Chapter 5 of this report. It is a multimodal plan that includes roadway, transit, pedestrian, bicycle, and trail improvements.

ROADWAY IMPROVEMENT RECOMMENDATIONS

Draft improvement recommendations were subject to review and comment by agency stakeholders and the general public. Refined improvement project improvements are presented in this document.

Short-Term Improvements

Short-term phase projects are recommended to be completed as the study area reaches Year 2020. Table 8.1 presents a comprehensive list of the transportation recommendations for this phase, as well as the project number, location, description, and estimated costs for each project. Each project is assigned a unique project number that can be used to track project progress. Planning level cost estimates were developed based on typical per-mile/foot construction costs in 2015 dollars. *Estimated costs for each project are expressed in 2015 dollars and do not include costs associated with right-of-way acquisitions. Actual costs for projects could vary at the time of implementation; therefore, a detailed analysis should be performed on a case-by-case basis to determine actual costs. Unless otherwise noted, the recommended projects are not yet funded.*

Table 8.1. Short-Term Roadway Recommendations

ID	Project Location and Description	Length (mi)	Estimated Cost
ST-1	**SR 264 (US 191 North to Cedar Hills Road)**	**5.56**	**$303,618**
1.1	*Pavement preservation – structural overlay*	5.56	**Project Funded Through TRACS H824601D*
1.2	*Install edge and centerline rumble strips*	5.56	
1.3	*Install recessed reflective pavement markers*	*5.56*	
1.4	*Widen roadway to add 5 FT paved shoulders*	*4.61*	
1.5	*Add an exclusive right-turn lane on SR 264 at Mustang Gas Station (eastern driveway)*	-	
1.6	*Add an exclusive right-turn lane on SR 264 at ADOT Maintenance Yard intersection*	-	
1.7	*Add an exclusive left-turn lane on SR 264 at ADOT Maintenance Yard intersection*	-	
1.8	*Construct snow plow turnaround at the entrance to the ADOT Maintenance Yard*	-	
1.9	*Add an exclusive right-turn lane on SR 264 at County Road 427 intersection*	-	
1.10	*Add an exclusive left-turn lane on SR 264 at County Road 427 intersection*	-	
1.11	*Repair and upgrade existing fence posts*	*5.56*	
1.12	*Clear roadside vegetation*	*5.56*	
1.13	Establish at least 3 FT additional unpaved clear zone	5.56	$242,618
1.14	Install (5) cattle guards with pedestrian gates	-	$30,000
1.15	Clean out (10) cattle guards and install pedestrian gates	-	$30,000
1.16	Install "Livestock" crossing sign at MP 441.8 Eastbound	-	$500
1.17	Install "Livestock" crossing sign at MP 445.6 Westbound	-	$500

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Table 8.1. Short-Term Roadway Recommendations (continued)

ID	Project Location and Description	Length (mi)	Estimated Cost
ST-2	**SR 264 (Cedar Hills Road to County Road 420)**	**1.00**	**$865,000**
2.1	*Pavement preservation – structural overlay*	*1.00*	**Project Funded Through TRACS H824601D*
2.2	*Add center turn lane on SR 264: US 191 to Ganado Unified School District Entrance*	*-*	
2.3	*Add an exclusive right-turn lane on SR 264 at Ganado Unified School District Entrance*	*-*	
2.4	*Add an exclusive left-turn lane on SR 264 at Ganado Unified School District Entrance*	*-*	
2.5	*Add an exclusive right-turn lane on SR 264 at County Road 420*	*-*	
2.6	*Add an exclusive left-turn lane on SR 264 at County Road 420*	*-*	
2.7	Construct 6 FT sidewalks in both directions (Cedar Hills Road to County Road 420)	1.00	$650,000
2.8	Install street lighting (Cedar Hills Road to County Road 420)	1.00	$200,000
2.9	Clean out (5) cattle guards and install pedestrian gates	-	$15,000
ST-3	**SR 264 (County Road 420 to Eastern Study Boundary)**	**1.32**	**$69,600**
3.1	*Pavement preservation – structural overlay*	*1.32*	**Project Funded Through TRACS H824601D*
3.2	*Install edge and centerline rumble strips*	*1.32*	
3.3	*Install recessed reflective pavement markers*	*1.32*	
3.4	*Widen SR 264 to include 5 FT paved shoulders*	*1.32*	
3.5	*Widen County Road 420 to include exclusive right-turn lane*	*-*	
3.6	*Repair and upgrade existing fence posts*	*1.32*	
3.7	*Clear roadside vegetation*	*1.32*	
3.8	Establish at least 3 FT additional unpaved clear zone	1.32	$57,600
3.9	Install (2) cattle guards with pedestrian gates	-	$12,000
ST-4	**SR 264 Ganado Wash Bridge #1046**	**-**	
4.1	*Replace bridge and reconfigure intersection to Hubbell Trading Post. Includes pedestrian walkways in both directions*		**Project Funded Through TRACS H824601D and TRACS H676801C*
ST-5	**SR 264/US 191/Navajo Route 9202 Intersection**	**-**	**-**
5.1	**Concept 1 (Traffic Signal):** Conduct Traffic Signal Warrant study to confirm if the intersection meets signal warrants. Install traffic signal, install raised medians on SR 264, convert the Sage Memorial Hospital to a right-in/right-out entrance, install pedestrian crosswalks and ADA compliant ramps, improve intersection signage	-	Study - $75,000 Signal - $500,000
5.2	**Concept 2 (Roundabout)**: Reconfigure intersection to include a single lane roundabout, install raised medians, convert the Sage Memorial Hospital to a right-in/right-out entrance, include pedestrian sidewalks and crosswalks, improve intersection signage, install streetscaping enhancements	-	$650,000
ST-6	**Cedar Hills Road and Chapter Drive - Drainage Study**	**0.60**	**$150,000**
6.1	Conduct a comprehensive drainage study to identify improvements to alleviate recurring flooding issues along the roadways	0.60	$150,000

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Table 8.1. Short-Term Roadway Recommendations (continued)

ID	Project Location and Description	Length (mi)	Estimated Cost
ST-7	**Cedar Hills Road and Chapter Drive - Implement Drainage Study Recommendations**	**0.60**	**N/A**
7.1	Implement recommendations from Drainage Study (ST-6) to address flooding. Mitigation measures such as storm water drains or concrete roadway should be considered. In addition, add sidewalks/curb/gutter, and street lighting	0.60	*Costs determined during drainage study
ST-8	**State Route 264/Navajo Route 27/Navajo Route 9034 Intersection**	**-**	**$1,000**
8.1	Restripe intersection to include lane markings and a stop bar on Navajo Route 27	-	$500
8.2	Relocate "Stop" sign on Navajo Route 27	-	$500
ST-9	**US Highway 191 South (SR 264 to Ganado Cemetery)**	**0.66**	**$907,820**
9.1	Pavement preservation – structural overlay	0.66	$396,000
9.2	Construct 6 FT sidewalks in both directions	0.66	$429,000
9.3	Install street lighting	0.66	$132,000
9.4	Install one (1) cattle guard with pedestrian gate	-	$6,000
9.5	Clean out three (3) cattle guards and install pedestrian gates	-	$9,000
9.6	Clear roadside vegetation	0.66	$1,320
9.7	Install "Livestock" crossing sign at MP 411.3 Southbound	-	$500
ST-10	**Navajo Route 15 (Study Area Boundary to SR 264)**	**1.30**	**$782,790**
10.1	Pavement preservation – structural overlay	1.30	$780,000
10.2	Install recessed reflective pavement markers	1.30	$1,950
10.3	Clear roadside vegetation	0.42	$840
ST-11	**SR 264 (Western Study Boundary to US 191 North) Improvements**	**1.95**	**$1,856,400**
11.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	1.95	$97,500
11.2	Clear roadside vegetation	1.95	$3,900
11.3	Widen SR 264 to include 8 FT paved shoulders	1.95	$1,755,000
ST-12	**US Highway 191 North (SR 264 to North of Chevron Gas Station) Improvements**	**0.18**	**$108,360**
12.1	Pavement preservation – structural overlay	0.18	$108,000
12.2	Clear roadside vegetation	0.18	$360
ST-13	**Navajo Route 9202 (SR 264 to Bridge N671)**	**0.18**	**$108,000**
13.1	Pavement preservation – structural overlay	0.18	$108,000
ST-14	**Navajo Route 27 Improvements**	**0.50**	**$26,250**
14.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	0.50	$25,000
14.2	Install recessed reflective pavement markers	0.50	$750
14.3	Install "Stop Ahead" warning sign approaching SR 264	-	$500
ST-15	**Navajo Route 9201 (SR 264 to Senior Center Driveway)**	**0.96**	**$1,152,500**
15.1	Grade and pave roadway. Include 5 FT paved shoulders	0.96	$1,152,000
15.2	Restripe SR 264 intersection to include lane markings and a stop bar	-	$500
ST-16	**Navajo Route 9202 (Bridge N671 to Navajo Route 27)**	**1.77**	**$92,040**
16.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	1.77	$88,500
16.2	Clear roadside vegetation	1.77	$3,540

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Table 8.1. Short-Term Roadway Recommendations (continued)

ID	Project Location and Description	Length (mi)	Estimated Cost
ST-17	**US Highway 191 South (Ganado Cemetery to Study Area Boundary)**	**1.59**	**$94,565**
17.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	1.59	$79,500
17.2	Install recessed reflective pavement markers	1.59	$2,385
17.3	Install one (1) cattle guard with pedestrian gate	-	$6,000
17.4	Clean out one (1) cattle guard and install pedestrian gate	-	$2,500
17.5	Clear roadside vegetation	1.59	$3,180
17.6	Install "Livestock" crossing sign at MP 409.7 Northbound	-	$500
17.7	Install "Intersection Ahead" warning sign approaching Navajo Route 151 in both directions	-	$500
ST-18	**US Highway 191 North (North of Chevron Gas Station to Study Boundary)**	**1.28**	**$760,410**
18.1	Pavement preservation – structural overlay	1.26	$756,000
18.2	Install recessed reflective pavement markers	1.26	$1,890
18.3	Clear roadside vegetation	1.26	$2,520
ST-19	**County Route 420**	**0.47**	**$23,500**
19.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	0.47	$23,500
ST-20	**Speed Limit Evaluation**	**-**	**N/A**
20.1	Conduct an engineering assessment to determine appropriate speed limits on: - SR 264 (Hubbell Trading Post to Navajo Route 27) - SR 264 (West of US 191 North to East of Mustang Gas Station) - US 191 South (Ganado Cemetery to SR 264) - Navajo Route 27	-	ADOT Regional Traffic can conduct study upon request.
ST-21	**Community Gateway Treatment - SR 264 Pedestrian Overpass**	**-**	**$10,000**
21.1	Incorporate community entrance treatments to overpass to alert drivers they are entering a community and to lower speeds	-	$10,000
ST-22	**Install Traffic Calming Devices**	**-**	**$62,500**
22.1	Paint colored speed limit markings on pavement and install speed feedback signs at: - SR 264 (West of US 191 North) entering Burnside - SR 264 (East of County Road 420) entering Ganado - US 191 South (Entering Ganado) - US 191 North (Entering Burnside) - Navajo Route 15 (Entering Burnside)	-	$62,500
22.2	Develop a community-wide Speed Enforcement Plan that outlines speed enforcement strategies (such as location of mobile and stationary patrols, speed radar needs, etc.), communication program, and funding strategies. In coordination with the Arizona Department of Public Safety and Navajo Nation Police to implement recommended enforcement countermeasures	-	-
ST-23	**Ganado Primary and Middle School Sidewalks and Street Lighting**	**1.84**	**$1,748,000**
23.1	Construct sidewalks in both directions on Navajo Route 9202 (SR 264 to County Road 420), County Road 420 (SR 264 to Navajo Route 9202), and SR 264 (Navajo Route 9202 to County Road 420)	1.84	$1,196,000
23.2	Install street lighting adjacent to sidewalks	1.84	$368,000

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 programmed improvements. A full listing of programmed improvements is provided in Chapter 2.

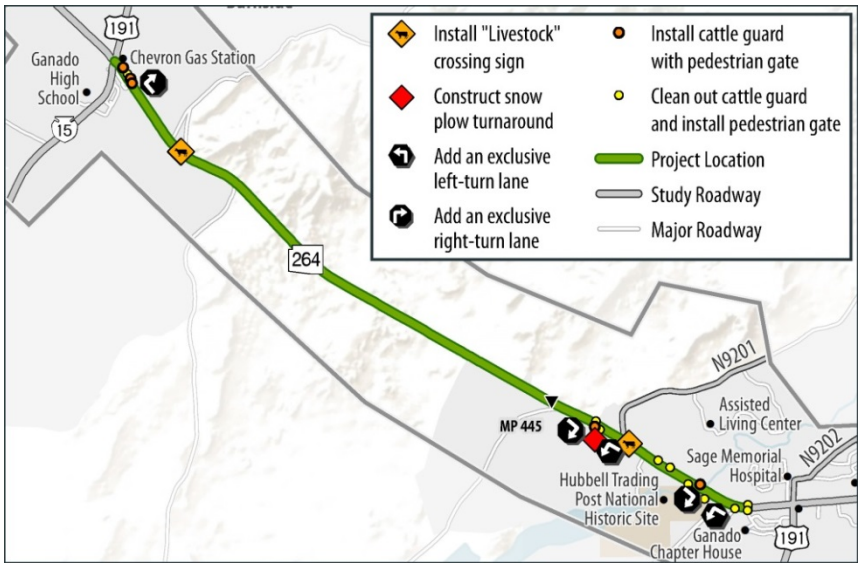
Table 8.1. Short-Term Roadway Recommendations (continued)

ID	Project Location and Description	Length (mi)	Estimated Cost
ST-24	**Burnside Area Sidewalks and Street Lighting**	**1.02**	**$399,970**
24.1	Remove and dispose of debris, litter, and vegetation from existing sidewalks on SR 264, US 191 North, and Navajo Route 15	0.61	$1,220
24.2	Extend existing sidewalks on westbound SR 264 from US 191 North to Mustang Gas Station	0.17	$55,250
24.3	Construct new sidewalks on SR 264 (both directions) from US 191 North to western Ganado High School driveway	0.21	$136,500
24.4	Extend existing sidewalks on US 191 North from SR 264 roundabout to north of Chevron Gas Station	0.16	$104,000
24.5	Install street lighting adjacent to sidewalks	1.02	$102,000
24.6	Add pedestrian crosswalk crossing SR 264 at Mustang Gas Station	-	$1,000
ST-25	**Sage Memorial Hospital Sidewalks and Street Lighting**	**0.45**	**$382,500**
25.1	Construct concrete shared use path that connects SR 264, Sage Memorial Hospital, and Navajo Route 9202	0.45	$292,500
25.2	Install street lighting adjacent to sidewalks	0.45	$90,000
ST-26	**SR 264 Bus Pullouts**	**-**	**$450,000**
26.1	*Install Bus Pullouts on SR 264* *- Navajo Route 27 (Eastbound and Westbound)* *- Cedar Hills Road (Westbound)* *- County Road 426 (Eastbound)* *- West of N 9201 (Westbound)* *- Mile Post 445.06 (Eastbound and Westbound)* *- At driveways between Mile Post 444 – 445 (Four Eastbound and Four Westbound)* *- Mile Post 443 (Eastbound and Westbound)* *- Mile Post 441.7 (Westbound)*	-	**Project Funded Through TRACS H824601D*
26.2	Construct raised platform with solar lighting at each pullout to safely accommodate students waiting for school buses	-	$450,000
ST-27	**Install Bus Shelters**	**-**	**N/A**
27.1	Install bus shelter structures at: Post Office, Ganado Chapter House, and Mustang Gas Station	-	**Funded through Navajo Transit System*
ST-28	**Burnside Park and Ride Facility**	**-**	**N/A**
28.1	Construct a NTS park-and-ride facility at either the Chevron Gas Station or the Ganado Shopping Center (scheduled for development in 2016)	-	**Funded through Navajo Transit System*

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 programmed improvements. A full listing of programmed improvements is provided in Chapter 2.

Project Descriptions for Short-Term Improvements

The following section presents detailed project information for projects identified for implementation during the short-term phase. Each project is profiled for ease of reference to pertinent information that may enable decision makers and funding agencies to quickly understand the need for their implementation.

Project #ST-1. SR 264 (US 191 North to Cedar Hills Road)			
Responsible Agency:	ADOT		
Route Name:	SR 264	**Project Mileage:**	5.56 miles
Project Location:			
Existing and Future Conditions:	• Paved state highway that provides access between Tuba City and Window; connects local residential areas to major activity centers (Chevron Gas Station, Hubbell Trading Post, Ganado Chapter House) • Population: 1,854 people and 561 homes in the Ganado/Burnside area • Number of Lanes: US 191 North – MP 442.7 (2 lanes with EB passing lane); MP 442.7 – MP 444 (2 lanes with WB passing lane); MP 444 – Cedar Hills Road (2 lanes) • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial		
Existing and Projected Traffic Conditions:	• Existing ADT: ~7100 Existing LOS: B-C • 2020 ADT: ~7700 2020 LOS: C *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

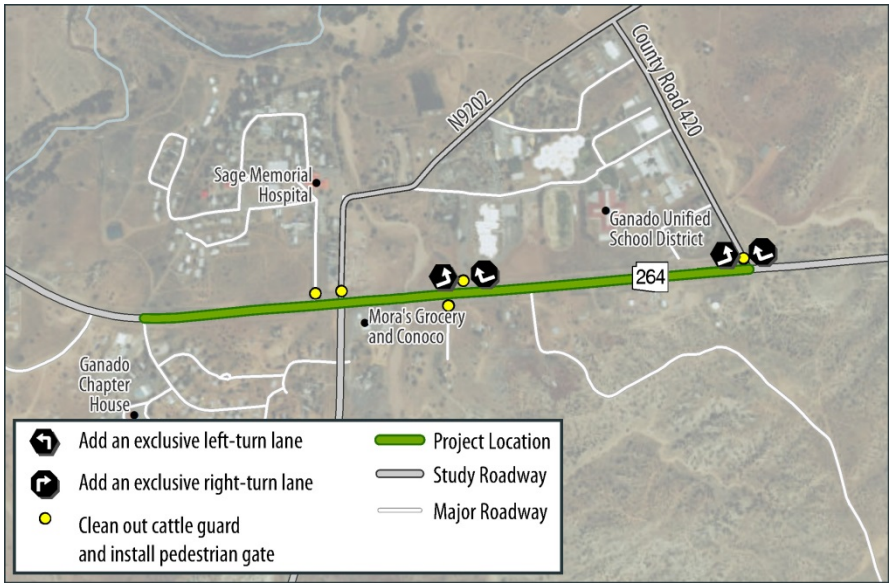
ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
1.1	*Pavement preservation – structural overlay (MP 441.0 to Cedar Hills Road)*	**Project Funded Through TRACS H824601D*	Extend pavement life; Improve driving conditions
1.2	*Install edge and centerline rumble strips*		Enhance safety; Alert drivers when leaving the travel lane
1.3	*Install recessed reflective pavement markers*		Improve night time visibility; Enhance safety
1.4	*Widen roadway to add 5 FT paved shoulders*		Provide safe area for vehicles to pull over
1.5	*Add an exclusive right-turn lane on SR 264 at Mustang Gas Station (eastern driveway)*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
1.6	*Add an exclusive right-turn lane on SR 264 at ADOT Maintenance Yard intersection*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
1.7	*Add an exclusive left-turn lane on SR 264 at ADOT Maintenance Yard intersection*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
1.8	*Construct snow plow turnaround at the entrance to the ADOT Maintenance Yard*		Improve maintenance practices; Provide safe area for maintenance vehicles to turn off of SR 264

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-1. SR 264 (US 191 North to Cedar Hills Road) - Continued			
Project Description:			
ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
1.9	*Add an exclusive right-turn lane on SR 264 at County Road 427 intersection*	**Project Funded Through TRACS H824601D*	Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
1.10	*Add an exclusive left-turn lane on SR 264 at County Road 427 intersection*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
1.11	*Repair and upgrade existing fence posts*		Restrict livestock from entering right-of-way
1.12	*Clear roadside vegetation*		Improve driver visibility, drainage, and safety
1.13	Establish at least 3 FT additional unpaved clear zone	$242,618	Provide safe area for vehicles regain control if exiting the travel lane; Increase pedestrian safety
1.14	Install (5) cattle guards with pedestrian gates	$30,000	Restrict livestock from entering right-of-way
1.15	Clean out (10) cattle guards and install pedestrian gates	$30,000	Restrict livestock from entering right-of-way; Improve pedestrian access
1.16	Install "Livestock" crossing sign at MP 441.8 EB	$500	Alert drivers of potential livestock entering right-of-way
1.17	Install "Livestock" crossing sign at MP 445.6 WB	$500	Alert drivers of potential livestock entering right-of-way

Purpose and Need:	As the major thoroughfare linking Burnside and Ganado, SR 264 has been identified as a critical corridor that is essential to community development. The corridor experiences high traffic volumes (~7100 ADT), high vehicle speeds (40-65 mph posted speed limit), high number of vehicle crashes (2.2 crash rate), and is often utilized by pedestrians. Proposed developments on the corridor will only further increase traffic volumes; therefore, safety improvements are needed. The purpose of the proposed project is to: 1) provide a safe access route between residential and commercial areas in Ganado and Burnside; 2) improve roadway conditions, including surface conditions, shoulder conditions, and safety; 3) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures along the corridor; and 4) promote biking and walking resulting in health benefits to the users.	
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improve pavement conditions; 3) extend the life of existing infrastructure; 4) reflects community vision; 5) improve public health by creating transportation options that result in daily physical exercise	
Performance Measures:	1) Reduction in vehicle crashes; 2) reduction in animal-related crashes; 3) reduction in pedestrian-related crashes; 4) improve emergency response times	
Target Geography: ** source: http://egis.hud.gov/*	**Ganado:** Median Income: $33,269 Poverty Rate: 31.09% Unemployed: 13.27%	**Burnside:** Median Income: $33,500 Poverty Rate: 45.29% Unemployed: 22.47%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements and recommended coordinating with ADOT to implement sign installation during scheduled reconstruction. Coordination was conducted throughout the study with Apache County District II, ADOT, Ganado Chapter, and the Navajo DOT.	
Economic Development:	Improving safety and accessibility along the corridor will promote economic growth which will directly and indirectly benefit the disadvantaged communities. Improved aesthetics will assist with the attraction of commercial developments and the overall livability of the area.	
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.	
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)	

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-2. SR 264 (Cedar Hills Road to County Road 420)			
Responsible Agency:	ADOT		
Route Name:	SR 264	**Project Mileage:**	1.0 mile
Project Location:			
Existing and Future Conditions:	• Paved state highway that provides access to Mora's Grocery Store, Sage Memorial Hospital, Ganado Chapter House, and Ganado Unified School District • Population: 1,854 people and 561 homes in the Ganado/Burnside area • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial		
Existing and Projected Traffic Conditions:	• Existing ADT: ~7200-8100 Existing LOS: C-D • 2020 ADT: ~7900-8900 2020 LOS: D *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

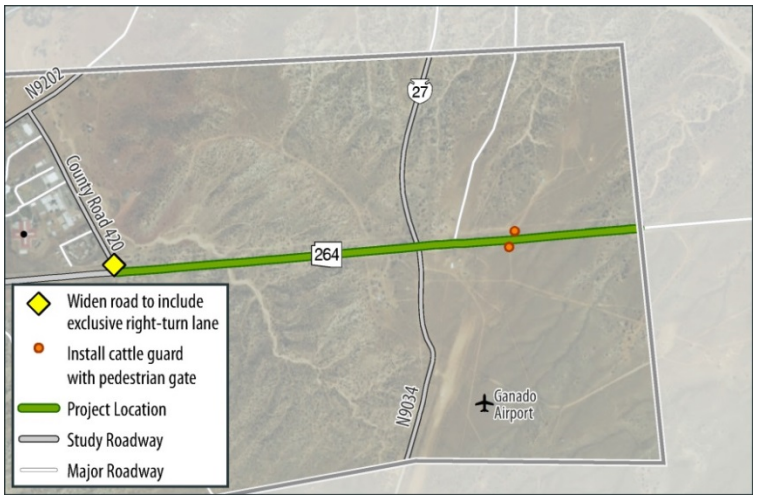
ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
2.1	*Pavement preservation – structural overlay*	**Project Funded Through TRACS H824601D*	Extend pavement life; Improve driving conditions
2.2	*Add center turn lane on SR 264: US 191 to Ganado Unified School District Entrance*		Provide safe area for motorist to turn off on/off SR 264; Reduce congestion on SR 264
2.3	*Add an exclusive right-turn lane on SR 264 at Ganado Unified School District Entrance*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
2.4	*Add an exclusive left-turn lane on SR 264 at Ganado Unified School District Entrance*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
2.5	*Add an exclusive right-turn lane on SR 264 at County Road 420*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
2.6	*Add an exclusive left-turn lane on SR 264 at County Road 420*		Provide safe area for motorist to turn off of SR 264; Reduce congestion on SR 264
2.7	Construct 6 FT sidewalks in both directions (Cedar Hills Road to County Road 420)	$650,000	Improve pedestrian/bicycle mobility; Encourage physical activity

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-2. SR 264 (Cedar Hills Road to County Road 420) - Continued			
Project Description:			
ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
2.8	Install street lighting (Cedar Hills Road to County Road 420)	$200,000	Improve night time visibility and safety
2.9	Clean out (5) cattle guards and install pedestrian gates	$15,000	Restrict livestock from entering right-of-way; Improve pedestrian access

Purpose and Need:	As the primary corridor utilized within the community of Ganado to access activity centers and residential areas, improving SR 264 is essential for community development. The corridor experiences high traffic volumes (~7200-8100 ADT), high number of vehicle crashes (2.2 crash rate), and is often utilized by pedestrians. The purpose of the proposed project is to: 1) improve safety for all modes between residential and commercial areas in Ganado; 2) improve roadway conditions, including surface conditions, shoulder conditions, and safety; 3) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures along the corridor; and 4) promote biking and walking resulting in health benefits to the users.
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improve pavement conditions; 3) extend the life of existing infrastructure; 4) increase pedestrian access to/from neighborhoods and activity centers; 5) reflect community vision; 6) improve public health by creating transportation option that result in daily physical exercise
Performance Measures:	1) Reduction in vehicle crashes; 2) reduction in pedestrian-related crashes; 3) reduction in night-time crashes
Target Geography: ** source: http://egis.hud.gov/*	**Ganado:** Median Income: $33,269 Poverty Rate: 31.09% Unemployed: 13.27%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements and were highly in favor of construction sidewalks along SR 264. Coordination was conducted throughout the study with Apache County District II, ADOT, Ganado Chapter, and the Navajo DOT.
Economic Development:	Improving safety and accessibility along the corridor will promote economic growth which will directly and indirectly benefit the disadvantaged communities. Improved aesthetics will assist with the attraction of commercial developments and the overall livability of Ganado.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)
Comments:	Per ADOT standards, continuous street lighting is permitted on state highways after the following conditions are considered: illumination of cross streets up to one-half mile, presence of urban development, comparison of night and day crashes in the past three years. Illumination at intersections is evaluated by: pedestrian and vehicular traffic county, availability of electrical services, number of crashes that have occurred at night, intersection signalization, or if the intersection has complex geometrics.

