

# 2016 Navajo Nation Long Range Transportation Plan

*Final Plan*

April, 2016



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# Navajo Nation Long Range Transportation Plan

Prepared for:  
**Navajo Nation**

**Navajo Nation Division of Transportation**



**April 2016**

Prepared by:

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# 2016 Navajo Nation

## Long Range Transportation Plan

### Contents

1.0	Introduction.....	1-1	4.1.1	Topography.....	4-1
1.1	Project Overview.....	1-1	4.2	Natural Resources.....	4-1
1.2	Study Area.....	1-1	4.3	Conflicts .....	4-1
1.3	Public Involvement Process .....	1-1	5.0	Existing Transportation System .....	5-1
1.3.1	Navajo Nation Government Structure .....	1-2	5.1	Roadway Infrastructure .....	5-3
1.4	LRTP Organization.....	1-3	5.2	Bridges.....	5-4
1.5	LRTP Development .....	1-3	5.3	Transit.....	5-5
2.0	LRTP Goals.....	2-1	5.4	Bicycle & Pedestrian Facilities.....	5-7
3.0	Socioeconomic, Demographic & Land Use Data .....	3-1	5.5	Intelligent Transportation Systems (ITS).....	5-11
3.1	Socioeconomic Profile .....	3-1	5.6	Safety .....	5-11
3.1.1	Population .....	3-1	5.6.1	Statewide Safety Plans.....	5-14
3.1.2	Households & Families.....	3-1	5.6.2	Navajo Nation Safety Plan .....	5-14
3.1.3	Education .....	3-1	5.7	Freight .....	5-14
3.1.4	Labor Force & Employment .....	3-1	5.8	Airports.....	5-17
3.1.5	Income .....	3-1	5.8.1	Federal Identification .....	5-17
3.1.6	Poverty.....	3-1	5.8.2	State Identification.....	5-17
3.1.7	Travel to Work.....	3-1	5.8.3	Navajo Nation Classification .....	5-17
3.1.8	Age Cohorts.....	3-2	6.0	Transportation Funding.....	6-1
3.1.9	Future Population .....	3-2	6.1	Maintenance .....	6-1
3.2	Land Use Pattern.....	3-3	6.2	Committed & Planned Transportation Improvements.....	6-1
3.2.1	Growth Centers.....	3-3	7.0	Project Partnering.....	7-1
3.3	Parks, Open Space, & Recreation.....	3-5	7.1	Federal Agencies.....	7-1
3.3.1	Scenic Byways & Tourist Destinations .....	3-5	7.1.1	Bureau of Indian Affairs .....	7-1
3.3.2	National Monuments & Recreation Areas.....	3-5	7.1.2	U.S. Department of Transportation .....	7-1
4.0	Environmental Overview.....	4-1	7.1.3	Federal Aviation Administration .....	7-1
4.1	Physical Conditions.....	4-1	7.1.4	Federal Transit Administration .....	7-1



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# 2016 Navajo Nation

## Long Range Transportation Plan

7.1.5	U.S. Department of Housing and Urban Development.....	7-1	Appendices:
7.1.6	U.S. Environmental Protection Agency.....	7-1	Appendix A: Road Summary
7.2	State Agencies .....	7-2	Appendix B: Maintenance Strategy
7.2.1	Arizona Department of Transportation .....	7-2	Appendix C: Bridge Summary
7.2.2	New Mexico Department of Transportation .....	7-2	Appendix D: Sidewalk Needs
7.2.3	Utah Department of Transportation.....	7-3	Appendix E: Functional Classification Cross Sections
7.3	Regional Governments.....	7-4	Appendix F: Priority Routes
7.3.1	Northern Arizona Council of Governments.....	7-4	Appendix G: New/Proposed Roads, Bridges and Paths
7.3.2	Northwest New Mexico Council of Governments.....	7-4	Appendix H: Collaboration Improvements with other Entities
7.3.3	North Central New Mexico Economic Development District .....	7-4	Appendix I: Reoccurring Washout Areas
7.3.4	Mid Region Council of Governments (MRCOG) .....	7-4	Appendix J: Deferred Maintenance Lists
7.3.5	Farmington Metropolitan Planning Organization .....	7-4	Appendix K: Airport Improvements
7.3.6	Southeastern Utah Association of Local Governments.....	7-4	
7.4	Local Governments / Counties.....	7-4	
7.5	Navajo Nation Divisions and Departments.....	7-5	
8.0	Strategies and Performance Measures .....	8-1	
8.1	Inventory .....	8-1	
8.2	Needs Identification.....	8-2	
8.3	Prioritization.....	8-3	
8.4	TTIP Budgeting .....	8-3	
9.0	Implementation and Monitoring .....	9-1	
9.1	Monitoring Progress.....	9-1	
9.2	Decision Making.....	9-4	
9.3	Prioritization Process.....	9-5	

# 2016 Navajo Nation

## Long Range Transportation Plan

### List of Figures

Figure 1-1  Navajo Nation Geographic Vicinity .....	1-1
Figure 1-2  Agency and Chapter Boundaries .....	1-4
Figure 1-3  Navajo Nation Administrative Service Centers .....	1-6
Figure 2-1  Paved Surface Conditions.....	2-1
Figure 2-2  LRTP and TTIP Processes and Relationships.....	2-3
Figure 2-3  State SHSP Relationships to Other Plans .....	2-6
Figure 2-4   Navajo Nation .....	2-7
Figure 2-5  Bicycle and Pedestrian Accommodation Factors .....	2-8
Figure 2-6  Roadway Cross Section Components.....	2-9
Figure 3-1  National Travel to Work Statistics by Income Level.....	3-2
Figure 3-2  Year 2010 Population Pyramid .....	3-2
Figure 3-3  Growth Centers and Destinations.....	3-4
Figure 3-4  Scenic Byways.....	3-5
Figure 3-5  Parks, Open Space & Recreation.....	3-6
Figure 4-1  Region Topography.....	4-2
Figure 5-1  Road Functional Classification.....	5-2
Figure 5-2  Cumulative Distribution of BIA Bridge Sufficiency Rating from both 2008 and 2013 Data.....	5-4
Figure 5-3  Curb or Sidewalk Width on Either Side of Bridge .....	5-5
Figure 5-4  Current NTS Routes.....	5-6
Figure 5-5  ADOT, Top Candidates for New Intercity Section 5311 Program Service .....	5-7
Figure 5-6  Potential Future Park and Ride Corridor, 2008 .....	5-7
Figure 5-7  Existing Road Shoulder Width .....	5-9
Figure 5-8  Ranking of Shoulder Width Condition .....	5-10
Figure 5-9  Count of Crash Records from State and Tribal Databases for Arizona - Years 2008-2012 .....	5-11
Figure 5-10  Fourteen-Year Trend in Crashes by Severity from Navajo DOT Database .....	5-12
Figure 5-11  Police Districts.....	5-12
Figure 5-12  National Freight Rail and Roadway Corridors .....	5-16
Figure 5-13  Private & Public Airports .....	5-19
Figure 6-1  FY2014 Navajo DOT Total Funding .....	6-1
Figure 6-2  Pre-Project Development Timeline .....	6-3
Figure 6-3  Potential Project Phasing Strategy .....	6-3

Figure 6-4  Project Development Process .....	6-4
Figure 7-1  Navajo Nation Governmental Boundaries .....	7-6
Figure 8-1  Inventory Related Strategies .....	8-1
Figure 8-2   Inventory Related Performance Measures.....	8-2
Figure 8-3  Needs Identification Strategies .....	8-2
Figure 8-4  Needs Identification Performance Measures.....	8-2
Figure 8-5  Prioritization Strategies .....	8-3
Figure 8-6   Prioritization Performance Measures .....	8-3
Figure 8-7  TTIP Budget Priorities .....	8-3
Figure 9-1  Three-Phased Improvement Approach .....	9-2
Figure 9-2  Decision Making Process .....	9-4

### List of Tables

Table 1.1  Chapter Name Reference .....	1-4
Table 2.1  Road Maintenance Strategy.....	2-2
Table 2.2  Bridge Maintenance Strategy .....	2-2
Table 5.1  Road Ownership by Mileage.....	5-1
Table 5.2  BIA Operated Roads by Class Code.....	5-3
Table 5.3  Nation Operated Roads by Class Code.....	5-3
Table 5.4   Current NTS Routes.....	5-5
Table 5.5  Future NTS Routes.....	5-5
Table 5.6  Identified State Bicycle Routes.....	5-8
Table 5.7  Identified Pedestrian Facility Improvements .....	5-8
Table 5.8  Distribution of Crashes by Severity from Navajo DOT Database .....	5-12
Table 5.9  Safety Emphasis Areas by State SHSP .....	5-14
Table 9.1  Road Maintenance Priority .....	9-2
Table 9.2  Bridge Maintenance/Replacement Priority .....	9-3

# Long Range Transportation Plan

## 1.0 INTRODUCTION

### 1.1 PROJECT OVERVIEW

The 2015 Navajo Nation Long Range Transportation Plan (LRTP) is a multi-year planning process to research, draft and develop a path forward for multimodal transportation investment within the Navajo Nation. The LRTP defines a set of goals to provide funding guidance in order to improve overall transportation system conditions, and direct funding towards the types of investments that are needed most. The LRTP also identifies short and long-range transportation improvement strategies that will address current and future transportation needs according to Tribal, Federal, and State government policies.

As required by the statutory requirement 25 CFR 170, the Navajo Nation LRTP is necessary because it serves as the defining vision for the region's transportation needs. The LRTP continually remains proactive as it is updated every five years. Multimodal transportation spending includes investing in infrastructure and strategies to improve mobility for those that drive, bicycle, walk, fly, use transit, and ship freight.

### 1.2 STUDY AREA

Encompassing over 27,000 square miles, the Navajo Nation is the largest tribal community in the United States. The Nation's territory occupies portions of three states including southeastern Utah, northeastern Arizona, and northwestern New Mexico. This geographic size is larger than 10 U.S. states and includes five regional governments and 11 counties. Figure 1-1 illustrates the Navajo Nation boundary as it overlaps into the State of Utah, Arizona, and New Mexico.

### 1.3 PUBLIC INVOLVEMENT PROCESS

This long range planning process involved extensive public involvement including a community survey, public meetings, comment cards, and a quarterly meeting discussion with project stakeholders. The community survey further revealed transportation needs within Navajo Nation. While the majority of

respondents did not know what an LRTP was, respondents did; however, know about the Community Land Use Plan (CLUP). Overwhelmingly, improvements for travel safety, signage, and sidewalks ranked the highest amongst respondent's goals along with resurfacing paved roads. The survey also revealed the majority of respondents do not feel safe while driving, walking, or biking within their communities, yet indicated that improvements would encourage more walking or biking. Two series of Open Houses were held. The first five open houses were held December 15-19, 2014 in Tse Bonito, New Mexico. Another five open houses were held April 15-24, 2015 throughout Navajo Nation (Chinle Chapter House, Navajo Technical University, LeChee Chapter House, Shiprock Chapter House, and Kinlichee Chapter House). Also conducted in April 2015 was a presentation to the Navajo Nation Resources and Development Committee (RDC).

**Figure 1-1 | Navajo Nation Geographic Vicinity**



### 1.3.1 NAVAJO NATION GOVERNMENT STRUCTURE

The Navajo Nation's inherent right to self-govern is sacred and demonstrated through daily governmental actions. Navajo government has evolved into the largest and most sophisticated form of American Indian government. The Navajo Nation Council Chambers hosts 24 council delegates representing 110 Navajo Nation chapters. As the governing body of the Navajo Nation, the Navajo Nation Council has the authority to pass laws which govern the Navajo Nation, members of the Navajo Nation, and certain conduct of non-member Indians and non-Indians within the territorial boundaries of the Navajo Nation. The Navajo Nation central government is composed of three branches headquartered in Window Rock, Navajo Nation (Arizona):

1. Legislative Branch (Navajo Nation Council);
2. Judicial Branch (District Courts, Family Courts, Peacemaker Courts, and a Supreme Court); and
3. Chapters (local government subdivisions)

All branches of the Navajo Nation government exercise varied delegated powers and governmental authority in accordance with Navajo statutory, regulatory, and common law. Within Navajo Nation, regional coordination also exists on an Agency and Service Center level.

### DIVISIONS & DEPARTMENTS

Navajo Nation has a relatively large government structure when compared to other tribal governments. Navajo Nation is comprised of 12 Divisions or Departments, they include:

- Division of Community Development
- Department of Dine Education
- Division of Economic Development
- Environmental Protection Agency
- Division of Public Safety
- Division of General Services
- Division of Health
- Division of Human Resources
- Division of Natural Resources
- Division of Social Services

- Division of Finance
- Division of Transportation

### AGENCIES

Agencies act as the regional government structures that are comprised of several local government division Chapters. In total, seven Agencies exist within Navajo Nation, and an NDOT Planner is assigned to each Agency:

- Chinle Agency: 15 Chapters
- Eastern/Crownpoint Agency: 31 Chapters
- Fort Defiance Agency: 26 Chapters
- Northern/Shiprock Agency: 20 Chapters
- Western/Tuba City Agency: 18 Chapters
- New Lands Agency
- NIIP (Navajo Indian Irrigation Project) Agency

These Agencies and the Chapters within their boundaries are illustrated in Figure 1-2.

### SERVICE CENTERS

As part of Navajo Nation's decentralization initiative, 16 Administrative Service Centers were created in June of 2014. These Service Centers will replace the five Local Governance Support Centers by Agency and are intended to provide planning services, technical assistance, and guidance to Chapters relating to project planning, infrastructure development, community land use planning and provide guidance to the Five Management System and policies. The new centers will include a director to develop and implement policies and procedures for effective management. Each center will be staffed by a senior planner, administrative assistant, accountant, and plans are underway to hire attorneys for the centers as well. The Service Centers are mapped in Figure 1-3. Direction for NDOT Planning functions to also decentralize to the Service Center level has not been determined yet; however there are extensive opportunities to improve local and regional coordination with this decentralization requirement.

### CHAPTERS

Local government subdivisions (known as Chapters) are one of the three branches of government. In total, 110 Chapters exist throughout Navajo Nation. Each Chapter is charged with creating a Community-Based Land Use Plan, also known as a CLUP. A CLUP is a locally developed land use plan that emphasizes housing and related infrastructure development in accordance with the Native American Housing Assistance and Self Determination Act (NAHASDA).

### 1.4 LRTP ORGANIZATION

The LRTP document is organized in the following manner to provide a background on existing socioeconomic and transportation asset conditions, and to outline the steps to improve and measure system level performance, including:

- Chapter 2: LRTP Goals
- Chapter 3: Socioeconomic, Demographic & Land Use Data
- Chapter 4: Environmental Overview
- Chapter 5: Existing Transportation System
- Chapter 6: Transportation Funding
- Chapter 7: Project Partnering
- Chapter 8: Strategies and Performance Measures
- Chapter 9: Implementation Program

### 1.5 LRTP DEVELOPMENT

The LRTP was developed through a collaborative process that went through the following steps:

1. Establish Policy Goals and Objectives
2. Analyze Transportation System Conditions
3. Perform Needs Analysis
4. Set Priorities
5. Establish Funding Plan
6. Develop the Plan
7. Develop the Program
8. Implement and Monitor the Plan

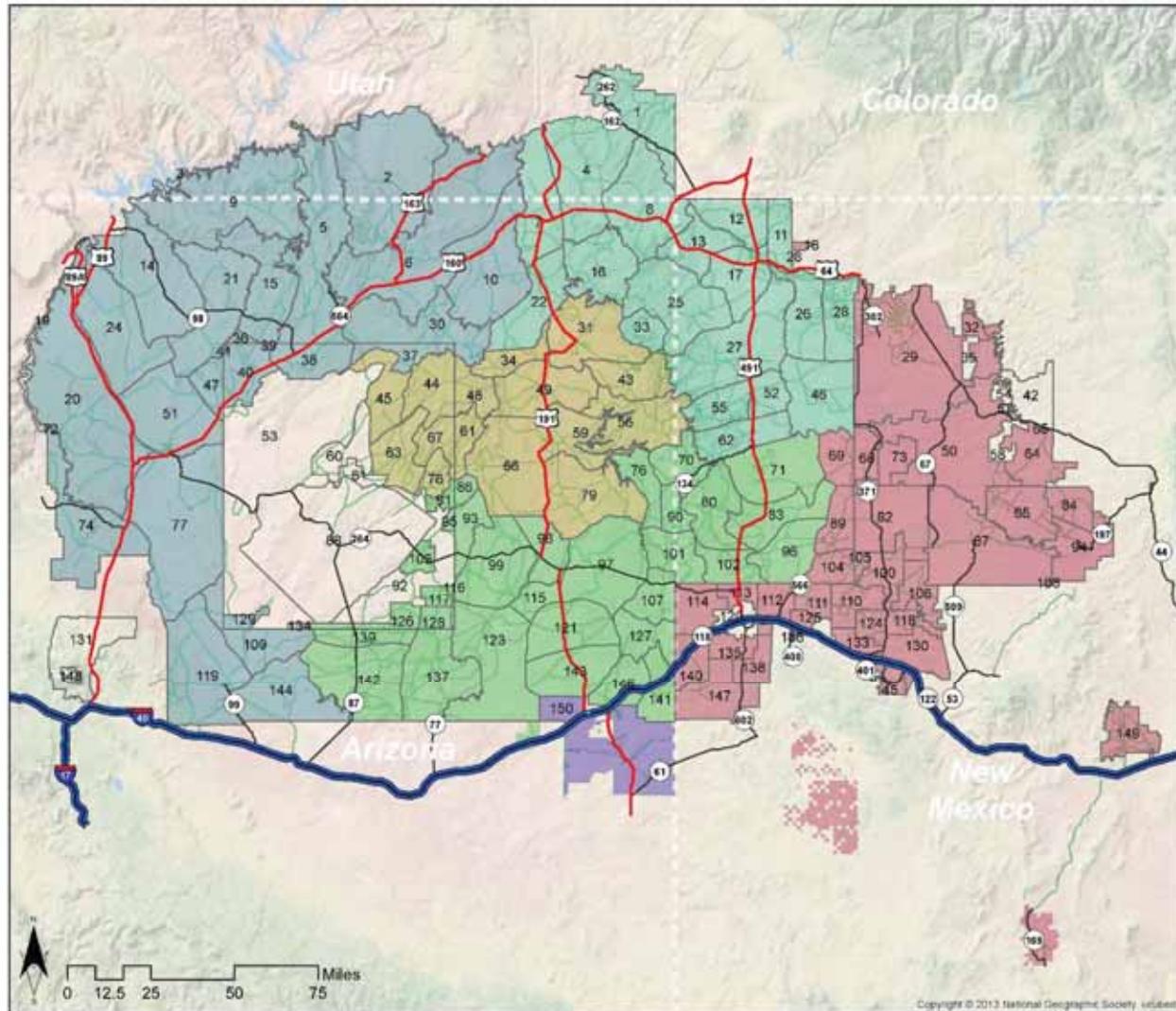
The intent of how this plan was developed, and will be monitored for performance, was to enable NDOT to use the most up to date information to

facilitate change through data-driven and transparent processes so ultimately, this regional plan and local Chapter plans are consistent. This transition will also be influenced as NDOT develops the processes and procedures relating to self-administrating their transportation program. This LRTP will maintain a set of appendices that outline specific transportation system deficiencies so priorities can be adjusted as updated data is collected and analyzed so system performance can improve including better roads, sound bridges, safe travel for all modes, and opportunities for economic development can occur.

# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 1-2| Agency and Chapter Boundaries



## Navajo Nation

### Agency Boundaries

Chapter Boundaries
Chinle
Crown Point
Fort Defiance
New Lands
Shiprock
Tuba City
BIA Route

Chapter numbers correspond to chapter names. Refer to Table 1.1 for corresponding Chapter names.



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Table 1.1| Chapter Name Reference



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## Long Range Transportation Plan

LABEL NUMBER	CHAPTER NAME			
1	ANETH	38	SHONTO (SOUTH)	79 NAZLINI
2	OLJATO	39	INSCRIPTION HOUSE (S.)	80 MEXICAN SPRINGS
4	RED MESA	40	TONALEA (SOUTH)	82 BECENTI
5	SHONTO (NORTH)	41	KAIBETO (SOUTH)	83 TOHATCHI
6	KAYENTA	43	LUKACHUKAI	84 OJO ENCINO
7	MEXICAN WATER	44	BLACK MESA	85 PUEBLO PINTADO
8	TEEC NOS POS	45	FOREST LAKE	86 LOW MOUNTAIN (EAST)
9	NAVAJO MOUNTAIN	46	BURNHAM	87 WHITEHORSE LAKE
10	DENNEHOTSO	47	TONALEA (WEST)	89 STANDING ROCK
11	HOGBACK (WEST)	48	BLACK MESA	90 RED LAKE
12	GADIIAHI	49	MANY FARMS	91 LOW MOUNTAIN (WEST)
13	BECLAHBITO	50	NAGEEZI	93 JEDDITO, AOACGE
14	LECHEE	51	TUBA CITY	94 TORREON (NORTH)
15	INSCRIPTION HOUSE (NORTH)	52	NEWCOMB	95 JEDDITO (EAST), NAVAJO
16	SWEETWATER	55	TWO GREY HILLS	96 COYOTE CANYON
17	SHIPROCK	56	TSAILE/WHEATFIELD	97 KINLICHEE
18	HOGBACK (NORTH)	59	CHINLE	98 GANADO
20	BODAWAY	61	TACHEE (EAST)	99 STEAMBOAT (EAST)
21	KAIBETO (NORTH)	62	SHEEP SPRINGS	100 CROWNPOINT
22	ROCK POINT	63	PINON	101 FORT DEFIANCE
23	HOGBACK (SOUTH)	64	COUNSELOR	102 TWIN LAKES
24	COPPERMINE	66	TSELANI	103 JEDDITO (WEST), NAVAJO
25	RED VALLEY	67	TACHEE (WEST)	104 NAHODISHGISH (WEST)
26	NENAHNEZAD/SAN JUAN	68	WHITE ROCK (EAST)	105 NAHODISHGISH (EAST)
27	SANOSTEE	69	WHITE ROCK (WEST)	106 LITTLEWATER
28	UPPER FRUITLAND	70	CRYSTAL	107 SAINT MICHAELS
29	HUERFANO (WEST)	71	NASCHITTI	108 TORREON (SOUTH)
30	CHILCHINBITO (NORTH)	72	CAMERON (NORTH)	109 TOLANI LAKE (SOUTH)
31	ROUND ROCK	73	LAKE VALLEY	110 MARIANO LAKE
32	HUERFANO (EAST)	74	CAMERON (SOUTH)	111 PINEDALE
33	COVE	75	BBR	112 CHURCH ROCK
34	ROUGH ROCK	76	SAWMILL	113 ROCK SPRINGS
36	TONALEA (NORTH)	77	COALMINE MESA	114 TSAYATOH
37	CHILCHINBITO (SOUTH)	78	WHIPPOORWILL	115 CORNFIELDS
				116 STEAMBOAT (WEST)
				117 WHITECONE
				118 CASAMERO LAKE
				119 LEUPP
				120 CITY OF GALLUP
				121 KLAGETOH
				122 GREASEWOOD SPRINGS (WEST)
				123 GREASEWOOD SPRINGS (EAST)
				124 SMITH LAKE
				125 IYANBITO (NORTH)
				126 TEESTO (NORTH)
				127 OAK SPRINGS
				128 INDIAN WELLS (NORTH)
				129 TOLANI LAKE (NORTH)
				130 HAYSTACK
				132 IYANBITO (MID)
				133 THOREAU
				134 TOLANI LAKE (EAST)
				135 RED ROCK
				136 IYANBITO (SOUTH)
				137 INDIAN WELLS (SOUTH)
				138 BREAD SPRINGS
				139 TEESTO (SOUTH)
				140 MANUELITO
				141 LUPTON
				142 DILKON
				143 WIDE RUINS
				144 BIRD SPRINGS
				145 BACA
				146 HOUCK
				147 CHICILTAH
				149 CANONCITO
				150 NAHATADZIL

