

# **The Highway Modal Planning Process North Dakota Department of Transportation**

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## **CHAPTER ONE**

### **INTRODUCTION**

Transportation is the backbone of our economy, providing for the delivery of services and the movement of people and goods. Transportation contributes to our quality of life and enhances our potential for economic growth and diversity. North Dakota's transportation system has evolved over many decades. In the late nineteenth century and well into the twentieth century, railroads were the state's main mode of transportation. By the early 1900's a basic highway system was beginning to develop and by the 1950's and 60's the Interstate era began. The state's highway system continued to grow and expand into the late 1980's. By the early 1990's, the state focused more on preserving its highway system than adding infrastructure. Today and into the future, our state's focus is to provide a safe and secure transportation system that offers a high level of personal and freight mobility and is adequately funded.

In January 2001, Governor John Hoeven directed the North Dakota Department of Transportation (NDDOT) to develop a statewide strategic transportation plan. The plan, called "[TransAction](#)," was published in 2002 and provides direction for the ongoing development of our state's transportation system. TransAction's scope is broad, engaging all levels of government, all modes of transportation, and both the public and private sectors. The plan also provides a blueprint for improving communication and for promoting collaboration and cooperation between units of government and private sector providers and users.

Concurrent with the development of TransAction, NDDOT developed its [Strategic Plan](#). This plan is an internal document designed to increase the effectiveness of the Department's programs, products, and services. The Strategic Plan presents NDDOT's vision and mission, and it defines goals and objectives to increase the effectiveness of the Department's programs, products and services.

In addition to TransAction and the Department's Strategic Plan, the broad transportation vision presented in TransAction was designed to be complimented by developing modal and functional plans. In addition to a highway modal plan, the Department will develop rail, pedestrian and bicycle modal plans.<sup>1</sup> The modal plans will provide policy direction and modal investment strategies to achieve desired levels of performance and service. The Department develops functional plans to address specific subject areas such as highway safety and intelligent transportation systems. Ultimately all of the Department's plans are integrated to achieve the maximum benefit for the state's transportation users and providers.<sup>2</sup>

This document, North Dakota's Highway Modal Plan, is one of several modal plans resulting from TransAction. It includes a description of NDDOT's public input process, a brief overview of the state highway system (including the Highway Performance Classification System), links to the [Pavement Preservation Program](#), [Highway Investment Strategy](#), and the three-year program of highway projects in the [Statewide Transportation Improvement Program](#). Since the plan is the

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<sup>1</sup> The North Dakota Aeronautics Commission is responsible to develop the state's modal plan for aeronautics.

<sup>2</sup> See Figure 1 on page 4.

product of a dynamic process; most elements of the plan will be updated either annually or biennially.

### **How are NDDOT's Various Transportation Related Plans Integrated?**

The statewide strategic transportation plan, [TransAction](#), provides overall direction for the development of North Dakota's transportation system (air, highway, rail modes; personal and freight mobility). Many of the initiatives contained in TransAction are broadly applicable to more than one mode of transportation. For example, Initiative 1 states North Dakota will strategically prioritize its use of transportation resources. Applying this initiative to each mode produces a different set of emphasis areas. For highways, ride quality and load carrying capacity improvements are emphasis areas while air transportation may have a different set of emphasis areas. A common emphasis area for both modes may be passenger and freight safety.

Once emphasis areas are identified for each mode, policy direction, performance objectives, and investment strategies may be developed; system and service deficiencies may be quantified; and improvements needed to achieve desired performance and services may be prioritized. The Highway Modal Plan's purpose, scope, and use provide policy direction.<sup>3</sup> Highway performance objectives are identified in NDDOT's [Strategic Plan](#) along with objectives to update the department's [Highway Investment Strategy](#) and [Pavement Preservation Program](#). The [Highway Performance Classification System Report](#), [Bridge Management System](#), [Pavement Management System](#) and department studies such as the biennial highway needs assessment are used to identify system and service deficiencies. Functional Plans such as NDDOT's [Intelligent Transportation System Plan](#) and [Highway Safety Plan](#) are also used to identify system and service deficiencies. Finally, the Office of Transportation Programs annually assimilates all of the above information to develop the [Statewide Transportation Improvement Program \(STIP\)](#).<sup>4</sup>

### **Relationship of Transaction, NDDOT's Strategic Plan and the Highway Modal Plan.**

#### **Purpose**

**The purpose of TransAction is to** provide broad strategic direction for collaborative efforts to develop North Dakota's statewide transportation system. TransAction provides strategic direction through a shared transportation vision, goals, and initiatives.