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-3. SR 264 (County Road 420 to Eastern Study Boundary)			
Responsible Agency:	ADOT		
Route Name:	SR 264	**Project Mileage:**	1.32 miles
Project Location:			
Existing and Future Conditions:	• Paved state highway that provides regional access to Window Rock • Potential development at the Ganado Airport and northeast of the SR 264/N 27 intersection • Number of Lanes: 2 lanes with EB passing lane • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial • Speed Limit: 40 - 65 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~6600-7200 Existing LOS: D • 2020 ADT: ~7300 2020 LOS: D *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

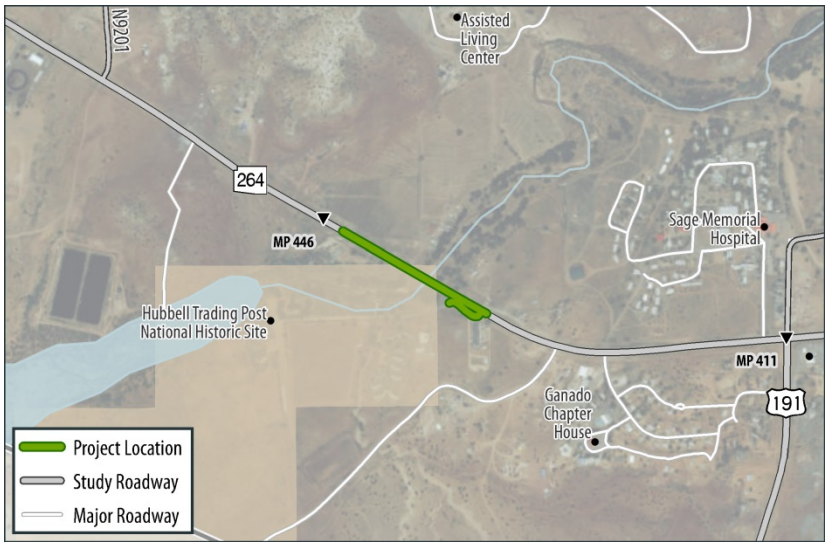
ID	Improvement	Cost Estimate	Purpose/Benefit
3.1	*Pavement preservation – structural overlay*	**Project Funded Through TRACS H824601D*	Extend pavement life; Improve driving conditions
3.2	*Install edge and centerline rumble strips*		Enhance safety; Alert drivers when leaving the travel lane
3.3	*Install recessed reflective pavement markers*		Improve night time visibility; Enhance safety
3.4	*Widen SR 264 to include 5 FT paved shoulders*		Provide safe area for vehicles to pull over
3.5	*Widen County Road 420 to include exclusive right-turn lane*		Provide safe area for motorists to turn off SR 264; Reduce congestion on SR 264
3.6	*Repair and upgrade existing fence posts*		Restrict livestock from entering right-of-way
3.7	*Clear roadside vegetation*		Improve driver visibility, drainage, and safety
3.8	Establish at least 3 FT additional unpaved clear zone	$57,600	Provide safe area for vehicles regain control if exiting the travel lane; Increase pedestrian safety
3.9	Install (2) cattle guards with pedestrian gates	$12,000	Restrict livestock from entering right-of-way

Purpose and Need:	As a major regional corridor that connects Ganado to Window Rock, improving SR 264 is essential for community development. The corridor experiences high traffic volumes (~6600-7200 ADT) and high number of vehicle crashes (1.1 crash rate). The purpose of the proposed project is to: 1) improve safety for all modes; 2) improve roadway conditions, including surface conditions, shoulder conditions, and safety; and 3) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures along the corridor.

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-3. SR 264 (County Road 420 to Eastern Study Boundary) - Continued	
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improve pavement conditions; 3) extend the life of existing infrastructure; 4) increase pedestrian access to/from neighborhoods and activity centers; 5) reflect community vision; 6) encourage economic development
Performance Measures:	1) Reduction in vehicle crashes; 2) reduction in intersection related crashes at N27
Target Geography: ** source: http://egis.hud.gov/*	**Ganado:** Median Income: $33,269 Poverty Rate: 31.09% Unemployed: 13.27%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements and recommended coordinating with ADOT to implement sign installation during scheduled reconstruction. Coordination was conducted throughout the study with Apache County District II, ADOT, Ganado Chapter, and the Navajo DOT.
Economic Development:	Improving safety and accessibility along the corridor will promote economic growth which will directly and indirectly benefit the disadvantaged communities. As development occurs at the Ganado Airport, roadway improvements are also necessary to accommodate potential traffic.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-4. SR 264 Ganado Wash Bridge # 1046	
Responsible Agency:	ADOT
Route Name:	SR 264
Project Location:	
Existing and Future Conditions:	• Paved state highway that provides access to Hubbell Trading Post • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial • Speed Limit: 40 MPH
Existing and Projected Traffic Conditions:	• Existing ADT: ~7100 Existing LOS: C • 2020 ADT: ~8900 2020 LOS: D *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*

Project Description:

ID	Improvement	Cost Estimate	Purpose/Benefit
4.1	*Replace bridge and reconfigure intersection to Hubbell Trading Post. Includes pedestrian walkways in both directions*	**Project Funded Through TRACS H824601D and TRACS H676801C*	Structurally deficient bridge, Improve intersection configuration; Increase pedestrian/bicyclist mobility

Purpose and Need:	As the major thoroughfare linking Burnside and Ganado, as well as providing access to the Hubbell Trading Post, SR 264 has been identified as a critical corridor that is essential to community development. The purpose of the proposed project is to: 1) extend the life of the Ganado Wash Bridge; 2) improve roadway conditions and turning movements; 3) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures along the corridor; and 4) promote biking and walking resulting in health benefits to the users.
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improved roadway conditions and turning movements into/out of Hubbell Trading Post; 3) extend the life of existing infrastructure; 4) reflect community vision; 5) improve public health by creating transportation option that result in daily physical exercise

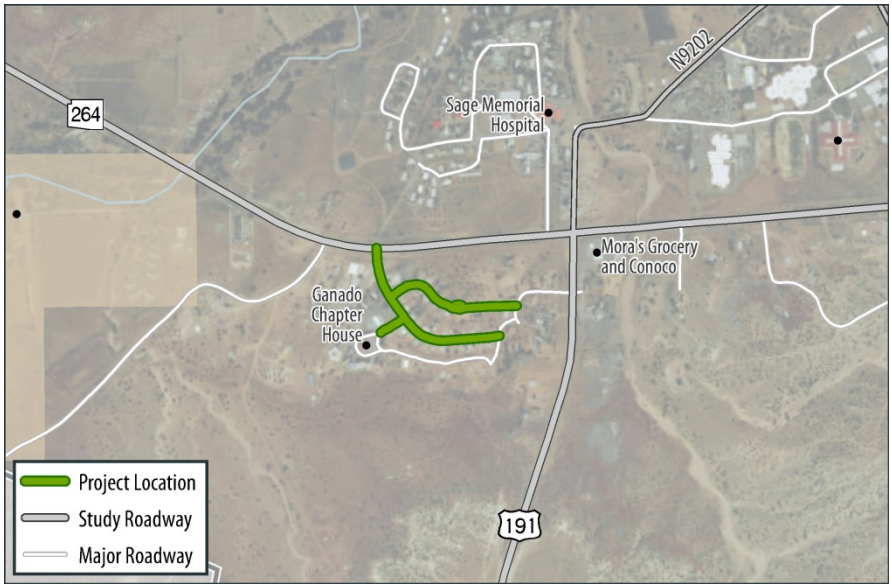
Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-4. SR 264 Ganado Wash Bridge # 1046 - Continued	
Performance Measures:	1) Reduction in vehicle crashes; 2) reduction in turning movement crashes
Target Geography: ** source: http://egis.hud.gov/*	**Ganado:** Median Income: $33,269 Poverty Rate: 31.09% Unemployed: 13.27%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements. Coordination was conducted throughout the study with Apache County District II, ADOT, Ganado Chapter, and the Navajo DOT.
Economic Development:	Improving safety and accessibility along the corridor will promote economic growth which will directly and indirectly benefit the disadvantaged communities. Safety and access improvements also assist with providing tourists visiting the Hubbell Trading Post with a safe access point.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors. Particular care should be given to lessen impacts on the Ganado Wash and potential wetlands or species of concern located along the Wash.
Responsible Agency:	ADOT

Note: ADOT has secured funding to conduct a safety and pavement preservation project on SR 264 from MP 441 to 459 (TRACS H824601D) and for the replacement of Ganado Wash Bridge (TRACS H676801C). The projects are expected to begin in 2016 and will incorporate a number of roadway and safety improvements. Recommended improvement projects in red, italic text are included in the funded ADOT SR 264 scheduled improvements. A full listing of scheduled improvements is provided in Chapter 2.

Project #ST-5. SR 264/US 191/Navajo Route 9202 Intersection			
Responsible Agency:	ADOT; Apache County District II; Ganado Chapter		
Route Name:	SR 264/US 191/Navajo Route 9202 Intersection		
Existing and Future Conditions:	• Major intersection in Ganado that is located next to the US Post Office, Sage Memorial Hospital, and Mora's Gas Station • Potential Sage Memorial Hospital expansion as well as additional residential development at intersection • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial • Speed Limit: 40 MPH		
Project Description:			
ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
5.1	 **Concept 1 (Traffic Signal):** Conduct Traffic Signal Warrant study to confirm if the intersection meets signal warrants. Install traffic signal, install raised medians on SR 264, convert the Sage Memorial Hospital to a right-in/right-out entrance, install pedestrian crosswalks and ADA compliant ramps, improve intersection signage	Study - $75,000 Signal- $500,000	Enhances traffic operations; Improve safety conditions; Provide safe pedestrian and bicyclist pathways and crosswalks; Enhance streetscaping
5.2	 **Concept 2 (Roundabout):** Reconfigure intersection to include a single lane roundabout, install raised medians, convert the Sage Memorial Hospital to a right-in/right-out entrance, include pedestrian sidewalks and crosswalks, improve intersection signage, install streetscaping enhancements	$650,000	Enhances traffic operations; Improve safety conditions; Reduce turning movement conflicts; Provide safe pedestrian and bicyclist pathways and crosswalks; Enhance streetscaping
Purpose and Need:	The SR 264/US 191/Navajo Route 9202 intersection is a critical intersection centrally located in Ganado. All traffic traveling along US 191 and SR 264, as well as local traffic, utilize this intersection. The purpose of the proposed project is to: 1) improve intersection congestion 2) improve safety for all modes; 3) reduce vehicle speeds; and 3) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures along the corridor.		

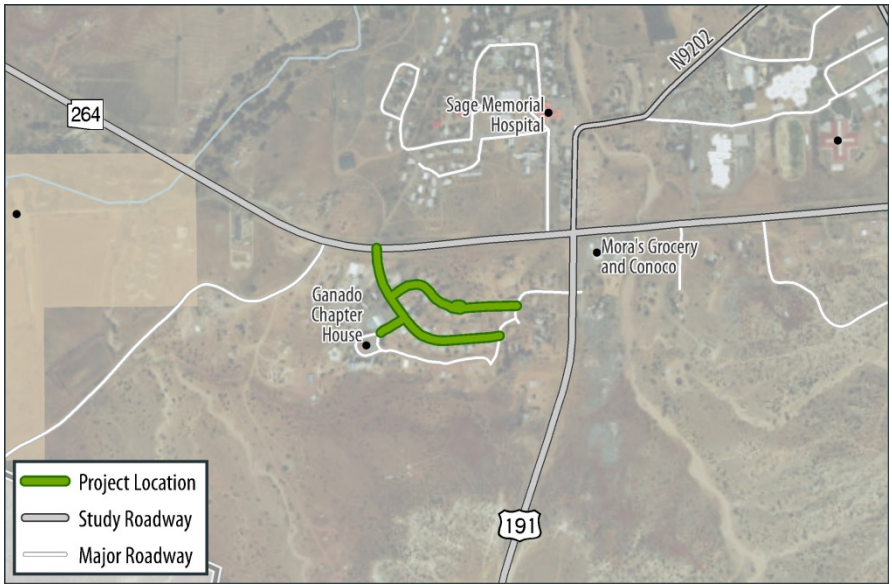
Project #ST-5. SR 264/US 191/Navajo Route 9202 Intersection - Continued	
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) forces motorists to slow speeds; 3) reduced turning movement conflicts; 4) increase pedestrian access to/from neighborhoods and activity centers; 5) reflect community vision; 6) enhanced streetscaping potential
Performance Measures:	1) reduction in intersection related crashes; 2) improved turning movement
Target Geography: ** source: http://egis.hud.gov/*	**Ganado:** Median Income: $33,269 Poverty Rate: 31.09% Unemployed: 13.27%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public were mutually in favor of constructing a roundabout or traffic signal at the intersection. Coordination was conducted throughout the study with Apache County District II, ADOT, Ganado Chapter, and the Navajo DOT.
Economic Development:	Improving safety and accessibility at the intersection will directly and indirectly benefit the disadvantaged communities. Improved safety and access to N9202, Sage Memorial Hospital, and Mora's Grocery Store may increase business to local developments and encourage additional development.
Environmental Overview:	Improvements are located at an existing intersection; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors. Additionally, effort should be made to limit the impacts on Title VI populations during construction.
Funding Sources:	Tribal Transportation Program (TTP); Surface Transportation Program (STP); Highway Safety Improvement Program (HSIP); Transportation Alternatives Program (TAP)

Project #ST-6. Cedar Hills Road and Chapter Drive - Drainage Study	
Responsible Agency:	Apache County District II; Ganado Chapter
Route Name:	Cedar Hills Road and Chapter Drive
Project Location:	
Project Mileage:	0.60 mile
Existing and Future Conditions:	• Paved and unpaved local streets that provide access to the Ganado Chapter House and residential developments • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Not Classified
Existing and Projected Traffic Conditions:	• Existing ADT: <500 Existing LOS: A • 2020 ADT: ~<500 2020 LOS: A *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
6.1	Conduct a comprehensive drainage study to identify improvements to alleviate recurring flooding issues along the roadways	$150,000	Identify drainage improvement needs to mitigate flooding hazards

Purpose and Need:	Identified as a critical corridor, Chapter House Drive and Cedar Hills Road provide the only access to the Ganado Chapter House. The purpose of the proposed project is to address roadway flooding issues.
Project Benefits:	1) Improved motor vehicle, pedestrian, bicyclist safety conditions; 2) improved drainage conditions
Performance Measures:	1) Reduction in roadway flooding during adverse weather
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements.
Economic Development:	Improving drainage along the roadways assists in providing access to existing developments and the Ganado Chapter House.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Funding Sources:	SEARCH - Special Evaluation Assistance for Rural Communities and Households; Navajo Nation Community Development Block Grant

Project #ST-7. Cedar Hills Road and Chapter Drive - Implement Drainage Study Recommendations			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	Cedar Hills Road and Chapter Drive	**Project Mileage:**	0.60 mile
Project Location:			
Existing and Future Conditions:	• Paved and unpaved local streets that provide access to the Ganado Chapter house and residential developments • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Not Classified		
Existing and Projected Traffic Conditions:	• Existing ADT: <500 Existing LOS: A • 2020 ADT: <500 2020 LOS: A *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	Improvement	Cost Estimate	Purpose/Benefit
7.1	Implement recommendations from Drainage Study (ST-6) to address flooding. In addition, reconstruct pavement, add sidewalks/curb/ gutter, and add street lighting	**Costs determined during drainage study (ST-6)*	Improve overall safety of the roadways; Improve drainage; Improve pedestrian/bicyclist mobility; Improve nighttime visibility

Purpose and Need:	Identified as a critical corridor, Chapter House Drive and Cedar Hills Road provide the only access to the Ganado Chapter House. The purpose of the proposed project is to: 1) address roadway flooding issues; 2) improve safety for all modes; 3) provide multimodal access between activity canters; and 4) promote biking and walking resulting in health benefits to the users.
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improved drainage conditions
Performance Measures:	1) Reduction in roadway flooding during adverse weather
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements.
Economic Development:	Improving drainage along the roadways assists in providing access to existing developments and the Ganado Chapter House.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Funding Sources:	Tribal Transportation Program (TTP); Navajo Nation Community Development Block Grant; Navajo Nation Infrastructure and Capital Improvement

Project #ST-8. SR 264/Navajo Route 27/Navajo Route 9034 Intersection	
Responsible Agency:	ADOT; Apache County District II; Ganado Chapter
Route Name:	SR 264/Navajo Route 27/Navajo Route 9034 Intersection
Project Location:	
Existing and Future Conditions:	• Major intersection that provides access to the Ganado Airport and Chinle via Navajo Route 27 • Potential development at the Ganado Airport and northeast of the SR 264/N 27 intersection • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial • Speed Limit: 55 MPH

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
8.1	Restripe intersection to include lane markings and a stop bar on Navajo Route 27	$500	Increase driver awareness and safety
8.2	Relocate "Stop" sign on Navajo Route 27	$500	Increase driver awareness and safety

Purpose and Need:	The SR 264/Navajo Route 27/Navajo Route 9034 intersection is a critical intersection that currently experiences a significant number of intersection related crashes. The purpose of the proposed project is to reduce vehicle crashes.
Project Benefits:	1) Improve safety conditions; 2) reduced turning movement conflicts
Performance Measures:	1) Reduction in intersection related crashes
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements.
Economic Development:	Improving safety at the intersection may encourage development at the Ganado Airport and will help in supporting proposed developments in the area.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources and utilities.
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)

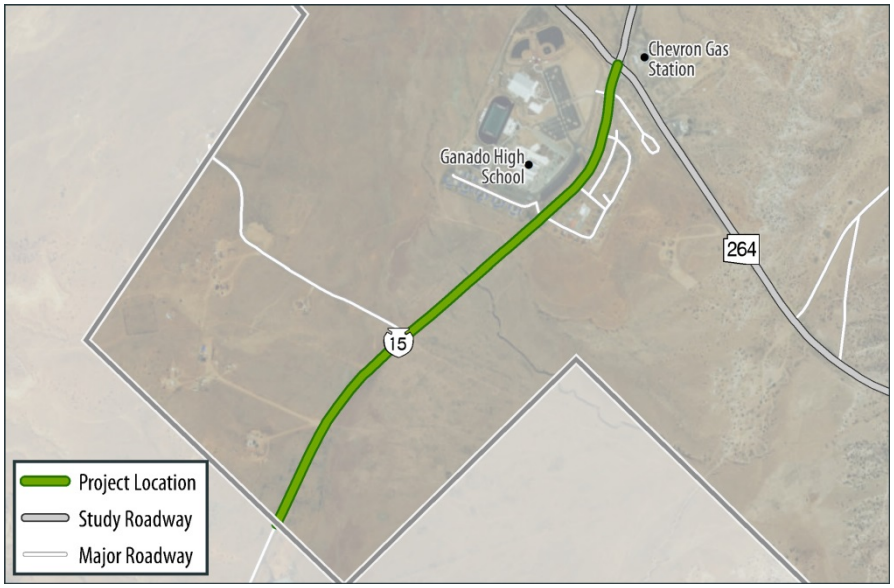
Project #ST-9. US 191 South (SR 264 to Ganado Cemetery)			
Responsible Agency:	ADOT		
Route Name:	US 191 South	**Project Mileage:**	0.66 mile
Project Location:			
Existing and Future Conditions:	• State highway that serves as a major regional corridor from Ganado to I-40 in the south; Provides access to the Ganado Cemetery, Mora's Grocery, and Conoco Gas Station • Substantial residential development is expected to occur on both side of US 191 south of the Conoco Gas Station • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Major Collector; BIA - Rural Minor Arterial • Speed Limit: 45-55 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~1900 Existing LOS: B • 2020 ADT: ~2100 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
9.1	Pavement preservation – structural overlay	$396,000	Extend pavement life; Improve driving conditions
9.2	Construct 6 FT sidewalks in both directions	$429,000	Improve pedestrian/bicycle mobility; Encourage physical activity
9.3	Install street lighting	$132,000	Improve night time visibility and safety
9.4	Install one (1) cattle guard with pedestrian gate	$6,000	Restrict livestock from entering right-of-way; Improve pedestrian access
9.5	Clean out three (3) cattle guards and install pedestrian gates	$9,000	Restrict livestock from entering right-of-way; Improve pedestrian access
9.6	Clear roadside vegetation	$1,320	Improve driver visibility, drainage, and safety
9.7	Install "Livestock" crossing sign at MP 411.3 Southbound	$500	Alert drivers of potential livestock entering right-of-way

Purpose and Need:	US 191 is a critical corridor that links Ganado and I-40 and is essential to community development. The corridor experiences moderate traffic volumes (~1900 ADT), high vehicle speeds (45-55 mph posted speed limit), and is often utilized by pedestrians. The purpose of the proposed project is to: 1) improve safety for all modes; 2) improve roadway conditions, including surface conditions, shoulder conditions, and safety; 3) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures along the corridor; and 4) promote biking and walking resulting in health benefits to the users.