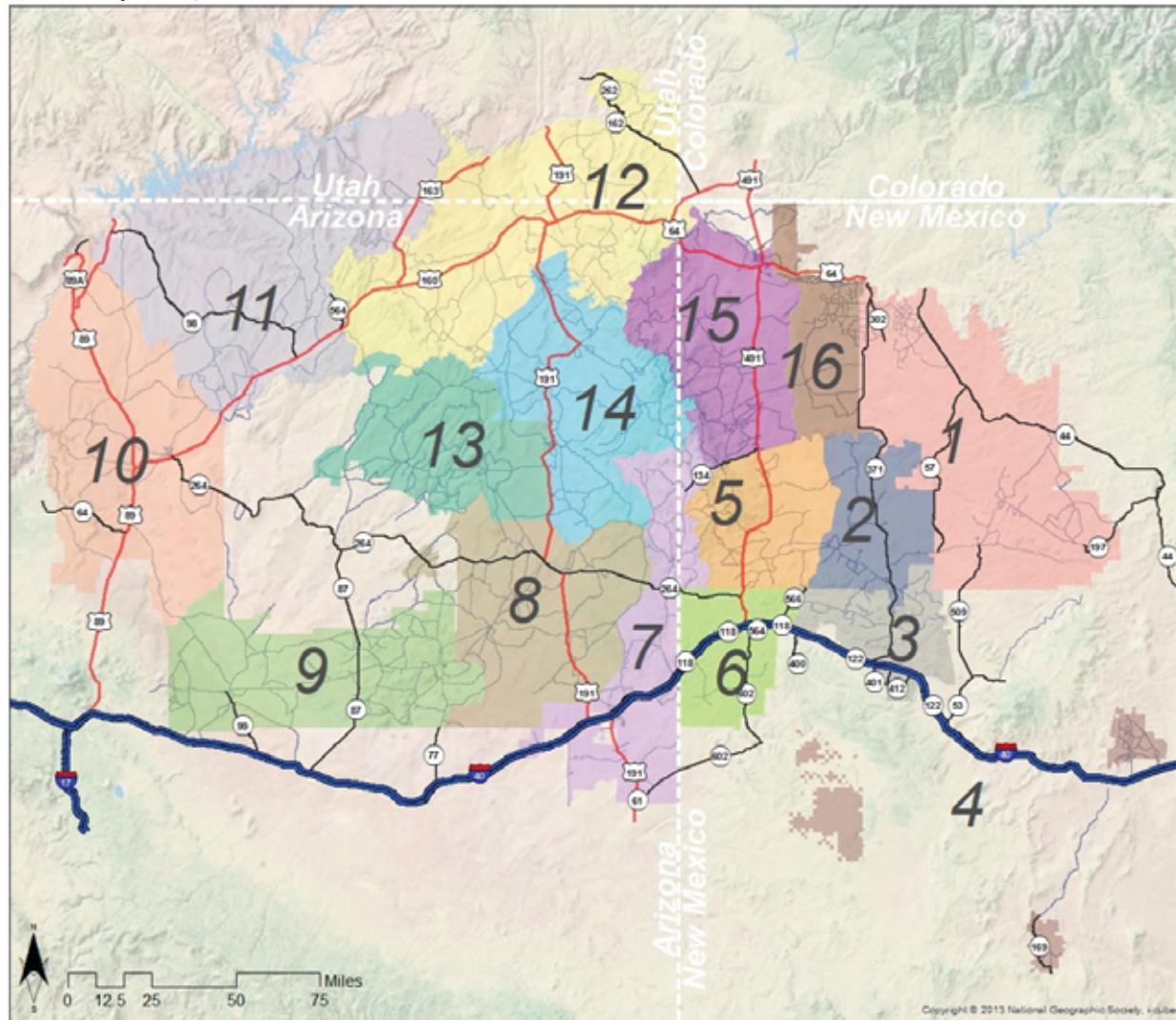
Source: Community Development



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## Long Range Transportation Plan

Figure 1-3| Navajo Nation Administrative Service Centers



## Navajo Nation

### Administrative Service Centers

1 Nageezi
2 Crownpoint
3 Baca
4 Baca
5 Twin Lakes
6 Breadsprings
7 Saint Michaels
8 Ganado
9 Bird Springs
10 Tuba City
11 Shonto
12 Dennehotsos
13 Whippoorwill
14 Chinle
15 Shiprock
16 Shiprock



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Source: Division of Community Development



## 2.0 LRTP GOALS

Since NDOT became a Division, NDOT has worked to identify how to be more efficient and effective in managing the transportation system. NDOT is working to be self-administering so to better control how federal funds are spent between NDOT and BIA. NDOT has been working with FHWA to convert the 38-year Tribal Transportation Improvement Program (TTIP) to a 5-year TTIP. This will enable NDOT to focus on planning, designing, obtaining needed environmental clearances and performing construction activities in a systematic manner. The TTIP outlines specific NDOT project activities over a 5-year period, and is updated every year with new projects being added in "Year 5" to maintain focus on those programmed projects, not to waste NDOT funding, and does not jeopardize future FHWA project funding.

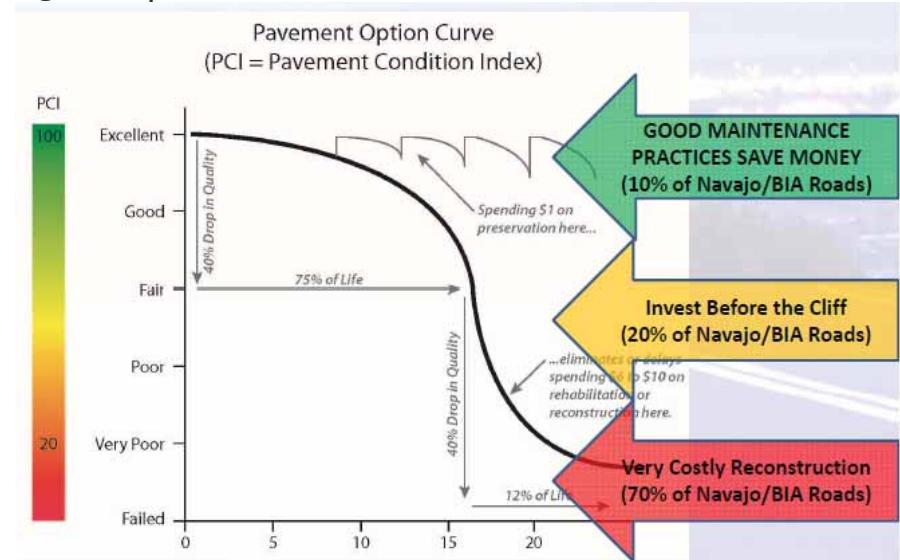
There are seven key goals of the LRTP, including:

**Take Care of the System** - The Nation has invested a significant amount of money on the existing transportation system which is very important and should be maintained to a level that corresponds to the function and use of the roadways and bridges. This transportation system requires a significant amount of maintenance resources to maintain, repair and reconstruct the roads and bridges that are deficient. These activities require very important environmental clearances and permits to do any work on the roadways, which takes time and coordination with many agencies.

- The system is in great need of repair and maintenance. Focus on the greatest needs first – those with high traffic volumes, safety issues and are of the highest functional classification.
- Maintain and share data with the communities and stakeholders for informed decision making.
- Conducting maintenance activities on roads and bridges is a cost effective way to save money rather than waiting until reconstruction is warranted.
- Create funding "pools" for separate bridge, safety and roadway funds.

The roadway system is made up of paved, gravel and dirt roads. Each has their purpose, and careful consideration should be made before any improvements are made. Figure 2-1 summarizes the Navajo Nation paved road system conditions based on the official 2015 RIFDS inventory. As shown, approximately 10% of the paved system is in good or better condition; 20% is in fair condition; and the remaining 70% is in poor or failing condition based on the inventory. This situation is caused by not enough resources being directed towards maintenance and reconstruction activities versus constructing new roads and upgrading roads to pavement without an increased budget for maintaining those roads once improved. National research has shown that properly maintaining paved roads is a cost effective approach versus allowing the pavement quality to deteriorate to the level of need for major maintenance or reconstruction.

**Figure 2-1 | Paved Surface Conditions**



Both gravel and dirt roads also require ongoing maintenance activities including blading and surface treatments. There is not enough funding, equipment or staff available to maintain all of the roads that NDOT and BIA are responsible for. As such, priorities must be set to maintain roads in good condition while improving fair roads, bringing them up to good condition. The priorities should be based on

both quantitative data such as functional classification, average daily traffic (ADOT), crash experiences/safety, and historic maintenance needs required to keep the roadway properly maintained. Table 2.1 depicts a strategy related to functional classification and AADT, and roadway condition for paved and gravel roads. The approach outlined in Table 2.1 uses a strategy of keeping roadways that are in good condition from deteriorating more, while bringing roads that are in fair condition up to "good" before major reconstruction activities on failed pavement surfaces takes place due to the expenses required to reconstruct a roadway. This approach also greatly reduces the attention on local roads that carry low traffic volumes. The local roads that are important to communities should be integrated into the Department of Roads blading schedule as appropriate. Notes included in Tables 2.1 and 2.2 indicate if a maintenance strategy is a low, moderate or high priority project.

**Table 2.1| Road Maintenance Strategy**

	<100 AADT	100-249 AADT	250-499 AADT	500-999 AADT	1000+ AADT
<b>Major Arterial</b>	Low	Low	Moderate	High	High
<b>Minor Arterial</b>	Low	Low	Moderate	High	High
<b>Collector</b>	Low	Low	Moderate	High	High
<b>Local*</b>	Low	Low	Moderate	High	High
<b>Pavement Condition Priority</b>					
	Failure	Poor	Fair	Good	Excellent
<b>Major Arterial</b>	Low	Low	Moderate	High	High
<b>Minor Arterial</b>	Low	Low	Moderate	High	High
<b>Collector</b>	Low	Low	Moderate	High	High
<b>Local*</b>	Low	Low	Moderate	Moderate	Moderate

\* Many local roads in housing subdivisions are operated and managed by the Navajo Housing Authority, and not NDOT.

Bridges are also a critical component to transportation and mobility. Table 2.2 depicts a strategy related to roadway functional classification and the actual bridge condition surveyed in the bridge reporting to NDOT.

**Table 2.2| Bridge Maintenance Strategy**

	Failure	Fair	Good	Excellent
<b>Major Arterial</b>	High	Moderate	Low	n/a
<b>Minor Arterial</b>	High	Moderate	Low	n/a
<b>Collector</b>	High	Moderate	Low	n/a
<b>Local*</b>	High	n/a	n/a	n/a

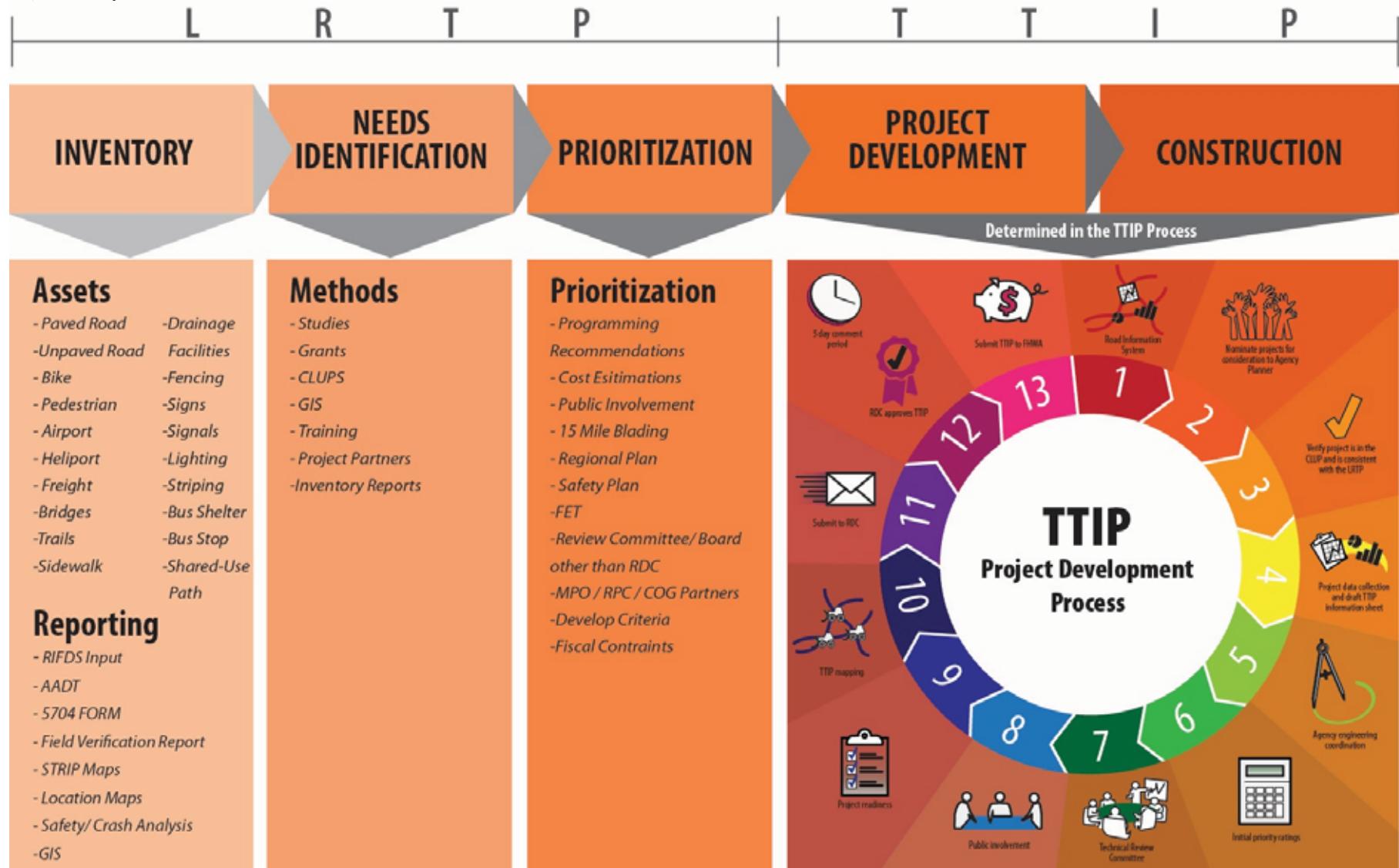
The approach outlined in Table 2.2 focuses attention on the bridges that are in greatest need first. To accomplish this, a dedicated funding pool specifically for bridges is recommended. A ten percent funding program could address the most critical-need bridges in a 7-year program. See Section '5.2 Bridges.'

To accomplish the goal of taking care of the system, it will require a focused attention to collecting, maintaining and sharing the road inventory data among departments and divisions, community members and administrative service center staff. This approach will lead to improved data-driven, performance-based discussions with elected and appointed officials so informed decision making is enhanced. Figure 2-2 depicts how the processes of inventorying, identifying needs and prioritizing are LRTP related functions that then influence the TTIP process of project development and construction activities. Reference Section 8.0 for respective strategies and performance measures that form the basis of performance based planning that drive the TTIP.

# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 2-2| LRTP and TTIP Processes and Relationships



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### Enhance Existing Partnerships and Create New Partnerships – The

relationships between Navajo Nation and the many funding partners that promote and assist in providing a safe and effective transportation system should continue to be enhanced to explore opportunities that further the goals of Navajo Nation, promote economic development and provide jobs.

Factors to consider:

- Many transportation programs are funded with money that is not Navajo Division of Transportation funds.
- Over the past few years, NDOT has partnered with many Chapter, local counties, Navajo Divisions, state and federal agencies to assist with roadway maintenance, improve roadway safety, make highway improvements, and conduct planning studies. These partnerships are very important to NDOT. The creation of projects that further multiple organizations' goals allows for limited funding to be stretched further.
- Available funding programs are very important to improve partnerships with other funding agencies is important to provide transportation choices, improve safety and upgrade our roads.
- Private industry is also an important partner to consider as economic development opportunities occur.



**Maximize Transportation Investment Effectiveness** – Transportation investments should be broadly discussed and vetted to direct funding to those needs that have the greatest positive impact on achieving local chapter, agency, Navajo DOT, State DOT, BIA and FHWA goals as appropriate.

- Every dollar that is invested in the transportation system is a long-term investment, regardless of if it is maintaining or upgrading an existing road or building a new one. Trade-offs exist with every decision– whether to construct a new paved roadway (\$2.0 million per mile), gravel a dirt roadway (\$400,000 per mile), maintaining gravel roads (\$2,000 per mile), blade dirt roads (\$700/mile) or fix a bridge that is in need of repair.
- The funding that is available is minimal, and is not expected to increase; however, traffic demands from communities will increase. Every effort must be made to reflect that money being spent on roadways is meaningful, long lasting and the improvements will be maintained after they are constructed.
- Transportation spending should be strategic in order to have the greatest positive impact towards achieving local and regional goals.
- The little amount of available funding is so important, therefore every dollar spent is a choice and a trade-off. Making sure there is an understanding of those trade-offs is very important.

Criteria and process should be fundamental to identifying priorities for improvement, and the types of improvements needed. Since there is not enough funding to address all of the Nations' transportation needs, careful consideration should be given to each and every improvement. Every Chapter has transportation needs that are desired. These needs have to be balanced with the available funding to determine if, how and to what extent an improvement project can address the needs. NDOT has a regional and nationwide responsibility in investing in transportation. With this responsibility, safely connecting Chapters and commercial centers is a primary responsibility of NDOT.



*In many cases, the traffic demands may provide surface-type options. Evaluating and arriving at an improvement decisions that balance the need (demand) with the investment amount (improvement type) should be data, financial and impact driven.*



*Bridges are expensive to construct and maintain. In some cases, low water crossings could be a viable option that provides a safe crossing while being financially careful.*

**Enhance Safety** – Transportation investments, maintenance activities, and improvements should improve the safety of all roadway users to minimize the potential for all serious injuries and fatalities.

- Transportation safety is at the forefront of the NDOT transportation program. The Nation must have a safe transportation system for all roadway users and decrease the number of fatality and serious injury crashes.
- There has been a significant push at the federal level to invest in safety, and NDOT has been able to obtain several grants to assist in helping with this important goal.
- Transportation spending should try to improve the safety for roadway users.
- It is important to reduce the potential for fatal and serious injury crashes.
- Safety/crash information should be shared across agencies to enhance the likelihood for more state and federal safety funding.
- Improving transportation safety can be implemented through investing in the 4-E's (engineering, education, enforcement and emergency services).

All crashes are caused by either driver behavior (education and enforcement focused), geographic/geometric issues (engineering focused), or natural events (education and engineering focused). Proactively reducing crashes through education can influence many factors such as improving seat belt use, properly restraining minor children, and reducing alcohol related crashes. Enforcing the driving laws of Navajo Nation provide the regulatory strength of a safe system. The engineering component is both reactive and proactive in nature. The reactive nature of safety is fixing "hot spots" where high crash locations exist by conducting Road Safety Audits/analyses/ studies and implementing countermeasures. The proactive aspect of safety is using historic data to understand systemic system problems. The emergency services element of the 4-E's is critical to enhance the effectiveness and timeliness of emergency medical

services in the event of a crash. For any safety effort, utilizing a collaborative, data-driven approach that incorporates transportation-safety research, analysis and documentation of the database of crash records, and other data, to identify safety Emphasis Areas and prioritize safety strategies.

The states of Arizona, New Mexico and Utah have all developed Strategic Highway Safety Plans (SHSSs) that are consistent with the national movement of **Toward Zero Deaths**. Each state has their own set of goals and objectives to address the pervasive types of crashes being experienced on their systems. Since Navajo Nation has territory in three states, the three separate SHSPs relate only to their specific, representative state. Each state also has their own set of Emphasis Areas and performance measures to address and monitor progress in mitigating specific types of crashes in the respective states. This relates directly to the available Highway Safety Improvement Program (HSIP) funding that is available through the three states. To be eligible for HSIP funding, the effort must be consistent with the appropriate state SHSP as shown in Figure 2-3. Navajo Nation can always focus funding towards other programs not included in the state SHSPs; however funding for those programs would need to be from sources other than state DOTs.

**Figure 2-3| State SHSP Relationships to Other Plans**



# 2016 Navajo Nation

## Long Range Transportation Plan

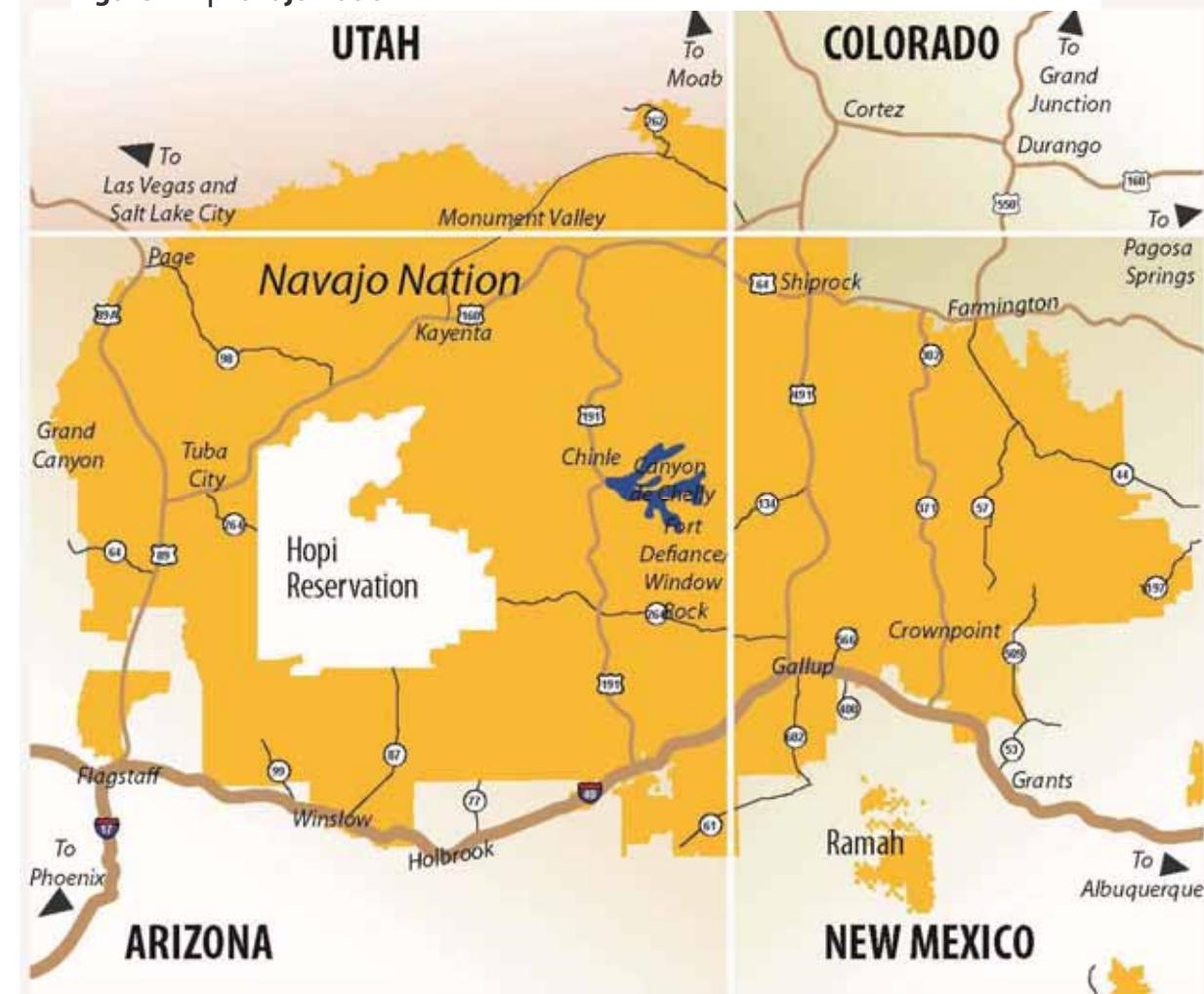
**Create Connections** – The transportation system should assist in providing seamless connectivity between the population centers and Chapters within Navajo Nation, public services and facilities, and the population centers and transportation systems surrounding Navajo Nation (Figure 2-4).

- It is that opportunities are provided for the citizens to travel within the communities they live in, and travel to other communities within and outside of Navajo Nation.
- All communities need connectivity to surrounding activity centers for school, government, work, shopping, groceries and commerce.
- There are connections outside of Navajo Nation that could enhance the quality of life for many. These connections are important to provide and maintain.
- The transportation systems (Greyhound bus, airports, Amtrak, etc...) are important to connect with to enable travel beyond Navajo Nation and the surrounding communities.

Currently, there is not public transportation provided or planned to Cortez, CO, Durango, CO, the Four Corners area, Holbrook, AZ, Winslow, AZ, and Page, AZ among other areas. In some cases, providing connections to these communities also provide access to their public transportation systems that service the regions around them.

From an economic development standpoint, creating connections can also improve visitation and attract “markets” of people such as bicycle riders. As an example, if there are safe routes to ride a bike that connects the various attractions within Navajo Nation, bicycle riders may be more attracted to an area for group rides which positively impact the tourism aspect of the Nation.