**The purpose of NDDOT's Strategic Plan is to** concentrate the Department's efforts addressing core business functions that will provide a transportation system that safely moves people and goods. The Strategic Plan defines the Department's vision, mission, values, and specifies the goals and objectives the department wants to achieve.

**The purpose of the Highway Modal Plan is to:**

- s Define a vision for North Dakota's highway system

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<sup>3</sup> See Relationship of Transaction, NDDOT's Strategic Plan and the Highway Modal Plan, page \_\_\_

<sup>4</sup> The STIP is a three-year plan of projected highway and highway-related construction projects, based on projected available federal funding, which address the performance levels and services identified in other plans.

- S Present the [Highway Performance Classification System](#) to the public, our customers and stakeholders.
- S Communicate the highway system's current status
- S Refine the Highway Performance Classification System
- S Integrate the Department's various highway planning processes and information, identify potential projects and develop the [Statewide Transportation Improvement Program](#) (STIP)

## Scope

**The scope of [TransAction](#)** extends to all modes of transportation, all levels of government and to both the public and private sectors.

**The scope of NDDOT's [Strategic Plan](#)** extends to the Department's core business functions.

**The scope of the [Highway Modal Plan](#)** extends to the physical infrastructure of the state highway system. It is not the intent of this plan to address roadway issues at the local, tribal, or federal level.

## Use

**TransAction will be used to** promote understanding of transportation's importance; increase awareness of how transportation systems tie the world together; improve communication between transportation consumers and providers; promote cooperation and collaboration between modes, jurisdictions and the public and private sectors; and enable ND to achieve its shared transportation vision.

**NDDOT's [Strategic Plan](#) will be used to** communicate with department employees and increase the effectiveness of programs, products, and services.

**The [Highway Modal Plan](#) will be used to;**

- S Provide internal direction for managing the state highway system ([HPCS](#), [Design Manual](#), [Pavement Preservation Program](#), [Highway Investment Strategy](#), [Highway Safety Improvement Program](#), [Highway Safety Plan](#), etc.)
- S Communicate NDDOT's management philosophy to the public
- S Present an overview of the state highway system's condition, performance and financial needs
- S Provide direction for achieving the highway-related initiatives identified in [TransAction](#)