Project #ST-9. US 191 South (SR 264 to Ganado Cemetery) - Continued	
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improve pavement conditions; 3) extend the life of existing infrastructure; 4) reflect community vision; 5) improve public health by creating transportation option that result in daily physical exercise
Performance Measures:	1) Reduction in vehicle crashes
Target Geography: ** source: http://egis.hud.gov/*	**Ganado:** Median Income: $33,269 Poverty Rate: 31.09% Unemployed: 13.27%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements. Coordination was conducted throughout the study with Apache County District II, ADOT, Ganado Chapter, and the Navajo DOT.
Economic Development:	Improving safety and accessibility along the corridor will promote economic growth which will directly and indirectly benefit the disadvantaged communities. Improved aesthetics will assist with the attraction of commercial developments and the overall livability of the Ganado area.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP); Navajo Nation Community Development Block Grant; Transportation Alternatives Program (TAP)
Comments:	Per ADOT standards, continuous street lighting is permitted on state highways after the following conditions are considered: illumination of cross streets up to one-half mile, presence of urban development, comparison of night and day crashes in the past three years. Illumination at intersections is evaluated by: pedestrian and vehicular traffic county, availability of electrical services, number of crashes that have occurred at night, intersection signalization, or if the intersection has complex geometrics.

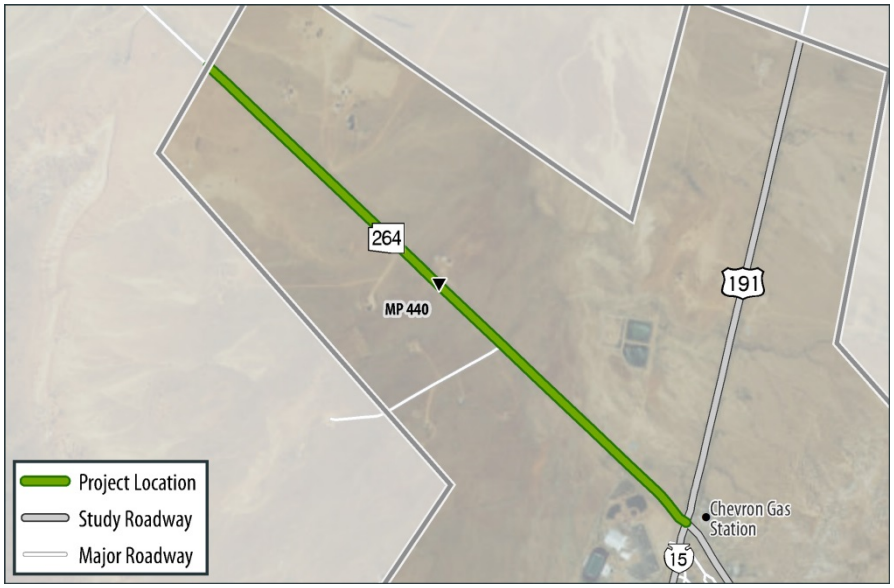
Project #ST-10. Navajo Route 15 (Study Area Boundary to SR 264)			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	Navajo Route 15	**Project Mileage:**	1.30 miles
Project Location:			
Existing and Future Conditions:	• Paved regional corridor that links SR 264 to SR 77; Provides access to Ganado High School, Ganado High School employee housing, and the Navajo Housing Authority's residential development area • Residential development is expected to occur south of the Ganado High School and south of the existing NHA development area • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Major Collector; BIA - Rural Minor Arterial • Speed Limit: 25 - 55 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~4200 Existing LOS: B • 2020 ADT: ~4600 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
10.1	Pavement preservation – structural overlay	$780,000	Extend pavement life; Improve driving conditions
10.2	Install recessed reflective pavement markers	$1,950	Improve night time visibility; Enhance safety
10.3	Clear roadside vegetation	$840	Improve driver visibility, drainage, and safety

Purpose and Need:	N15 is a critical corridor that is essential to the development of the Burnside area. The corridor experiences high traffic volumes (~4200 ADT), high vehicle speeds (25-55 mph posted speed limit), and is often utilized by pedestrians. Proposed developments on the corridor will only further increase traffic volumes; therefore, safety improvements are needed. The purpose of the proposed project is to: 1) improve safety conditions for all modes; 2) stimulate economic development by providing infrastructure that will maintain existing developments and encourage new investment ventures
Project Benefits:	1) Improve motor vehicle, pedestrian, bicyclist safety conditions; 2) improve pavement conditions; 3) extend the life of existing infrastructure; 4) reflect community vision; 5) improve driver visibility

Project #ST-10. Navajo Route 15 (Study Area Boundary to SR 264) - Continued	
Performance Measures:	1) Reduction in vehicle crashes; 2) pavement condition ratings
Target Geography: ** source: http://egis.hud.gov/*	**Burnside:** Median Income: $33,500 Poverty Rate: 45.29% Unemployed: 22.47%
Local and Public Support:	Stakeholder and public meetings were held in September 2015. Stakeholders and the public agreed with the proposed improvements.
Economic Development:	Improving safety along the corridor will promote economic growth which will directly and indirectly benefit the disadvantaged communities. Improved aesthetics will assist with the attraction of commercial developments and the overall livability of the Ganado area.
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP); Navajo Nation Community Development Block Grant

Project #ST-11. SR 264 (Western Study Boundary to US 191 North)			
Responsible Agency:	ADOT		
Route Name:	SR 264	**Project Mileage:**	1.95 miles
Project Location:			
Existing and Future Conditions:	• Paved State Highway; Provides regional access to Tuba City • Commercial development is expected to occur northwest of the SR 264/US 191 north intersection • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Minor Arterial; BIA - Rural Minor Arterial • Speed Limit: 45 - 65 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~2200 Existing LOS: B • 2020 ADT: ~2500 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
11.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	$97,500	Extend pavement life; Improve driving conditions
11.2	Clear roadside vegetation	$3,900	Improve driver visibility, drainage, and safety
11.3	Widen SR 264 to include 5 FT paved shoulders	$1,755,000	Provide safe area for vehicles to pull over

Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Issues Addressed:	Roadway safety concerns; pavement conditions; emergency response; road side vegetation; livestock entering right-of-way; narrow shoulders
Project Benefits:	Improved pavement conditions; improved driving conditions; improved driver visibility; extends the life of existing infrastructure; reflects community vision; economic development
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)

Project #ST-12. US 191 North (SR 264 to North of Chevron Gas Station)			
Responsible Agency:	ADOT		
Route Name:	US 191 North	**Project Mileage:**	0.18 mile
Project Location:			
Existing and Future Conditions:	• State highway that serves as a major regional corridor from Burnside to Chinle n the north; Provides access to the Chevron Gas Station • Significant residential and commercial development is expected to occur at the intersection, including a shopping center, motel, and restaurant • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Major Collector; BIA - Rural Minor Arterial • Speed Limit: 45 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~3900 Existing LOS: B • 2020 ADT: ~4300 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
12.1	Pavement preservation – structural overlay	$108,000	Extend pavement life; Improve driving conditions
12.2	Clear roadside vegetation	$360	Improve driver visibility, drainage, and safety

Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Issues Addressed:	Roadway safety concerns; pavement conditions; road side vegetation; livestock entering right-of-way
Project Benefits:	Improved pavement conditions; improved driving conditions; improved driver visibility; economic development
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)

Project #ST-13. Navajo Route 9202 (SR 264 to Bridge N671)			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	Navajo Route 9202	**Project Mileage:**	0.18 mile
Project Location:			
Existing and Future Conditions:	• Paved local roadway that primarily provides access to the US Post Office, the Ganado Unified School District, and residential areas • Sage Memorial Hospital is expected to expand their facilities in the future. • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Rural Major Collector • Speed Limit: 25 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~2100 Existing LOS: B • 2020 ADT: ~2300 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
13.1	Pavement preservation – structural overlay	$108,000	Extend pavement life; Improve driving conditions

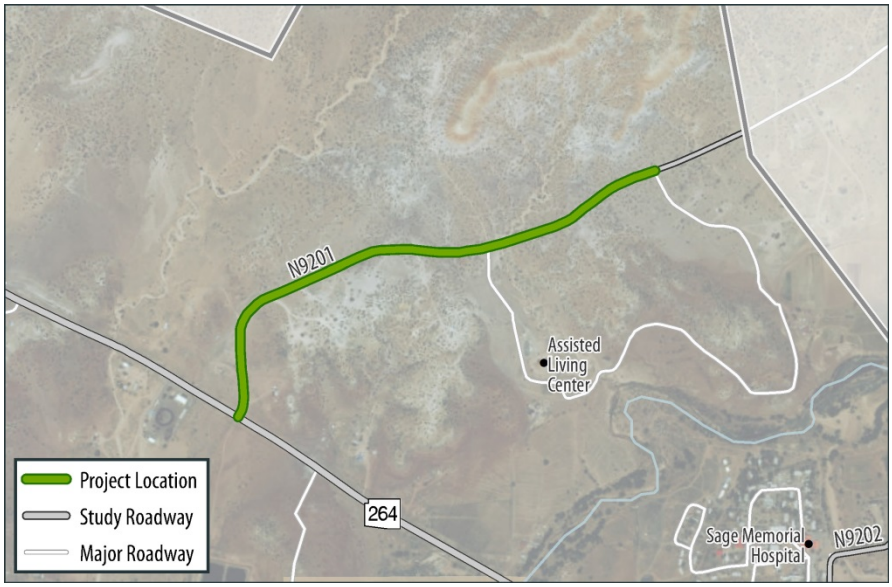
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, utilities, and noise receptors.
Issues Addressed:	Roadway safety concerns; pavement conditions
Project Benefits:	Improved pavement conditions; improved driving conditions; reflects community vision; economic development
Responsible Agency:	Apache County District II; Ganado Chapter
Funding Sources:	Tribal Transportation Program (TTP); Navajo Nation Community Development Block Grant; USDA Community Facility Grants

Project #ST-14. Navajo Route 27			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	Navajo Route 27	**Project Mileage:**	0.50 mile
Project Location:			
Existing and Future Conditions:	• Regional corridor that connects 264 to Ganado Lake, Nazlini, and serves as an alternative route to Chinle • Significant residential developments may occur along the corridor in the future • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Rural Major Collector • Speed Limit: 55 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~1200 Existing LOS: A • 2020 ADT: ~1400 2020 LOS: A *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
14.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	$25,000	Extend pavement life; Improve driving conditions
14.2	Install recessed reflective pavement markers	$750	Improve night time visibility; Enhance safety
14.3	Install "Stop Ahead" warning sign approaching SR 264	$500	Increase driver awareness and safety

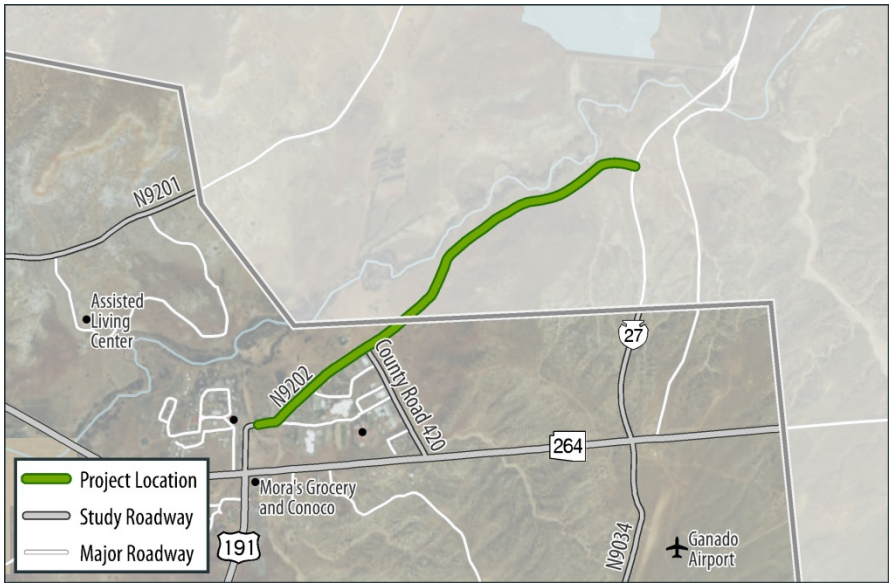
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources and utilities.
Issues Addressed:	Roadway safety concerns; pavement conditions; nighttime visibility
Project Benefits:	Improved pavement conditions; improved driving conditions; improved driver visibility; advance driver warning of approaching intersection
Responsible Agency:	Apache County District II; Ganado Chapter
Funding Sources:	Tribal Transportation Program (TTP); Navajo Nation Community Development Block Grant

Project #ST-15. Navajo Route 9201 (SR 264 to Senior Center Driveway)			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	Navajo Route 9201	**Project Mileage:**	0.96 mile
Project Location:			
Existing and Future Conditions:	• Unpaved local roadway that provides access to residential areas and the Ganado Senior Center • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Rural Major Collector • Speed Limit: 25 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: <500 Existing LOS: A • 2020 ADT: ~500 2020 LOS: A *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
15.1	Grade and pave roadway. Include 5 FT paved shoulders	$1,152,000	Improve access to SR 264; Improve drainage; Provide safe area for vehicles to pull over
15.2	Restripe SR 264 intersection to include lane markings and a stop bar	$500	Increase driver awareness and safety

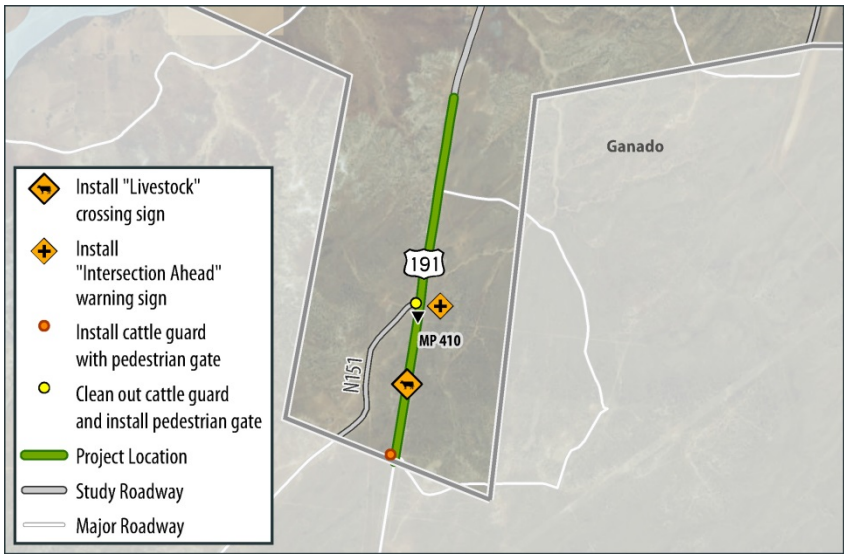
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources and utilities.
Issues Addressed:	Roadway safety concerns; unpaved roadway with drainage concerns
Project Benefits:	Improved driving conditions; improved accessibility between SR 264 and the Ganado Senior Center
Funding Sources:	Tribal Transportation Program (TTP); Navajo Nation Community Development Block Grant

Project #ST-16. Navajo Route 9202 (Bridge N671 to Navajo Route 27)			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	Navajo Route 9202	**Project Mileage:**	1.77 miles
Project Location:			
Existing and Future Conditions:	• Paved local roadway that connects SR 264 to Navajo Route 27, the US Post Office, Ganado Unified School District, and residential areas • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Rural Major Collector • Speed Limit: 25 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~2100 Existing LOS: B • 2020 ADT: ~2300 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
16.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	$88,500	Extend pavement life; Improve driving conditions
16.2	Clear roadside vegetation	$3,540	Improve driver visibility, drainage, and safety

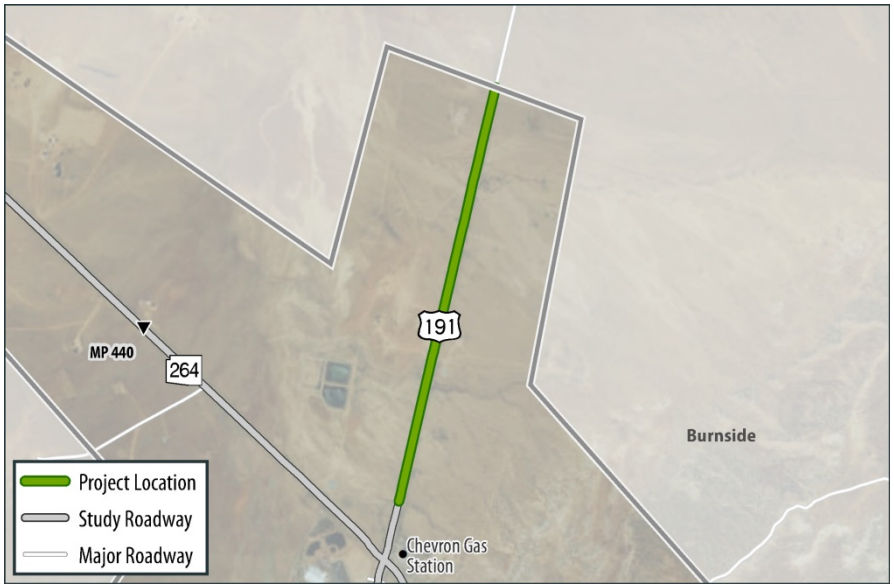
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, noise receptors, and utilities.
Issues Addressed:	Roadway safety concerns; pavement conditions; road side vegetation
Project Benefits:	Improved pavement conditions; improved driving conditions; improved driver visibility
Funding Sources:	Tribal Transportation Program (TTP); Navajo Nation Community Development Block Grant

Project #ST-17. US 191 South (Ganado Cemetery to Study Area Boundary)			
Responsible Agency:	ADOT		
Route Name:	US 191 South	**Project Mileage:**	1.59 miles
Project Location:			
Existing and Future Conditions:	• State highway that serves as a major regional corridor from Ganado to I-40 in the south • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Minor Collector; BIA - Rural Minor Arterial • Speed Limit: 55 - 65 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~1900 Existing LOS: B • 2020 ADT: ~2300 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
17.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	$79,500	Extend pavement life; Improve driving conditions
17.2	Install recessed reflective pavement markers	$2,385	Improve night time visibility; Enhance safety
17.3	Install one (1) cattle guard with pedestrian gate	$6,000	Restrict livestock from entering right-of-way
17.4	Clean out one (1) cattle guard and install pedestrian gate	$2,500	Restrict livestock from entering right-of-way; Improve pedestrian access
17.5	Clear roadside vegetation	$3,180	Improve driver visibility, drainage, and safety
17.6	Install "Livestock" crossing sign at MP 409.7 Northbound	$500	Alert drivers of potential livestock entering right-of-way
17.7	Install "Intersection Ahead" warning sign approaching Navajo Route 151 in both directions	$500	Alert drivers of approaching intersection

Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, noise receptors, and utilities.
Issues Addressed:	Roadway safety concerns; pavement conditions; nighttime visibility; emergency response; livestock entering right-of-way
Project Benefits:	Improved motor vehicle, pedestrian, bicyclist safety conditions; improved pavement conditions; extends the life of existing infrastructure; reflects community vision; advance driver warning of approaching intersection
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP); Highway Safety Improvement Program (HSIP)

Project #ST-18. US 191 North (North of Chevron Gas Station to Study Boundary)			
Responsible Agency:	ADOT		
Route Name:	US 191 North	**Project Mileage:**	1.28 miles
Project Location:			
Existing and Future Conditions:	• State highway that serves as a major regional corridor from Burnside to Chinle in the north • Commercial and educational development may occur along the corridor in the future • Number of Lanes: 2 lanes • Functional Classification: FHWA – Rural Minor Collector; BIA - Rural Minor Arterial • Speed Limit: 65 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: ~3900 Existing LOS:B • 2020 ADT: ~4300 2020 LOS: B *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
18.1	Pavement preservation – structural overlay	$756,000	Extend pavement life; Improve driving conditions
18.2	Install recessed reflective pavement markers	$1,890	Improve night time visibility; Enhance safety
18.3	Clear roadside vegetation	$2,520	Improve driver visibility, drainage, and safety

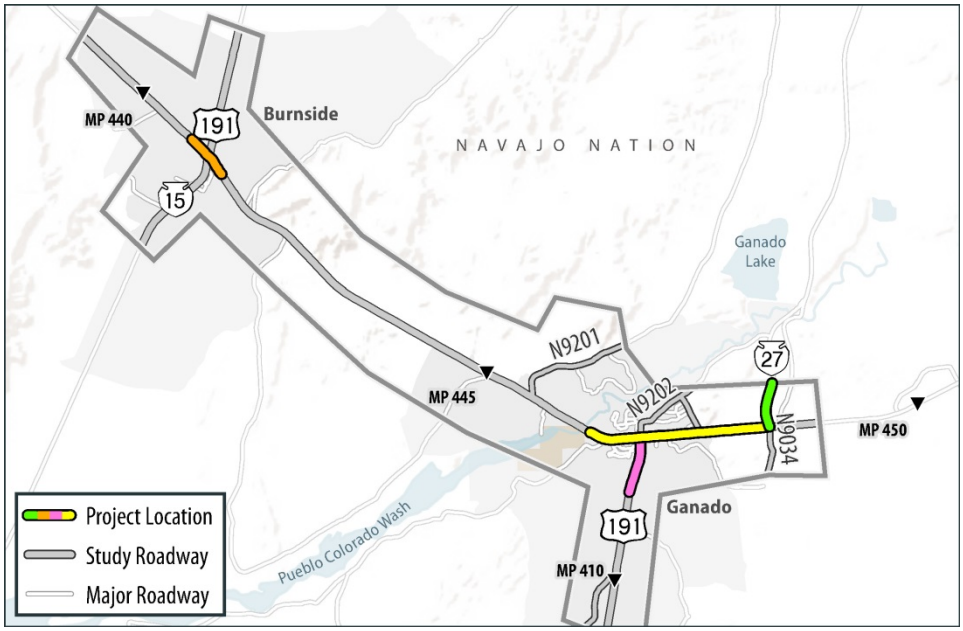
Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources and utilities.
Issues Addressed:	Roadway safety concerns; pavement conditions; road side vegetation
Project Benefits:	Improved pavement conditions; improved driving conditions; improved driver visibility
Funding Sources:	Surface Transportation Program (STP); Tribal Transportation Program (TTP)

Project #ST-19. County Road 420			
Responsible Agency:	Apache County District II; Ganado Chapter		
Route Name:	County Road 420	**Project Mileage:**	0.47 mile
Project Location:			
Existing and Future Conditions:	• Paved local roadway that connects Navajo Route 9202 to SR 264 • Number of Lanes: 2 lanes • Functional Classification: FHWA – Not Classified; BIA - Not Classified • Speed Limit: 20 MPH		
Existing and Projected Traffic Conditions:	• Existing ADT: <500 Existing LOS: A • 2020 ADT: <500 2020 LOS: A *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*		

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
19.1	Pavement preservation – minor rehabilitation (chip seal and routine maintenance)	$23,500	Extend pavement life; Improve driving conditions

Environmental Overview:	Area is developed; therefore environmental impacts are minimal. Consideration should be given to impacts on cultural resources, noise receptors, and utilities.
Issues Addressed:	Roadway safety concerns; pavement conditions
Project Benefits:	Improved pavement conditions; improved driving conditions
Funding Sources:	Tribal Transportation Program (TTP)

Project #ST-20. Speed Limit Reduction	
Responsible Agency:	ADOT; Apache County District II; Ganado Chapter
Route Name:	Study Area Wide
Project Location:	
Existing and Future Conditions:	• Speed Limit: SR 264 (Hubbell Trading Post to Navajo Route 27) - 40 MPH; SR 264 (West of US 191 North to East of Mustang Gas Station) - 45-55 MPH; SR 264 (West of US 191 North to East of Mustang Gas Station) – 45-55 MPH; Navajo Route 27 - 55 MPH • The area is expected to have a significant residential and commercial development in Burnside and Ganado