**Figure 2-4 | Navajo Nation**



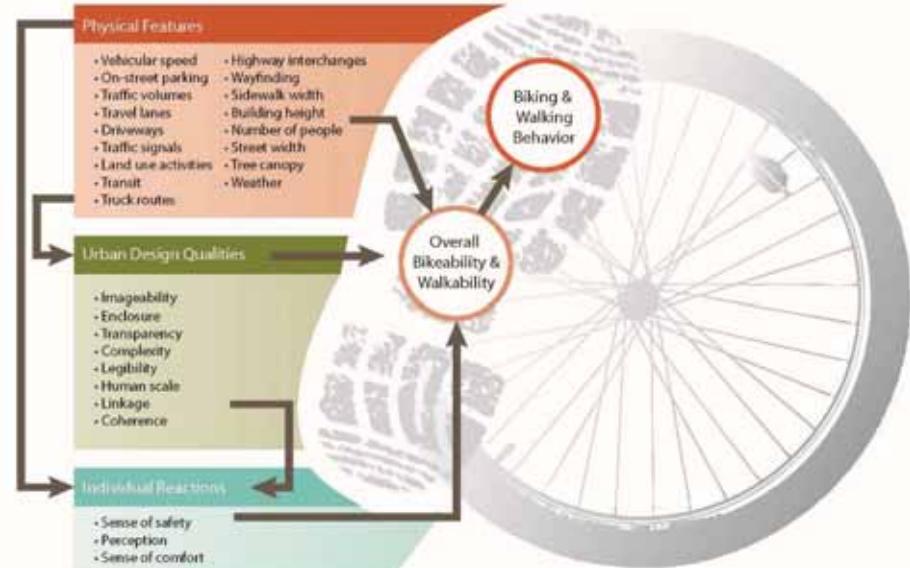
**Provide Options** – The transportation system should allow for safe travel for those that walk, bicycle, ride on public transportation, fly, and drive.

- Approximately 40% of the residents have income levels below poverty so a transportation system that provides options other than the automobile is important.
- NDOT investments must provide safe options for those that cannot afford to drive their own car.
- Safe options for all that travel is critical for the success of our community.
- Navajo citizens and visitors should be able to safely walk, ride a bicycle or take transit if desired.



Figure 2-5 depicts many factors that relate to providing safe accommodation for bicyclists and pedestrians. These type of factors should be examined when planning and designing for bicycles and pedestrians.

**Figure 2-5| Bicycle and Pedestrian Accommodation Factors**

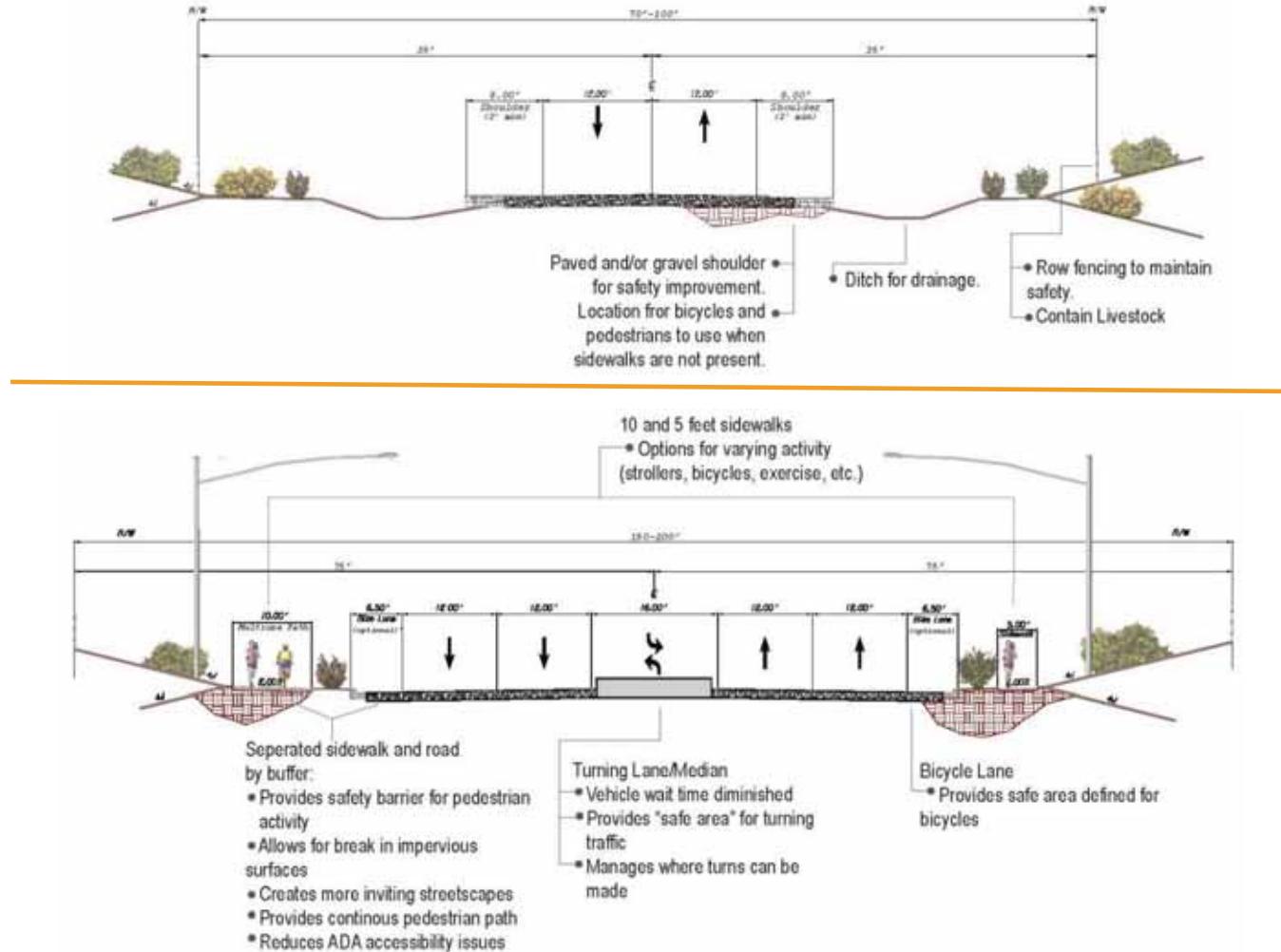


# 2016 Navajo Nation

## Long Range Transportation Plan

Specifically pertaining to roadways, proposed improvements can have a significant impact on how well a road can improve upon safety, and provide options for bicycling and walking. Figure 2-6 depicts specific roadway components that should be discussed as improvements are made. Appendix E depicts functional classification cross sections and characteristics of each. Ultimately, design standards will need to be developed for each approved cross sections. With each improvement, such as sidewalks, streetlights, and other enhancements, communities need to consider the costs and staff required for operations and maintenance of improvements being constructed.

**Figure 2-6| Roadway Cross Section Components**



**Promote Economic Development** – New transportation investments should correlate closely with economic development, services and new jobs.

- Transportation spending for new roads should relate to new jobs and economic development.
- New development should try to locate where existing transportation systems exists.

Efforts should be taken to have cross-Division discussions when transportation investment is required. When new facilities such as schools, event centers, agency buildings, hospitals, shopping centers, industrial parks, airports, etc... are developed, these developments typically require a supporting transportation system to provide meaningful and safe access. In many cases, improvements are necessary to facilitate the meaningful and safe access to the new development. Understanding these costs, including continued maintenance costs, will promote sustainable economic development opportunities that have positive impact to all agencies, Divisions and communities involved.



## 3.0 SOCIOECONOMIC, DEMOGRAPHIC & LAND USE DATA

### 3.1 SOCIOECONOMIC PROFILE

The purpose of analyzing the socioeconomic profile of Navajo Nation is to develop a better understanding of the past, present and future conditions of the community. This section includes a summary of data collected from the U.S. Census Bureau comparing the most recent data sets (2010 and 2012) against the previous data collected (2000 and 2007). Areas analyzed include population, households and families, geographical mobility, education, income, labor force and employment, poverty, age cohorts, and how people travel to work. Analyzing factors such as these, provides a comprehensive planning framework for growth cities and destinations, accessibility, tourism, and an overall cohesive transportation network.

#### 3.1.1 POPULATION

According to the 2010 Census, Navajo Nation is the largest Indian tribe in the United States with a nationwide population of 286,731, a 0.65% annual growth from the 2000 population. In 2010 population on the Navajo Reservation and Off-Reservation Trust Land was 173,667, which represents an annual population decrease of -0.4% from the 2000 population of 180,462.

#### 3.1.2 HOUSEHOLDS & FAMILIES

In 2010 there were 49,946 households on the Navajo Nation Reservation and Off-Reservation Trust Land. In 2012 the average household size was 3.46 people.

#### 3.1.3 EDUCATION

In 2012, the total school enrollment was 55,714; 40,413 were elementary and high school enrollment, 6,694 were preschool and kindergarten enrollment and 8,337 were college and graduate enrollment. Of those people 25 years of age and older, 33.7% had, at a minimum, graduated from high school (a 30% reduction from 2007) and 16% had a bachelor's degree or higher (a 7% increase from 2007).

#### 3.1.4 LABOR FORCE & EMPLOYMENT

In 2010, 45.7% (58,327) of the people 16 years of age and over were in the labor force which increased by 1.4% from 2000. Of the total labor force, 99.9% (58,275) were employed in the civilian labor force and .091% (53) were employed in the Armed Forces (a 0.2% decrease from 2000).

#### 3.1.5 INCOME

In 2012, the Navajo Nation and Off-Reservation Trust Land's median household income was \$25,166; this is a \$290 reduction from 2007 and approximately half of the 2012 U.S. household median income of \$51,375.

#### 3.1.6 POVERTY

In 2012, 43.6% of the population and 39.1% of all families lived below the poverty level; which indicates a 6.8% increase of population in poverty and an 8.3% increase of families in poverty from 2007.

#### 3.1.7 TRAVEL TO WORK

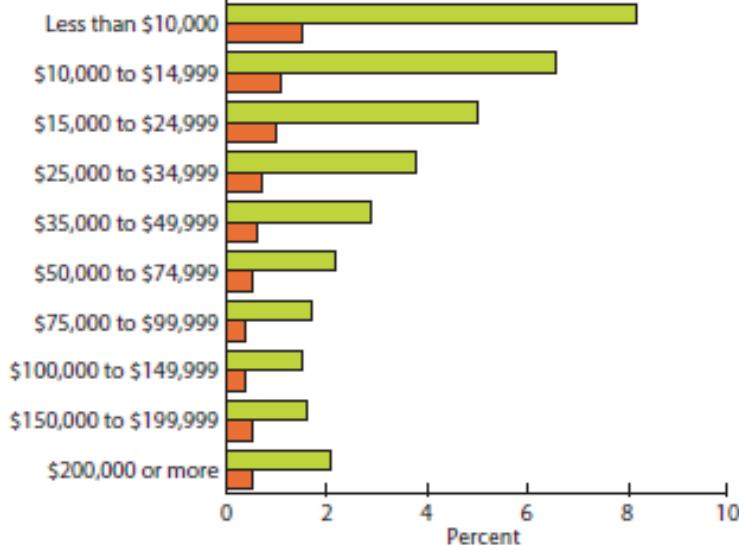
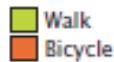
Of the 44,812 employed individuals over 16 years of age, 77% drove alone to work, 11.7% carpooled, 0.4% used public transportation, 5.8% walked or traveled by other means, and 5.1% worked at home. Figure 3-1 illustrates national statistics relating to the tie between income level and travel to work trends.

**Figure 3-1| National Travel to Work Statistics by Income Level**

### Walking and Bicycling to Work by Household Income:

2008-2012

(Data based on sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see [www.census.gov/acs/www/](http://www.census.gov/acs/www/))



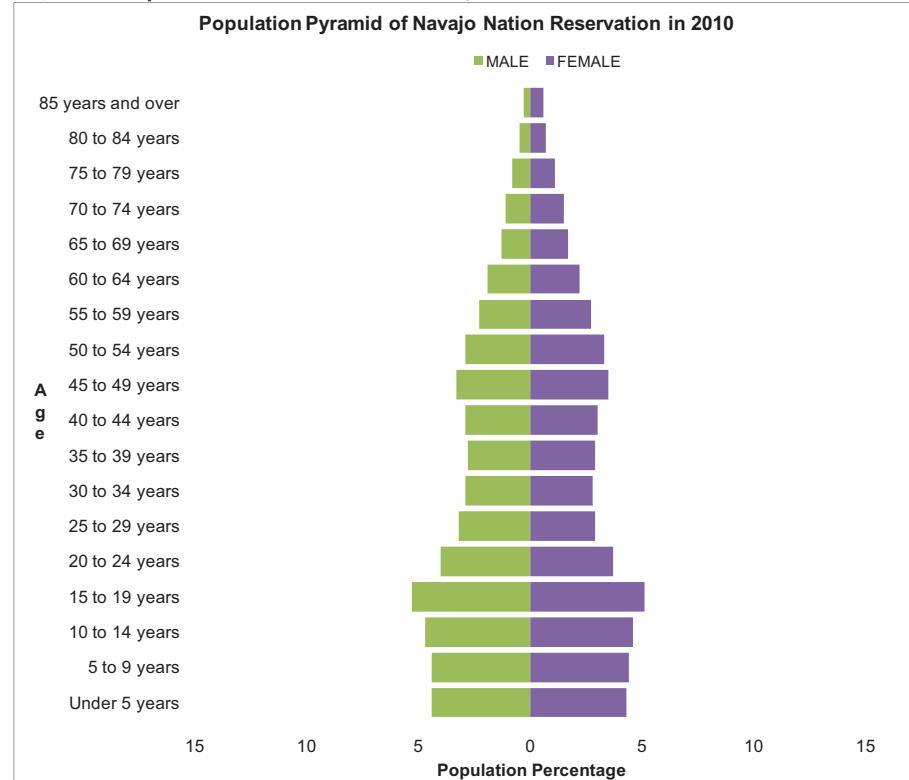
Source: U.S. Census Bureau, American Community Survey, 2008-2012.

### 3.1.8 AGE COHORTS

A population pyramid is a useful way to visualize age cohorts by gender. Figure 3-2 illustrates the age cohorts in relation to sex for Navajo Nation for year 2010.

In 2010, the largest cohorts were 19 years old and younger (44.5%) with a statistically non-significant majority of males; of this population of youth, the largest percentage of population falls between the ages of 15 and 19 years old. As the cohort groups increase in age the representative percentage of the population decreases. As the cohort age passes 75 years old the reflective percentage falls below 1%.

**Figure 3-2| Year 2010 Population Pyramid**



### 3.1.9 FUTURE POPULATION

In the 2009 Navajo Nation Long Range Transportation Plan, the future population was projected at an annual increase of 1.82% which would place the 2010 total population of the reservation at 216,131. According to the 2010 Census, the total population of the Navajo Nation Reservation was 173,667, which is 42,464 less than the projected population.

In working with the Navajo Nation Division of Community Development, that agency has identified that current population projections are not available due to contested issues with the 2010 Census.

### 3.2 LAND USE PATTERN

In order to understand the land use pattern of much of the Navajo Nation this study focused on the Primary and Secondary Growth Centers within Navajo Nation. The study of these growth centers identified the major road network, rivers or streams, and topography. Furthermore, we determined locations of landmarks within the growth centers and where civic/institutional and recreation activity nodes occur. This information is essential when planning for the future of Navajo Nation and accommodating predicted transportation needs.

Navajo Nation Chapters are each required to develop a CLUP. Historically, the CLUP has had minimal information relating to transportation related needs. NDOT is now looking to use the CLUP for criteria for future project selection to make sure the applications for a project are consistent with local planning efforts. To achieve this, NDOT is recommending that the following topics be included in future CLUP updates:

- Identify the highest priority dirt roads that should be bladed/graded (15-mile lists) and potentially upgraded to gravel, chip seal or pavement in the future (Take Care of the System).
- Describe any paved or gravel roads that need additional maintenance (Take Care of the System).
- Describe any sidewalks (if there are any) that need additional maintenance (Take Care of the System)
- Describe any proposed new roads or sidewalks that should be examined as part of future improvement projects (Create Connections).
  - If a new road is proposed, why does this road create a new connection? Why is it important to your community? Will this change an existing circulation pattern? Will this improve or affect safety?
  - If a new sidewalk is proposed, what facilities/activity centers are being connected?
- Describe any proposed enhancements for transit (Provide Options).
- Describe any proposed enhancements for walking and bicycling (Provide Options).
- Describe any proposed enhancements to access other transportation systems such as Greyhound and Amtrak (Provide Options).

- Describe any proposed airport / aviation enhancements (Provide Options).
- Describe how any proposed transportation enhancements will promote economic development identified in the CLUP-C Plan (Promote Economic Development).
- Describe any roads that you believe have motorist, bicycle and/or pedestrian safety issues (Enhance Safety).
- Describe how proposed developments in the CLUP-C Plan would require spending money on roads and sidewalks to connect to the new development (Maximize Transportation Investment Effectiveness).
  - Describe how proposed developments could be developed without additional spending on roads and sidewalks (is the development a smart investment for the community? Can the development go somewhere else? If the development needs a paved or graveled road for access, is the road providing access already paved or graveled?).
  - Describe if the proposed developments would increase truck traffic. Is the current road meant to carry heavy truck traffic?
- Describe how proposed improvements would be paid for (Enhance Existing Partnerships and Create New Partnerships).
  - Did you receive a funding grant?
  - Who will have maintenance responsibility of this? Have they been involved in these discussions?
  - Does the new improvement involve a State Highway? Have the DOT been involved in these discussions?

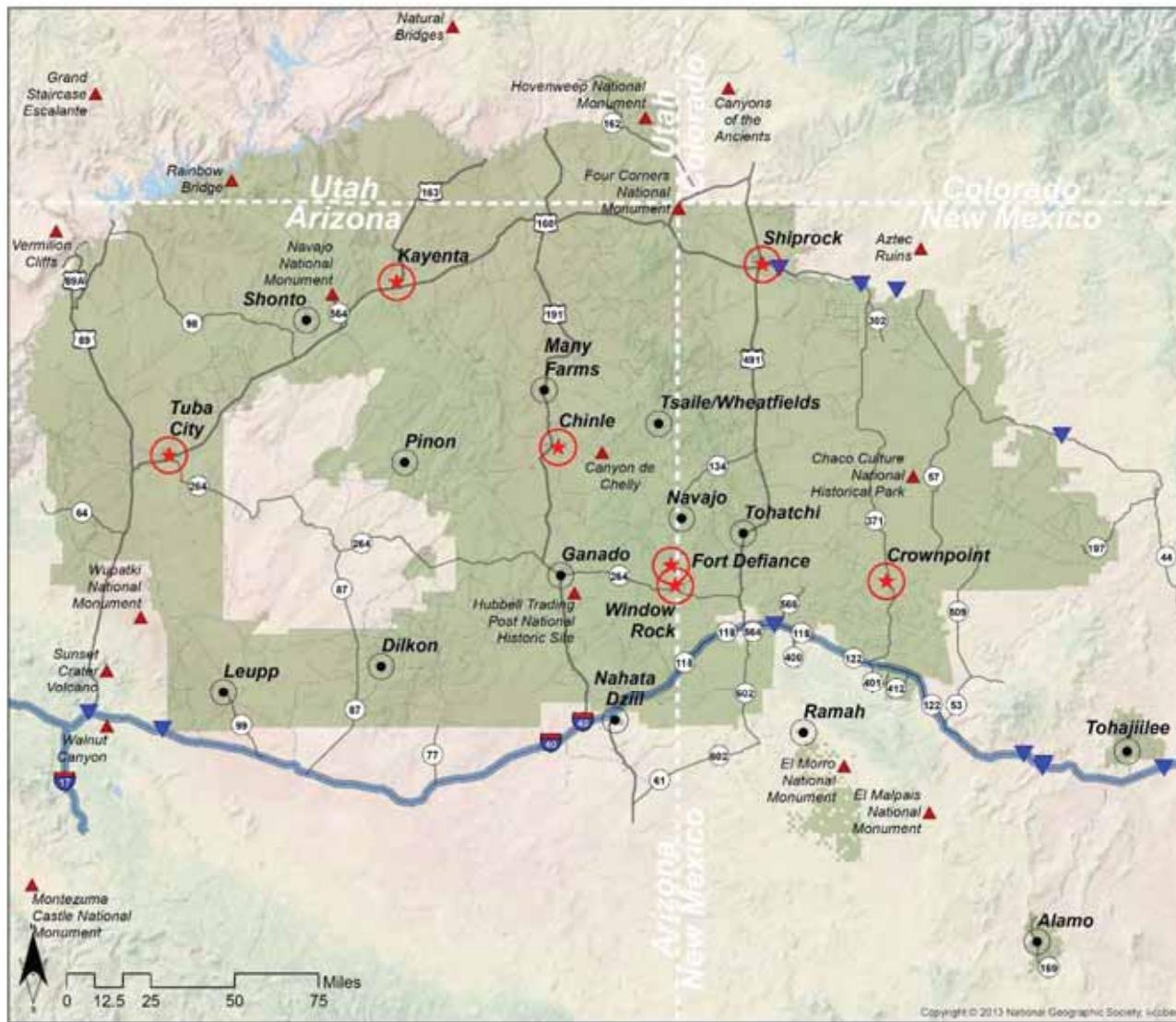
#### 3.2.1 GROWTH CENTERS

Primary Growth Centers include Chinle, Crownpoint, Fort Defiance, Kayenta, Shiprock, Tuba City, and Window Rock. Secondary Growth Centers include Alamo, Dilkon, Ganado, Leupp, Many Farms, Nahata Dziil, Navajo, Pinon, Shonto, Tohajiilee, Tohatchi, and Tsaiile Wheatfields. Figure 3-3 illustrates the Primary and Secondary Growth Centers including identifying landmarks and activity nodes.

## 2016 Navajo Nation

## Long Range Transportation Plan

### Figure 3-3 | Growth Centers and Destinations



## Navajo Nation

## Destinations

## Growth Center

- ★ Primary
- Secondary
- ▲ National Monument
- ▼ Casino and other destinations

## Road Hierarchy

- Interstate
- US Highway
- State Highway
- BIA Routes



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# 2016 Navajo Nation

## Long Range Transportation Plan

### 3.3 PARKS, OPEN SPACE, & RECREATION

#### 3.3.1 SCENIC BYWAYS & TOURIST DESTINATIONS

Figure 3-4 maps the numerous scenic byways that exist in Arizona, New Mexico and Utah. Numerous state byways pass through Navajo Nation. Federal scenic byways and All-American Roads that pass through Navajo Nation include:

- Trail of the Ancients;
- Jemez Mountain; and
- Historic Route 66.

#### 3.3.2 NATIONAL MONUMENTS & RECREATION AREAS

##### NATIONAL MONUMENTS

In total there are 18 national monuments that are located within or near Navajo Nation; however, only eight of which sit directly within the Navajo Nation boundary. These eight national monuments include:

- Navajo National Monument (AZ);
- Canyon de Chelly (AZ);
- Hubbell Trading Post National Historic Site (AZ);
- Hovenweep National Monument (UT);
- Rainbow Bridge National Monument (UT);
- Chaco Culture National Historical Park (NM);
- El Morro National Monument (NM); and
- Four Corners National Monument (NM)

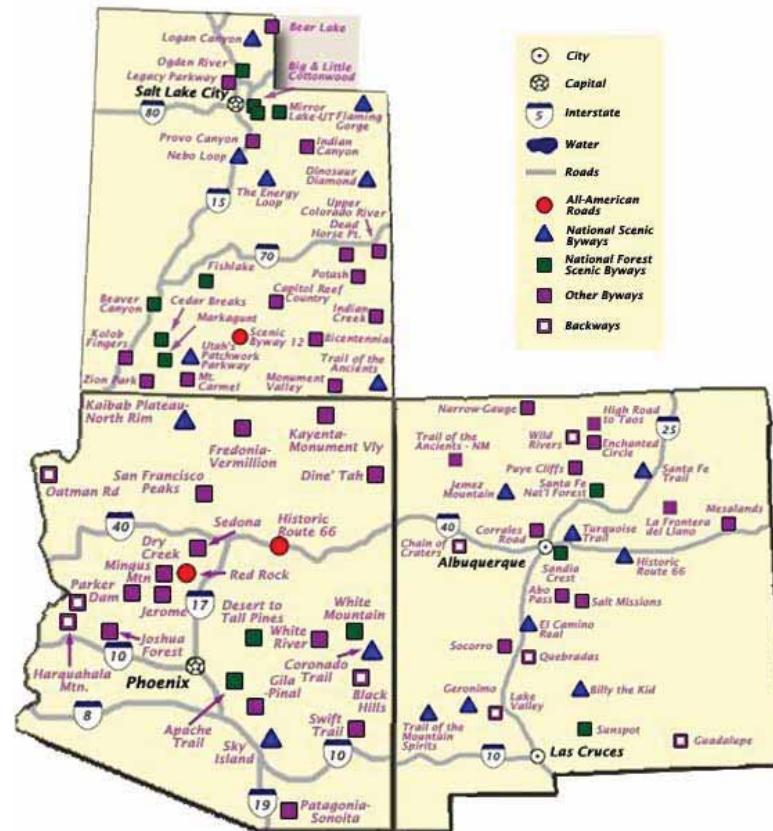
Figure 3-5 maps the locations of the National Monuments in or near Navajo Nation.

##### RECREATION AREAS

To determine the large recreation areas within or near Navajo Nation, surface management data was examined to identify which federal government entity oversees what pieces of land. The majority of Navajo Nation is classified under the Bureau of Indian Affairs (BIA); however, two large pieces of land are listed under the National Park Service. These locations are the Canyon de Chelly in Arizona and the Chaco Culture National Historical Park in New Mexico. Areas outside of the

Navajo Nation are managed by several entities including the Army, BIA, Bureau of Land Management (BLM), Bureau of Reclamation, U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, state governments, local governments and private entities.