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
20.1	Conduct an engineering assessment to determine appropriate speed limits on: - SR 264 (Hubbell Trading Post to Navajo Route 27) - SR 264 (West of US 191 North to East of Mustang Gas Station) - US 191 South (Ganado Cemetery to SR 264) - Navajo Route 27	*ADOT Regional Traffic can conduct study upon request.*	Improve corridor safety conditions; Enhance pedestrian safety; Reduce speeding

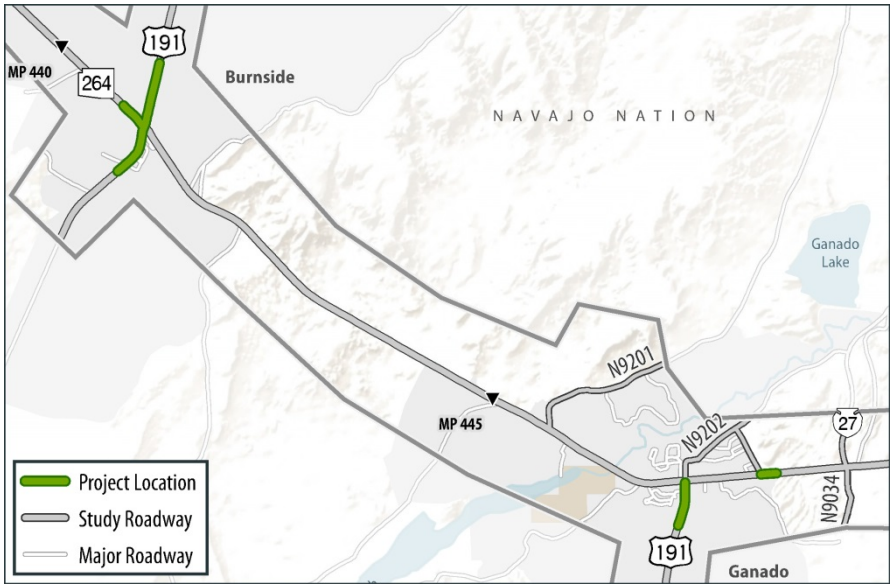
Environmental Overview:	Project adjusts speed conditions along an established roadway; therefore impacts are minimal. Consideration should be given to impacts on noise receptors.
Issues Addressed:	Roadway safety concerns; high vehicular speeds
Project Benefits:	Improved motor vehicle, pedestrian, bicyclist safety conditions
Funding Sources:	Section 402 State and Community Highway Safety Grant Program; Navajo Nation Community Development Block Grant

Project #ST-21. Community Gateway Treatment - SR 264 Pedestrian Overpass	
Responsible Agency:	Ganado Unified School District; Apache County District II
Route Name:	SR 264
Project Location:	
Existing and Future Conditions:	• Pratt truss pedestrian bridge that provides pedestrian access across SR 264 to the Ganado Primary and Middle School • Approximately 94 FT in length with switchback ramps • Significant residential development is expected to occur in Ganado
Existing and Projected Traffic Conditions:	• Existing ADT: ~7200 Existing LOS: D • 2020 ADT: ~7900 2020 LOS: D *Average Daily Traffic (ADT) refers to a roadway`s total traffic volume during a 24-hour period. Level of Service (LOS) is a measurement of traffic congestion. LOS is expressed using letters "A" through "F", with LOS A representing free flow conditions and LOS F representing failing conditions.*

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
21.1	Incorporate community entrance treatments to overpass to alert drivers they are entering a community and to lower speeds	$10,000	Alert drivers that they are entering a developed area; Encourage motorists to reduce speeds; Enhance aesthetics

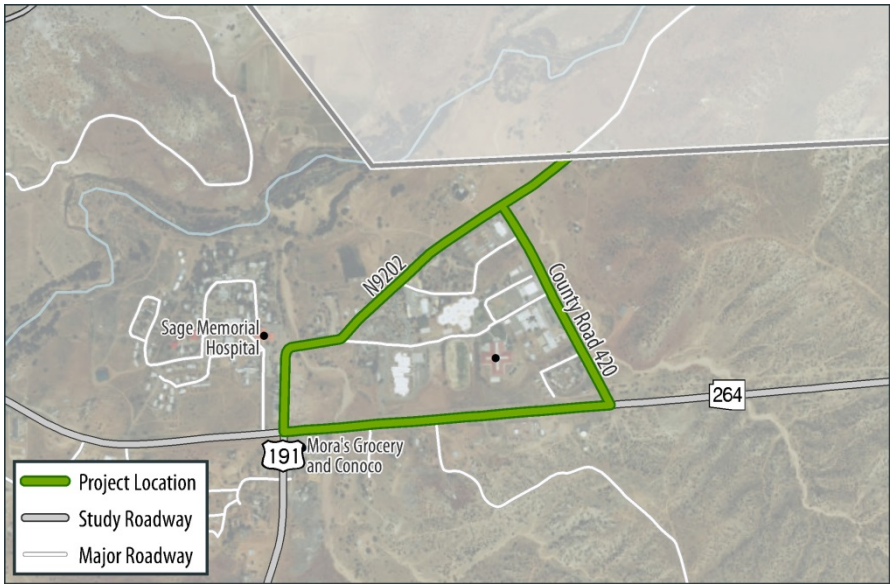
Environmental Overview:	Project is located on an existing structure; therefore, environmental impacts are minimal.
Issues Addressed:	Roadway safety concerns; high vehicle speeds
Project Benefits:	Increased roadway safety; reduced vehicle speeds; enhance corridor aesthetics
Funding Sources:	Navajo Nation Community Development Block Grant; Tribal Transportation Program Safety Funds (TTPSF); Accelerated Innovation Deployment (AID) Demonstration; Section 402 State and Community Highway Safety Grant Program; Transportation Alternatives Program (TAP) - Safe Routes to School
Comments:	Any signage installed on ADOT ROW has to be MUTCD compliant along with establishing a legitimate need. Place named signs may be installed on state highways if one of the following criteria is met: the town or city is incorporated by the State of Arizona, the unincorporated community has a system of streets and a U.S. Post Office, or the unincorporated community is of historical importance and continues to provide an impact in such fields as architecture, history, archeology, and culture and is listed in the Arizona State Historical Register. In addition, signage installed on the pedestrian bridge will need to be evaluated by ADOT's Bridge Design Section to determine the effects of the signage on the structure.

Project #ST-22. Install Traffic Calming Devices	
Responsible Agency:	ADOT; Apache County District II; Ganado Chapter
Route Name:	Study Area Wide
Project Location:	
Existing and Future Conditions:	• Project is located on major local and regional corridors in the developed areas of Burnside and Ganado • The area is expected to have a significant residential and commercial development in Burnside and Ganado, which may increase traffic along study roadways

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
22.1	Paint colored speed limit markings on pavement and install speed feedback signs at: - SR 264 (West of US 191 North) entering Burnside - SR 264 (East of County Road 420) entering Ganado - US 191 South (Entering Ganado) - US 191 North (Entering Burnside) - Navajo Route 15 (Entering Burnside)	$62,500	Alert drivers of changing speed conditions; Improve overall corridor safety
22.2	Develop a community-wide Speed Enforcement Plan that outlines speed enforcement strategies (such as location of mobile and stationary patrols, speed radar needs, etc.), communication program, and funding strategies. In coordination with the Arizona Department of Public Safety and Navajo Nation Police to implement recommended enforcement countermeasures		Improve overall corridor safety

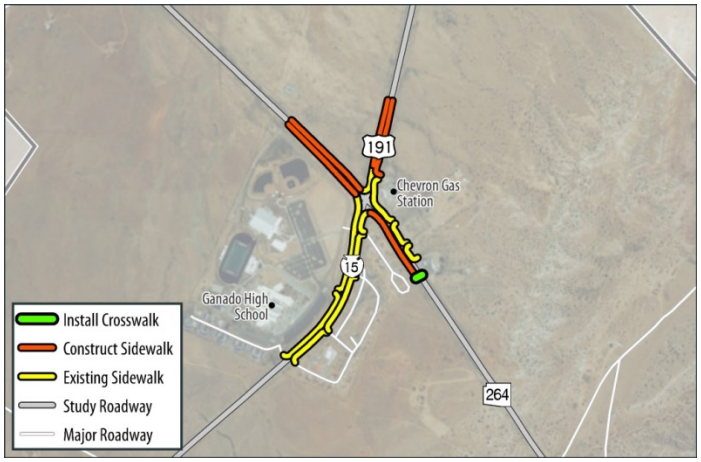
Environmental Overview:	Projects are along established roadway; therefore environmental impacts are minimal. Consideration should be given to the impacts of the speed feedback signs on adjacent properties
Issues Addressed:	Roadway safety concerns; high vehicle speeds
Project Benefits:	Increased roadway safety; reduced vehicle speeds; improved pedestrian/bicyclist safety conditions
Funding Sources:	Tribal Transportation Program Safety Funds (TTPSF); Highway Safety Improvement Program (HSIP); Section 402 State and Community Highway Safety Grant Program

Project #ST-23. Ganado Primary and Middle School Sidewalks and Street Lighting	
Responsible Agency:	ADOT; Apache County District II; Ganado Chapter
Project Location:	
Project Mileage:	1.84 miles
Existing and Future Conditions:	• Project is located in the vicinity of the Ganado Primary and Ganado Middle School along SR 264, Navajo Route 9202, and County Road 420 • Ganado is expected to have significant residential development south of SR 264 and the Sage Memorial Hospital is expected to expand their facilities

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
23.1	Construct sidewalks in both directions on Navajo Route 9202 (SR 264 to County Road 420), County Road 420 (SR 264 to Navajo Route 9202), and SR 264 (Navajo Route 9202 to County Road 420)	$1,196,000	Improve pedestrian/bicycle mobility; Encourage physical activity
23.2	Install street lighting adjacent to sidewalks	$368,000	Improve night time visibility; Enhance safety

Environmental Overview:	Project is located adjacent to existing roadway; therefore impacts are minimal. Effort should be made to limit the impacts on Title VI populations and noise receptors during construction
Issues Addressed:	Pedestrian/bicyclist safety and mobility; night time visibility
Project Benefits:	Improved motor vehicle, pedestrian, bicyclist safety conditions; reflects community vision; economic development
Funding Sources:	Navajo Nation Community Development Block Grant; Highway Safety Improvement Program (HSIP); Section 402 State and Community Highway Safety Grant Program; Tribal Transportation Program (TTP); USDA Community Facility Grants; Navajo Nation Infrastructure and Capital Improvement; Transportation Alternatives Program (TAP) - Safe Routes to School
Comments:	Per ADOT standards, continuous street lighting is permitted on state highways after the following conditions are considered: illumination of cross streets up to one-half mile, presence of urban development, comparison of night and day crashes in the past three years. Illumination at intersections is evaluated by: pedestrian and vehicular traffic county, availability of electrical services, number of crashes that have occurred at night, intersection signalization, or if the intersection has complex geometrics.

Project #ST-24. Burnside Area Sidewalks and Street Lighting	
Responsible Agency:	ADOT; Apache County District II; Ganado Chapter
Project Location:	
Existing and Future Conditions:	• Project is located in the vicinity of the Ganado High School SR 264, US 191 North, and Navajo Route 15 • Burnside is expected to have significant commercial development in the vicinity of the SR 264/US 191/Navajo Route 15 intersection • Residential development is expected to occur along Navajo Route 15

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
24.1	Remove and dispose of debris, litter, and vegetation from existing sidewalks on SR 264, US 191 North, and Navajo Route 15	$1,220	Improve pedestrian/bicycle facilities; Improve driver visibility
24.2	Extend existing sidewalks on westbound SR 264 from US 191 North to Mustang Gas Station	$55,250	Improve pedestrian/bicycle mobility; Encourage physical activity
24.3	Construct new sidewalks on SR 264 (both directions) from US 191 North to western Ganado High School driveway	$136,500	Improve pedestrian/bicycle mobility; Encourage physical activity
24.4	Extend existing sidewalks on US 191 North from SR 264 roundabout to north of Chevron Gas Station	$104,000	Improve pedestrian/bicycle mobility; Encourage physical activity
24.5	Install street lighting adjacent to sidewalks	$102,000	Improve night time visibility; Enhance safety
24.6	Add pedestrian crosswalk crossing SR 264 at Mustang Gas Station	$1,000	Improve pedestrian/bicycle mobility

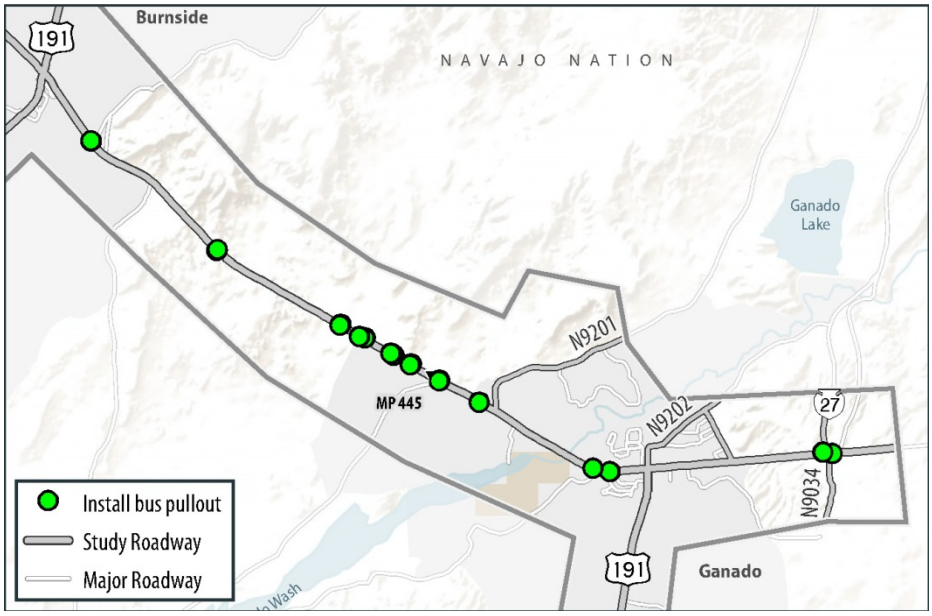
Environmental Overview:	Project is located adjacent to existing roadway; therefore impacts are minimal. Effort should be made to limit the impacts on Title VI populations and noise receptors during construction.
Issues Addressed:	Pedestrian/bicyclist safety and mobility; night time visibility
Project Benefits:	Improved motor vehicle, pedestrian, bicyclist safety conditions; reflects community vision
Funding Sources:	Navajo Nation Community Development Block Grant; Highway Safety Improvement Program (HSIP); Section 402 State and Community Highway Safety Grant Program; Tribal Transportation Program (TTP); USDA Community Facility Grants; Navajo Nation Infrastructure and Capital Improvement
Comments:	Per ADOT standards, continuous street lighting is permitted on state highways after the following conditions are considered: illumination of cross streets up to one-half mile, presence of urban development, comparison of night and day crashes in the past three years. Illumination at intersections is evaluated by: pedestrian and vehicular traffic county, availability of electrical services, number of crashes that have occurred at night, intersection signalization, or if the intersection has complex geometrics.

Project #ST-25. Sage Memorial Hospital Sidewalks and Street Lighting	
Responsible Agency:	Apache County District II; Ganado Chapter
Project Location:	
Project Mileage:	0.45 mile
Existing and Future Conditions:	• Project is located in the vicinity of the Sage Memorial Hospital and connects SR 264 to Navajo Route 9202 • Ganado is expected to have significant residential development south of SR 264 and the Sage Memorial Hospital is expected to expand their facilities

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
25.1	Construct concrete shared use path that connects SR 264, Sage Memorial Hospital, and Navajo Route 9202	$292,500	Improve pedestrian/bicycle mobility; Encourage physical activity
25.2	Install street lighting adjacent to sidewalks	$90,000	Improve night time visibility and safety

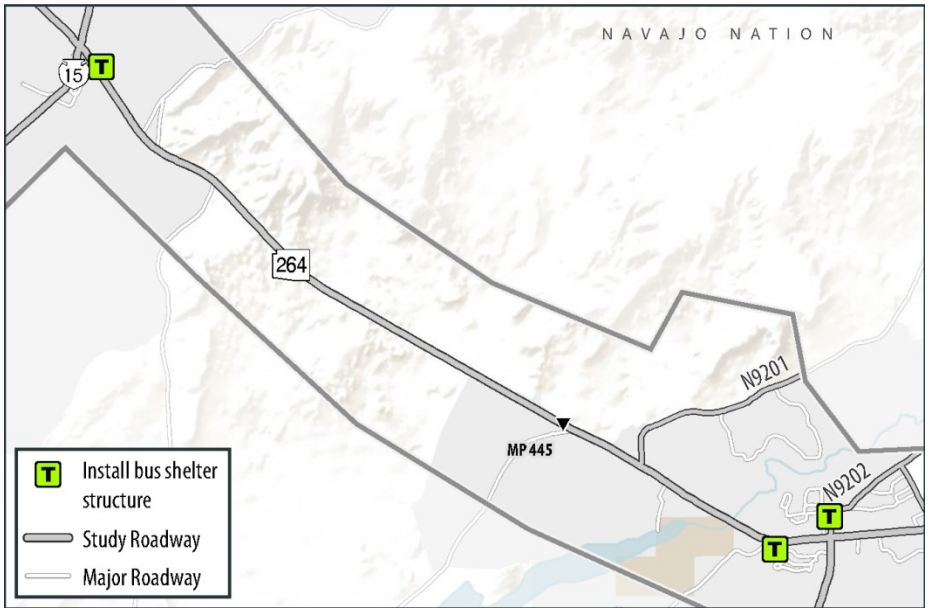
Environmental Overview:	Project is located adjacent to existing roadway; therefore impacts are minimal. Effort should be made to limit the impacts on Title VI populations and noise receptors during construction.
Issues Addressed:	Pedestrian/bicyclist safety and mobility; night time visibility
Project Benefits:	Improved motor vehicle, pedestrian, bicyclist safety conditions; reflects community vision; economic development
Funding Sources:	Navajo Nation Community Development Block Grant; Tribal Transportation Program (TTP); USDA Community Facility Grants; Navajo Nation Infrastructure and Capital Improvement

Project #ST-26. SR 264 Bus Pullouts	
Responsible Agency:	ADOT
Project Location:	
Existing and Future Conditions:	• Project is located on along the major regional corridor of SR 264 • The land use ranges from residential, commercial, to open space • The area is expected to have a significant residential and commercial development in Burnside and Ganado, which may increase traffic along study roadways

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
26.1	*Install Bus Pullouts on SR 264* *- Navajo Route 27 (Eastbound and Westbound)* *- Cedar Hills Road (Westbound)* *- County Road 426 (Eastbound)* *- West of N 9201 (Westbound)* *- Mile Post 445.06 (Eastbound and Westbound)* *- At driveways between Mile Post 444 – 445 (Four Eastbound and Four Westbound)* *- Mile Post 443 (Eastbound and Westbound)* *- Mile Post 441.7 (Westbound)*	**Projected Funded Through TRACS H824601D*	Reduce congestion on SR 264; Improve overall corridor safety
26.2	Construct raised platform with solar lighting at each pullout to safely accommodate students waiting for school buses	$450,000	Provide a safe waiting area for students waiting for school bus; Improve overall corridor safety

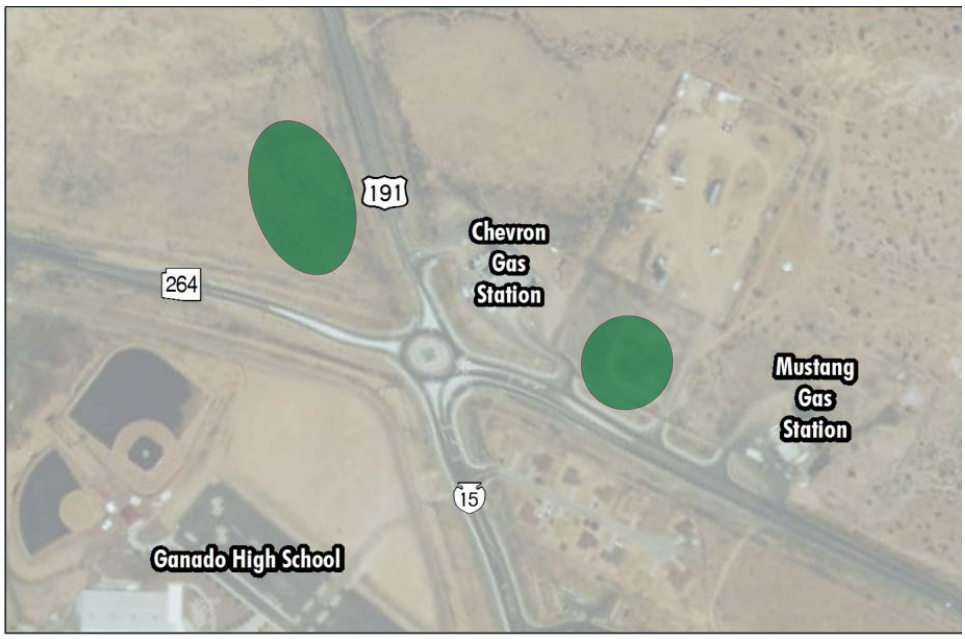
Environmental Overview:	Project is located adjacent to existing roadway; therefore impacts are minimal. Effort should be made to limit the impacts on Title VI populations and noise receptors during construction.
Issues Addressed:	Roadway safety concerns; vehicles parked along SR 264; school route and transit route safety issues
Project Benefits:	Improved motor vehicle, pedestrian, bicyclist safety conditions; improved emergency response
Funding Sources:	Navajo Nation Community Development Block Grant; National Priority Safety Program; Highway Safety Improvement Program (HSIP); Section 402 State and Community Highway Safety Grant Program; USDA Community Facility Grants; Accelerated Innovation Deployment (AID) Demonstration; Transportation Alternatives Program (TAP)

Project #ST-27. Install Bus Shelters	
Responsible Agency:	Navajo Transit System
Project Location:	
Existing and Future Conditions:	• Project is located at current NTS transit stops – Post Office, Ganado Chapter House, and Mustang Gas Station • The area is expected to have a significant residential and commercial development in Burnside and Ganado

Project Description:

ID	*Improvement*	*Cost Estimate*	*Purpose/Benefit*
27.1	Install bus shelter structures at: Post Office, Ganado Chapter House, and Mustang Gas Station	**Funded through Navajo Transit System*	Provide safe waiting area for NTS transit riders

Environmental Overview:	Project is located at existing facilities; therefore, environmental impacts are minimal. Effort should be made to limit the impacts on Title VI populations and noise receptors during construction.
Issues Addressed:	Lack of shelter for NTS passengers
Project Benefits:	Improved safety conditions for NTS passengers
Funding Sources:	Tribal Transit Program (TTP); Rural Area Formula Grants (Section 5311)

Project #ST-28. Burnside Park-and-Ride Facility	
Responsible Agency:	Navajo Transit System
Project Location:	
Existing and Future Conditions:	• Project is located at the proposed Ganado Shopping Center or east of the Chevron Gas Station • Burnside is expected to have significant residential and commercial development

Project Description:

ID	Improvement	Cost Estimate	Purpose/Benefit
28.1	Construct a NTS park-and-ride facility at either the Ganado Shopping Center (scheduled for development in 2016) or east of the Chevron Gas Station	**Funded through Navajo Transit System*	Provide parking facilities for transit riders; reduce parking demand at the Chevron and Mustang gas stations

Environmental Overview:	Project is located in a developed area; therefore, environmental impacts are minimal. Effort should be made to limit the impacts on Title VI populations and noise receptors during construction.
Issues Addressed:	Parking congestion issues
Project Benefits:	Provide ample parking facilities and improve safety conditions for NTS passengers
Funding Sources:	Tribal Transit Program (TTP); Rural Area Formula Grants (Section 5311)