**Figure 3-4| Scenic Byways**



# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 3-5| Parks, Open Space & Recreation



## Navajo Nation

### Parks, Open Space, & Recreation

- ▲ National Monument
- Federal Scenic Byway
- State Scenic Byway
- National Conservation Area
- Wilderness
- Wilderness Study Area
- US Highway
- State Highway

### Road Hierarchy

- Interstate

### National Park Service Boundaries

- Legislated
- Legacy
- BIA Route



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## 4.0 ENVIRONMENTAL OVERVIEW

As our transportation systems continue to grow and expand, our communities continue to experience issues of the built environment conflicting with that of the natural environment and our cultural resources. Through the various offices of State and Federal agencies, including the various DOTs, numerous studies and other efforts have helped to ensure an awareness and consideration for our environmental and cultural resources. The environmental overview section is divided into three categories as follows:

1. Physical Conditions;
2. Natural Resources;
3. Cultural Resources; and
4. Conflicts.

### 4.1 PHYSICAL CONDITIONS

An analysis of physical conditions provides details on the limitations of the natural environment and the potential impacts caused in development.

#### 4.1.1 TOPOGRAPHY

Much of Navajo Nation is located in the high desert regions of Arizona, New Mexico and Utah. The terrain varies with steep canyons, high mountains and extensive natural features, therefore the Navajo Nation experiences a range of elevations. Winter weather in high elevations and dust storms during summer months can potentially affect transportation construction, maintenance schedules, materials, safety measures, and overall costs. Figure 4-1 illustrates some of the physical relief features of the region. Topography is an important consideration as transportation facilities are improved and planned.

### 4.2 NATURAL RESOURCES

A natural resources overview was conducted to understand the potential for wildlife, water resources, and wetlands in the potential area of impact. As areas continue to develop, impacts to natural resources should be avoided or minimized. However, there may be instances where other alternatives may not exist; in which case, minimizing or mitigating impacts may be the necessary course of action. This natural resources analysis identifies potential impacts which

can be used in refining a project development process. Navajo Nation Environmental Protection Agency has established processes for environmental review for both Navajo Nation and federal based regulations.

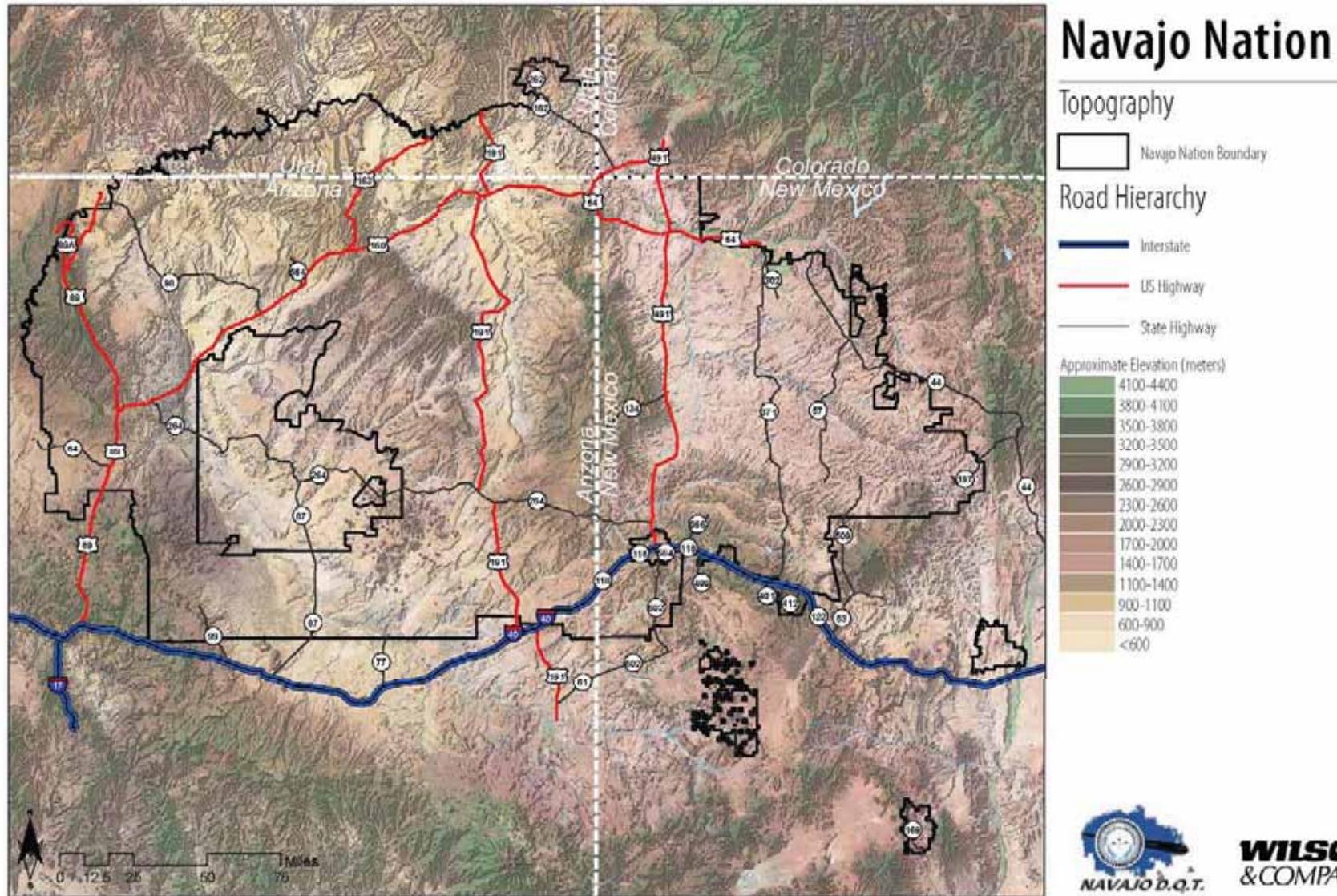
### 4.3 CONFLICTS

National Environmental Policy Act (NEPA), signed into law in 1970, established the environmental protection policy. NEPA requires that all Federal agencies consider the environmental consequences of their proposals, document the analysis, and make this information readily available to the public prior to implementation. Similarly, the Federal Highway Administration (FHWA) desires to avoid transportation projects with large social and natural environment impacts and has partnered with NEPA to create the FHWA NEPA project development process. This process takes into consideration the potential impacts on both the human and natural environment, as well as the public's need for safe and efficient transportation. Maintaining a balance between growth and preservation is crucial to the sustainability of Navajo Nation.

# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 4-1 | Region Topography



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## 5.0 EXISTING TRANSPORTATION SYSTEM

The Navajo roadway network consists of 14,221 miles of roads; of these, 5994.5 miles are BIA roads, 1644.8 miles are state highways, 1689.8 miles are county routes, and 4891.9 miles are Nation owned and maintained. Only 23.4% of the total roadway network is paved. Table 5.1 summarizes the roadway ownership responsibilities.

**Table 5.1 | Road Ownership by Mileage**

Ownership Entity	Miles of Road	% of System
<b>BIA</b>	5,994.5	42.3%
<b>Nation</b>	4,889.9	34.5%
<b>State</b>	1,644.8	11.6%
<b>County</b>	1,638.4	11.6%
<b>TOTAL</b>	<b>14,167.6</b>	

Source: 2015 Official RIFDS Dataset

State DOTs, counties, BIA and Navajo DOT are the primary highway programs to fund and oversee construction and maintenance of the road network.

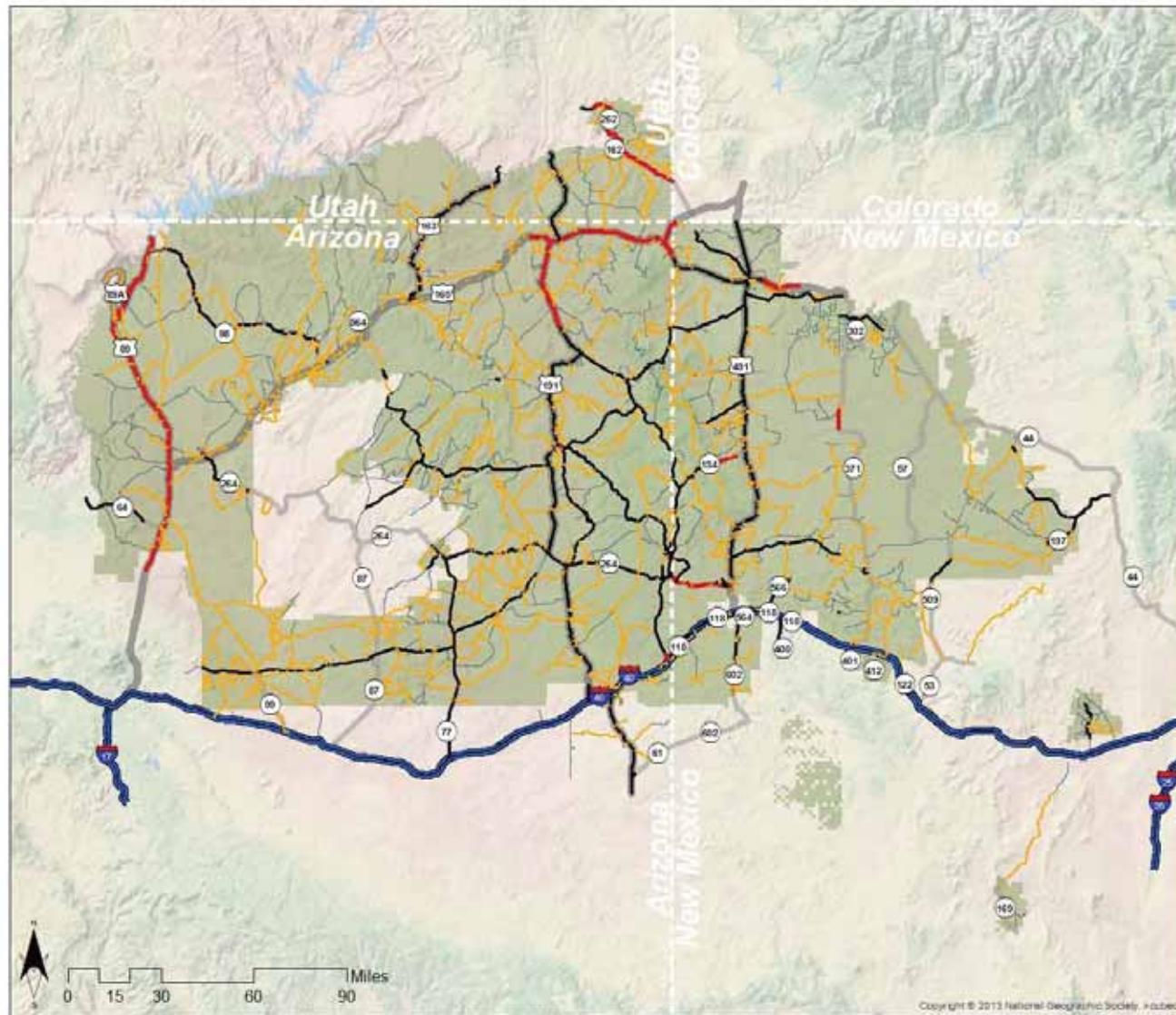
The roadway infrastructure maintains a hierarchy of functional classifications that relate to the level of regional or local significance the roadway plays. Principal and minor arterials serve a primary function of moving traffic and commerce. These routes should be all-weather Roadways as they have the greatest demands of the system. Major and minor collectors serve a primary function of connecting communities to the arterials for regional mobility. These routes are typically paved or gravel, and some that are lower volume are dirt. Local roads primarily serve local mobility needs and are generally dirt. Furthermore, the connection between road classifications and funding opportunities is important. Different road types are eligible for various funding opportunities (see funding opportunities table). The functional classifications are mapped in Figure 5-1, however they are revisited periodically so the coding in the Road Inventory Field Data System (RIFDS) database is the official classification.



# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 5-1 | Road Functional Classification



## Navajo Nation

### Road Hierarchy

- Interstate
- US Highway
- State Highway
- BIA Routes

### FHWA Functional Class

- Principal Arterial
- Minor Arterial
- Minor Collector



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### 5.1 ROADWAY INFRASTRUCTURE

The RIFDS system were compiled using the street classification system the BIA created to identify types of roads. The classes include:

- **Class 1**- Major Arterial: Serves traffic between large population centers and maintain an average daily traffic volume of 10,000 vehicles per day or more with more than two lanes of traffic.
- **Class 2**- Rural Minor Arterial: Provide a connection to smaller towns and communities and generally allow high overall traffic speeds with minimum interference to through traffic movement. Facilitates less than 10,000 vehicles per day.
- **Class 3**- City Local: Streets serving residential areas.
- **Class 4**- Rural Major Collector: Serves as a collector to rural local roads.
- **Class 5**- Rural Local: May serve areas around villages, farming areas, schools, attractions, or various small enterprises.
- **Class 6**- City Minor Arterial: Located within communities and serve as access to major arterials.
- **Class 7**- City Collector: Located within communities and serve as collectors to the city local streets.

These 7 Class Codes were used to generate an inventory of the roads within Navajo Nation. Appendix A calculates the lane mileage of each class of road. In general, there is a direct correlation between funding levels, travel demand, surface type, and functional classification. Navajo DOT is currently working through transitioning the BIA route classifications to using the FHWA Highway Performance Management System (HPMS) functional classifications; however, Navajo DOT is complying with the BIA class codes.

#### ROADS

Roads within Navajo Nation are owned either by the BIA, the Tribe, the County, or the State. This section summarizes the road miles owned by each entity, associated roadway classifications, and the surface type.

#### BIA OPERATED ROADS

Within Navajo Nation, the BIA is responsible for 5,994.5 miles of roads. The total miles of BIA operated roads by Agency and by class is listed in Table 5.2.

**Table 5.2| BIA Operated Roads by Class Code**

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Total
<b>Shiprock</b>	0	96.2	12.9	825.1	291.5	0.9	0	0	<b>1226.6</b>
<b>Western</b>	1	89.3	18	806.5	498.7	0	0	7	<b>1420.5</b>
<b>Eastern</b>	0	111.9	6.8	271.6	265.3	2.6	0	0	<b>658.2</b>
<b>Chinle</b>	1.1	234	3.4	719.5	71.9	0	0	0	<b>1029.9</b>
<b>Fort Defiance</b>	2	211.9	0.5	919.8	140.4	0	0	0	<b>1274.6</b>
<b>NIIP</b>	0	16.6	0	120.1	161.3	0	0	0	<b>298</b>
<b>New Lands</b>	0	0.2	17	68.3	1.2	0	0	0	<b>86.7</b>
<b>Total</b>	<b>4.1</b>	<b>760.1</b>	<b>58.6</b>	<b>3730.9</b>	<b>1430.3</b>	<b>3.5</b>	<b>0</b>	<b>7</b>	<b>5994.5</b>

#### NAVAJO OPERATED ROADS

Tribal operated roads account for 4,889.9 miles of all roads within Navajo Nation (Table 5.3). The Tribe owned roads within Navajo Nation are classified and categorized the same as the BIA owned roads. The vast majority of Tribe operated roads consist of unimproved dirt surfaces.

**Table 5.3| Nation Operated Roads by Class Code**

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Total
<b>Shiprock</b>	0	0	12.7	21.2	522	1.5	0.7	0	<b>558.1</b>
<b>Western</b>	0	0.2	19.9	444.8	1107.6	3.7	0.4	0	<b>1576.6</b>
<b>Eastern</b>	0	5.1	5.3	106.8	541.1	0	0	0	<b>658.3</b>
<b>Chinle</b>	0	0	18.5	47.1	519.4	0	0	0	<b>585</b>
<b>Fort Defiance</b>	0	0	28.6	131.3	1352	0	0	0	<b>1511.9</b>
<b>NIIP</b>	0	0	0	0	0	0	0	0	<b>0</b>
<b>New Lands</b>	0	0	0	0	0	0	0	0	<b>0</b>
<b>Total</b>	<b>0</b>	<b>5.3</b>	<b>85</b>	<b>751.2</b>	<b>4042.1</b>	<b>5.2</b>	<b>1.1</b>	<b>0</b>	<b>4889.9</b>

#### STATE OPERATED ROADS

The state facilities use the FHWA HPMS functional classifications. The majority of State operated roads fall in the principal arterial, minor arterial, major collector and minor collector functional classifications, and primarily provide connectivity between the populated areas, various attractions, and the interstate system.

### COUNTY OPERATED ROADS

There are several County operated and maintained roadways servicing populations, industry and businesses within Navajo Nation. Agreements are in place relating to maintenance of those roadways. Agreements exist between the County and BIA when the county is maintaining the roadways.

### 5.2 BRIDGES

The Tribal Transportation Program (TTP) bridge system includes all bridges on public roads, or providing access to, Navajo Nation lands. When including bridges on state managed roads and highways there are a total of 720 bridges as part of the National Bridge Inventory bridge system within Navajo Nation. This summary is concerned with only the 179 bridges that are owned and maintained by the BIA on BIA and Tribal roadways. The other 549 bridges are County and State DOT bridges that are important to NDOT, but not necessarily in the RIFDS inventory. Historically, a partnership between NDOT and these organizations have taken place.

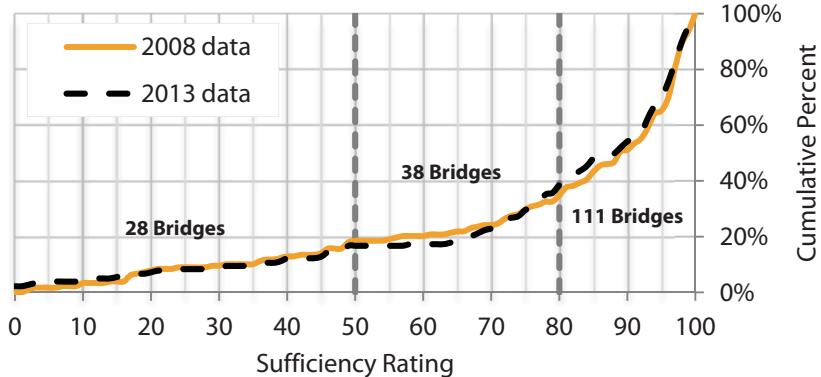
### BRIDGE CONDITIONS

Bridge conditions on the tribal bridge system are inspected every two years. As part of the inspection, a condition rating between zero and 100 is calculated for each bridge. To be eligible for rehabilitation, a bridge must be deficient and have a condition sufficiency rating of 80 or less. A functionally or structurally deficient bridge is eligible for replacement when the sufficiency rating is 50 or less. Figure 5-2 illustrates that approximately 66 out of 179 bridges qualify for bridge work.

### 2008 TO 2013 CONDITIONS COMPARISON

Figure 5-2 shows the bridge condition sufficiency rating cumulative distribution of all BIA bridges with both 2008 data and 2013 data. The recent data shows nearly 39 percent of bridges are eligible for rehabilitation or replacement. This is slightly more than the number of deficient bridges five years previous indicating that maintenance has been just short of keeping pace with bridge deterioration.

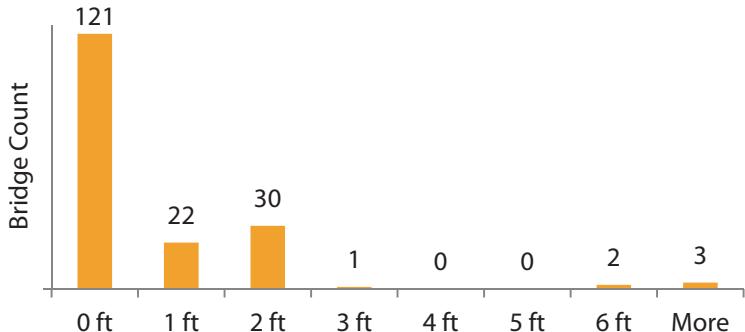
**Figure 5-2| Cumulative Distribution of BIA Bridge Sufficiency Rating from both 2008 and 2013 Data**



### SIDEWALK WIDTHS ON BRIDGES

Curb or sidewalk width is an important characteristic of bridges that, though not factored in an overall bridge condition sufficiency rating, is important in affecting mobility and safety of pedestrians and other non-motorized road users. Approximately 40% of the population lives at or below poverty levels, and strongly linked to that, almost 6% of the working population either bicycle or walk to work. Figure 5-3 shows nearly all bridges with shoulders are inadequate for pedestrian and other traffic combined.

**Figure 5-3| Curb or Sidewalk Width on Either Side of Bridge**



## 5.3 TRANSIT

### PUBLIC TRANSIT SERVICE

Within Navajo Nation the Navajo Transit System (NTS) provides service to many of the Chapter communities. The NTS is largely funded through State and Federal transit programs. Refer to NTS website for more details:  
<http://www.navajotransit.com/>

### NAVAJO TRANSIT SYSTEM

Navajo Nation operates an independent transit system (NTS), which is run under General Services. A thorough overview of the mission and operations of this organization can be found on the NTS website.

The NTS operates on weekdays between 5:00 AM and 7:00 PM (DST). Communities and Chapters located between the established origin and final destination have access to transit services. Table 5.4 lists the current NTS routes and Figure 5-4 illustrates the routes and Chapters served by transit. Tables 5.4 and 5.5 list the current and future NTS routes as identified on the NTS website.

**Table 5.4 | Current NTS Routes**

Route Number	Origin & Destination
<b>Route 01:</b>	Tuba City, AZ to Ft.Defiance, AZ and return
<b>Route 02:</b>	Steamboat, AZ to Ft. Defiance, AZ and return
<b>Route 03:</b>	Kayenta, AZ to Ft.Defiance, AZ and return
<b>Route 04:</b>	Crownpoint, NM to Ft.Defiance, AZ and return
<b>Route 05:</b>	Ft. Defiance, AZ to Gallup, NM and return
<b>Route 06:</b>	Crystal, NM to Gallup, NM and return
<b>Route 07-A:</b>	Newcomb, NM to Farmington, NM and Ft.Defiance, AZ and return
<b>Route 07-B:</b>	Newcomb, NM to Shicrock, NM and Farmington, NM and return
<b>Route 08:</b>	Chinle, AZ to Ganado, AZ and Tsai, AZ and return
<b>Route 09:</b>	Dilkon, AZ to Ft. Defiance, AZ and return
<b>Route 11:</b>	Flagstaff, AZ and Tuba City, AZ and return
<b>Route 12:</b>	Kayenta, AZ to Tuba City, AZ and return
<b>Route 13:</b>	Ft.Defiance, AZ to Crownpoint, NM and Gallup, NM and return
<b>Route 14:</b>	Shiprock, NM to Ft.Defiance, AZ and return
<b>Route 15:</b>	Sanders, AZ to Window Rock, AZ and return
<b>Route 16:</b>	Aneth, UT to Bluff, UT and Blanding, UT and return
<b>Route 17:</b>	Monument Valley, UT to Bluff, UT and Blanding, UT and return
<b>Route 18:</b>	Torreón, NM to Cuba, NM and Farmington, NM and return

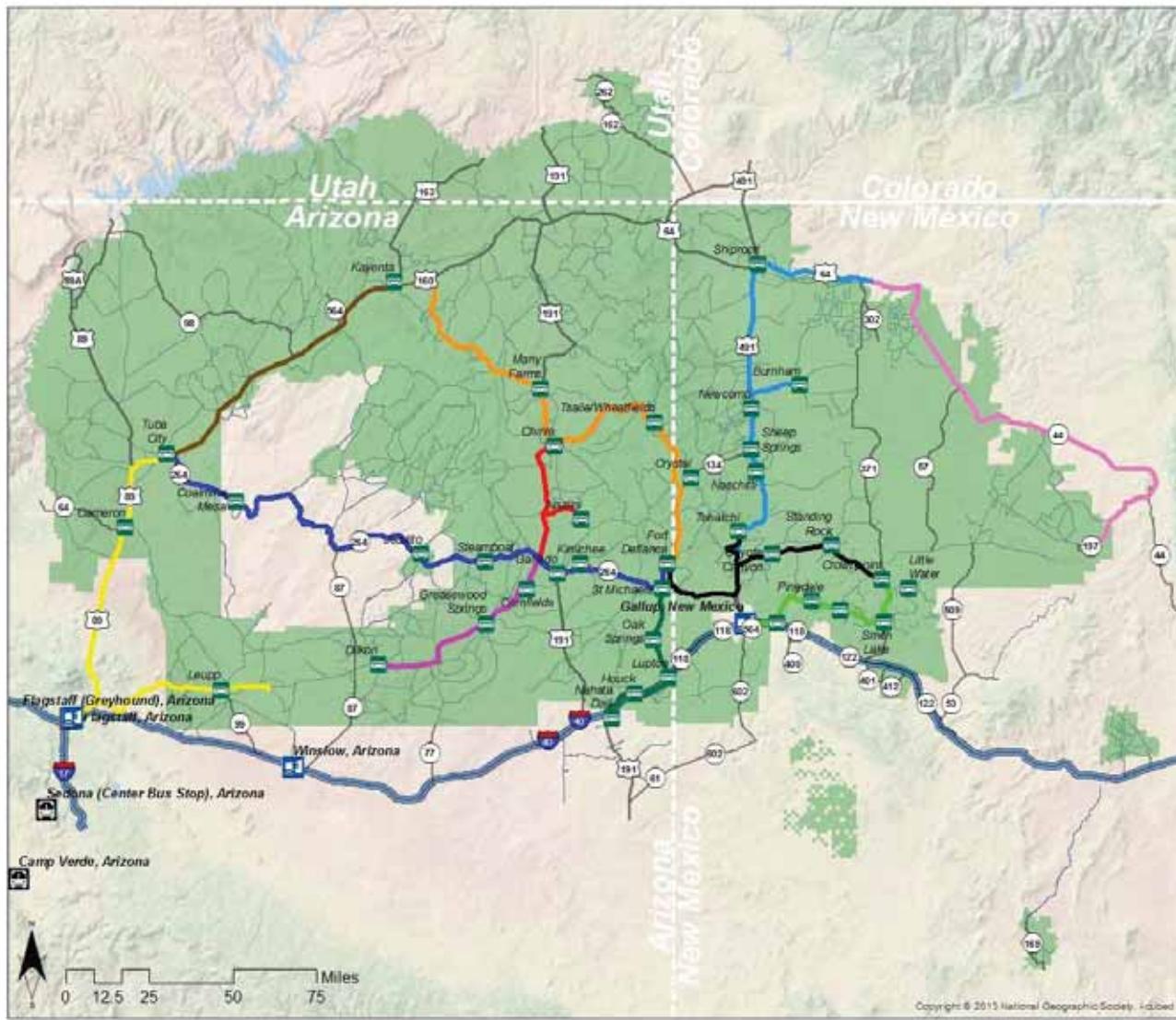
**Table 5.5| Future NTS Routes**

Route Number	Origin & Destination
<b>Route 19:</b>	Forest Lake, AZ to Pinon, AZ and Chinle, AZ and return
<b>Route 20:</b>	Ramah, NM to Gallup, NM and Ft.Defiance, AZ and return

# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 5-4| Current NTS Routes



## Navajo Nation

### Transit

- Chapters Served by Transit
- Greyhound/ Bus Station
- Amtrak/ Passenger Rail Station

### Navajo Transit Routes

- Route 1 and 2
- Route 3
- Route 4
- Route 5 and 6
- Route 7 and 14
- Route 8
- Route 9
- Route 11
- Route 12
- Route 13
- Route 15
- Route 18
- BIA Routes



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### STATE TRANSIT PLANNING

In 2008 Arizona Department of Transportation (ADOT) completed a Rural Transit Needs Study which identified a need for intercity bus service between Page, Kayenta, Tuba City and Flagstaff. This plan identified these areas as top candidates for new intercity Section 5311 program service. Figure 5-5 illustrates the potential routes identified as proposed service lines from that study. To date, the Tuba City to Page connection is the only route that does not currently have service.

Additionally, this study identified supporting policies and practices including recommended roles, responsibilities and next steps for implementing transit service. The following were identified recommendations for local and tribal governments:

- **Support.** Generate support for rural transit among local residents;
- **Monitor demographics.** Actively monitor demographic changes in jurisdiction that may impact existing or new services;
- **Service coordination.** Identify public transportation services within city/town or Tribal Reservation that promote the efficiency of general public, elderly, and disabled service by supporting the streamlining and coordination of existing public transportation programs; and
- **Planning.** Ensure proper planning and development of operations is provided to meet the needs of the city/town or Tribal Reservation.
- **State and COGs.** The State and COGs should work closely with local and Tribal governments and social service agencies to pool funding resources by region, encourage efficiency, improve service coordination, and consolidate services, if applicable.

This study also identified Navajo Nation as a top candidate for expanded Section 5311 program service. Expanded 5311 program services were identified for NTS (in Apache, Coconino, and Navajo Counties, as well as portions of New Mexico and Utah).

In 2010 New Mexico Department of Transportation (NMDOT) completed the New Mexico Statewide Public Transportation Plan. This plan provides an overview of both the existing transit system and the need for expanded or improved service. Of the proposed improvements is a potential future park and ride corridor running from Gallup to Albuquerque as illustrated in Figure 5-6.

**Figure 5-5| ADOT, Top Candidates for New Intercity Section 5311 Program Service**



**Figure 5-6| Potential Future Park and Ride Corridor, 2008**



Utah Department of Transportation's (UDOT) plans and studies do not address transit service within Navajo Nation.

### 5.4 BICYCLE & PEDESTRIAN FACILITIES

An assessment of proposed bicycle and pedestrian facilities in State plans is important in identifying where the State DOTs can become key partners in implementing these improvements.

### BICYCLE FACILITIES

Several highways are identified as bicycle routes in State bicycle plans. In Arizona segments of US-89 and US-160 are identified as bicycle routes. In New Mexico segments of US-64 and US-491 are identified as bicycle routes. Provided in Table 5.6 are summary notes on these routes from the State plans. Using only BIA and Tribal Routes Figure 5-7 identifies in green all routes with roadway shoulders greater than 4', indicating a potential network of bike shoulder facilities. In the same way, Figure 5-8 illustrates the surface conditions of all roadway shoulders that are greater than 4'. Improved roadway shoulders on both state and county routes is desired, creating an opportunity for partnerships.

**Table 5.6 | Identified State Bicycle Routes**

State	Highway	Area	From	To	Comments
Arizona	US-160	Tonalea to Tuba City	MP 329+0.76	BIA 021	Effective shoulder width is less than 4 feet. Rumble strips present in some areas.
Arizona	US-160	Tuba City to US 89	US-89	MP 321+0.68	Effective shoulder width is less than 4 feet. Rumble strips present.
Arizona	US-89	Tuba City	MP 469.5	480 (US 160)	While some sections of this segment have been improved, there are still sections without shoulders; US 89 is part of US Bicycle Route System 79.
Arizona	US-89	Tuba City	MP 491.7	494.4	
Arizona	US-89	Tuba City	MP 505.4	512.5	
Arizona	US-89	Tuba City	MP 518	MP 521.2	
New Mexico	US-64	Gallup to CO Border	I-40	Colorado Border	Proposed Bicycle Route
New Mexico	US-491	Farmington to AZ Border	BIA 371	Arizona Border	Proposed Bicycle Route

### PEDESTRIAN FACILITIES

Of the State long range transportation plans, only Arizona's plan specifically identified pedestrian facility improvements. Several highways and state routes are identified as sidewalk opportunities in the Arizona plan including a short segment of US-89 and SR-98 that are identified as sidewalk opportunities and were prioritized as a moderate need. Additional summarized details on these pedestrian facility improvements are listed in Table 5.7. The New Mexico state planned listed communities that actively participate in the Safe Routes to School Program. Of the communities within Navajo Nation, only the border communities of Gallup and Farmington were listed.

**Table 5.7 | Identified Pedestrian Facility Improvements**

State	Highway	Area	Street Face	From	To	Sidewalk Need
Arizona	US-89	Page	Both	Industrial Rd.	Dam Access Rd.	Moderate
Arizona	SR-98	Page	Both	US-89 intersection	Coppermine Rd.	Moderate

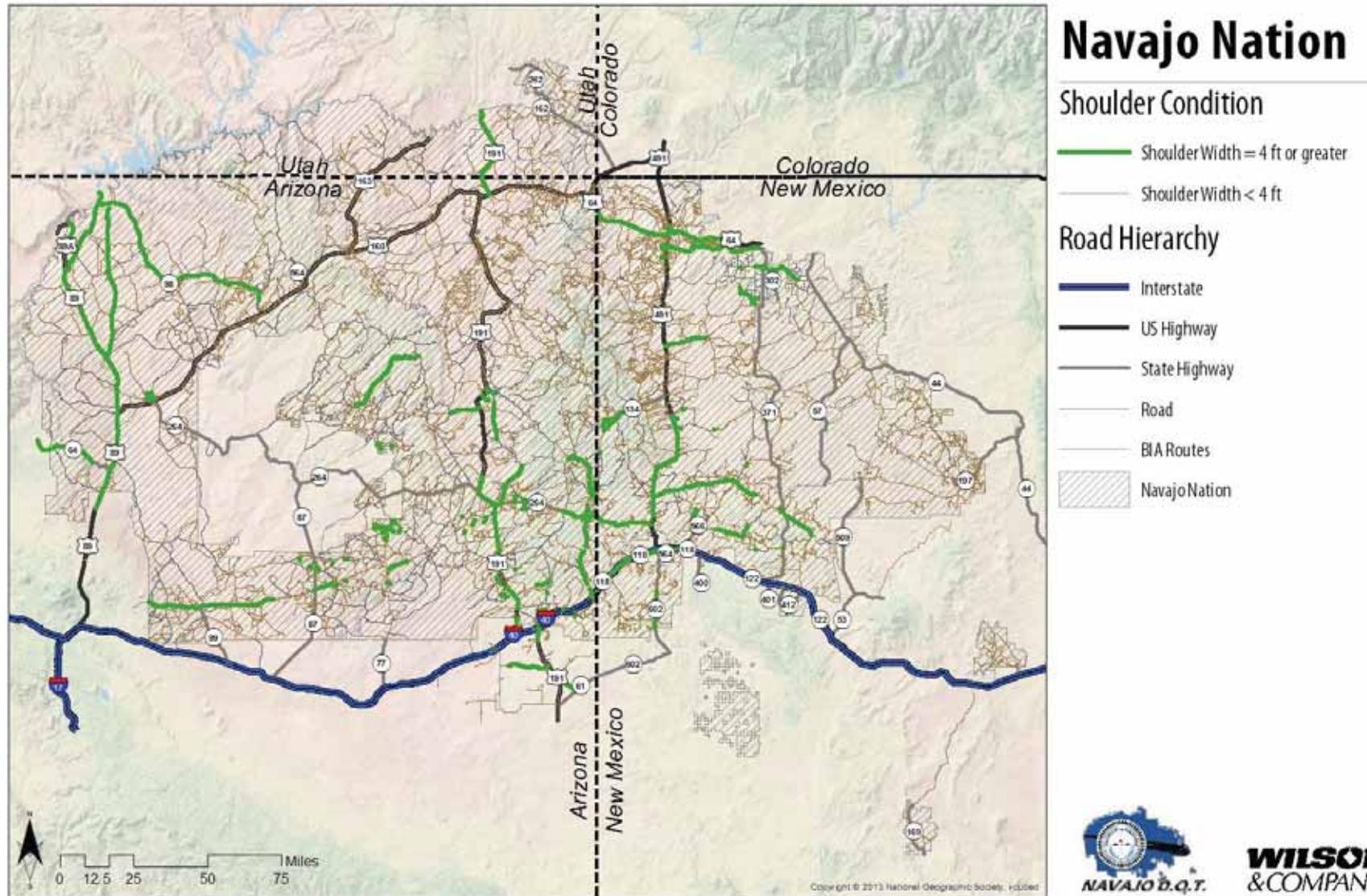
### Pedestrians on Highway Shoulder



# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 5-7| Existing Road Shoulder Width



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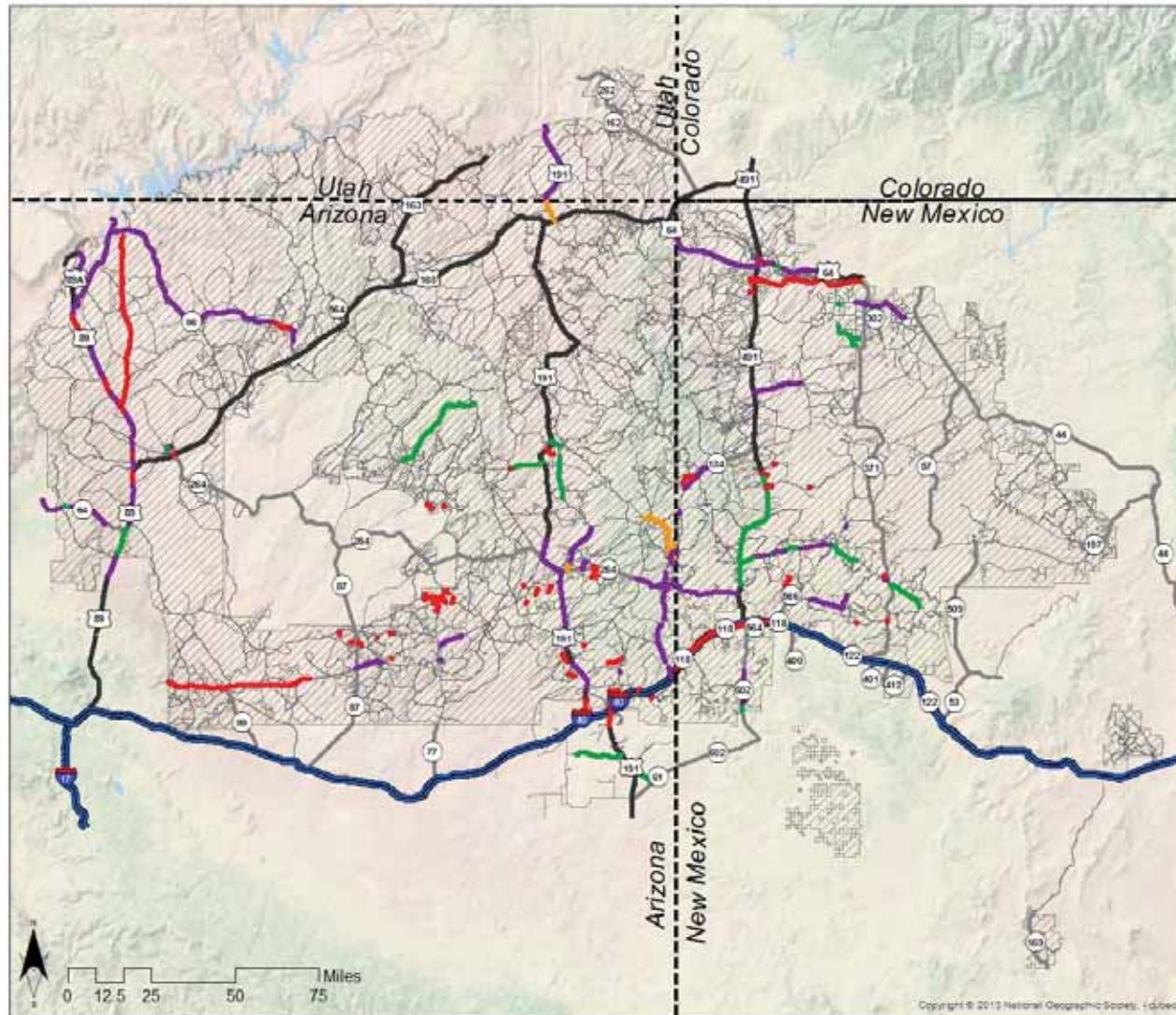
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# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 5-8| Ranking of Shoulder Width Condition



## Navajo Nation

### Shoulder Condition

Shoulder Width = 4 ft or greater

- None
- Critical Condition
- Tolerable Condition
- Excellent Condition



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### 5.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

Regions implementing ITS projects are required to develop a regional ITS architecture consistent with national guidelines and standards. While the states of Arizona and New Mexico have developed strategic ITS plans and defined the statewide framework and architecture for ITS on state managed facilities within Navajo Nation, a regional ITS architecture for the Nation has not been developed. A strategic ITS assessment needs to be conducted for the Navajo Nation to coordinate the efforts of various agencies and stakeholders on the Nation and incorporate existing and planned ITS into an architecture that is consistent and coordinated with state ITS. Coordination of ITS may require intergovernmental agreements with state DOTs and other agencies that are not currently in-place.

The Arizona strategic plan for early deployment of ITS on I-40 was completed in 1997. This activity included the deployment of Highway Condition Reporting System (HCRS), which provides continuous and up-to-date information on roadway and weather conditions to the users. Applications and technologies in the Arizona ITS plan on Navajo Nation lands include Advanced Traveler Information Systems (ATIS) through kiosks and 511 telephone system, Road Weather Information System (RWIS), closed-circuit television (CCTV) cameras, and 21 existing or planned variable-message signs (VMSs). The New Mexico strategic ITS plan has likewise defined a full array of ITS deployments that in-part have been implemented in Navajo Nation. In 2007, when the plan was last published, there were at least seven operational VMSs on state managed roads in the New Mexico portion of the Nation.

The Navajo Division of Transportation created a traffic management center (TMC) to support the emergency management department. The TMC functions as the key technical and institutional hub to bring together the various jurisdictions, modal interests, and service providers to focus on optimizing the performance of the entire surface transportation system. The TMC is located in the Navajo Division of Transportation building in Tse Bonito near the city of Window Rock and monitors at least two CCTV cameras and is equipped to monitor increased ITS infrastructure throughout Navajo Nation. ITS deployments in some parts of Navajo Nation include portable DMS, signal preemption for tribal public safety vehicles, local and tribal police dispatch, and data communications for construction and maintenance coordination. Expanding use of ITS has also been considered to identify tourism opportunities on tribal lands.

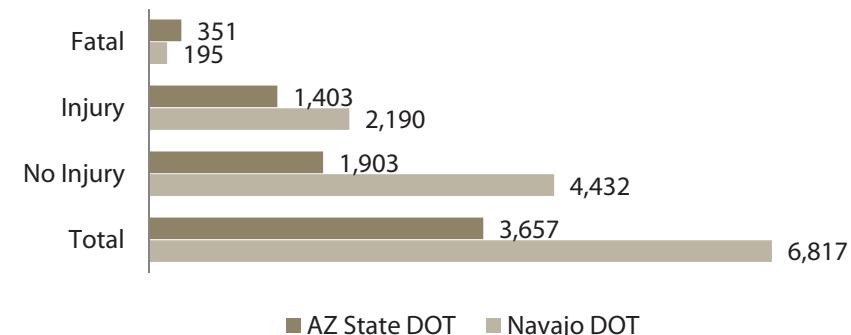
### 5.6 SAFETY

Safety is an important factor to consider in transportation planning and engineering activities. In MAP-21, there is specific direction to reduce the number and rate of fatal and serious injury crashes. For Navajo Nation, as with many tribes, there are issues with tracking and reporting crashes on the system, which in turn, directly relates to the availability of federal and state funding to mitigate crashes.

#### UNDER-REPORTING

Navajo Nation roadways exist in the states of Arizona, New Mexico, and Utah. Each of these states maintain record of motor vehicle crashes from crash reports submitted by municipal, tribal, county, or state police agencies. The Navajo Nation also maintains record of the same crashes across all three states. Coordination between police agencies, Navajo DOT, and state DOTs in reporting and sharing crashes records is often incomplete and many crashes go unreported. Significant differences, therefore, exist between the Tribal and State databases of crash records as demonstrated in Figure 5-9 relating to Arizona.

**Figure 5-9| Count of Crash Records from State and Tribal Databases for Arizona - Years 2008-2012**



Tribal community participation in sharing crash data with states is optional by right of tribal sovereignty and, even when sharing agreements are in place, coordination of records can be difficult. Two observations are clear from Figure 5-9 where crash count comparisons for the Arizona portion of Navajo Nation are shown. First, close to half of the crash records for the Arizona portion of the Nation

have not been shared between tribal and state transportation agencies. Second, and slightly less obvious, is that crash records for a portion of all crashes are not being submitted at all. When police crash reports are not available, the federal FARS database will rely on information from EMS and even hospital records in accounting for fatalities, and the state database will ultimately reflect the same fatalities being reported in FARS. However, almost 45 percent of these fatal crashes over the eight year period are not reflected in the database of crash records for the Navajo DOT suggesting that, for these crashes, a crash report may have never been collected. Underreporting of crashes is more significant as crash severity decreases and so it's expected that an even higher portion of injury and no-injury crashes are missing.

### DISTRIBUTION OF CRASHES BY SEVERITY, OWNERSHIP & AGENCY

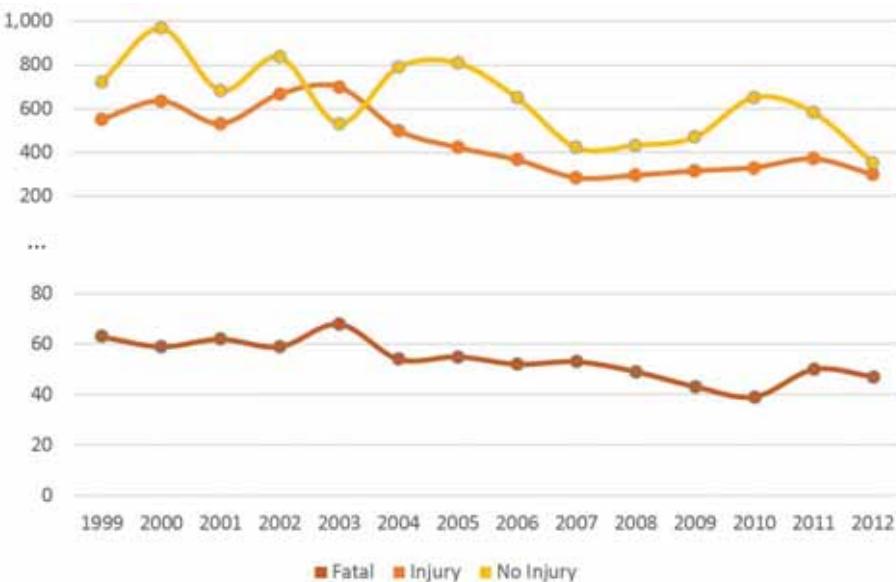
The distribution of all crashes by severity is shown in the following table for the past five years where crashes are counted from the Navajo DOT database. For the five-year period from the end of 2007 to the end of 2012, there has been an 8 percent reduction in the total number of crashes. Table 5.8 lists crash severity by year and the percentage change from year to year. Figure 5-10 illustrates a 14-year trend in crashes by severity within Navajo Nation.

Several police agencies for Navajo Nation are evaluating transitioning to the Traffic and Criminal Software (TraCS) Program electronic reporting of crashes and this is expected to have an impact in increasing crash reporting. Navajo DOT is also currently involved in a GIS data integration and analysis pilot study that will in part result in easier sharing of crash data between the Navajo DOT and the Arizona and New Mexico DOTs. Figure 5-11 illustrates the Police Districts throughout Navajo Nation.

**Table 5.8| Distribution of Crashes by Severity from Navajo DOT Database**

Crash Severity	2007	2008	2009	2010	2011	2012	Total
Fatal	53	49	43	39	50	47	281
Injury	285	296	316	331	371	300	1,899
No Injury	423	434	471	653	584	354	2,919
<b>Total Crash Count</b>	<b>761</b>	<b>779</b>	<b>830</b>	<b>1,023</b>	<b>1,005</b>	<b>701</b>	<b>5,099</b>
<b>Total Percent Change</b>	<b>N/A</b>	<b>2%</b>	<b>7%</b>	<b>23%</b>	<b>-2%</b>	<b>-30%</b>	<b>-8%</b>

**Figure 5-10| Fourteen-Year Trend in Crashes by Severity from Navajo DOT Database**

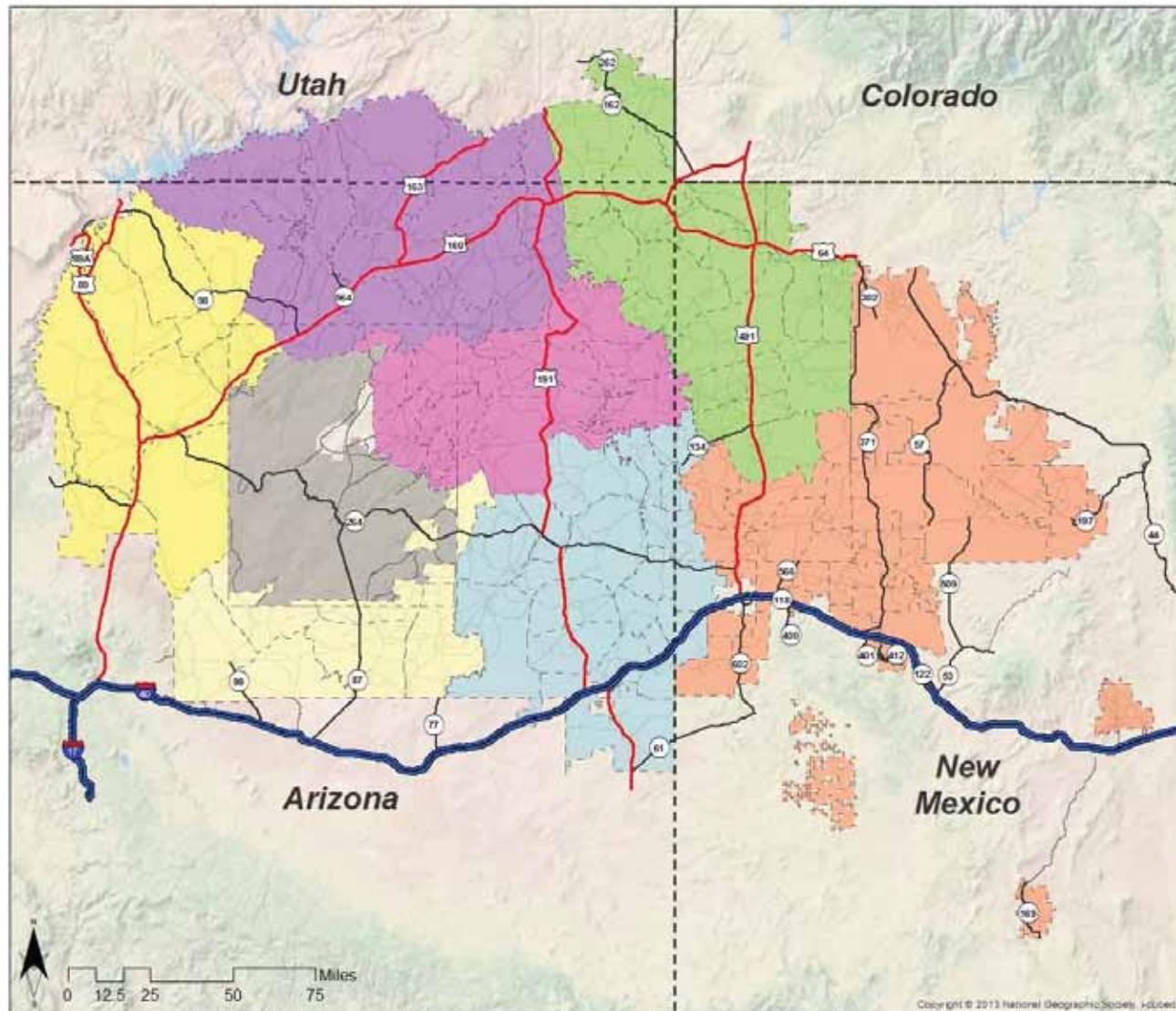


**Figure 5-11| Police Districts**



# 2016 Navajo Nation

## Long Range Transportation Plan



### 5.6.1 STATEWIDE SAFETY PLANS

Safety funding for the Navajo Nation may be received through state safety programs from Arizona, New Mexico, and Utah. Some important differences exist between safety emphasis areas and strategies outlined in individual state Strategic Highway Safety Plans (SHSP) that will impact how safety funding can be obtained. Arizona has just completed their 2014 SHSP update and New Mexico is currently in the process of updating the previous 2010 SHSP. The Utah SHSP has most recently been updated in 2013.