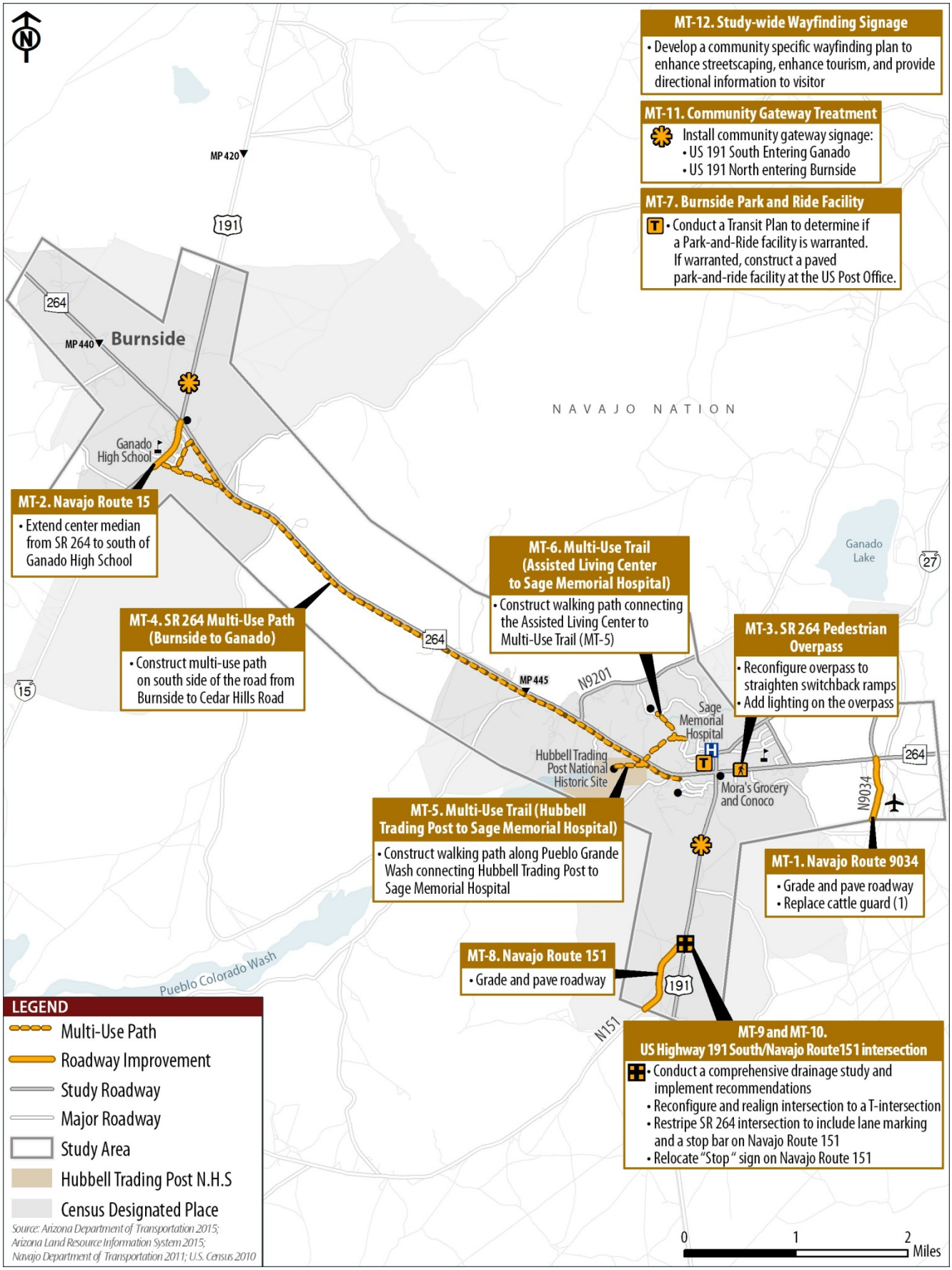
Mid-Term Improvements

Mid-term phase projects are recommended to be completed as the study area reaches year 2025. Table 8.2 and Figure 8.1 present a comprehensive list of the transportation recommendations for this phase, as well as the project number, location, description, and estimated costs for each project. Each project is assigned a unique project number that can be used to track progress. Planning level cost estimates were developed based on typical per-mile/foot construction costs in 2015. *Estimated costs for each project are expressed in 2015 dollars and do not include costs associated with right-of-way acquisitions. Actual costs for projects could vary at the time of implementation; therefore a detailed analysis should be performed on a case-by-case basis to determine actual costs. Unless otherwise noted, the recommended projects are not yet funded.*

Table 8.2. Mid-Term Roadway Recommendations

ID	Project Location and Description	Length (mi)	Estimated Cost
Mid-Term			
MT-1	**Navajo Route 9034**	**0.55**	**$665,000**
1.1	Grade and pave roadway. Includes 5 FT paved shoulders	0.55	$660,000
1.2	Replace cattle guard (1)	-	$5,000
MT-2	**Navajo Route 15**	**0.48**	**$40,000**
2.1	Extend center median from SR 264 to south of Ganado High School	0.48	$40,000
MT-3	**SR 264 Pedestrian Overpass**	**-**	**$255,000**
3.1	Reconfigure overpass to straighten switchback ramps	-	$250,000
3.2	Add lighting on the overpass	-	$5,000
MT-4	**SR 264 Multi-Use Path (Burnside to Ganado)**	**6.10**	**$1,830,000**
4.1	Construct multi-use path on south side of the road from Burnside to Cedar Hills Road	5.20	$1,560,000
4.2	Construct multi-use path connecting Navajo Housing Authority Housing to SR 264 multi-use path	0.90	$270,000
MT-5	**Multi-Use Trail (Hubbell Trading Post to Sage Memorial Hospital)**	**0.79**	**$237,000**
5.1	Construct walking path along Pueblo Grande Wash connecting Hubbell Trading Post to Sage Memorial Hospital (30-80 FT crossing)	0.79	$237,000
MT-6	**Multi-Use Trail (Senior Center to Sage Memorial Hospital)**	**0.41**	**$123,000**
6.1	Construct walking path connecting the Senior Center to Multi-Use Trail (MT-5)	0.41	$123,000
MT-7	**Ganado Park-and Ride Facility**	**-**	**N/A**
7.1	Conduct a Transit Plan to determine if a Park-and-Ride facility is warranted in Ganado. If warranted, construct a paved park-and-ride facility at the US Post Office.	-	**Funded through Navajo Transit System*
MT-8	**Navajo Route 151**	**0.75**	**$900,000**
8.1	Grade and pave roadway. Includes 5 FT paved shoulders	0.75	$900,000
MT-9	**US 191 South/Navajo Route 151 intersection - Drainage Study**	**-**	**$150,000**
9.1	Conduct a comprehensive drainage study to identify improvements to alleviate recurring flooding issues	-	$150,000
MT-10	**US 191 South/Navajo Route 151 intersection**	**-**	**$451,000**
10.1	Reconfigure and realign intersection to a T-intersection	-	$200,000
10.2	Restripe SR 264 intersection to include lane marking and a stop bar on Navajo Route 151	-	$500
10.3	Implement recommendations from Drainage Study to address flooding. Mitigation measures such as storm water drains or concrete roadway should be considered.	-	$250,000
10.4	Relocate "Stop" sign on Navajo Route 151	-	$500
MT-11	**Community Gateway Treatment**	**-**	**$70,000**
11.1	US 191 South Entering Ganado - Install community gateway signage	-	$35,000
11.2	US 191 North entering Burnside - Install community gateway signage	-	$35,000
MT-12	**Study-wide Wayfinding Signage**	**-**	**$50,000**
12.1	Develop a community specific wayfinding plan to enhance streetscaping, enhance tourism, and provide directional information to visitor. The plan could include: identification of signage needs, development of sign design, and incorporate pedestrian and vehicular paths.	-	$50,000

Figure 8.1. Recommended Mid-Term Improvements



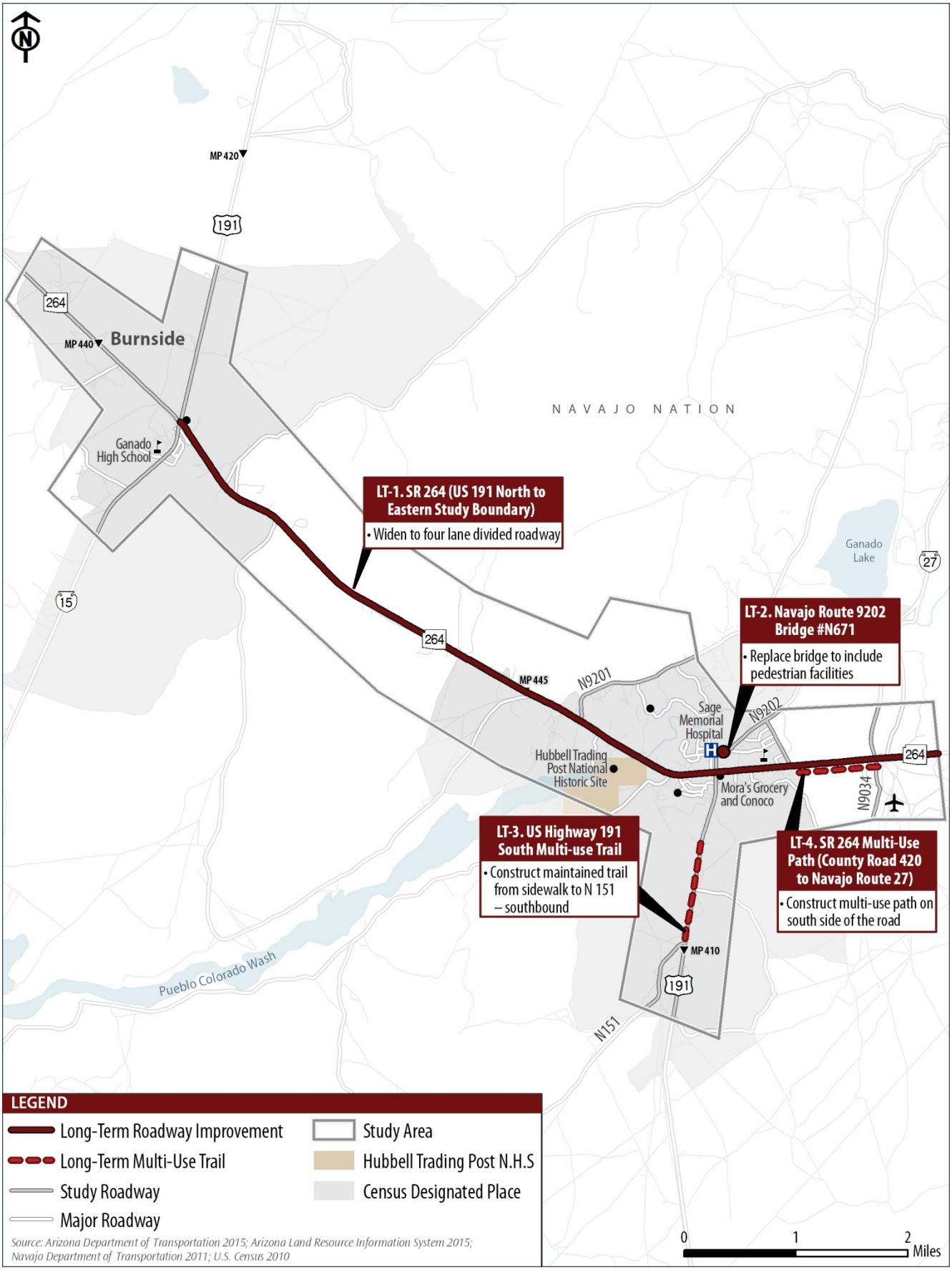
Long-Term Improvements

Long-term phase projects are recommended to be completed as the study area reaches year 2035. Table 8.3 and Figure 8.2 present a comprehensive list of the transportation recommendations for this phase, as well as the project number, location, description, and estimated costs for each project. Each project is assigned a unique project number that can be used to track project progress. Planning level cost estimates were developed based on typical per-mile/foot construction costs in 2015. *Estimated costs for each project are expressed in 2015 dollars and do not include costs associated with right-of-way acquisitions. Actual costs for projects could vary at the time of implementation; therefore a detailed analysis should be performed on a case-by-case basis to determine actual costs. Unless otherwise noted, the recommended projects are not yet funded.*

Table 8.3. Long-Term Roadway Recommendations

ID	Project Location and Description	Length (mi)	Estimated Cost
Long-Term			
LT-1	**SR 264 (US 191 North to Eastern Study Boundary)**	**7.88**	**$27,580,000**
1.1	Widen to four lane divided roadway	7.88	$27,580,000
LT-2	**Navajo Route 9202 Bridge #N671**	**-**	**$480,000**
2.1	Replace bridge to include pedestrian facilities	-	$480,000
LT-3	**US Highway 191 South Multi-use Trail**	**0.91**	**$182,000**
3.1	Construct maintained trail from sidewalk to N 151 – southbound	0.91	$182,000
LT-4	**SR 264 Multi-Use Path (County Road 420 to Navajo Route 27)**	**0.77**	**$231,000**
4.1	Construct multi-use path on south side of the road from County Road 420 to Navajo Route 27	0.77	$231,000

Figure 8.2. Recommended Long-Term Improvements



PEDESTRIAN, BICYCLE, AND TRAIL IMPROVEMENT RECOMMENDATIONS

Existing pedestrian and trail facilities were reviewed in relation to: the location of activity centers such as schools, retail establishments, medical facilities, recreation centers; residential community developments; and existing roadway alignments. Analyzing the study area's existing pedestrian and trail facilities helped to identify locations that would benefit from these amenities and that would be closely integrated with the area's roadway system while maintaining pedestrian safety, and keeping in mind the priorities of the community. The prioritization of the pedestrian and trail improvement projects is based on input from the TAC, stakeholders, and the public. Figure 8.3 places the improvements into short-, mid- and long- terms.

Short-Term (2020) Pedestrian, Bicycle, and Trail Improvement Recommendations

- Construct concrete sidewalks
  - SR 264: Cedar Hills Road to County Road 420 (1.0 mile)
  - Cedar Hills Road and Chapter Drive (0.60 mile)
  - US 191 South: SR 264 to Ganado Cemetery (0.66 mile)
  - Ganado Primary and Middle School - Navajo Route 9202: SR 264 to County Road 420, County Road 420: SR 264 to Navajo Route 9202, and SR 264: Navajo Route 9202 to County Road 420 (1.84 miles)
  - Burnside Area – SR 264 WB: US 191 North to Mustang Gas Station, SR 264 EB and WB: US 191 North to western Ganado High School driveway, US 191 North: SR 264 roundabout to north of Chevron Gas Station (1.02 miles)
  - Sage Memorial Hospital (0.45 mile)

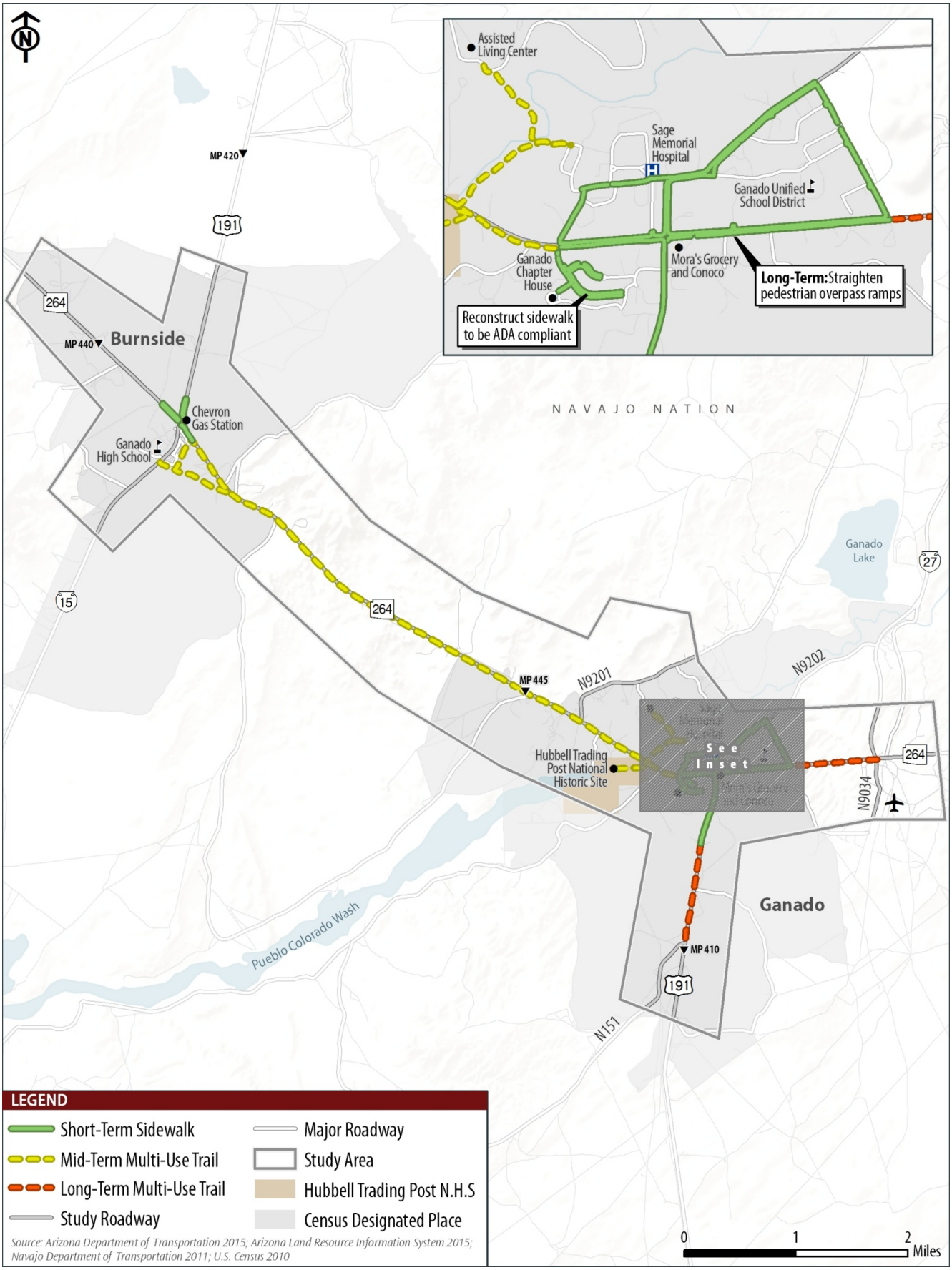
Mid-Term (2025) Pedestrian, Bicycle, and Trail Improvement Recommendations

- Reconfigure SR 264 pedestrian overpass to straighten switchback ramps
- Construct asphalt shared-use path
  - SR 267: Ganado to Burnside (6.10 miles)
  - Hubbell Trading Post to Sage Memorial Hospital (0.79 mile)
  - Senior Center to Sage Memorial Hospital (0.41 mile)

Long-Term (2035) Pedestrian, Bicycle, and Trail Improvement Recommendations

- Replace Navajo Route 9202 Bridge #N671 to include pedestrian facilities
- Expand multi-use trail system:
  - US 191 South: Ganado Cemetery to N 151 (0.91 mile)
  - SR 264: County Road 420 to Navajo Route 27 (0.77 mile)

Figure 8.3: Recommended Pedestrian, Bicycle, and Trail Improvements



TRANSIT IMPROVEMENT RECOMMENDATIONS

The identification of transit projects were based on input from the TAC, stakeholders, public input, Navajo Transit System (NTS), and a review of previous planning studies.

Short-Term (2020) Transit Recommendations

- Install bus pullouts with a raised platform and solar lighting along SR 264
    - Navajo Route 27 (Eastbound and Westbound)
    - Cedar Hills Road (Westbound)
    - County Road 426 (Eastbound)
    - West of N 9201 (Westbound)
    - Mile Post 445.06 (Eastbound and Westbound)
    - At driveways between Mile Post 444 – 445 (Four Eastbound and Four Westbound)
    - Mile Post 443 (Eastbound and Westbound)
    - Mile Post 441.7 (Westbound)
- Install bus shelters at NTS stops: Post Office, Ganado Chapter House, and Mustang Gas Station

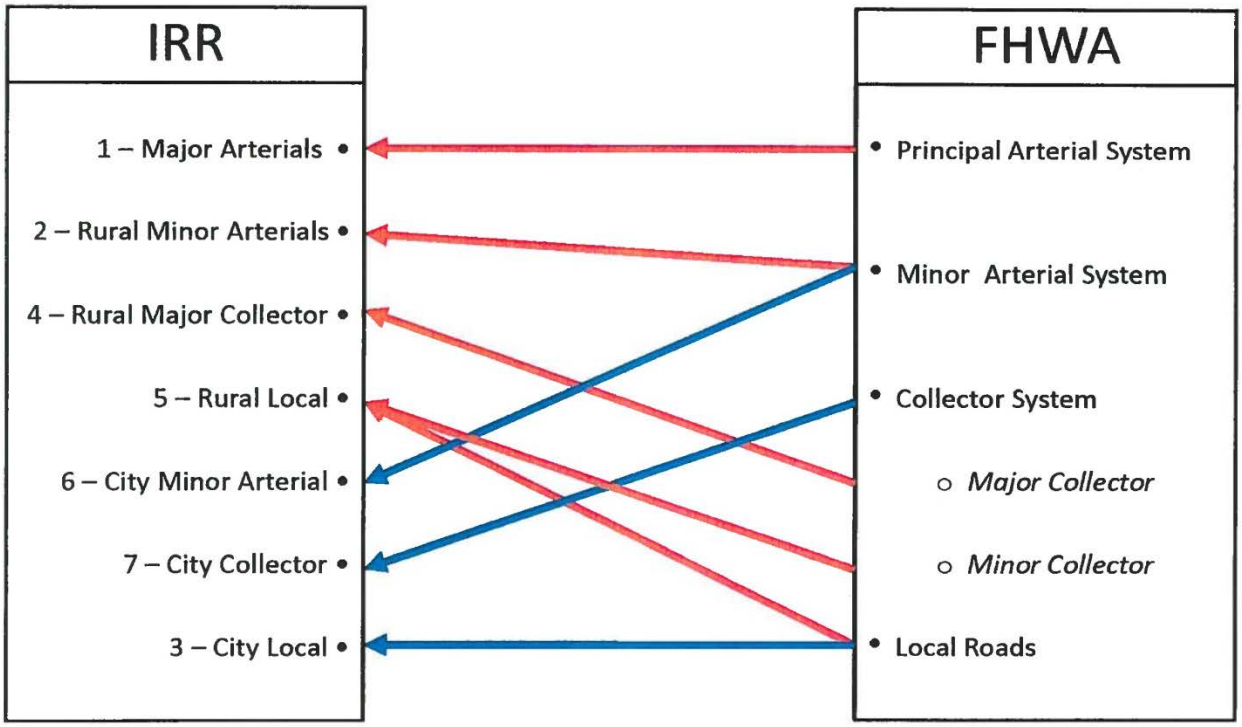
Mid-Term (2025) Transit Recommendations

- Construct a NTS park-and-ride facility east of the Chevron Gas Station

FUNCTIONAL CLASSIFICATION RECOMMENDATIONS

Functional classification is the process by which streets and highways are grouped into classes according to their role of moving traffic through a roadway network. Planners and engineers utilize this hierarchy to establish a roadway's design standards, speed, capacity, access management features, and land use development. Functional classification also impacts a roadway's eligibility for federal transportation funds for road improvements and maintenance. Roads within the study area are classified by both FHWA and BIA functional classification system. Figure 8.4 illustrates the relationship between BIA and FHWA's functional classification systems; Figures 8.5 and 8.6 illustrate the recommended functional classifications for the Ganado/Burnside study area by FHWA and BIA functional classification systems. Table 8.4 also presents the recommended functional classification.