Table 5.9 identifies emphasis areas that are designated in each of the three state SHSPs, many of which are common between all three or two states.

Understanding these emphasis areas allows agencies to pursue Highway Safety Improvement Program (HSIP) funding which is used to help implement the strategies outlined in the SHSP. Since each state has different SHSP emphasis areas, it is also important to understand where the various safety funding programs can be used, with engineering, education, enforcement and emergency service provider improvements to improve safety conditions.

**Table 5.9| Safety Emphasis Areas by State SHSP**

Emphasis Area Category	State SHSP
<b>Speeding and Aggressive Driving</b>	AZ, NM, UT
<b>Safety Restraints or Occupant Protection</b>	AZ, NM, UT
<b>Alcohol-Related or Impaired Driving</b>	AZ, NM, UT
<b>Lane Departure Crashes</b>	AZ, NM, UT
<b>Intersection Crashes</b>	AZ, NM, UT
<b>Pedestrian Safety</b>	AZ, NM, UT
<b>Bicycle Safety</b>	AZ, NM, UT
<b>Motorcycles</b>	AZ, NM, UT
<b>Young Drivers</b>	AZ, NM, UT
<b>Older Driver Safety</b>	AZ, NM, UT
<b>Distracted Driving</b>	AZ, NM, UT
<b>Truck and Bus Safety</b>	AZ, UT

Emphasis Area Category	State SHSP
<b>Railroad Crossing Safety</b>	AZ, UT
<b>Work Zone Safety</b>	AZ, UT
<b>Traffic Records or Data</b>	NM, UT
<b>Fatigued/Drowsy Driving</b>	NM, UT
<b>Public Outreach and Education</b>	NM, UT
<b>Emergency Services Response</b>	NM, UT
<b>Traffic Incident Management</b>	AZ
<b>Interjurisdictional Coordination</b>	AZ
<b>Natural Risks (Weather and Animal)</b>	AZ
<b>Native Americans</b>	NM
<b>Judicial System</b>	UT
<b>Child Safety</b>	UT
<b>Rural Local Road Safety</b>	UT
<b>Transit System Safety</b>	UT
<b>Rural Local Road Safety</b>	UT

### 5.6.2 NAVAJO NATION SAFETY PLAN

Navajo Nation and the NDOT will soon be undertaking a safety plan. The goal of this effort includes four parts:

- Improving awareness of programs
- Improving cooperation
- Improving reporting
- Developing a safety improvement program

### 5.7 FREIGHT

Many of the U.S. highways and State highways that run through and near Navajo Nation are identified as Freight Truck Routes. The U.S. highways identified as truck routes include: I-17, I-40, US-64, US-89, US-160, US-163, US-191, and US-491. The State highways identified as truck routes include: AZ-61, AZ-64, AZ-77, AZ-87, AZ-

98, AZ-264, NM-44, NM-53, NM-57, NM 264, NM-371, NM-566, NM-602, UT-162, and UT-262. These routes are mapped in Figure 5-12.

### RAILWAYS

There are six different railways that navigate through or near Navajo Nation. These railways are mapped in Figure 5-12 and described below:

- **Apache Railway:** The 38-mile mainline Apache Railway is located outside of Navajo Nation and runs south from Interstate 40. The railway is used to connect a newsprint plant near Snowflake with the BNSF Transcon Corridor at Holbrook. An additional seven-mile branch line links Snowflake with the mainline; service on the branch line is as needed.
- **Black Mesa & Lake Powell Railroad:** The 78-mile Black Mesa and Lake Powell Railroad is located in the northwest portion of Navajo Nation and is not connected with any other railroad; it is used to haul coal from a strip mine at Black Mesa (near Kayenta) to the Salt River Project Navajo Generating Station (near Page). The railroad is jointly owned by Navajo Nation and the Hopi Tribe and has a fenced right-of-way.
- **Burlington Northern & Santa Fe Railway:** The BNSF Railway is categorized as a Class I Railroad. The Transcon line (Gallup Subdivision) runs east-west along the Interstate 40 corridor and includes several lines that run north and south off of the Transcon line including the Defiance Branch which runs northwest of the City of Gallup. The Transcon line also operates with Amtrak service with a stop located in the City of Gallup.
- **Escalante-Western Railway:** The Escalante-Western Railway is categorized as a private railroad. This 55 mile line runs northeast out of the City of Thoreau branching off the BNSF Transcon line to serve the Lee Ranch Mine, El Segundo Mine, and Escalante Generating Station that connects with the BNSF Gallup Subdivision at two locations near Prewitt, New Mexico.
- **Navajo Mine Railroad:** The Navajo Mine Railroad is categorized as a private railroad. This 13 mile line is located southwest of Farmington, New Mexico and is used to transport coal from the Navajo Mine to the Four Corners Power Plant.
- **United States Gypsum Railway.** The United States Gypsum Railway are small private rail lines that operate off of the BNSF main line to connect to gypsum quarries.

### STATE RAIL PLANS

In 2011, ADOT completed the Arizona State Rail Plan which identified several improvements in Navajo Nation including a proposed new South Mesa Rail Line that runs from the Kayenta Mines south to the BNSF Transcon line, serving coal mine operations. Additionally, two identified "Corridors of Opportunities" pass through the Navajo Nation including:

- Arizona Spine: a north to south corridor through the central part of the State which focuses on Passenger Rail opportunities to support the emerging Sun Corridor and the tourism industry. Although the Arizona Spine Corridor runs into the Navajo Nation, all identified opportunities occur south of Flagstaff.
- Route 66 Corridor: an east to west corridor generally following the cross country transportation corridor consisting of the BNSF Transcon Corridor and Interstate 40. This corridor focuses on network enhancements to move people and goods within Northern Arizona and across the country.

In 2013, NMDOT completed the New Mexico State Rail Plan. This plan identifies several improvements in the Navajo Nation area including:

- Freight Rail from Gallup to Farmington (Facilities and Operations Improvement); and
- Gamarco Logistics Hub (Facilities and Operations Improvement); and
- Navajo Energy Hub at Thoreau.

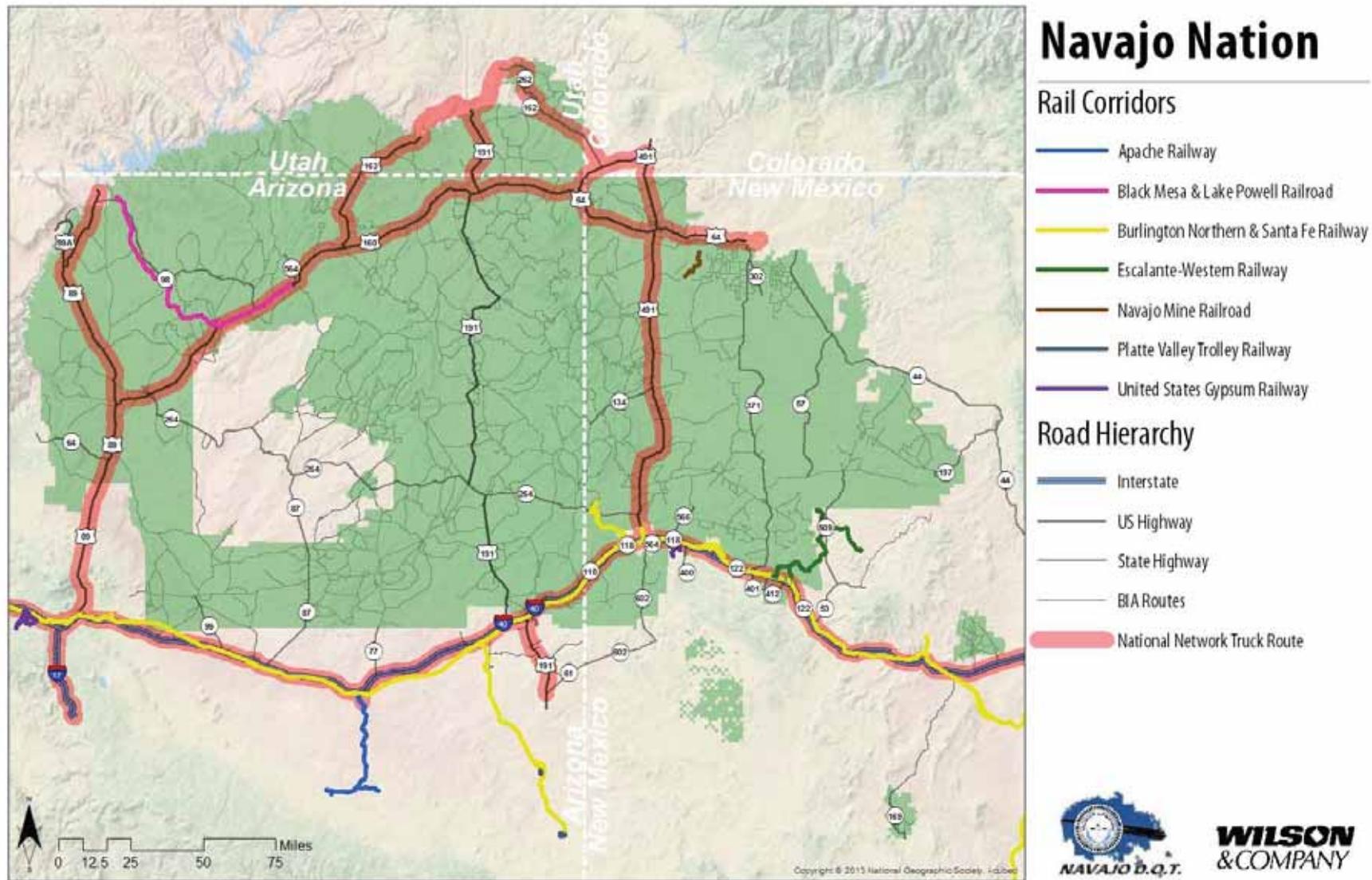
### WEIGHTS & MEASURES

Navajo Nation and the NDOT should partner with state agencies in Arizona, New Mexico and Utah to develop and administer a weights and measures program in Navajo Nation. The tribal and BIA routes are not designed to handle the heavy truck activity which creates surface quality issues.

# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 5-12| National Freight Rail and Roadway Corridors



### 5.8 AIRPORTS

The data provided for the Airports section was taken from Working Paper Number 1 of the Navajo Nation Airport System Master Plan (NNASMP) published September 2014. Navajo DOT is working to develop the NNASMP to identify needed improvements by airport. As part of the LRTP, the NNASMP will be included by reference so as updates are performed, the LRTP will remain current. The goal included in the NNASMP is to "Develop and improve the system of airports over time in such a manner that each community's desires are achieved." There were also five objectives, including:

- Prioritize needs and phase development to be in alignment with available funding and operational sustainability;
- Actively seek funding from federal, state, and non-traditional sources to develop and enhance the system of airports;
- Establish and develop local partnerships;
- Incorporate the airport system plan into Community Land-Use Plans;
- Establish a Navajo Nation Aviation Advisory Board.

Although there are 32 airports/airstrips within Navajo Nation, the NNASMP focused on five airports within the Navajo Nation which are located in Arizona and New Mexico. The NNASMP outlines a set of improvement strategies that include basic facility needs, all-weather capabilities and aeronautical services, with facility upgrades at each airport. Figure 5-13 illustrates the public and private airports in or near Navajo Nation.

#### 5.8.1 FEDERAL IDENTIFICATION

The Federal Aviation Administration produces an airport facility directory that lists all open-to-the-public airports, seaplane bases, heliports, military facilities, and selected private use airports. The directory lists six airports located within Navajo Nation including:

- Navajo Mountain Airport (Utah)
- Chinle Municipal Airport (Arizona)
- Kayenta Airport (Arizona)
- Tuba City Airport (Arizona)
- Window Rock Airport (Arizona)
- Shiprock Airstrip (New Mexico)

- Crownpoint Airport (New Mexico)

There are no airports recognized in this directory for Utah. With the exception of Kayenta Airport which was not studied in the NNASMP all other federally-identified airports are addressed in the NNASMP.

#### 5.8.2 STATE IDENTIFICATION

The Navajo Nation airports that are identified in each State Department of Transportation aviation system plan include:

- Tuba City Airport (Arizona)
- Kayenta Airport (Arizona)
- Chinle Municipal Airport (Arizona)
- Window Rock Airport (Arizona)
- Ganado Airport (currently closed) (Arizona)
- Rock Point Airport (Arizona)
- Shonto Airport (Arizona)
- Pinon Airport (Arizona)
- Lukachukai Airport (Arizona)
- Rocky Ridge Airport (Arizona)
- Pine Springs Airport (Arizona)
- Shiprock Airstrip (New Mexico)
- Crownpoint Airport (New Mexico)
- Oljatoh Airstrip (Utah)

#### 5.8.3 NAVAJO NATION CLASSIFICATION

Navajo Nation recognizes 32 airports/airstrips that are classified as either primary or secondary.

#### PRIMARY AIRPORTS

Primary airports are those located within primary growth centers, are open to public use and are primarily used for medical emergencies, tribal business, or occasionally by tourists. The primary airports include:

- Chinle Municipal Airport (Arizona)
- Ganado Airport (currently closed) (Arizona)

- Kayenta Airport (Arizona)
- Tuba City Airport (Arizona)
- Window Rock Airport (Arizona)
- Crownpoint Airport (New Mexico)
- Shiprock Airstrip (New Mexico)
- Oljatoh Airstrip (Utah)

Between 1998 and 2003 Shiprock Airstrip, Tuba City Airport, Crownpoint Airport, and Chinle Municipal Airport were constructed and the Kayenta Airport had considerable facility improvements. Although currently closed, the Ganado Airport is planned to re-open in 2015 and will primarily be used for emergency medical transportation. Window Rock Airport had minor improvements in 2009 and is used for transportation of the Navajo Nation President, tribal officials, and private service.

### SECONDARY AIRPORTS

Within Navajo Nation there are twenty secondary airports that typically consist of unpaved/dirt runways and do not have support facilities. Many of these airports are in poor condition and are closed unless used for medical emergencies or emergency landings. There are six secondary airports in the Arizona State Aviation System Plan (ASASP) including:

- Rock Point Airport
- Shonto Airport
- Pinon Airport
- Lukachukai Airport
- Rocky Ridge Airport
- Pine Springs Airport

Of the remaining secondary airports none are included in New Mexico's or Utah's state aviation system plans. There are also four privately owned and maintained airports, they include:

- Goulding's Airport
- Thoreau Airport
- Klagetoh Airport
- Black Mesa Airport

### PROPOSED AIRPORTS

There are currently three proposed airports being studied to expand aviation services in northern and southern Navajo Nation, including:

- Twin Arrows near Flagstaff, Arizona;
- Red Mesa in Utah, near Four Corners; and
- Ramah in New Mexico, southeast of Gallup.

Figure 5-13 illustrates the locations of the three new potential airports being studied.

### HELIPADS

As communities identify aviation related needs, helipads have become a lower-cost method to initiate and provide critical aviation services. Current helipads in operation include a BIA / Fire Department at the Window Rock airport, the Four Corners Regional Health Center, and a helipad at the Newcomb Chapter. Figure 4-13 depicts the Helipad System Plan.

Currently, there are five helipads that are being examined, including:

- Cove Chapter
- Beclahbito Chapter
- Sanostee Chapter
- Pinon Chapter
- Dennohotso Chapter

For a community to identify the potential for aviation related improvements, the Chapter must work through the Navajo Nation Department of Airports Management to evaluate and identify the correct type and extent of improvement, funding to study, develop and maintain the airport, and identify related improvements in a specific airport/helipad master plan. Once a specific airport/helipad master plan is developed, it would be considered a referenced plan under this LRTP.

# 2016 Navajo Nation

## Long Range Transportation Plan

Figure 5-13 | Private & Public Airports



## 6.0 TRANSPORTATION FUNDING

In FY 2014 the Navajo DOT funding totaled \$62.9 million. NDOT utilized federal funds as well as several tribal revenue sources for both operating and capital expenditures. NDOT receives funding directly from the Federal government.

Outside of federal funds the Navajo Nation has several revenue streams that provide funding to NDOT in FY 2014 including their General Funds, Fuel Excise Tax (FET), and Indian Health Services. These funding sources are summarized in Figure 6-1.

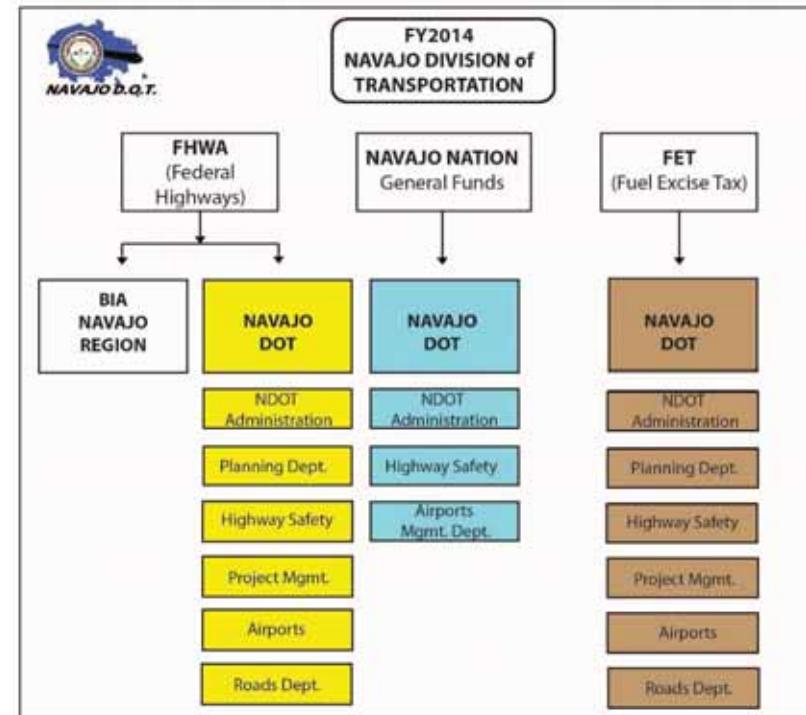
## 6.1 MAINTENANCE

Over a 20-year period, the total funding available to conduct roadway maintenance and construction activities totals \$820 million. The overall need to only address current pavement condition deficiencies is approximately \$1.4 billion. To upgrade the current roadway system (dirt, gravel, and paved roads) to current roadway standards is estimated to cost \$6.5 billion. The total \$7.9 billion needed to maintain the current system and upgrading to current standards, and does not include ongoing roadway maintenance costs for paved, gravel and dirt roads. Annual maintenance costs include:

- \$750 per mile for dirt road blade maintenance;
- \$2,000 per mile for gravel road maintenance; and
- \$6,000 - \$10,000 per mile for paved road maintenance.

Additionally, there are 179 bridges that are on the Navajo inventory. Currently, 108 bridges are identified as intact without deficiencies, 41 bridges are in need of maintenance and approximately 30 bridges are in need of reconstruction to address functional or structural issues. Funding for maintenance projects typically come from several sources including the FET, TTP, BIA, Department of Interior (DOI), and "Special Projects".

Figure 6-1| FY2014 Navajo DOT Total Funding



## 6.2 COMMITTED & PLANNED TRANSPORTATION IMPROVEMENTS

The 2015 Tribal Transportation Improvement Program (TTIP) outlines a five-year program regarding how funding is used to manage the transportation system. Typically, Navajo DOT has an annual construction budget of approximately \$55 million to program projects in the Tribal Transportation Improvement Program (TTIP). The funding in the TTIP is a five-year, fiscally constrained program, and it must be consistent with the goals and objectives of the LRTP. Funding for construction projects typically comes from several sources including the FET, Tribal Transportation Program (TTP), FHWA Partnership and "Special Projects".

The following activities are eligible for BIA Transportation Facility Maintenance Program. The list below is not all-inclusive. There are items in the following list that may not currently apply to Navajo Nation, but the inclusive list was Maintenance funds can only be used for the following activities:

1. Cleaning and repairing ditches and culverts.
2. Stabilizing, removing, and controlling slides drift sand, mud, ice, snow, and other impediments.
3. Adding additional culverts to prevent roadway and adjoining property damage.
4. Repairing, replacing or installing traffic control devices, guardrails and other features necessary to control traffic and protect the road and the traveling public.
5. Removing roadway hazards.
6. Repairing or developing stable road embankments.
7. Repairing parking facilities and appurtenances such as striping, lights, curbs, etc.
8. Repairing transit facilities and appurtenances such as bus shelters, striping, sidewalks, etc.
9. Training maintenance personnel.
10. Administering the BIA Transportation Facility Maintenance Program.
11. Performing environmental/ archeological mitigation associated with transportation facility maintenance.
12. Leasing, renting, or purchasing of maintenance equipment.
13. Paying utilities cost for roadway lighting and traffic signals.
14. Purchasing maintenance materials.
15. Developing, implementing, and maintaining a tribal Transportation Facility Maintenance Management System (TFMMS).
16. Performing pavement maintenance such as pot hole patching, crack sealing, chip sealing, surface rejuvenation, and thin overlays (less than 1 inch).
17. Performing erosion control.
18. Controlling roadway dust.
19. Re-graveling roads.
20. Controlling vegetation through mowing, noxious weed control, trimming, etc.
21. Making bridge repairs.

22. Paying the cost of closing of transportation facilities due to safety or other concerns.
23. Maintaining airport runways, heliport pads, and their public access roads.
24. Maintaining and operating BIA public ferry boats.
25. Making highway alignment changes for safety reasons. These changes require prior notice to the Secretary.
26. Making temporary highway alignment or relocation changes for emergency reasons.
27. Maintaining other tribal intermodal transportation facilities provided that there is a properly executed agreement with the owning public authority within available funding.

### FINANCIAL CONSTRAINT

Financial constraint is an important aspect of project development activities. The 5-year TTIP is fiscally constrained based on the understood funding that NDOT has to work with over the time period of the TTIP. In order for the TTIP to be approved by FHWA, it must be fiscally constrained, meaning that NDOT is not trying to spend more money than it has in the 5-year period of the TTIP. Once a project is on the TTIP, the study and engineering phases begin, and it is also being environmentally cleared so federal funding can be used for construction activities. It is very important that once projects are listed in the TTIP, they stay in the TTIP so not to lose federal funding. Additionally, there are time limitations on how long the project can be "dormant" and still allow for the environmental clearances to remain intact to allow for construction activities to progress.

There are instances when funding opportunities arise, emergencies occur or required maintenance activities shift other projects in the TTIP. Great care must be taken in these circumstances to not lose federal funding in these instances, so close coordination between NDOT and FHWA is required with any potential TTIP change. Communities can help to reduce "surprise" projects by closely coordinating with the NDOT Regional Planner assigned to that Chapter. This involves working collaboratively on any grant applications for improvements, particularly when there is NDOT funding, staff, equipment and ongoing maintenance responsibilities involved.

# 2016 Navajo Nation

## Long Range Transportation Plan

### 38-YEAR TTIP TO 5-YEAR TTIP

In 2013, NDOT redefined the TTIP from a 38-year list of projects to an actively managed 5-year TTIP project listing. The previous 38-year TTIP was developed based on limited information and, most of the projects included in the TTIP had not been engineered or environmentally cleared. With this effort, NDOT has been working very closely with all of the regulatory offices and project partners to reduce the number of outstanding projects that are in the TTIP. The specific TTIP projects in the 2015 TTIP were included in Working Paper 2: Future Conditions.

The current process should include projects that are planned, scoped and designed in the out-years (last two years of the TTIP) and are constructed in the first three years of the TTIP. This creates a situation that forces projects to be delivered in a short period of time. Figure 6-2 illustrates the 5-year project timeline and relationship to project development in the TTIP. When funding is small, and the project costs are high and construction needs to extend over several TTIP years, it makes it critical to be accurate in the early stages of project development. The project development activities that include the environmental clearances can delay projects, so clear project definition is important to maintain the required schedules to receive federal funding. The project development activities are outlined in Figure 6-3. For large projects, allowing project phasing to occur can ensure significant financial resources are not spent on one project in any given TTIP year. Figure 6-4 illustrates the project development process for all tribal transportation program funded projects.

Figure 6-2| Pre-Project Development Timeline

YEAR	1	2	3	4	5
	CONSTRUCTION			PROJECT DEVELOPMENT	

Figure 6-3| Potential Project Phasing Strategy

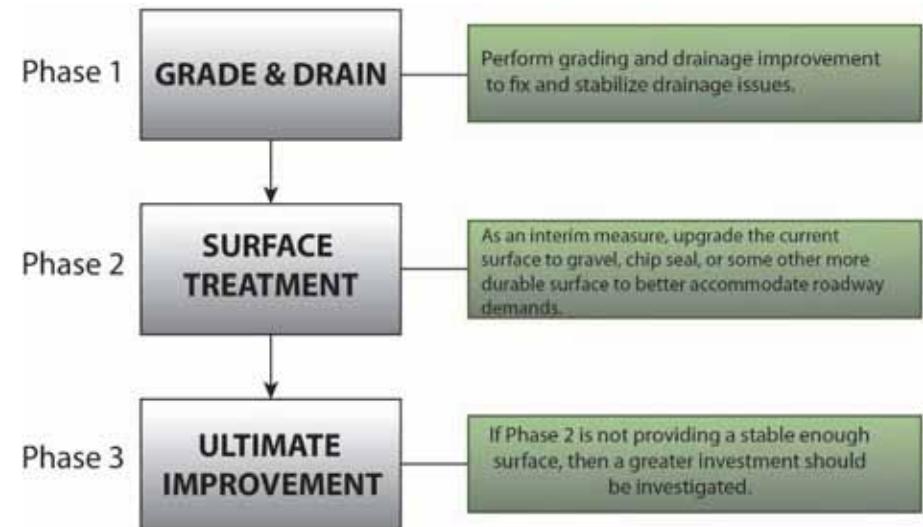
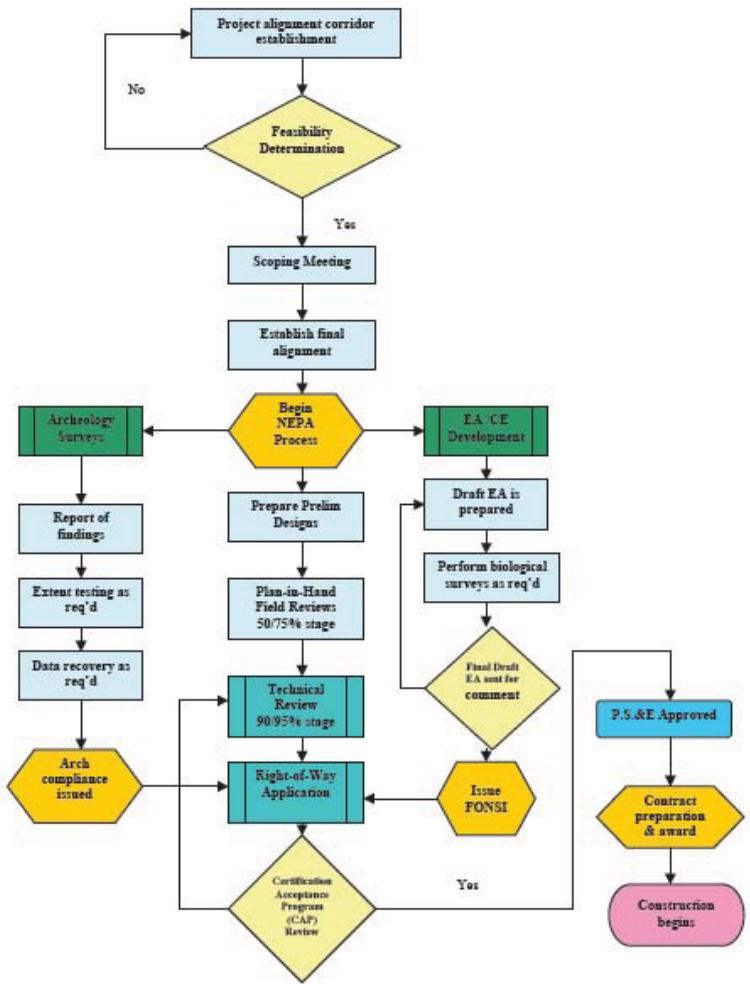


Figure 6-4| Project Development Process



Source: Bureau of Indian Affairs (BIA)

## 7.0 PROJECT PARTNERING

Navajo Nation frequently coordinates with outside agencies on transportation projects and programs. This includes coordination with federal, state, regional, and local agencies. One of the LRTP Goals: *Enhance Existing Partnerships and Create New Partnerships* is critical for planning and project successes. The various planning and project partners described herein are just some of the critical partners that can assist in helping to plan and implement the LRTP.

### 7.1 FEDERAL AGENCIES

Navajo Nation often coordinates with the Bureau of Indian Affairs (BIA), the U.S. Department of Transportation (USDOT), and the Federal Aviation Administration (FAA).

#### 7.1.1 BUREAU OF INDIAN AFFAIRS

The Navajo Nation has P.L. 93-638 contracts with the Bureau of Indian Affairs (BIA) and coordinates on project activities including project review, planning, and public hearings. BIA is organized in agencies that are defined with the same boundaries as NDOT agencies. Refer to <http://www.bia.gov/cs/groups/public/documents/text/idc1-026996.pdf> for detailed information related to grant funding and the submission process.

#### 7.1.2 U.S. DEPARTMENT OF TRANSPORTATION

Navajo Nation is currently working with FHWA and BIADOT to transfer to the Nation, all of the functions and duties that the Secretary of the Interior would have performed with respect to a program or project under Chapter 2 of Title 23, United State Code, other than those functions and duties that cannot be legally transferred under the Indian Self Determination and Education Assistance Act (ISDEAA), together with such additional activities as the Nation may perform under MAP-21 and 25 CFR Part 170. See <https://www.transportation.gov/grants> for grant opportunities, process information, and schedules for funding.

#### 7.1.3 FEDERAL AVIATION ADMINISTRATION

The Navajo Nation regularly applies and coordinates with the Federal Aviation Administration (FAA) on grants for airport planning and improvements.

The FAA website,

[http://www.faa.gov/about/office\\_org/headquarters\\_offices/ato/service\\_units/acquisition/grants/](http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/acquisition/grants/) provides information on FAA grant funding and gives direction for proposal submittals.

#### 7.1.4 FEDERAL TRANSIT ADMINISTRATION

Although Navajo Nation does not work directly with the Federal Transit Administration (FTA), the Navajo Transit Program applies for transit grants through the regional planning offices which ultimately pass onto the FTA. Refer to FTA's website <http://www.fta.dot.gov/grants.html> for detailed information related to grant funding. Information related to discretionary grants, formula grants, the application process, and sample agreements is all provided at FTA's grant programs webpage.

#### 7.1.5 U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

The U.S. Department of Housing and Urban Development (HUD) has many programs that provide grant funding to communities that are enhancing sustainability and livability. The HUD website, [http://portal.hud.gov/hudportal/HUD?src=program\\_offices/public\\_indian\\_housing/grants](http://portal.hud.gov/hudportal/HUD?src=program_offices/public_indian_housing/grants) provides information on HUD grant funding and gives direction to the grant management center, grant administration, and the application center.

#### 7.1.6 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) provides several grant opportunities that relate to community sustainability practices. In terms of project development activities, the EPA has a direct role in the project development process through environmental reviews and clearances. Proper planning can provide streamlined reviews and approvals. Refer to EPA's website <http://www.epa.gov/grants> for detailed information related to grant funding. Information related to grants resources, the application process, rules, regulations and policies, as well as program offices near you is all provided at EPA's grant programs webpage.

## 7.2 STATE AGENCIES

The State DOTs from Arizona, New Mexico, and Utah are important partners in implementing projects and pursuing funding applications. Navajo Nation and the DOTs coordinate regularly and have Memorandums of Understanding (MOUs) to resolve planning, right-of-way, and other legal issues regarding road projects. For transit projects the Navajo Transit Program applies for transit grants and coordinates with state DOTs on transit projects.

### 7.2.1 ARIZONA DEPARTMENT OF TRANSPORTATION

The Arizona Department of Transportation (ADOT) is the governing agency over all state transportation infrastructures in Arizona. Within ADOT there are three key resources for the Navajo Nation LRTP including: the Arizona Tribal Transportation Program, the 5311 Rural Public Transportation Program, and the Traffic Safety Section. Refer to <https://www.azdot.gov/planning/TransitProgramsandGrants> for information related to various transit programs and program handbooks, applications, and awards.

#### ADOT NORTHEAST DISTRICT

The redistricting process for ADOT engineering and maintenance districts was recently conducted. Navajo Nation's first point of contact for ADOT is the District Engineer for the Northeast district; therefore all issues regarding Navajo DOT and state highway system and impacts on Tribal/BIA routes are addressed by the Northeast District Engineer.

#### MULTIMODAL PLANNING DIVISION

The Multimodal Planning Division at ADOT is responsible for Data and Analysis, Studies and Programs, Transportation Programming, Transit Programs and Grants, Airport Development, and statewide research.

#### ARIZONA TRIBAL TRANSPORTATION PROGRAM

The Arizona Tribal Transportation Program provides for oversight of state-tribal transportation related partnerships, planning and research projects, activities, groups, resources and tribal related coordination and consultation efforts. This Program is housed out of the ADOT Multimodal Planning Division. The Navajo Nation Partnership (NNP) was formed out of efforts of the Arizona Tribal Transportation Program to pursue identified common goals and strategies. The

mission of the NNP is to develop, foster, and maintain good working relationships in order to construct, operate, and maintain the most reliable, economical, efficient and effective transportation system for the safety of the traveling public. NNP members include Navajo Nation, Navajo DOT, ADOT, BIA, FHWA, Hopi Tribe, Coconino County, Navajo County, and Apache County.

#### 5311 RURAL PUBLIC TRANSPORTATION PROGRAM

The Section 5311 grant program's goals are to address the mobility needs of Arizona's rural population by enhancing access to health care, shopping, education, employment, public services and recreation; and assisting local communities in building effective transit services in rural areas. Navajo Nation's Navajo Transit System is one of the participating agencies in this program.

#### TRAFFIC SAFETY SECTION

The ADOT Traffic Safety Section (TSS) investigates, recommends and evaluates improvements and countermeasures for traffic-related issues on the State Highway System. Specific programs of TSS include: the Arizona Strategic Highway Safety Plan (SHSP), the Arizona Highway Safety Improvement Program (HSIP), the Crash Modification Factors Clearinghouse, Road Safety Assessments, and Stewardship and Oversight Agreement for Arizona.

### 7.2.2 NEW MEXICO DEPARTMENT OF TRANSPORTATION

The New Mexico Department of Transportation (NMDOT) is the governing agency over all state transportation infrastructures in New Mexico. Within NMDOT there are three key resources for the Navajo Nation LRTP including: the Tribal Liaison Program, the Transit and Rail Division and the Traffic Safety Bureau. The NMDOT offers a webpage at [http://www.dot.state.nm.us/en/Transit\\_Rail.html](http://www.dot.state.nm.us/en/Transit_Rail.html), which provides information related to transit grant application resources.

#### TRIBAL LIAISON PROGRAM

In 2003 the Tribal liaison position was created as a full-time position using State Planning and Research (SPR) funds. The program is intended to help tribes understand and participate in the transportation planning processes. Program elements include: historic preservation in transportation planning, interagency cooperation and collaboration, and processes for tribal consultation.

### TRANSIT & RAIL DIVISION

The Transit and Rail Division at NMDOT has several two divisions, the Transit Bureau and the Rail Bureau. The Transit Bureau conducts planning and service coordination for public bus transit throughout the state. The Rail Bureau conducts planning and service coordination for commuter rail as well as preparing and updating the State Rail Plan.

### AVIATION DIVISION

The NMDOT Aviation Division is charged with advancing general aviation in New Mexico. This includes the coordination and administration of state grants used in improving aviation infrastructure and expending state funds for construction, development and maintenance of public use airport facilities. The Air Service Assistance Program is used to support and encourage air service to smaller communities.

### TRAFFIC SAFETY BUREAU

The Traffic Safety Bureau is charged with education and enforcement of traffic laws and safety as well as the Highway Safety Plan.

### NEW MEXICO INDIAN AFFAIRS DEPARTMENT

The New Mexico Indian Affairs Department (IAD) is responsible for implementing state-tribal policies intended to improve the quality of life for the state's Indian citizens. IAD's policy initiatives are designed to strengthen tribal and state relations and address the challenges of tribal communities; challenges such as economic development, infrastructure improvements, the protection of cultures and languages, health care, and educational opportunities.

### 7.2.3 UTAH DEPARTMENT OF TRANSPORTATION

The Utah Department of Transportation (UDOT) is the governing agency over all state transportation infrastructures in Utah. Within UDOT there are three key resources for the Navajo Nation LRTP including: the Transportation Planning Division, the Public Transit Team, and the Traffic & Safety Division. See

<http://www.udot.utah.gov/main/uconowner.gf?n=4082819043218787> for a detailed information handbook related to UDOT Federal Transit Grant Programs.

### UTAH REVITALIZATION FUND

The Navajo Revitalization Fund (NRF) is a program of the State of Utah. The goal is to maximize the long-term benefits of state taxes paid on oil and natural gas production by providing both grants and loans to agencies of county or tribal government in San Juan County. The NRF is managed by a five-member board including a governor's designee, two members of San Juan County Commission, the chair of the Navajo Utah Commission, and the president of one of the seven chapters located in Utah. Priority projects include capital projects and infrastructure, housing projects, and educational endowments that promote economic development.

### UTAH NAVAJO TRUST FUND DEPARTMENT

The Utah Navajo Trust Fund is a private purpose trust fund of the State of Utah. The fund accounts for several revenues received by the State including net oil royalties. The fund is managed by a three member board of trustees including the Utah State Treasurer, the Director of the State Division of Finance, and a State officer or employee appointed by the Governor, with advice and consent of the Senate. A nine-member Diné Committee provide input and advice on how the funds may be expended.

### TRANSPORTATION PLANNING DIVISION

The Transportation Planning Division at UDOT is focused on coordination between jurisdictions to assure that transportation facilities and services operate as a total system.

### PUBLIC TRANSIT TEAM

The Public Transit Team at UDOT promotes public transit throughout Utah by promoting and advocating for public transit, supporting and promoting effectiveness of public transit, leveraging transit resources, increasing responsiveness of transit services, and implementing equitable distribution of transit funds throughout the state.

### TRAFFIC & SAFETY DIVISION

The Traffic and Safety Division at UDOT is responsible for overseeing research and programs that improve transportation safety statewide.

### DIVISION OF AERONAUTICS

This Division of UDOT is responsible for all transportation issues involving aviation including licensing all public-use airports in the state and working with airport sponsors and managers to ensure the airports function as an important part of the statewide airport system.

### 7.3 REGIONAL GOVERNMENTS

Figure 7-1 illustrates that six regional government agencies overlap with Navajo Nation. Regional governments are the Metropolitan Planning Organizations, Councils of Governments or Rural Transportation Planning Organizations that are organized to facilitate transportation planning activities in defined geographical regions. The role of these agencies is to also manage the TIP and TIP funding for inclusion into the appropriate STIP. In areas such as Fort Defiance where the community is on the geographic boundary of two states, it can make it difficult to facilitate project funding.

The Navajo Nation is a participating member of the Northern Arizona Council of Governments and the Northwestern New Mexico Regional Planning Organization. Additionally, Navajo DOT planners often attend regional planning office meetings and are on many technical committees. The Navajo Transit Program applies for transit grants through the regional planning offices.

#### 7.3.1 NORTHERN ARIZONA COUNCIL OF GOVERNMENTS

The Northern Arizona Council of Governments (NACOG) is the rural regional governing agency that covers the full extent of Navajo Nation in Arizona. Refer to [http://nacog.org/index.cfm?fuseaction=dep\\_intro&dept\\_id=12](http://nacog.org/index.cfm?fuseaction=dep_intro&dept_id=12) for more information regarding NACOG and their coordination with ADOT.

#### 7.3.2 NORTHWEST NEW MEXICO COUNCIL OF GOVERNMENTS

The Northwest New Mexico Council of Governments (NWNMCOG) is a rural regional governing agency that covers the majority of Navajo Nation in San Juan County and McKinley County, New Mexico. The NWNMCOG operates an independent transportation planning organization, the Northwest Regional Transportation Planning Organization (NWRTP). Navigate to <http://www.nwnmcog.com/> for more information regarding NWNMCOG and potential partnership opportunities.

#### 7.3.3 NORTH CENTRAL NEW MEXICO ECONOMIC DEVELOPMENT DISTRICT

The North Central New Mexico Economic Development District (NCNMEDD) is a rural regional governing agency that covers a small portion on the eastern limits of Navajo Nation within Sandoval and Rio Arriba Counties. Navigate to <http://ncnmedd.com/> for more information regarding NCNMEDD and potential partnership opportunities.

#### 7.3.4 MID REGION COUNCIL OF GOVERNMENTS (MRCOG)

The Mid Region Council of Governments (MRCOG) is a significant Metropolitan Planning Organization (MPO) in the southeast limits of Navajo Nation within Bernalillo County. The MRCOG is the urban regional governing agency for the greater Albuquerque metropolitan area. Navigate to <http://www.mrcog-nm.gov/> for more information regarding MRCOG and potential partnership opportunities.

#### 7.3.5 FARMINGTON METROPOLITAN PLANNING ORGANIZATION

The Farmington Metropolitan Planning Organization (FMPO) sits on the northeastern border of Navajo Nation in San Juan County. The FMPO is the urban regional governing agency for the greater Farmington metropolitan area. Navigate to <http://www.fmtn.org/index.aspx?NID=363> for more information regarding FMPO and potential partnership opportunities.

#### 7.3.6 SOUTHEASTERN UTAH ASSOCIATION OF LOCAL GOVERNMENTS

The Southeastern Utah Association of Local Governments (SEUALG) is a rural regional governing agency that covers the northern portions of Navajo Nation in San Juan County, Utah. Navigate to <http://seualg.utah.gov/> for more information regarding SEUALG and potential partnership opportunities.

### 7.4 LOCAL GOVERNMENTS / COUNTIES

Navajo Nation overlaps into 11 counties (Arizona: Coconino County, Navajo County, and Apache County. New Mexico: San Juan County, McKinley County, Cibola County, Rio Arriba County, Sandoval County, Bernalillo County, and Socorro County. Utah: San Juan County.) The Navajo Nation often works with county highway programs for road construction planning, funding and maintenance.

Additionally, the Navajo Nation and/or Chapters have Memorandum of Understandings (MOU) with several counties in Arizona, New Mexico and Utah.

### 7.5 NAVAJO NATION DIVISIONS AND DEPARTMENTS

Within the Navajo Nation government structure, there are several Divisions and Departments that can work together with the Division of Transportation to further the goals of the Nation. For instance, the Division of Community Development has the responsibility of establishing and maintaining the 16 Administrative Service Centers. These Service Centers are staffed with a Planner, who should have direct and frequent contact with the NDOT Planning staff within each Agency.

The Navajo Nation Chapters located within the State of New Mexico have the opportunity to seek funding through the State's Infrastructure Capital Improvement Plan (ICIP) Program. Each year the Chapters are required to update their project information on the State's ICIP website with an emphasis on each Chapter's top five (5) priority projects. If a Chapter decides to seek NM Capital Outlay or Tribal Infrastructure Funding (TIF), their project needs to correlate with their State ICIP accordingly. Any NM State funding awarded to Navajo Nation Chapters will be managed by the New Mexico Indian Affairs Department (NMIAD) through a joint-powers agreement with the Navajo Nation. With the right amount of planning on projects that meet the State's infrastructure goals, NM funds are a powerful alternative that Chapters can take advantage of for matching funds.

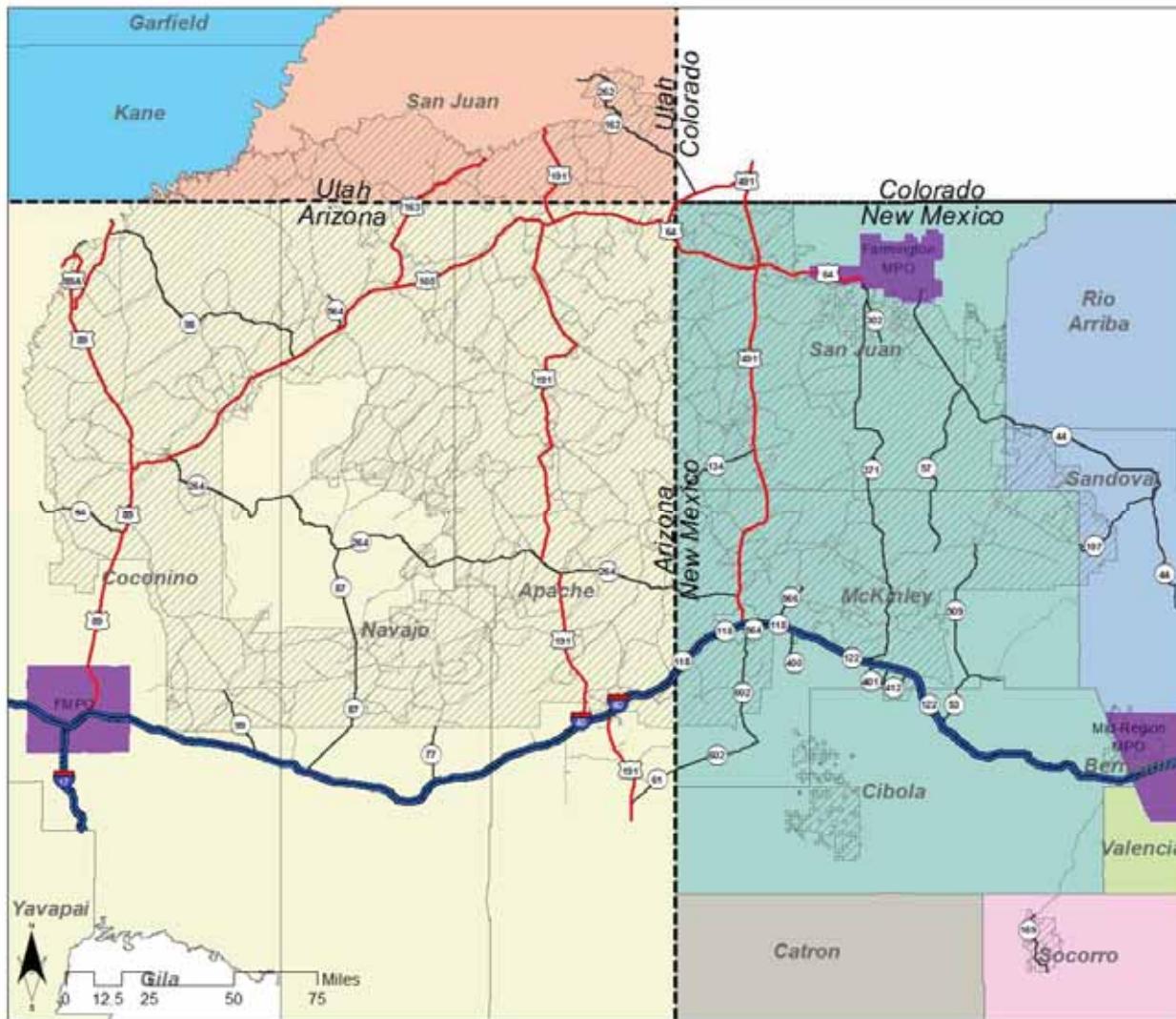
The Navajo Nation Department of Diné Education is a critical partner to communicate with NDOT to coordinate maintenance activities for bus routes. As an example, the Regional Routes have tried to assist with this need.