Figure 8.4: BIA and FWHA Functional Classification Systems



Source: Bureau of Indian Affairs

Table 8.4: Recommended Roadway Functional Classification Changes

Road	Beginning	Ending	BIA Functional Classification		FHWA Functional Classification	
			Previous Classification	Recommended Classification	Previous Classification	Recommended Classification
State Route 264	439.1	448.8	N/A	Rural Minor Arterial	Rural Minor Arterial	Rural Minor Arterial
US Highway 191 (North)	417.5	418.9	N/A	Rural Minor Arterial	Rural Major Collector	Rural Major Collector
US Highway 191 (South)	409.4	411.6	N/A	Rural Minor Arterial	Rural Major Collector	Rural Major Collector
Navajo Route 15	State Route 264	Study Area Boundary	Rural Minor Arterial	Rural Minor Arterial	Rural Major Collector	Rural Major Collector
Navajo Route 9201	State Route 264	Study Area Boundary	Rural Major Collector	Rural Major Collector	N/A	Rural Minor Collector
Navajo Route 9202	State Route 264	Study Area Boundary	Rural Major Collector	Rural Major Collector	N/A	Rural Minor Collector
County Road 420	State Route 264	Navajo Route 9202	N/A	Rural Local Road	N/A	Rural Minor Collector
Navajo Route 27	State Route 264	Study Area Boundary	Rural Minor Arterial	Rural Minor Arterial	Rural Minor Collector	Rural Minor Collector
Navajo Route 9034	State Route 264	Study Area Boundary	Rural Local Road	Rural Local Road	N/A	Rural Minor Collector
Navajo Route 151	US Highway 191	Study Area Boundary	Rural Major Collector	Rural Major Collector	N/A	Rural Minor Collector

Figure 8.5: Recommended FHWA Functional Classification

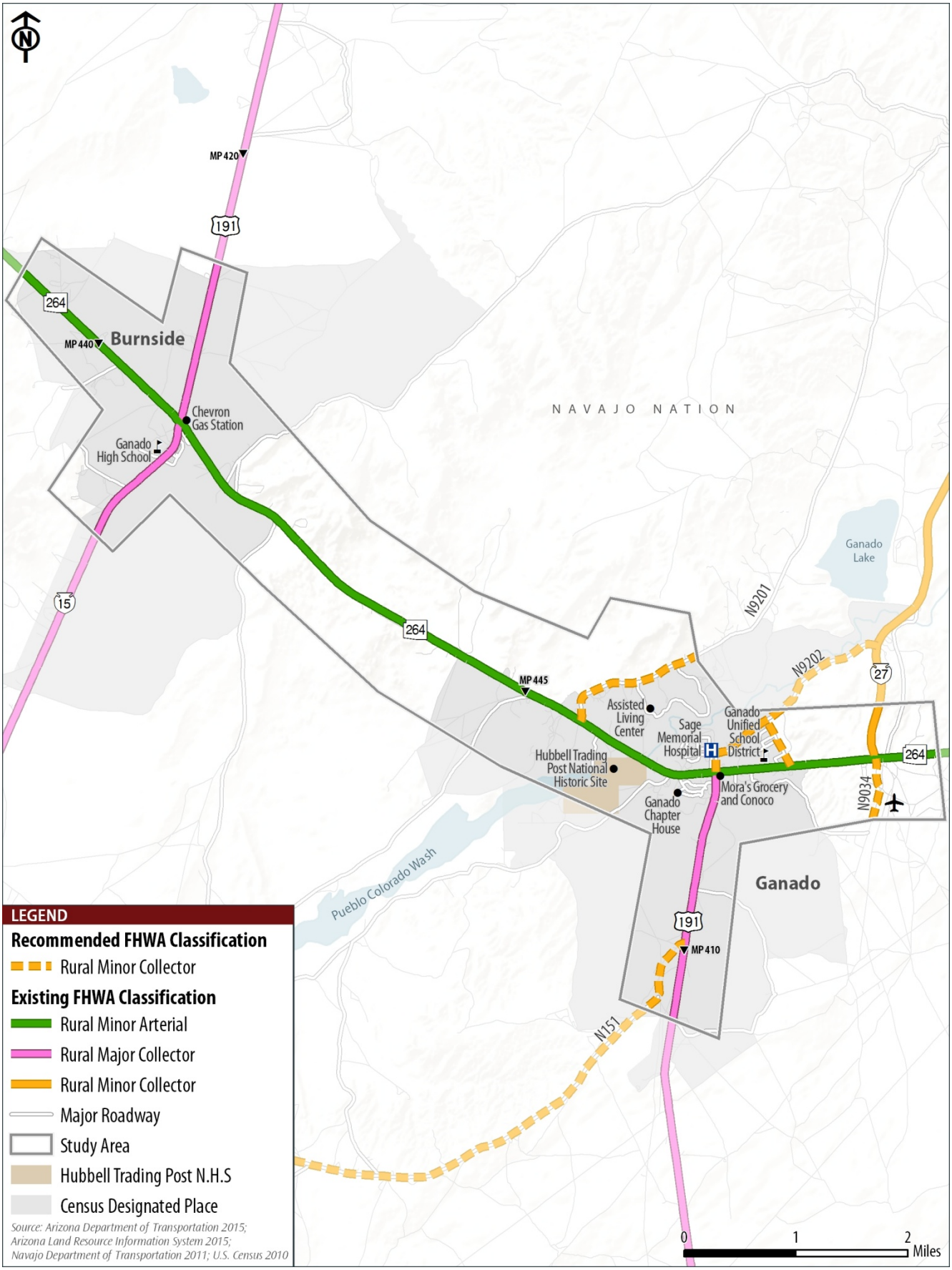
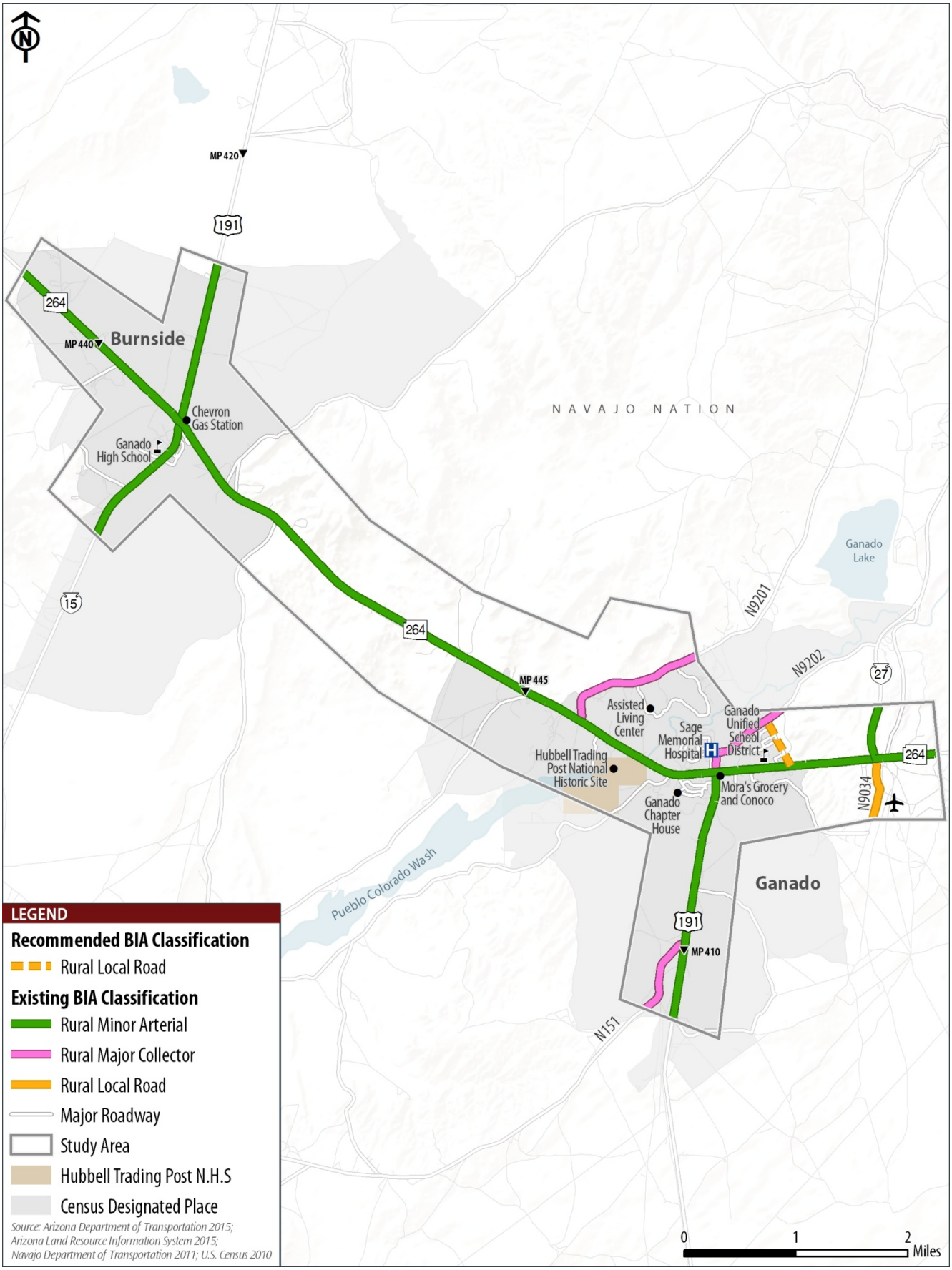


Figure 8.6: Recommended BIA Functional Classification



TITLE VI IMPLICATIONS

To ensure that the recommended projects provide a fair distribution of benefits and burdens to all residents, an analysis of potential impacts on protected populations was conducted. Since the study is located within the Navajo Reservation, the entire study area has a high percentage of Title VI populations. It is anticipated, however, that recommended transportation improvement projects will only have negative impacts during construction periods. Ultimately, this plan's recommendations will provide protected populations with enhanced, safer multimodal transportation. Table 8.5 provides an overview of potential impacts and benefits of recommended improvements on Title VI population.

Throughout the course of the study, efforts were made to include meaningful participation by all residents through stakeholder and public outreach. A two-phase public involvement process including two public meetings in which protected populations were invited to voice their opinion on the needs of the community and comment on recommended improvements. As recommended projects are implemented, it is vital that on-going outreach efforts to protected populations continue. Furthermore, consideration should be given during project development and construction to minimize or mitigate adverse impacts to minority business owners, the mobility needs of the protected populations, and residential parcels of protected populations.

Table 8.5: Recommended Project Impacts and Advantages on Title VI Populations

Project Type	Project Number	Project Description	Impacted Populations	Disproportionate/ Adverse Impacts	Benefits of Recommended Improvement
Roadway Deficiencies	**ST:**1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 **MT:** 1, 8, 9, 10 **LT:** 1, 2	Pave unpaved roadways; pavement rehabilitation, roadway striping; install shoulders; add landscape buffer; widen street; bridge replacement; repair drainage issues	Minority, low-income, age 65 and older, and disabled populations	Temporary constraints to access businesses, residential areas, and activity centers during construction. Increased noise during construction.	Improved overall safety and efficiency of roadway network. Improved road conditions and emergency response time. Improved pedestrian safety. Reduction in crashes and crash severity.
Roadside Safety Enhancements	**ST:**1, 2, 3, 5, 8, 9, 10, 11, 12, 14, 16, 17, 18, 23, 24, 25 **MT:** 1, 10, 12	Install cattle guards; repair fencing; remove vegetation; install signage; install street lighting	Minority, low-income, age 65 and older, and disabled populations	Temporary constraints and increased noise during construction.	Improved overall safety and efficiency of roadway network. Reduction in crashes and crash severity.
Intersection Traffic Control	**ST:** 1, 2, 3, 5 **MT:** 2, 10	Install traffic signals; enhance existing traffic signal; add turn lanes; reconfigure intersection to roundabout	Minority, low-income, age 65 and older, and disabled populations	Temporary constraints and increased noise during construction.	Improved overall safety and efficiency of roadway network. Improved road conditions and emergency response time. Improved pedestrian safety. Reduction in crashes and crash severity. Relieve traffic congestion.
Pedestrian Mobility	**ST:** 1, 2, 3, 4, 5, 9, 11, 15, 23, 24, 25 **MT:** 1 , 3, 4, 5, 8 **LT:** 1, 2, 3, 4	Install multi-use paths, construct sidewalks; widen shoulders; add pedestrian crosswalks	Minority, low-income, age 65 and older, and disabled populations	Temporary constraints and increased noise during construction.	Improved pedestrian, bicycle, and roadway safety. Promote safe mobility and exercise. Provide alternative means of transportation.
School Zone and Corridor Speed Control	**ST:** 19, 20, 22 **MT:** 11	Install traffic calming devices; install warning signs; reduce speed limits; police enforcement	Minority, low-income, age 65 and older, and disabled populations	Temporary constraints and increased noise during construction.	Improved pedestrian, bicycle, and roadway safety. Reduction in crashes and crash severity.
Transit	**ST:** 26, 27, 28 **MT:** 7	Install bus shelters; install bus pullouts; construct park-and-ride facility	Minority, low-income, age 65 and older, and disabled populations	Temporary constraints to access activity centers during construction. Increase traffic noise and traffic volume. Decreased air quality.	Improved local and regional transit connectivity. Provide alternative means of transportation. Improved pedestrian safety. Improved overall efficiency of roadway network. Relieve traffic congestion.

TRIBAL TRANSPORTATION PROGRAM UPDATE RECOMMENDATIONS

The National Tribal Transportation Facility Inventory (NTTFI) is a comprehensive national inventory of all tribal transportation facilities that are eligible for TTP funding, and includes specific facility information, such as classification, route/bridge number, current and projected traffic volumes, pavement conditions, etc., and is utilized for the ongoing review of facility conditions. This inventory is utilized as the basis to identify a tribe's transportation system, determine the transportation needs of a tribe, and serves as a basis for apportioning federal funds. In order to obtain funding and accurately report the status of the tribe's transportation system, the current NTTFI for the Ganado Chapter was reviewed against field review conditions and GIS analysis to identify necessary corrections and updates. Detailed descriptions of the recommended updates to the NTTFI were documented and provided to the Ganado Chapter, BIA, and ADOT.

Data Corrections

Existing NTTFI routes and sections were analyzed to determine if the inventory includes accurate information.

- Route 15, Section 348: update shoulder type to reflect curb and gutter (4)
- Conduct a surface conditions analysis and update the following routes:
    - Route 15, Section 348: update surface condition to reflect the good condition of the roadway
    - Route 27, Section 10: update surface condition to reflect the good condition of the roadway
    - Route 9202, Section 30: update surface condition to reflect the fair condition of the roadway

Existing Traffic Volumes

Traffic counts were collected the Navajo Division of Transportation Planning Department as part of the *Ganado/Burnside Area Traffic Circulation Study*. One of the major criteria in determining the functional classification of a roadway is the number of vehicles that utilize the road every day. In order for appropriate decisions and improvement recommendations to be made, traffic count data was gathered in February 2015 at 12 locations along study roadways. Existing ADT and ADT Year corrections to the NTTFI need to be made to the following roadways:

- Route 0015: Section 10
- Route 0027: Section 10
- Route 9201: Section 10
- Route 9202: Section 10
- Route C428: Section 810

Recommended New Route to the NTTFI

Based on analysis of current and future conditions, it is recommended that the following roadways be added to the inventory:

- Cedar Hills Road and Chapter House Road - significant vehicular and pedestrian traffic utilize these roadways to access the Ganado Chapter House and should be considered for inclusion. Inclusion to the NTTFI will ensure funding to maintain the roadways.
- Parking facilities at the Ganado Chapter House, US Post Office, and the Friday Market should be considered for inclusion in the inventory. Including parking lots in the NTTFI makes the facilities eligible for funding to maintain and/or improve the facilities.

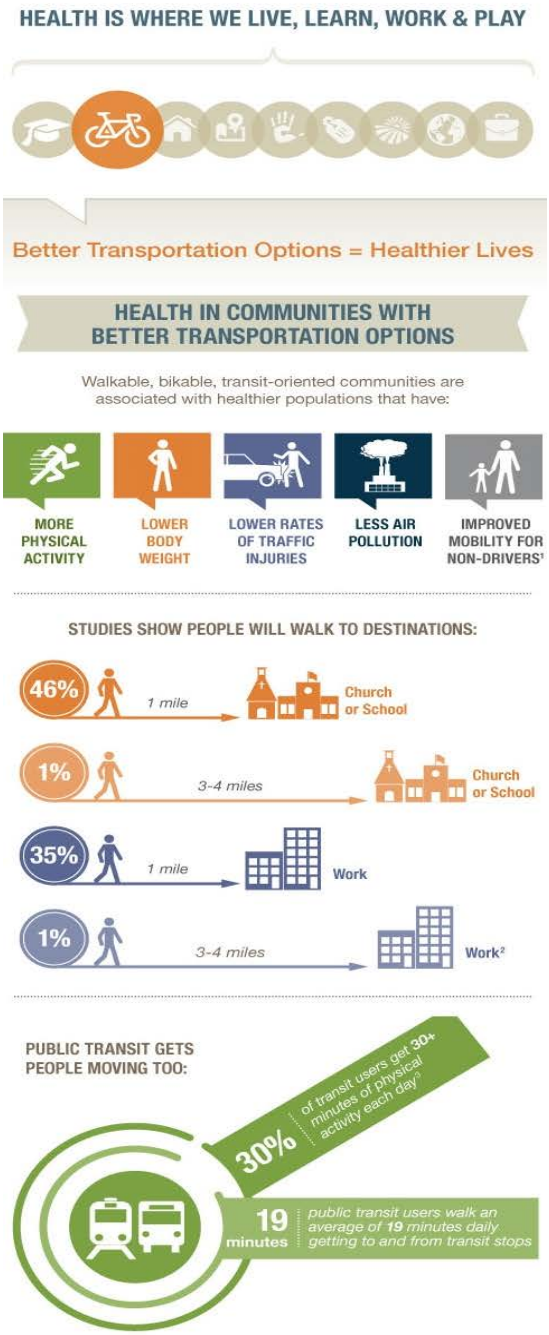
9. HEALTH IMPACT ASSESSMENT

Funded by the Arizona Department of Health Services (ADHS) with a grant from the Centers of Disease Control (CDC), a Health Impact Assessment (HIA) was conducted in conjunction with the *Ganado/Burnside Area Traffic Circulation Study*. The goal of the HIA is to increase awareness among Ganado Chapter, Apache County District II, and other local and agency transportation providers on the correlation between the local transportation system and the community's health. This section provides a summary of the HIA.

HIAs provide decision makers with a guidebook in regards to the potential harms and benefits of roadway improvements on the health of the community, disproportionate harms or benefits on population groups, and recommendations on how to increase positive health outcomes and minimize adverse health outcomes. By conducting an HIA, decision makers can make informed decisions building or implementing plans, policies, programs, and projects to improve public health. The HIA is a six step process that screens, scopes, assesses, provides recommendations, reports findings, and guides the monitoring and evaluation of recommended projects.

Summary of Findings

The HIA assessed the impacts of pertinent improvement projects recommended in the *Ganado/Burnside Area Traffic Circulation Study*. The HIA study also identified additional transportation improvements to promote healthy travel options within the study area. Recommended improvements were assessed to determine the positive and negative impacts on the general health of the community. Each recommendation was analyzed against physical, individual behavior, and social/economic determinates that could affect community health (such as number of vehicle travel lanes, running on sidewalks and trails, and providing access to new developments). Following is a list of recommendations that were evaluated in the HIA that are also supported by the *Ganado/Burnside Area Traffic Circulation Study*:



Source: Robert Wood Johnson Foundation. Better Transportation = Healthier Lives

- Construct all paths along SR 264 with asphalt or concrete materials to provide an all-weather walking surface, increase walkability, and provide stable surface for residents to run.
- Provide pedestrian access to/from the Senior Center to provide a way for seniors to be less isolated and to independently access the hospital, Senior Center, Ganado Chapter House, Friday market, and community services.
- Install an ADA accessible sidewalk between SR 264/US 191 and the Ganado Chapter House to make the Chapter House more accessible to the entire community.
- Install street lighting between Chapter House Road and County Road 420, along US 191 south of SR 264, along Round Top/Trading Post Road, and at the SR 264/County Road 420 intersection to increase pedestrian visibility along walking major routes.

- Install traffic calming devices along SR 264 entering Ganado, US 191 south of SR 264, and in Burnside to reduce speeds so motorists have more time to react to pedestrians and other roadway obstacles.
- In all areas where lighting is recommended, separate pedestrian and roadway lighting fixtures, or lighting fixtures that are designed to illuminate pedestrian area making them safer to navigate and to prevent falls.
- Install a buffer zone and vertical curb separating the pedestrian and vehicular travel ways on Round Top/Trading Post Road and SR 264/County Road 420 intersection to improve pedestrian access
- A buffer with or vertical barrier, such as street trees, on SR264 between Chapter House Road and Indian Route 420 to protect pedestrians from cars.

Following are additional recommendations made by the HIA study.

- Install marked pedestrian crosswalks at SR 264/Chapter House Road, SR 264/ US 191, SR 264/N27, along N15 near the Ganado High School, and on local roads intersecting SR 264 to increase pedestrian safety and provide safe locations for children to walk to/from school and bus stops. SR 264 corridor between Burnside and Ganado is a rural highway with speeds varying between 35 – 65 MPH. The study team and ADOT Holbrook District did not prefer installing crosswalks at intersections along rural segments of SR 264 corridor since that could result in more safety concerns for pedestrians especially during darker hours. Crosswalks at SR 264/ US 191 intersection are supported in the *Ganado/Burnside Area Traffic Circulation Study*.
- Install an ADA accessible sidewalk between SR 264/N9201 and Chapter House to help reduce social isolation of seniors and others in the community. *Ganado/Burnside Area Traffic Circulation Study* recommended paving the roadway and adding a 5 foot shoulder on both sides of the road to accommodate pedestrians, bicyclists, and vehicles. This option was financially more feasible than a standalone concrete sidewalk.
- Install solar powered pedestrian activated bus stop warning signs before bus stops along SR 264 and US 191 to assist in reducing collisions between vehicles. This concept however was not included in the final recommendations of the *Ganado/Burnside Area Traffic Circulation Study* because of high costs and other concerns.
- Install school zone signage and enforcement measures to reduce traffic speeds near schools to improve safety and encourage children to walk to school. Ganado/Burnside Area Traffic Circulation Study includes recommendations to conduct a Speed Study to warrant speed reduction. At the elementary and high school sites, the LRTP includes recommendations for additional school area signage. A pedestrian overpass is located in the vicinity of the elementary school area and did not meet the requirements for an official school zone designation.
- Upon widening SR 264 to four lanes, include a paved pedestrian path with a 15 FT buffer zone in both directions. Due to utility and cost constraints, the *Ganado/Burnside Area Traffic Circulation Study* recommended a multiuse path only on the south side of SR 264.
- Install sidewalks and pedestrian access over Ganado Wash to remove pedestrians from the roadway. The Ganado Wash bridge is scheduled for widening to include pedestrian walkways. The *Ganado/Burnside Area Traffic Circulation Study* team agreed with the Holbrook District that a separate pedestrian bridge was not feasible.
- Add additional transit stops at the planned shopping center and Sage Memorial Hospital. Existing transit stops are located at the US Post Office, Chevron gas station, and the Ganado Chapter House. The *Ganado/Burnside Area Traffic Circulation Study* recommended that a new park and ride and transfer stop be located at the proposed shopping center in Burnside.
- Provide a local circulator route connecting major activity centers to improve mobility. A circulator route was not included in the final LRTP recommendations of the *Ganado/Burnside Area Traffic Circulation Study* because transit demand did not warrant the need for additional local service.

Several recommendations included in the HIA are not incorporated into final *Ganado/Burnside Area Traffic Circulation Study* recommendations as existing and projected traffic conditions do not warrant the improvements, the improvements lack agency or community support, or due to financial constraints. As applicable, HIA improvements were included in study recommendations.