The NM Indian Affairs Department is a great resource that has policies specific to improving the quality of life for tribal citizens. Strategic alliance with NMIAD is important to communicate the Nation's needs and can help with coordinating efforts with the Governor's Office, the Transportation of Secretary, as well as State Representatives.

## 2016 Navajo Nation

## Long Range Transportation Plan

## Figure 7-1 | Navajo Nation Governmental Boundaries



## Navajo Nation

## Boundaries

Navajo Nation  
Metropolitan Planning Organization  
County

Regional Planning Government

	MRRPO
	NPRPO
	NWRPO
	SCRPO
	SWRPO
	NACOG
	Five County
	Southeast Utah

## Road Hierarchy

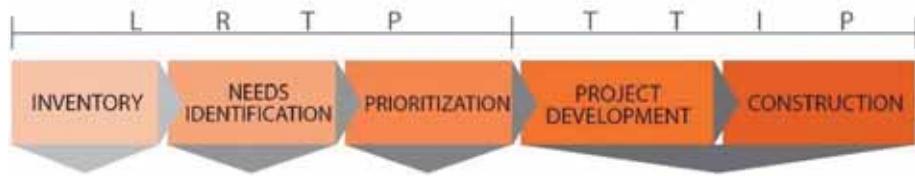
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& COMPANY**



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## 8.0 STRATEGIES AND PERFORMANCE MEASURES

Each function that NDOT has, also has a set of implementation strategies and associated performance measures to understand and measure how progress is being made in accomplishing the goals of the LRTP. Nationally, performance-based planning has become extremely important in order to measure how much impact investments are making. For NDOT, these investments relate to the planning, inventory of, maintenance, upgrading, and construction of transportation assets (e.g. roads, bridges, airports, sidewalks, traffic signals, roundabouts, safety improvements). The following sections outline strategies and performance-based measures so NDOT and the communities across Navajo Nation can understand how progress is being made relating to inventorying assets, identifying needs, and prioritizing those needs through a transparent process with the limited amount of funding that is available.



### 8.1 INVENTORY

Inventorying the system is a critical function the Planning Department plays in order to understand the transportation system. The teams required to collect, manage, analyze and share the data provide important inputs to the maintenance, project development, engineering and construction functions of NDOT and the communities. The official inventory, or RIFDS, is what is used to quantify the quality and quantity of the transportation system.

For a data-driven process to be functional, data must be collected regularly, and managed in a manner that can be utilized for those that need the data for informed decision making. From this data-driven process, the “performance” of how decisions are influencing how well the greatest needs are being addressed can be measured and reported so adjustments regarding how funding is spent

can be made. Figure 8-1 illustrates the strategies related to inventory efforts so a data-driven process to protect transportation assets and prioritize needs based on thorough and understood information.

**Figure 8-1 | Inventory Related Strategies**



There are several performance measures related to the inventorying of assets that should be explored. Figure 8-2 identifies some performance measures that would assist management and elected officials in understanding how efficient and effective inventory efforts are being conducted.

**Figure 8-2 | Inventory Related Performance Measures**



**Figure 8-3| Needs Identification Strategies**



## 8.2 NEEDS IDENTIFICATION

Needs identification is critical to properly understand the issues to be addressed, and to identify a correct set of improvement strategies. Needs identification can come in several formats including reports that NDOT develops, High Crash Location Reports, state or other agency plans, CLUP, and other reports or public input.

It is important to distinguish the difference between a need, and a project. A need is directly related to an issue. It has to be defined and examined in order to understand the various related issues. Once understood and studied, a project is defined through the project development process. The solution, or set of solutions is defined in the project development process – not the needs identification process. Figure 8-3 illustrates strategies that can be developed to enhance the understanding and use of data for needs identification. Figure 8-4 provides several performance measures that can be used to understand trends so needs identification processes can be refined and improved upon.

**Figure 8-4| Needs Identification Performance Measures**



### 8.3 PRIORITYZATION

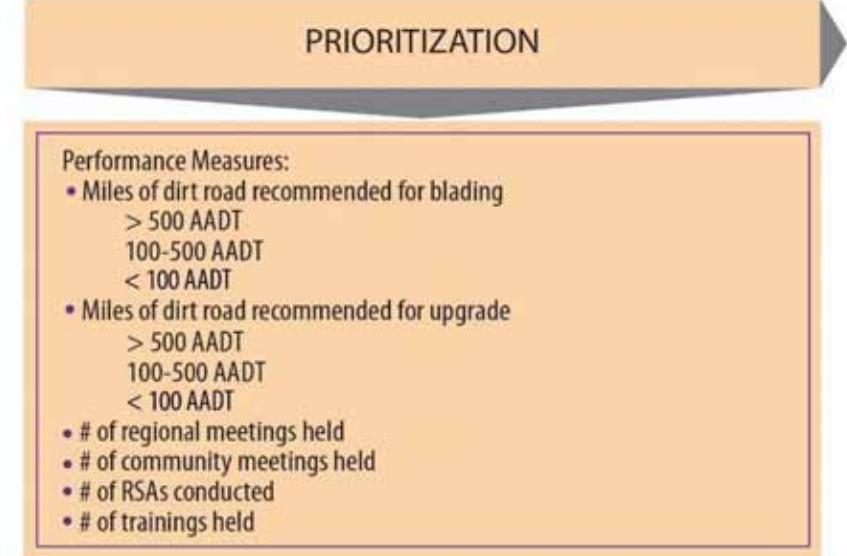
Prioritization is a critical process that involves data and discussion to identify and act upon the highest priority needs. The priorities span across all of the goals, infrastructure and NDOT processes and procedures. The highest priority needs are properly scoped, designed, and programmed in the TTIP for construction.

Strategies related to prioritization are included in Figure 8-5, and performance measures to assist in understanding how well the prioritization process is working is included in Figure 8-6.

**Figure 8-5 | Prioritization Strategies**



**Figure 8-6 | Prioritization Performance Measures**



### 8.4 TTIP BUDGETING

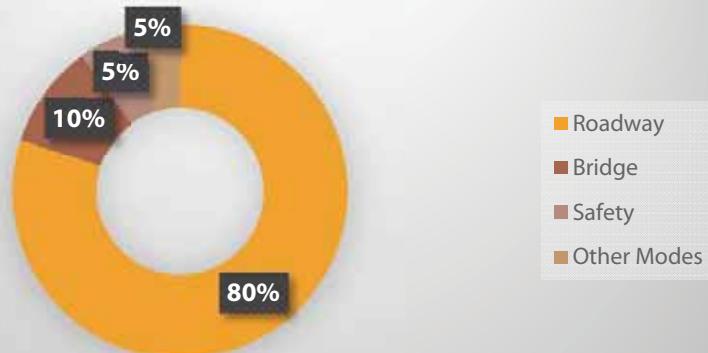
Based on the RIFDS data needs evaluation, a strategy related to TTIP budgeting could assist in addressing many of the needs. To accomplish this, it is recommended that separate funding pools or programs be adopted to separate the TTP funding into the following categories:

- Roadway (80% to 85% target over 5-years)
- Bridge (5% to 10% target over 5-years)
- Safety (5% target over 5-years)
- Other Modes (bicycle, pedestrian, aviation, other) (5% target over 5-years)

Figure 8-7 illustrates the separate funding pools that would comprise the TTIP Budget.

**Figure 8-7 | TTIP Budget Priorities**

### TTIP Funding Pools



For all of these programs, there are many project partners that have grant opportunities that may be able to augment TTP funding. It is very important that any grant opportunities that are sought for transportation related funding be coordinated through the NDOT Regional Planners. Ultimately NDOT has the responsibility to operate and maintain the tribal transportation systems. In many cases, grants only provide a proportion of the required funding so it is important that grant opportunities are sought for and further the Nation's priorities.

## 9.0 IMPLEMENTATION, MONITORING AND EVALUATION

The LRTP was developed through a collaborative process that was coordinated through federal, state, local, tribal, regional agencies, and the public stakeholders to develop and agree upon the goals of this LRTP. This implementation and monitoring section will outline the following:

- Developing an on-going process known to participants for tracking conditions and monitoring progress toward plan objectives;
- Establishing a process for how decisions regarding implementation are to be made; and
- Establishing a well-defined process for how priorities will be set.

These three key process are outlined herein to help provide a common understanding of how plan implementation will occur.

### 9.1 MONITORING PROGRESS

Progress made for each goal should be summarized and communicated to agency officials and the Chapters on an annual basis. The information for roadways and bridges (and other infrastructure, system data collection, etc.) should be maintained in a Geographic Information Systems environment for easy access, querying and summary. Data collection activities by NDOT are an essential function in order to understand and report on system conditions and activities. The following items should be included in the progress summary:

#### TAKE CARE OF THE SYSTEM

Annually, after the official RIFDS inventory is completed, the tables in Appendix A, Road Summaries, and Appendix C, Bridge Summaries, will be updated and will replace the tables in the "then current" LRTP. From these summaries, the following items will be tabulated and summarized to understand system level condition progress, including:

- Dirt Roads
  - Miles of road with AADT less than 100

- Miles of grade and drain improvements for roads with AADT less than 100;
- Miles of road with AADT between 100 and 249;
- Miles of grade and drain improvements for roads with AADT between 100 and 249;
- Miles of road with AADT between 250 and 499;
- Miles of grade and drain improvements for roads with AADT between 250 and 499;
- Miles of road with AADT of 500 or greater; and
- Miles of grade and drain improvements for roads with AADT of 500 or greater.
- Gravel Roads
  - Miles of gravel roads;
  - Miles of gravel roads bladed; and
  - Miles of gravel roads re-improved/maintained.
- Paved Roads
  - Miles of paved roads with a PCI greater than 85;
  - Miles of paved roads with a PCI greater than 85 that were surface treated/preserved in the prior year;
  - Miles of paved roads with a PCI between 70 and 84;
  - Miles of paved roads with a PCI between 70 and 84 that were surface treated/preserved in the prior year;
  - Miles of paved roads with a PCI between 55 and 69;
  - Miles of paved roads with a PCI between 55 and 69 that were surface treated/preserved/rehabilitated in the prior year;
  - Miles of paved road with a PCI of less than 55; and
  - Miles of paved roads with a PCI of less than 55 and rehabilitated in the previous year.
- Bridges
  - Number of NDOT bridges;
  - Number of NDOT bridges with a sufficiency rating between 50 and 80.
  - Number of NDOT bridges with a sufficiency rating between 50 and 80 that were repaired.
  - Number of NDOT bridges with a sufficiency rating of less than 50.

- Number of NDOT bridges with a sufficiency rating of less than 50 that were repaired or replaced.

### ENHANCE EXISTING PARTNERSHIPS AND CREATE NEW PARTNERSHIPS

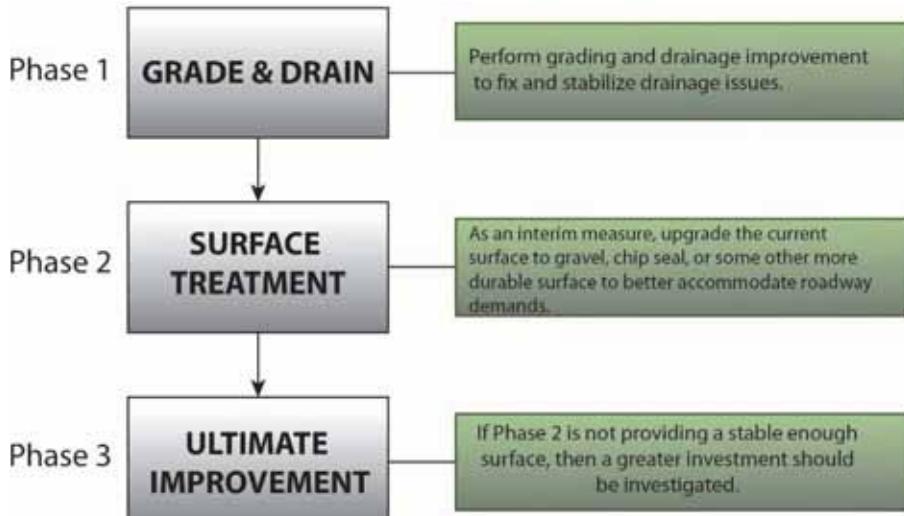
On an annual basis, NDOT will schedule and participate in State DOT consultation meetings that provide a forum for an exchange of information.

On a quarterly basis, NDOT currently hosts “Regional Meetings” for Chapter delegates and county/state partners to learn about current program activities and ask questions of NDOT. This forum also provides an opportunity for NDOT to learn about Chapter activities and priorities such as new development, updated CLUP plans or other undertakings.

### MAXIMIZE TRANSPORTATION INVESTMENT EFFECTIVENESS

Navajo DOT must spend transportation funding frugally, which requires a performance-based approach to help stretch every dollar. Because there are so many system-level needs, a three-phased approach (Figure 9-1) was developed to address a broader set of needs and address fundamental issues and create a network of “all-weather” roadways.

**Figure 9-1| Three-Phased Improvement Approach**



The three-phased approach outlined in Figure 9-1 is primarily aimed at addressing needs related to dirt roads. The AADTs in Table 9.1 provide guidance on priority based on AADT. For the greatest impact, the priority ratings should align with community priorities. To accomplish this, NDOT must work closely with the communities to share the data and achieve a common understanding of travel demand on the network. When the priorities in Table 9.1 align with the community priorities for the regional routes (15-mile plan), then those corridors in agreement should be the highest priority for grade and drain improvements. After grade and drain improvements are completed, then a separate evaluation should be undertaken to determine an appropriate Phase 2 surface treatment based on the type and amount of use the roadway experiences, including all modes. If the Phase 2 surface treatment is not providing a stable enough surface, then a major investment/Phase 3 improvement may be warranted.

Besides phasing improvements, specific improvement project recommendations should also rely on data, primarily, to determine solutions as outlined in Table 9.1.

**Table 9.1| Road Maintenance Priority**

	<100 AADT	100-249 AADT	250-499 AADT	500-999 AADT	1000+ AADT
<b>Major Arterial</b>	Low	Low	Moderate	High	High
<b>Minor Arterial</b>	Low	Low	Moderate	High	High
<b>Collector</b>	Low	Low	Moderate	High	High
<b>Local</b>	Low	Low	Moderate	High	High
<b>Pavement Condition Priority</b>					
	<b>Failure</b>	<b>Poor</b>	<b>Fair</b>	<b>Good</b>	<b>Excellent</b>
<b>Major Arterial</b>	Low	Low	Moderate	High	High
<b>Minor Arterial</b>	Low	Low	Moderate	High	High
<b>Collector</b>	Low	Low	Moderate	High	High



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Local	Low	Low	Moderate	Moderate	High
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Bridges are also a critical component to transportation and mobility. Table 9.2 depicts a strategy related to roadway functional classification and the actual bridge condition surveyed in the bridge reporting to NDOT.

**Table 9.2| Bridge Maintenance/Replacement Priority**

	Failure	Fair	Good	Excellent
Major Arterial	High	Moderate	Low	n/a
Minor Arterial	High	Moderate	Low	n/a
Collector	High	Moderate	Low	n/a
Local*	High	n/a	n/a	n/a

\* Bridge replacements on local roads should consider available alternative routes before considering a "High" need.

To monitor this progress, an annual report that outlines the miles of roads recommended for Phase 1, Phase 2 and Phase 3 improvements, and the number of bridges recommended for improvement/replacement. The report should include the roadway functional classification, ADT and if a bridge, the current bridge condition sufficiency rating and status. The report should also include if there was consistency between NDOT and the community's identification of a regional route priority.

### ENHANCE SAFETY

To enhance safety on Navajo Nation's roads, it is important to establish and understand the baseline conditions of safety on Navajo Nation. This understanding will provide the needed insights for the technical analysis to develop Emphasis Area definitions for safety practitioners to understand the issues that Navajo Nation is facing. Agency and stakeholder focused safety efforts that involve and integrate the engineering, enforcement, emergency services and education (4-E) stakeholders and practitioners into a program to develop, advance and implement safety implementation strategies would provide a foundation to advance safety efforts and attract safety funding grants.

Developing and completing a Strategic Safety Plan would assist Navajo Nation in understanding and improving transportation system safety.

Once safety data is readily available and quantified in a way that can be associated with proposed NDOT work, the safety conditions should be reviewed to understand how understood safety issues can be improved or mitigated with any proposed project.

### CREATE CONNECTIONS

Connecting where people live to where they work, recreate and conduct business is essential for a functional transportation system. These connections occur both internally and externally to Navajo Nation. Many of these efforts will require close coordination with other partner agencies such as Navajo Transit, city, county and state DOT representatives.

### PROVIDE OPTIONS

Every project should evaluate the need to accommodate pedestrians, bicycles, and bus stops (school and transit). To report progress in providing mobility options, an annual report will be developed that summarizes:

- Miles of roads recommended in TTIP to include improved bicycle accommodation.
- Miles of roads recommended in TTIP to include improved pedestrian accommodation.
- Number of bus pull-outs or bus stops recommended to be improved in the TTIP.

### PROMOTE ECONOMIC DEVELOPMENT

Economic development activities are typically related to a local Chapter or other Division action or set of actions that eventually require NDOT's assistance for access with a transportation facility. It is important that these activities are coordinated with NDOT at the early stages of understanding so any proposed improvements can be integrated into the project development process without impacting other projects already in the TTIP. To report progress in promoting economic development, a quarterly report will be developed that summarizes the number and location of potential projects coordinated with NDOT. It will also summarize the number of projects and actual projects being delayed, if any.

## 9.2 DECISION MAKING

The decision making process for recommendations relation to fund expenditures is held through the Navajo Nation Resources and Development Committee. The process is outlined in Figure 9.2.

Figure 9-2| Decision Making Process



Soon after receiving the official RIFDS inventory listing annually, the Planning Department will summarize the system conditions and outline a programming strategy based on the system conditions, and note the changing conditions based on the inventory. This data-driven approach will provide an informed method to identify funding pool targets for:

- Roadway;
- Bridge;
- Safety;
- Airport; and
- Other Modes.

After the initial approval from the Resources and Development Committee on funding pool targets based on the data, the Planning Department will also maintain a list of "eligible routes" that are data-driven needs identified through this performance-based approach, and will be updated annually.

Each of the NDOT Agencies will have a level of funding distribution based on the needs for each type of funding pool. In many cases, the funds will not be the same across each Agency as inventory asset conditions and system issues differ between the agencies.

The potential project selections and programming of projects will be determined based on available resources, including staff resources, to complete any needed design, clearances and approvals. The programming of projects will include all funding, including TTP and FET at a minimum.

The next step includes an FHWA review of the proposed projects to be entered into the TTIP. This early review will assist NDOT by providing additional information relating to other funding that may be available, procedural issues and pending approvals prior to submitting to the Resources and Development Committee.

### 9.3 PRIORITY PROCESS

The priorities for all improvements must be performance-driven based on data. At a minimum, the following criteria will be used when applicable, to determine eligibility for a future road project:

- Surface condition (paved routes);
- Average Annual Daily Traffic;
- Drainage washout areas;
- Regional Route designation by Chapter;
- Bus route;
- Bridge condition (sufficiency rating and status);
- Fatal and serious injury crashes (when available); and
- Roadway Functional Classification.

The Tribal Transportation Improvement Program prioritization and programming process will identify specific data breakpoints for roadway project eligibility, using each of the above criteria. The list of eligible routes will be maintained as Appendix F. The list will include, at a minimum:

- All paved roads in RFIDS;
- Dirt roads in RIFDS:
  - AADT of 250 or more and a Regional Route – highest priority;
  - AADT of 250 or more and not a Regional Route – high priority;
  - AADT of 100 to 249 and a Regional Route – moderate priority;
  - AADT of 100 to 249 and not a Regional Route – low priority;
  - AADT of 0 to 99 – lowest priority.
- All gravel roads in RIFDS;
- Routes that include collaboration (Chapter, County, State, etc...) and potential joint funding / memorandums of understanding (included as Appendix H).
- Reoccurring drainage washout areas on roads in RIFDS (included as Appendix I);
- All bridges in the bridge inventory (included as Appendix C).

Once the list of eligible routes is developed, the Planning Department will use the criteria above to prioritize the needs based on achieving the goals of this LRTP. Communication regarding the prioritization process and recommendations to the

Resources and Development Committee will be shared at the Regional Planning Meetings.

Appendix G will be reserved for projects (new roadways, paths, etc...) that are not part of the existing transportation system. In order for a new roadway to be considered for inclusion, it must be recommended as part of a Chapter's CLUP plan or an approved study.

Due to limited funding availability, proposed projects that dramatically change existing alignments, have excessive environmental impacts and are high cost (greater than 40% of an annual TIP budget) may have a lower priority over other potential projects.

### Appendix A: Road Summaries

Road Inventory Field Data Systems (RIFDS) were compiled using the street classification system the Bureau of Indian Affairs (BIA) created to identify types of roads. According to the BIA:

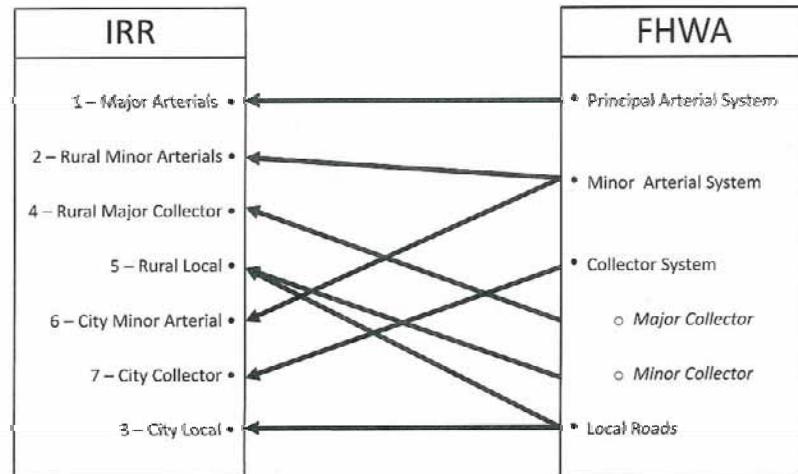
- Class 1- Major Arterial: Serves traffic between large population centers and maintain an average daily traffic volume of 10,000 vehicles per day or more with more than two lanes of traffic.
- Class 2- Rural Minor Arterial: Provide a connection to smaller towns and communities and generally allow high overall traffic speeds with minimum interference to through traffic movement. Facilitates less than 10,000 vehicles per day.
- Class 3- City Local: Streets located within communities serving residential areas.
- Class 4- Rural Major Collector: Serves as a collector to rural local roads.
- Class 5- Rural Local: May serve areas around villages, farming areas, schools, attractions, or various small enterprises. Also included are roads/trails for administration of forests, grazing, mining, oil, recreation, or other use purposes.
- Class 6- City Minor Arterial: Located within communities and serve as access to major arterials.
- Class 7- City Collector: Located within communities and serve as collectors to the city local streets.

These 7 Class Codes were used to generate an inventory of the roads within Navajo Nation. Appendix A calculates the lane mileage of each class of road and calculates the Pavement Condition Index (PCI). The total cost of maintenance is also included.

Priorities must be set to maintain the roads that have the greatest need. It is essential that roadways in fair condition with high average daily traffic be improved and not neglected. Properly maintaining paved roads is a cost effective approach versus allowing the pavement quality to deteriorate to the level of need for major maintenance and/or reconstruction.

### Navajo Division of Transportation Classification Methodology

#### FHWA Classification Assessment (Rural & Urban)



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### Appendix B: Pavement Maintenance Strategy



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### Appendix C: Bridge Summaries

The bridge system includes all bridges on public roads, or providing access to, Navajo Nation lands. When including bridges on state managed roads and highways there are a total of 720 bridges as part of the National Bridge Inventory bridge system within Navajo Nation. This summary is concerned with 71 bridges that are owned and maintained by the BIA on BIA and Tribal roadways. Bridge conditions on the tribal bridge system are inspected every two years. As part of the inspection, a condition rating between zero and 100 is calculated for each bridge. To be eligible for rehabilitation, a bridge must be deficient and have a condition sufficiency rating of 80 or less. A bridge is eligible for replacement where the sufficiency rating is 50 or less. Appendix C details the 71 bridges that scored the lowest sufficiency rating scoring below 80, qualifying them to be eligible for rehabilitation. Of those bridges, 30 are eligible for replacement because they scored a sufficiency rating of 50 or less.



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### Appendix D: Pedestrian Accommodation Needs

A preliminary assessment of sidewalk needs was completed for each of the communities. There is extensive pedestrian traffic in rural areas outside of the developed communities. Making investments to improve the safety for those individuals is also important, which could include paving or graveling shoulders and providing space on bridges to accommodate pedestrians. The correct solution for accommodating pedestrians should go through the project development and CLUP processes, just as the other transportation investments do.



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## Appendix E: Road Cross Sections



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### Appendix F: Eligible Routes Listing



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### Appendix G: Proposed New Routes



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### Appendix H: Collaboration Improvements with Other Agencies



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### Appendix I: Reoccurring Washout Areas



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### Appendix J: Deferred Maintenance Lists



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## Appendix K: Airport Improvements



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