10. ROADWAY MAINTENANCE PLAN

The Navajo Nation BIA Road System consists of existing and proposed public roads within the Navajo Reservation that meet the Tribal Transportation Program (formerly IRR) definition and for which the BIA Navajo Regional Office Division of Transportation (BIA-NRODOT) has or plans to obtain legal right-of-way. Within the BIA-NRODOT, the Navajo Nation Road Maintenance Program is responsible for the preservation, repair, and restoration of system roads to their original condition. In effort to establish a standard schedule for which road shall be maintained, the following Roadway Maintenance Plan provides an overview of standard maintenance activities and frequency for which maintenance should occur.

STUDY ROADWAY MAINTENANCE NEEDS

Paved roads require routine maintenance such as patching; crack sealing; snow plowing; guardrail, sign and delineator replacements; repair, and cleaning; fence and gate repair; roadside clean-up and mowing; and striping. As identified by the *BIA Road Maintenance Manual,* the following is the minimum acceptable level for paved road maintenance:

- Maintaining all roadways, shoulders, traffic signs, drainage structures, and pavement markings;
- Patching potholes and localized failures is necessary;
- Sealing cracks in the pavement; and
- Pavement sealing when deterioration is moderate, with small areas rated as severe.

Table 10.1 provides an overview of standard road maintenance activities per the *BIA Road Maintenance Manual* and *ADOT Performance Guidelines Manual*.

Table 10.1. Road Maintenance Activities

Maintenance Activity	Description and Purpose	Guidelines	Season
Replace Surface / Base	The removal and replacement of badly cracked and broken asphalt surface and deteriorated base with new material.	Material shall be removed a minimum depth of 4" and a minimum thickness of 2" asphaltic premix surface material should be used.	Spring or Fall
Patching Surface	Patch potholes, severe depressions, edge breakup, and breaks in roadway and shoulder surfaces using premix materials.	1. Potholes and localized failures are to be repaired as soon as scheduling permits, but no later than one week after notification, except when: a. The speed limit on the road is 35 MPH or less. The hole or localized failure is not over 2" deep as measured from the adjacent pavement. Repair work is within existing schedules. b. Sealing or resurfacing project is starting within the month. 2. Apply either temporary or permanent patches. Use permanent patching unless overlays or other general repairs are scheduled.	Can be performed year-round

Source: BIA Road Maintenance Manual; ADOT Performance Guidelines Manual

Table 10.1. Road Maintenance Activities (continued)

Maintenance Activity	Description and Purpose	Guidelines	Season
Crack Sealing	Rout and/or clean 1/4" or greater expansion or working cracks and seal in AC or PCC pavements to prevent the passage of water through the surface crack into the pavement structure or sub-grade.	This should be done in cool weather when cracks are open (spring or fall). Not in inclement weather which would interfere with adherence of the asphalt.	Winter
Sand Seal Coat	Full-surface treatment on continuous sections of bituminous pavement with one application of liquid asphalt and cover material to seal and restore surface life, flexibility, and skid resistance. Sand seals enrich weathered pavements and fills fine cracks in the pavement surface.	This should be done when deterioration is moderate, with perhaps small areas rated as severe. Severe deterioration requires a decision of whether to return the road to gravel or repave; and may require a report on why deterioration was allowed to progress so far.	Spring or Fall
Chip Seal	Full-surface treatment on continuous sections of bituminous pavement with one application of liquid asphalt and cover material to seal and restore surface life, flexibility and skid resistance.	Section of surface to be treated must be large enough to utilize at least twenty-one tons of liquid asphalt spread by the supplier. This should be done when deterioration is moderate, or perhaps with small areas rated as severe. Severe deterioration requires a decision of whether to return the road to gravel or repave; and may require a report on why deterioration was allowed to progress so far	Spring or Fall
Tight Blading	The application of premix with a blade to fill ruts and raveling in asphaltic pavement and/or ACFC finishing course. (1-1/2 inches deep or less)	Schedule seal coat at least one month after completion to allow to cure and to get additional traffic compaction. Should be coordinated with the District Traffic Engineer to avoid covering recently painted stripe and allow for restriping schedule.	Spring or Fall
Surface Blading and Reshaping	Grade unpaved roads, including frontage roads, to restore proper shape, smoothness and drainage. This activity includes forming or reforming of drainage gutters, removal of berms, and placement of cut material on the roadway.	Grading is best performed after rain or when surface materials are moist to insure proper compaction.	Spring or Fall
Soil Stabilization Unpaved Roads	Apply magnesium chloride soil stabilizers to promote compaction and dust control on dirt or gravel roads	Apply magnesium chloride at recommended rate for dust control or compaction on gravel or dirt roads, do not exceed 300 gallons per lane mile per day.	Can be performed year-round

Source: BIA Road Maintenance Manual; ADOT Performance Guidelines Manual

Table 10.1. Road Maintenance Activities (continued)

Maintenance Activity	Description and Purpose	Guidelines	Season
Dust Control	Apply water to reinforce soil characteristics for dust control and maintenance of unpaved surfaces, stockpiles, etc.	Apply a sufficient amount of water to settle dust or form a crust	Can be performed year-round
Blade Unpaved Shoulders	Blade and reshape shoulders & drainage ditches including fill & cut sections, if necessary, to correct pavement drop-off, rutting of shoulders, build-up of shoulder material, and to restore a smooth, safe surface with proper drainage.	Grading is best performed when shoulder material is moist to insure maximum workability of material.	Can be performed year-round
Repair Shoulders	Add or remove material to shoulder and slope to eliminate pavement drop-off, rutted or eroded conditions.	Should be scheduled before rutting along the edge of the pavement effects the integrity of the roadway or when slope erosion, if left unrepaired, will deteriorate into major damage.	Spring or Fall
Reconstruction	When a roadway has reached the end of its life cycle and can no longer be rehabilitated, a new road must be constructed. All existing pavement will be removed and recycled for use as a new sub-base. The old sub-base will be regraded and compacted and a new hot-mix asphalt surface applied.	Material shall be removed a minimum depth of 4" and a minimum thickness of 2" asphaltic premix surface material should be used. The base shall be replaced when unstable.	Spring or Fall
Pavement Striping	Paint traffic lines which include center lines, lane lines, no passing stripes, gore stripes and edge stripes on roadways, frontage roads, all re-paved or sealed roadways and other pavement markings.	Striping should be scheduled to follow seal coats.	Spring or Fall
Asphalt Sidewalks and Shared-Use Paths	Repair pop-outs; potholes, buckled sidewalks, broken curbs, sunken pavement, root infiltration.	Check drainage components for proper function; Identify and complete joint and crack sealing and patching; perform seal coating. If widespread subgrade issues are suspected, removal and replacement is the only option	Can be performed year-round
Concrete Sidewalk and Shared-Use Paths	Repair potholes, buckled sidewalks, broken curbs, crumbling concrete, sunken pavement.	Check drainage components for proper function, no pooling water; Identify and complete joint and crack sealing and patching. If widespread subgrade issues are suspected, removal and replacement is the only option	Can be performed year-round
Guardrail Replacement, Repair, and Cleaning	Replace and upgrade guardrail systems	Maintenance work is scheduled as required and as necessary to replace and upgrade guardrail system	Can be performed year-round

Source: BIA Road Maintenance Manual; ADOT Performance Guidelines Manual

Table 10.1. Road Maintenance Activities (continued)

Maintenance Activity	Description and Purpose	Guidelines	Season
Cattle Guard Maintenance and Clean-Out	Replace, repair grills and/or clean cattle guards.	When damaged cattle guard becomes a traffic safety hazard or allows livestock to enter right-of-way, this activity should be treated as an emergency.	Can be performed year-round
Drainage Maintenance and Clean-Out	Clean inlet and outlet drainage ditches within right-of-way and drainage easements, including those for roadway dips. Clean catch basins, drop right-of-way and drainage easements, including those for roadway dips. Clean catch basins, drop inlets and down drains.	This work shall be performed on drainage installations, as required.	Can be performed year-round
Fencing and Gate Repair	Inspect, maintain, repair or replace all fencing and gates	Maintenance work is as necessary to replace and upgrade fence system, including installation and maintenance of gates.	Can be performed year-round
Sign Clean/ Wash/ Inspect	Inspect and clean to maintain unit at optimum designed efficiency.		Can be performed year-round
Sign Repair and Replacement	Repair and replace existing signs due to graffiti, accident, weather damage, or retro-reflectivity	The BIA shall install and replace signs in accordance with the current edition of the MUTCD.	Can be performed year-round
Sweeping	Sweeping of the curbed and other portions of the roadway with a mechanical sweeper	Sweeping shall be accomplished when possible during times of low traffic volume and in accordance with the applicable route schedule.	Can be performed year-round
Roadside Mowing	Machine mow road edge on road shoulders to improve sight distance, control weeds, tree seedlings, eliminate snowdrift, reduce summer fire fuels and enhance view of hazard markers, guardrails and delineators.	Vegetation is not to be mowed unless average height of plants is greater than 17". In order to preserve perennial grasses needed for shoulder stability, do not mow lower than 4".	Can be performed year-round
Brush and Tree Removal	Trim shrubs and ground cover in landscaped areas to maintain sight distance, or to improve plant barrier density.	Various conditions and/or shrub varieties require pruning at different times during the year.	Can be performed year-round
Roadside Clean-up	Pick up and disposal of all litter within the right-of-way. Includes removal of all unsightly objects and items which could cause damage to roadside mowing equipment.	Work shall be accomplished as needed to preserve the aesthetic appearance of the highway and assure safety of roadside mowing equipment.	Can be performed year-round
Removal of Traffic Obstacles	Remove all obstacles within the right-of-way that are potentially hazardous to roadway users.	Obstacles include fallen trees and posts, rocks, brush, trash, dead animals, unauthorized signs, etc.	Can be performed year-round

Source: BIA Road Maintenance Manual; ADOT Performance Guidelines Manual

Table 10.1. Road Maintenance Activities (continued)

Maintenance Activity	Description and Purpose	Guidelines	Season
Winter Preparation	Conduct winter patrol of snow and ice areas of the road to determine the possible development of hazardous conditions requiring maintenance attention.	Winter storm patrol shall be used as weather forecasts and conditions warrant. Remove de-icer from equipment to prevent excessive corrosion.	Fall and Winter
Snow and Ice Control	Plow snow and/or apply de-icing agents to the roadway as conditions warrant	Plow and/or apply abrasives / de-icers to locations where needed. Abrasive material may be treated with de-icing agents.	Winter
Bridge Clean and Inspect	Inspect, clean, remove graffiti from, and otherwise maintain decks, joints, footings, abutments, wingwalls, superstructure, and rails	Scheduling shall become an emergency when conditions require immediate attention for public safety.	Can be performed year-round

Source: BIA Road Maintenance Manual; ADOT Performance Guidelines Manual

Within the Ganado/Burnside study area, maintenance of minor arterials and major collectors is a high priority since they serve traffic between population centers and carry high volumes of local traffic. To prioritize maintenance, a road classification system was developed based on a road's function, land use, and traffic conditions. This classification system, referred to as "Level of Development" (LOD), serves as a guide for determining the type and timetable of maintenance activities within the study area. Table 10.2 outlines LOD Classification System utilized in this study as well as corresponding study roadways.

Table 10.2. Level of Development

LOD	Roadway Context	Study Roadways
LOD 1	• Arterial roadway • Moderate to high traffic volumes • Regional and local traffic • Major school bus route	• SR 264 • US 191 • N15
LOD 2	• Paved arterial or collector roadway • Moderate to low traffic volumes • Provides access to residence and businesses	• N9202 • N27
LOD 3	• Gravel or earth surface • Low traffic volumes • Regional and local traffic	• N151 • N9201 • N9034

For each LOD classified roadway, a specific maintenance schedule should be followed in order to maintain the safety of the traveling public. Tables 10.3 – 10. 5 illustrate the recommended maintenance schedule for roadways classified as LOD 1-3, respectively.

Table 10.3: Level of Development 1 Maintenance Activities and Frequency

Maintenance Activity	Frequency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Crack Sealing	5 years		■					■					■					■				
Shoulder Maintenance	10 years							■										■				
Drainage Structure Clean-Out and Repair	2 years	■		■		■		■		■		■		■		■		■		■		■
Guardrail Replacement, Repair, and Cleaning	2 years	■		■		■		■		■		■		■		■		■		■		■
Fence, Cattleguard, and Gate Clean-Out and Repair	2 years	■		■		■		■		■		■		■		■		■		■		■
Chip Sealing	7 years	■						■							■							■
Sign Replacement	7 years	■						■							■							■
Overlay	20 years	■										■										
Reconstruction	40 years																					
Surface Blading	N/A																					
Maintenance Performed Once a Year		✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
Patching Surface	Should be performed in Spring or Fall																					
Surface Inspection	Can be performed year-round																					
Pavement Striping	Can be performed year-round																					
Drainage Structure Inspection	Can be performed year-round																					
Guardrail Inspection	Can be performed year-round																					
Fence, Cattleguard, and Gate Inspection	Can be performed year-round																					
Maintenance Performed Twice a Year		■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■
Surface Cleaning	Can be performed year-round																					
Roadside Cleanup	Can be performed year-round																					
Roadside Mowing	Can be performed year-round																					
Sign Inspection	Can be performed year-round																					
Brush and Tree Removal	Can be performed year-round																					

Table 10.4: Level of Development 2 Maintenance Activities and Frequency

Maintenance Activity	Frequency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Crack Sealing	5 years		■					■					■					■				
Shoulder Maintenance	10 years							■										■				
Drainage Structure Clean-Out and Repair	3 years	■			■			■			■			■			■			■		
Guardrail Replacement, Repair, and Cleaning	3 years	■			■			■			■			■			■			■		
Fence, Cattleguard, and Gate Clean-Out and Repair	3 years	■			■			■			■			■			■			■		
Chip Sealing	7 years	■						■							■							■
Sign Replacement	7 years	■						■							■							■
Overlay	30 years	■																				
Reconstruction	30 years																					
Maintenance Performed Once a Year		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Patching Surface	Should be performed in Spring or Fall																					
Surface Inspection	Can be performed year-round																					
Pavement Striping	Can be performed year-round																					
Drainage Structure Inspection	Can be performed year-round																					
Guardrail Inspection	Can be performed year-round																					
Fence, Cattleguard, and Gate Inspection	Can be performed year-round																					
Surface Cleaning	Can be performed year-round																					
Roadside Cleanup	Can be performed year-round																					
Roadside Mowing	Can be performed year-round																					
Sign Inspection	Can be performed year-round																					
Brush and Tree Removal	Can be performed year-round																					
Surface Blading	Where Needed, Once Every 6 Weeks																					

Table 10.5: Level of Development 3 Maintenance Activities and Frequency

Maintenance Activity	Frequency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Surface Blading	Every 17 Weeks	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Dust Control																						
Soil Stabilization																						
Drainage Structure Clean-Out and Repair	4 years	■				■				■				■				■				■
Guardrail Replacement, Repair, and Cleaning	4 years	■				■				■				■				■				■
Fence, Cattleguard, and Gate Clean-Out and Repair	4 years	■				■				■				■				■				■
Sign Replacement	10 years	■										■										■
Maintenance Performed Once a Year		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Surface Inspection	Can be performed year-round																					
Drainage Structure Inspection	Can be performed year-round																					
Guardrail Inspection	Can be performed year-round																					
Fence, Cattleguard, and Gate Inspection	Can be performed year-round																					
Roadside Cleanup	Can be performed year-round																					
Sign Inspection	Can be performed year-round																					
Brush and Tree Removal	Can be performed year-round																					

ROADWAY MAINTENANCE ESTIMATES

To assist Tribal and County staff to determine the costs of maintaining existing roadways, the following section provides general costs estimates. Table 10.6 outlines typical maintenance procedures and planning cost estimates for each. These costs estimates should be used for planning purposes and initial project budgeting only; during the design phase of a project engineering estimates should be developed. Cost estimates provided in this section do not include right-of-way acquisition or utility relocation costs.

Table 10.6. Road Maintenance Activities

Maintenance Item	Cost Per Installation	Cost Per Linear Unit	Cost Per Mile
Replace Surface / Base			$80,000
Patching Surface		$150 per sqft	$15,000
Crack Sealing			$30,000
Chip Seal		$0.416 x pavement width	$2,204 x pavement width
Surface Blading and Reshaping			$20,000
Dust Control			$125,000
Asphalt-Concrete Overlay (1 1/2")		$0.706 x pavement width + $1.69 x length	$3,768 x pavement width + $10,223
Asphalt Grinding		$0.476 x pavement width	$2,520 x pavement width
Repair Shoulders			$15,000 per lane mile to reshape. Additional $5,000 per mile to place millings
Pavement Striping - Continuous or Broken		$0.30	$1,600 per mile per lane
Pavement Markings	$420 Per Marking (Symbol or Word)		
Raised Pavement Markers (reflectors)	$6.25 each	$6.25	$825 per lane
Guardrail Replacement	$40 per linear foot; Additional $1,500 per end terminal		
Fencing - Chain Link (6-feet high)		$23.10	$122,000
Sign Replacement	$485 each installation		
Sidewalk (5-foot, one side only)		$16.38	$86,500
Bike Path (8-foot asphalt-concrete; separate from road)		$18.08	$95,500
Fencing - Chain Link (6-feet high)		$23.10	$122,000

11. TRANSPORTATION PLAN IMPLEMENTATION

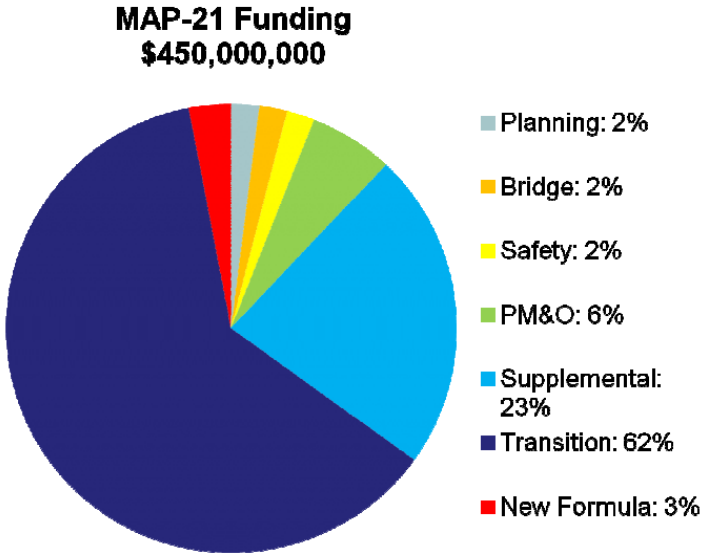
This section discusses available funding sources and implementation actions to help execute the Plan for Improvements.

FUNDING SOURCES

This section describes funding resources available for the types of projects recommended in Chapter 8. The successful implementation of the *Ganado/Burnside Area Traffic Circulation Study* is contingent upon the availability of funding for design and construction of the improvement projects. Primary funding sources for the area include Federal programs, BIA, ADOT, and other regional government agencies.

Passed in July 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) reauthorized surface transportation programs through fiscal year 2014. The program was enacted to create a streamlined, performance-based, and multimodal program to address the many challenges facing the Nation's transportation system. MAP-21 authorizes Federal-aid highway programs for the next two-years while maintaining current spending levels by consolidating core highway programs of SAFETEA-LU.

Under MAP-21, the new Tribal Transportation Program (TTP) provides $450 million annually with the ultimate goal to provide safe and adequate transportation and public road access to and within Indian reservations and Indian lands. While generally following the existing Indian Reservation Roads program, the TTP also includes new standards that a certain percentage of funds should be allocated for tribal bridge and tribal safety projects. Funds through the TTP are allocated to Tribes utilizing a statutory formula based on tribal population, road mileage, and average tribal shares of SAFETEA-LU funding. In accordance with MAP-21, Tribes may utilize up to 25% of their TTP funds or $500,000, whichever is greater, for eligible and approved maintenance activities.



Included in MAP-21 is a new program called Tribal High Priority Projects Program (THPP). The THPP is a special funding pool that may be utilized for tribes or governmental subdivisions whose annual allocation is insufficient to complete its highest priority project; or for emergency/disasters on any TTP facilities. MAP-21 authorizes $30 million per year from the General Fund (subject to appropriation) for this new program.

In addition, MAP-21 gives FTA significant new authority to strengthen the safety of public transportation systems throughout the United States. The Act aims to align Federal funding to progress towards the goals of restoring and replacing aged public transportation infrastructure, supporting development, and improving the efficiency of administering grant programs by consolidating and streamlining several programs. MAP-21 provides federal funding for public transit assistance through the Tribal Transit Program (TTP). The TTP is a set-aside from the Formula Grants for Rural Areas program and consists of a $25 million formula program and a $5 million discretionary grant program.

Navajo Nation Fuel Excise Tax Revenue is another funding source that could be used to fund some of the projects identified in the Plan for Improvements. Since 1999, the Fuel Excise Tax (FET) has been collected by the Office of Navajo Tax Commission and is making a positive

impact on the Navajo Nation for community road projects. For gasoline, the FET is 18 cents and for diesel, it is 25 cents. Funding from the road fund is used for improvement projects such as parking lots, school bus routes, drainage crossings, access roads, road maintenance, grading, graveling, archaeological surveys, testing, mitigation, drainage studies, construction services, threatened and endangered species, airport maintenance, designs, plans, specifications, bidding, and contract services. This revenue source generates, on average, approximately $13 million each year. Projects completed with this funding are identified and included in the Navajo DOT Transportation Improvement Program (TIP).

Navajo DOT can also partner with Apache County District II to establish an Intergovernmental Agreement (IGA). If the county elects to enter into IGAs then some funds could be dedicated to specific projects through cooperative partnership.

Several counties in the state have instituted a ½ cent sales tax dedicated to transportation improvement projects. Counties have the ability to use these funds for planning, design and construction. The funds cannot be used to supplement staff salaries. Apache County could investigate the opportunity to institute this funding mechanism; however, it does require approval by the voters.

In addition to these Federal and local programs, there are a multitude of funding opportunities available through ADOT, regional government agencies, and private entities. Table 11.1 presents a comprehensive matrix of potential funding sources for roadway, safety, pedestrian and bicycle, and transit improvements that the Ganado Chapter can apply for funding to implement the Plan for Improvements. The following resources also provide additional information related to funding sources.

Local Public Agency Projects Manual for Federal-aid Funded Projects

The ADOT Local Public Agency Projects Manual provides information and guidance to assist local public agencies (i.e., counties, cities, towns and tribal governments) with projects funded through the Federal Highway Administration's (FHWA) Federal-Aid Highway Program (FAHP), from planning to final acceptance. The manual outlines the ADOT and FHWA policies and procedures when developing, delivering, and administering transportation projects. The Manual is available at the following website link:

http://www.azdot.gov/business/programs-and-partnerships/LocalPublicAgency/lpa-projects-manual

Additionally, another available tool is the Federal-aid Essentials. It is web based and can be accessed at:

http://www.fhwa.dot.gov/federal-aidessentials/index.cfm

Arizona Tribal Transportation Website Funding Resources Links

The Arizona Tribal Transportation website is hosted by ADOT and is designed as a central location for state-tribal transportation related partnerships, projects, activities, groups, links, and other related information. The website contains a listing of transportation related funding resources which can be found at the following link:
http://www.aztribaltransportation.com/aztt/links.asp

PARTNERSHIPS

With the support of the Arizona Tribal Transportation Partnership, the Navajo Nation re-established a partnership between with the Navajo DOT, ADOT, BIA, FHWA, Hopi Tribe, Coconino County, Navajo County, and Apache County. The mission of the partnership is to foster and maintain working relationships in order to construct, operate, improve, and maintain a safe transportation system for the traveling public. The Navajo DOT Partnership Steering Committee identified the main goals of the partnership as focusing on aspects of the approval process, agreements, emergency response, training and education, funding resources, and route standards for the following sub goals:

- Subgoal#1: High Volume Routes/Region
- Subgoal#2: School Bus Routes/Region
- Subgoal#3: Low Volume Routes/Region
- Subgoal#4: Community Routes

As part of this partnership, a steering committee comprised of agency officials host meetings to discuss and plan for roadway improvement projects, emergency response, intergovernmental agreements, and to improve general communication and data sharing among agencies. Information generated on the above topics by this partnership could assist the Ganado Chapter and Apache County District II with plan implementation. Access to the partnership information is available at the following link: http://www.aztribaltransportation.com/NNP/index.asp.

In addition, the Ganado Chapter and Apache County District II should work to build on the stakeholder partnership efforts initiated through this study planning process. It is recommended that project-specific partnerships be continued with the Navajo DOT, BIA Fort Defiance Agency and other agency stakeholders in order to garner support and available joint financial commitment to implement the study project recommendations. A guide on the basics of transportation partnering is available on the ADOT website at the following link: http://www.azdot.gov/business/programs-and-partnerships/partnering.

Table 11.1. Potential Funding Sources

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Roadway and Safety Projects					
Tribal Transportation Program (TTP)	TTP funds may be used by the Tribe to pay the costs of the following activities: Transportation planning, research, maintenance, engineering, rehabilitation, restoration, construction, and reconstruction of tribal transportation facilities; Operation and maintenance of transit programs and facilities that are located on, or provide access to, tribal land, or are administered by a tribal government.	Federal Funds Allocated to BIA-DOT Western Regional Office on a formula basis	Funding formula is based on each tribe's total population and mileage. Improvement projects must be included in the Tribe's TIP.	Improvement projects must be submitted to FHWA by August	Paul Bonar BIA-DOT Western Regional Office Division of Transportation 4th Floor Mailroom, MS 370 Phoenix, AZ 85004 Phone: 602- 379-6782 Email: Paul.Bonar@bia.gov
Tribal High Priority Projects (THPP)	Repair or reconstruction of eligible facilities in the national inventory of tribal transportation facilities. Funds may not be used for transportation planning; research; routine maintenance activities; structures and erosion protection; landscaping and irrigation systems; purchasing equipment; or condemnation of land for recreational trails.	Federal Funds are allocated to the Regional Office based on approved Tribal Applications for these funds.	Funds appropriated from the Federal General Fund, to remain available until September 30 of the third fiscal year after the year appropriated. An applicant may have only one application for assistance pending at any one time. Project funding is limited to a $1 million per application.		Paul Bonar BIA-DOT Western Regional Office Division of Transportation 4th Floor Mailroom, MS 370 Phoenix, AZ 85004 Phone: 602- 379-6782 Email: Paul.Bonar@bia.gov
Tribal Transportation Planning Program	Transportation planning procedures for the TTP must be consistent with Statewide and Metropolitan planning processes.	Federal Funds Allocated to BIA-DOT Western Regional Office on a formula basis and distributed on a project by project basis	Funded by a set-aside of up to 2% from TTP funds. Funds are allocated directly to Tribe based on a formula, and distributed on a project by project basis.		Paul Bonar BIA-DOT Western Regional Office Division of Transportation 4th Floor Mailroom, MS 370 Phoenix, AZ 85004 Phone: 602- 379-6782 Email: Paul.Bonar@bia.gov
Tribal Transportation Program Safety Funds (TTPSF)	MAP-21 established Tribal Safety funds by setting aside not more than 2 percent of the funds made available under the Tribal Transportation Program for each fiscal year. Eligible activities include: Tribal Safety Plans; Enforcement and EMS; Education Programs; Engineering Improvements; Data Collection; Data analysis and improvement; Road Safety Audits; and funding goals for each category.	Federal Funds are allocated to the Regional Office based on approved Tribal Applications for these funds.	Projects ranked by BIA, FHWA and Tribes. Funded by a set-aside of up to 2% from TTP funds. Maximum of $9,000,000 could be made available in each of FYs 2013 and 2014 for TTPSF.		Russell Garcia TTPSF Program Manager Federal Highway Administration 1200 New Jersey Avenue SE., Washington, DC 20590 Phone: (202) 366-9815 Email: russell.garcia@dot.gov

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Tribal Bridge Program	Funds may be used for planning, design, engineering, preconstruction, construction, and inspection of a project to replace, rehabilitate, seismically retrofit, paint, or for anti-icing and deicing, or to implement any countermeasures (including multiple-pipe culverts) for eligible tribal transportation facility bridges. To be eligible, a bridge must have an opening of at least 20 FT, be classified as a tribal transportation facility, and be structurally deficient or functionally obsolete.	Federal Funds are allocated to the Regional Office based on approved applications from the Region for these funds.	Funded by a set-aside of up to 2% from TTP funds.		Paul Bonar BIA-DOT Western Regional Office Division of Transportation 4th Floor Mailroom, MS 370 Phoenix, AZ 85004 Phone: 602- 379-6782 Email: Paul.Bonar@bia.gov
Navajo Nation Fuel Excise Tax	The Navajo Nation administers a special fuel tax of 18 cents for gasoline and 25 cents for diesel. Revenue is utilizes for road improvement projects, such as: parking lots, school bus routes, drainage crossings, access roads, road maintenance, grading, graveling, and construction services	Office of Navajo Tax Commission	In 2013, FET collected over $13 million. From the revenue, approximately $4 million is distributed to Arizona yearly.		Office of the Navajo Tax Commission P.O. Box 1903 Window Rock, Arizona 86515 Phone: 928-871- 6681 Fax: 928-871- 7608 For general program information, visit: http://www.navajotax.org/
Surface Transportation Program (STP)	States and metropolitan regions may use these funds for highway, bridge, transit (including intercity bus terminals), and pedestrian and bicycle infrastructure projects. Eligible projects include: • Construction, reconstruction, rehabilitation, resurfacing, restoration, preservation, or operational improvements for highways, bridges, and tunnels on any public roadway • Construction of new bridges and tunnels on a Federal-aid highway • Inspection and evaluation of bridges, tunnels and other highway assets as well as training for bridge and tunnel inspectors • Transit capital projects • Bicycle, pedestrian, and recreational trails • Environmental mitigation efforts	Federal Highway Administration Funds Administered Through ADOT and Planning Organizations	In general, STP projects may not be on local or rural minor collectors. Special rule allows States to use up to 15% of funds sub allocated for areas with a population of 5,000 or less on rural minor collectors. Project is scoped and request for funding submitted to NACOG.		Jason Kelly NACOG Transportation/Transit Planning 3130 Robert Rd. Ste. 1 Prescott Valley, AZ 86314 Phone: (928) 830-0127 Email: jkelly@nacog.org

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Surface Transportation Program (STP) -Off-System Bridges	From the State's STP apportionment, States are required to obligate a portion of funds (not from sub allocated amounts) for bridges not on Federal-aid highways (off-system bridges). Eligible projects include, but are not limited to: replacement, deicing, construction, inspection and evaluation of bridges.	Federal Highway Administration Funds Administered through ADOT and Regional Planning Organizations	For projects to replace or rehabilitate deficient off-system bridges funded wholly by State/local sources, any amounts spent post-enactment that are in excess of 20% of project costs may be credited to the non-Federal share of eligible bridge projects in the State.	Project is scoped and request for funding submitted to NACOG. Project is scoped and request for funding submitted to the Planning Organization.	Jason Kelly NACOG Transportation/Transit Planning 3130 Robert Rd. Ste. 1 Prescott Valley, AZ 86314 Phone: (928) 830-0127 Email: jkelly@nacog.org
Federal Lands Transportation Program (FLTP)	Eligible projects include, but are not limited to: • Program administration, transportation planning, research, preventive maintenance, engineering, rehabilitation, restoration, construction, and reconstruction of Federal lands transportation facilities. • Operations and maintenance of transit facilities. • Any transportation project eligible under title 23 of the United States Code that is within or adjacent to, or that provides access to Federal lands open to the public.	Funded by contract authority from the Highway Account of the Highway Trust Fund	On October 1 of each fiscal year, funds will be allocated among Federal Land Management Agency (FLMA) partners		Arizona Division Federal Highway Administration 4000 N. Central Avenue, Ste. 1500 Phoenix, Arizona 85012-3500 Phone: (602) 379-3646 Fax: (602) 382-8998 For information, visit: http://www.fhwa.dot.gov/azdiv
Federal Lands Access Program	Eligible projects include, but are not limited to: • Transportation planning, research, engineering, preventive maintenance, rehabilitation, restoration, construction, and reconstruction of Federal Lands Access Transportation Facilities. • Operation and maintenance of transit facilities. • Any transportation project eligible under title 23 of the United States Code that is within or adjacent to, or that provides access to Federal lands open to the public.	Funded by contract authority from the Highway Account of the Highway Trust Fund	The funds made available under this program will be available for the current year plus three additional years. Funds are distributed by formula among States that have Federal lands		Allen Grasmick Central Federal Lands Highway Division 12300 West Dakota Avenue Lakewood, CO 80228 Phone: (720) 963-3500 Email: Allen.Grasmick@dot.gov For general program information, visit: http://www.cflhd.gov/programs/flap/AZ/index.cfm

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Highway Safety Improvement Program (HSIP)	The HSIP is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands. Any project on a public road, trail or path that is consistent with the state's Strategic Highway Safety Plan and corrects a safety problem is eligible for HSIP funding. Eligible projects include: • Intersection improvements • Construction of shoulders • Traffic calming • Improvements for bicyclists, pedestrians, and individuals with disabilities. • Minimum standards of retro-reflectivity of traffic signs and pavement markings	Federal Highway Administration Funds Administered Through ADOT and Planning Organizations	Project is scoped and request for funding submitted to Regional Planning Organization. The HSIP Local Government Coordinator provides assistance to local agencies throughout the process of identifying and developing the projects. 5.7% for most projects	Applications due in May	Mona Aglan-Swick HSIP Manager ADOT Statewide HSIP Program Phone: (602) 712-7374 Email: maglan@azdot.gov
Governor's Office of Highway Safety	Finances State and local government highway safety projects. Eligible projects include: inventories, need studies, engineering studies, system development, program implementation, or for purchasing equipment. Cannot be used for the construction, design, or maintenance of highways or for highway construction research papers.	Arizona Governor's Office of Highway Safety (GOHS)	Project funding is limited to a maximum of $50,000 per project contract	Applications due in February	Director Alberto Gutier Governor's Office of Highway Safety 3030 North Central Ave #1550 Phoenix, Arizona 85012
National Priority Safety Program	Programs include: • Section 405(b): Occupant Protection • Section 405(c): State Traffic Safety Information System Improvements • Section 405(d): Impaired Driving Countermeasures • Section 405(e): Distracted Driving • Section 405(f): Motorcyclist Safety • Section 405(g): Graduated Driver Licensing	National Highway Traffic Safety Administration (NHTSA) at the federal level and Arizona Governor's Office of Highway Safety at the state level		Applications due in July	Director Alberto Gutier Governor's Office of Highway Safety 3030 North Central Ave #1550 Phoenix, Arizona 85012
Section 402 State and Community Highway Safety Grant Program	Funds can be spent in accordance with national guidelines for programs such as reducing impaired driving; reducing speeding; encouraging the use of occupant protection; improving motorcycle safety; improving pedestrian and bicycle safety; improving enforcement of traffic safety laws; improving traffic records; and emergency services.	Arizona Governor's Office of Highway Safety	MAP-21 authorizes funding for the 402 program at $235 million each year in FY 2013 and FY 2014.	Proposals due to the Arizona Governor's Office of Highway Safety in April/May	Director Alberto Gutier Governor's Office of Highway Safety 3030 North Central Ave #1550 Phoenix, Arizona 85012

Source: FHWA, ADOT, FRA, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Road Safety Assessment	The Road Safety Assessments (RSA) program conducts Road Safety Assessments on state, local and tribal road facilities. An RSA is defined as a formal examination of user safety of a future or existing roadway by an independent multidisciplinary audit team, which includes qualified and experienced members.	ADOT Traffic Safety Section	Technical assistance, no actual awarding of funds	On-going	Richard S. Weeks, PE, PTOE Program Manager Road Safety Assessment 1615 West Jackson St., Mail Drop 065R Phoenix, AZ 85007-3217 Phone: 602-712-4382 Fax: 602-712-3243 Email: rweeks@azdot.gov
Navajo Nation Community Development Block Grant	Eligible activities include, but are not limited to: • Housing • Community Facilities: Infrastructure construction, e.g., roads, water and sewer facilities; and, single or multipurpose community buildings. • Economic Development: Wide variety of commercial, industrial, agricultural projects	CDBG Program is a federally funded program and serves as a liaison between U.S. Housing and Urban Development (HUD) and the Navajo Nation.	Southwest Region receives $22.6 million and the Navajo Nation is eligible up to $5.5 million. Eligible applicants under the Navajo Nation are the 110 Chapters and non-profit entities serving the Navajo Nation. CDBG requires a match of 25% or more.	October or November 2014	Navajo Nation Community Development CDBG P.O. Box 2365 Window Rock, Arizona 86515 Phone: 928-871-6539 For general program information, visit: http://www.nndcd.org/
Navajo Nation Infrastructure and Capital Improvement	Eligible projects include, but are not limited to: The cost for the development of infrastructure such as electric power line, water line, sewer lagoons, waste water treatment facilities, communication and transportation systems, roads and parking lots	Navajo Nation Capital Improvement Office	No limit on length or Funding Request, dependent on available funds. Open to Navajo Nation Chapters, Departments, programs, non-profit organizations	General proposal due annually on March 1st at 5:00 pm	Casey Begay Department Manager II Capital Improvement Office Phone: 928-871-6509 Email: begay_casey@hotmail.com
AmeriCorps Indian Tribes Planning Grants	AmeriCorps planning grants provide up to $75,000 for a one-year period to provide support to an Indian Tribe for the development of an AmeriCorps program that will engage AmeriCorps members in order to address pressing community problems.	AmeriCorps	AmeriCorps State and National sets aside one percent of grant funds to support programs operated by American Indian Tribes	On-going	For general program information, contact: Phone: (202) 606-7508 americorpsgrants@cns.gov http://www.nationalservice.gov/build-your-capacity/grants/
Planning Assistance for Rural Areas (PARA) Program	PARA funds are limited to planning applications and may not be used for the design or construction of transportation facilities. PARA funds may be applied to address a broad range of planning issues related to roadway and non-motorized transportation modes. Funds may also be applied to studies dedicated solely to the planning of public transportation services.	Federal funds administered through ADOT	The PARA program is funded 100% by ADOT using Federal Statewide Planning and Research (SPR) funds. The awarded funding is a limit or cap of $250,000 for each PARA study process. Applications for projects are submitted to ADOT MPD on an annual basis.	Applications for planning projects are submitted to ADOT on an annual basis in early summer.	Dan Gabiou, Program Manager ADOT MPD 206 S. 17th Ave., MD 310B Phoenix, AZ 85007 Phone: 602.712.7025 Fax: 602.712.6412 Email: dgabiou@azdot.gov

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
USDA Community Facility Grants	Grant funds may be used to assist in the development of essential community facilities. Grant funds can be used to construct, enlarge, or improve community facilities for health care, public safety, and community and public services. This can include the purchase of equipment required for a facility's operation.	USDA Rural Development		On-going	USDA Rural Development St. Michael's Satellite Office St. Michaels Professional Plaza, Hwy. 264, P.O. Box 859, St. Michaels, AZ 86511 Phone: (928) 871-5038 Ext. 3 For program information, visit: http://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program/az
SEARCH - Special Evaluation Assistance for Rural Communities and Households	This program helps very small, financially distressed rural communities extend and improve water and waste treatment facilities that serve local households and businesses. Funds can be used to pay for predevelopment planning costs for: • Feasibility studies to support applications for funding water or waste disposal projects • Preliminary design and engineering analysis • Technical assistance for the development of an application for financial assistance	USDA Rural Development	Areas to be served must be rural and financially distressed: rural areas not in a city or town, populations of 2500 or less, and the area must have a median household income below the poverty line	On-going	USDA Rural Development St. Michael's Satellite Office Hwy. 264, P.O. Box 859, St. Michaels, AZ 86511 Phone: (928) 871-5038 Ext. 3 For general information, visit: http://www.rd.usda.gov/programs-services/search-special-evaluation-assistance-rural-communities-and-households/az
Accelerated Innovation Deployment (AID) Demonstration	Eligible projects include, but are not limited to: • Accelerate adoption of innovative technologies in all aspects of highway transportation • Construct longer-lasting highways • Improve highway efficiency, safety, mobility, reliability, service life, environmental protection, and sustainability	Federal Highway Administration Funds	Award recipients must obligate awarded funds to project within 6 months of allocation.	Open, rolling solicitation.	For general program information, visit: http://www.fhwa.dot.gov/accelerating/grants/
TIGER Grants	Eligible projects include, but are not limited to: • Highway or bridge projects eligible under title 23, United States Code; • Public transportation projects eligible under chapter 53 of title 49, United States Code; • Freight rail projects; • High speed and intercity passenger rail projects; • Port infrastructure investments	United States Department of Transportation	• $1 million minimum grant • No match requirement, though competitive • applications often feature a match • Tribal Transportation Program (TTP) Funds are eligible to match/complete financing	Applications must be submitted through Grants.gov	Office of the Under Secretary for Policy Office of the Secretary of Transportation 1200 New Jersey Ave, SE Washington, DC 20590 Phone: 202-366-4544 For general program information, visit: http://www.dot.gov/tiger

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Transportation Alternatives Program (TAP)	Eligible projects include, but are not limited to: • Bicycle and pedestrian facilities • Safe routes projects for non-drivers • Construction of turnouts and overlooks • Community improvement activities including vegetation management and historic preservation • Environmental mitigation activity	Federal Highway Administration Funds Administered Through ADOT and Regional Planning Organizations	TAP funds are available for obligation for a period of 3 years after the last day of the fiscal year for which the funds are authorized.		Patrick Stone TE Section Manager Department of Transportation 1615 W. Jackson Street, MD EM10 Phoenix, AZ 85226 Phone: 602-712-4428 Email: pstone@azdot.gov
Pedestrian, Bicycle, and Trail Projects					
Transportation Alternatives Program (TAP) - Safe Routes to School	Safe Routes to School (SRTS) eligible projects and activities include: • Infrastructure-related projects. • No infrastructure-related activities. • Safe Routes to School coordinator	Federal Highway Administration Funds Administered Through ADOT and Regional Planning Organizations	80 percent Federal/20 percent State or local match subject to the sliding scale adjustment		Kristin Myers ADOT - Local Public Agency Section 1615 W. Jackson St., MD EM11 Phoenix, AZ 85007 Phone: (602) 712-6166 Email: KMyers@azdot.gov
Transportation Alternatives Program (TAP) - Recreational Trails Program (RTP)	Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses.	FHWA Administered through Arizona State Parks			Robert Baldwin State Trails Coordinator Arizona State Parks Resources Management Section 1300 W Washington St Phoenix AZ 85007-2932 Phone: 602-542-7130 Email: rbb2@azstateparks.gov
Transit Projects					
Tribal Transit Program (TTP)	Eligible projects include public transportation capital projects for start-ups, replacement or expansion, operating costs for start-ups, and planning.	Federal Transit Administration	In FY 13 approximately $5 million in funding was available for the TTP. The federal share for projects selected under the TTP discretionary program was up to a 90 percent federal share of project costs, unless the Indian tribe could demonstrate a financial hardship in their application. Eligible applicants could also apply for planning grants of up to $25,000 for planning studies.	Check the TTP Notice of Funding Availability upon publication in the Federal Register..	Contact the appropriate FTA Regional Office at *http://www.fta.dot.gov* for proposal-specific information and issues. For general program information, contact : Lorna Wilson, Office of Program Management, (202) 366–0893, Email: *lorna.wilson@dot.gov*

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

Table 11.1: Potential Funding Sources (Continued)

Funding Program	Eligible Uses	Administering Agency	Program and Funding Details	Application Deadline	Contact Information
Pedestrian, Bicycle, and Trail Projects					
Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310)	Program funds are used for capital assistance, the purchase of vehicles, related equipment and operating funds statewide. Eligible recipients include private nonprofit and public agencies that provide transportation to the elderly and disabled.	Federal funds administered through ADOT	Using these funds for operating expenses requires a 50 percent local match while using these funds for capital expenses (including acquisition of public transportation services) requires a 20 percent local match.	Applications due to NACOG in March	Jason Kelly NACOG Transportation/Transit Planning 3130 Robert Rd. Ste. 1 Prescott Valley, AZ 86314 Phone: (928) 830-0127 Email: jkelly@nacog.org
Rural Area Formula Grants (Section 5311)	The Rural Program provides funding to States for the purpose of supporting public transportation in rural areas including funding for Tribal Transit, Appalachian region, Intercity Bus and technical assistance programs and services. Rural areas are locations with populations less than 50,000, where many residents often rely on public transit to reach their destinations.	Federal funds administered through ADOT	The Tribal program now consists of a $25 million formula program and a $5 million discretionary grant program. Formula factors include vehicle revenue miles and the number of low-income individuals residing on tribal lands. Federal share may exceed 85% for certain projects related to ADA, CAA, and for certain bicycle projects.	Applications are submitted in December, and awards are generally made in July of each year.	Sara Allred 5311 Program Manager 206 S 17th Ave MD 340B Phoenix, AZ 85007 Phone: 602-712-4498 Email: sallred@azdot.gov
Rural Transit Assistance Program	Training, technical assistance, research, and outreach funding to all 5310, 5311, 5316, and 5317 grantees statewide.	Federal funds administered through ADOT	To be eligible to receive a RTAP Scholar ship, applicants must be an active Arizo na grantee receiving 5311 and 5310 FT A program funding.	All grantees must submit a RTAP Application at least 30 days prior to the training event.	Sara Allred 5311 Program Manager 206 S 17th Ave MD 340B Phoenix, AZ 85007 Phone: 602-712-4498 Email: sallred@azdot.gov

Source: FHWA, ADOT, USDOT, AmeriCorps, USDA, Arizona State Parks

IMPLEMENTATION GUIDELINES

Implementation of the recommended Improvement Plan to enhance the safety and mobility along roadways within Ganado/Burnside area requires active participation from local citizens, private entities, local, county, and State government officials. The following actions are recommended to successfully implement the Plan for Improvements developed as part of this study.

- The Ganado Chapter Council needs to formally approve this plan in order to initiate the process of requesting project inclusion in the Navajo Nation TIP and to subsequently receive Federal Lands Highway Program funds or other MAP-21 funds.
- Incorporate high priority improvement projects in the State Transportation Improvement Program (STIP). In order to receive any federal funding, transportation improvement projects must be included in the State TIP.
- The Ganado Chapter should hire a transportation/community planner to support current and long-range planning efforts in the Chapter. At a minimum, the applicant should have a Bachelor's degree from an accredited college in Planning, Transportation, or a closely related field and have a minimum of three years of progressive transportation planning, project coordination, or project development experience. Job duties and responsibilities of the planner would include:
    - Advise Tribal officials on transportation matters, including developing written reports, solicit ideas, provide recommendations, and conduct technical meetings on transportation planning activities.
    - Develop and maintain working relationships with ADOT, Apache County District II, Bureau of Indian Affairs, Navajo Department of Transportation, Federal Highways Administration, etc.
    - Develop and maintain an inventory of the community roads system.
    - Assist in developing and maintaining a tribal Transportation Improvement Program (TIP) of a prioritized list of improvements for tribal, BIA, state, county, and/or federal roadways within the Chapter.
    - Assist in updating the tribal transportation plan and any other studies as needed.
    - Seek out and prepare requests for proposals, grant applications, and applications to fund transportation planning activities or studies.
    - Conduct project funding administration and/or construction project oversight.
- Solicit grants for pedestrian improvements to enhance connections to existing facilities and to construct new facilities in deficient locations.
- Work with Apache County District II, ADOT, and BIA to confirm existing ROW widths and identify areas where additional ROW is required. It is important that as existing roads are reconstructed that ROW descriptions are prepared as part of the design surveys. If needed, purchase required ROW from property owners.
- Establish partnerships with new commercial developments for the planning, design, improvement, and funding of roadway improvements that provide pedestrian or motor vehicle access to developments.
- Coordinate with the BIA to update the Nation's road condition information in the National Tribal Transportation Facility Inventory (NTTFI).
- Further research and apply for funding for each project identified in the Plan for Improvements.
- Traffic calming devices should be considered in the design of new roads serving housing, governmental facilities, or commercial developments.