**Relationship of NDDOT Planning & Programming Processes**

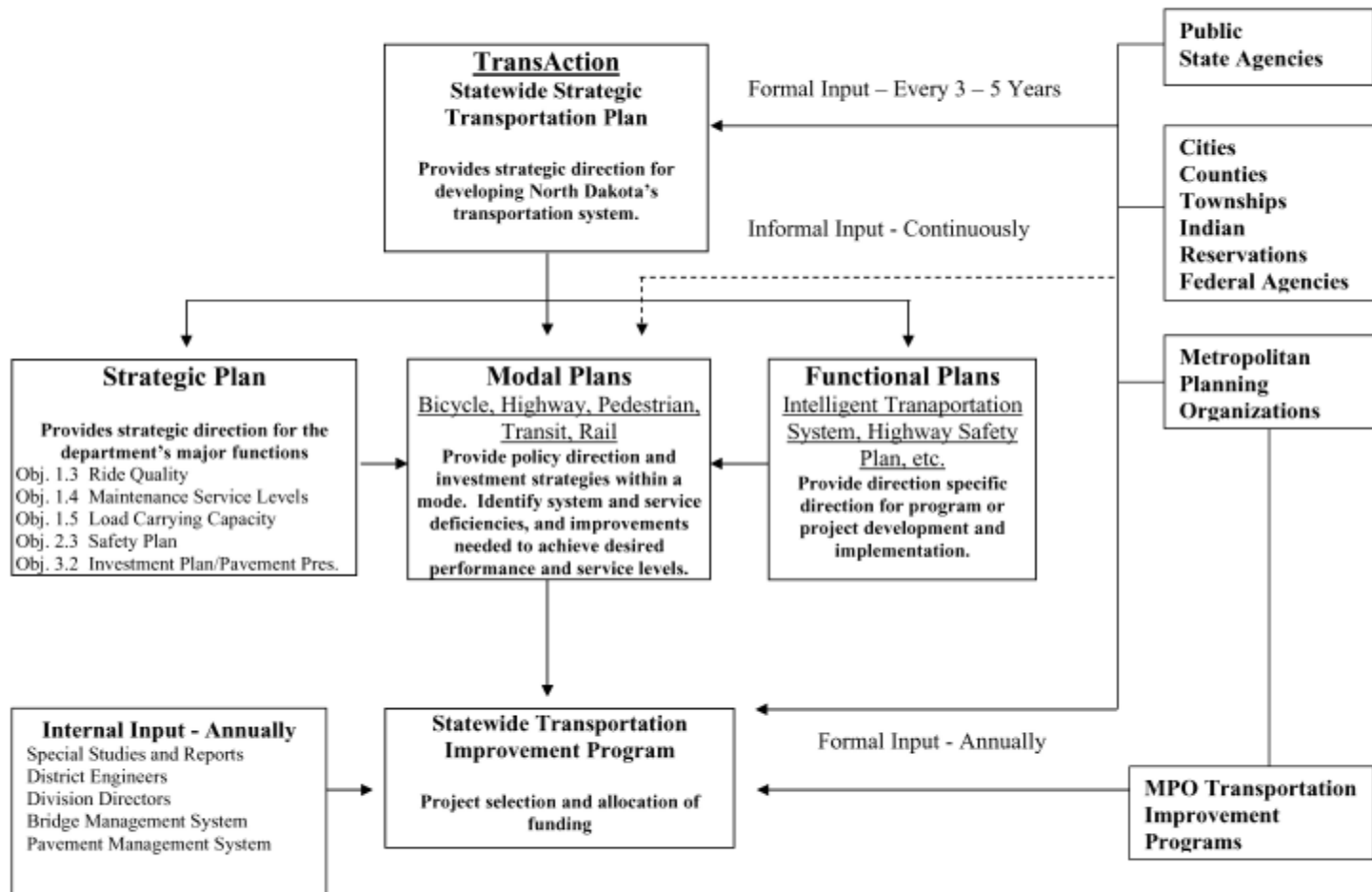


Figure 1

## Public Input Process Overview

NDDOT's public input, planning, and programming processes are highly integrated. Broad public input was used to develop [TransAction](#). Two advisory groups representing government agencies, tribal entities, and private sector businesses were established; statewide business and public opinion surveys were employed, interviews were conducted with numerous business owners, and several public input meetings were held. The information developed through this process was used to identify strategic issues which in turn were refined to identify sixteen initiatives. In particular, TransAction Initiatives 1 and 2 have significant implications for the state's highway system and are discussed in greater detail in Chapter Two of this document.

In addition to the formal TransAction public input process, the highway modal planning process receives informal input continuously as department staff members attend meetings and conferences throughout the state. Many of the best ideas on how to improve performance of the state highway system are the product of small group discussions and one-on-one exchanges that occur at these functions. Formal input is again obtained in the highway modal planning process when NDDOT publishes its annual draft [Statewide Transportation Improvement Program](#) (STIP). Before the annual STIP is adopted, input is sought from local governmental units, tribal authorities, state and federal agencies, and the public<sup>5</sup>. A unique relationship, prescribed in federal legislation, exists with the state's three metropolitan planning organizations (MPOs). The state's three MPOs conduct long-range transportation planning and annually develop transportation improvement programs (TIPs) which are incorporated directly into the STIP.

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<sup>5</sup> See [North Dakota Federal-Aid Highway Program Stewardship Agreement Local and Tribal Governments](#)

## **CHAPTER TWO**

### **BRIEF OVERVIEW OF NORTH DAKOTA'S STATE HIGHWAY SYSTEM**

North Dakota's state highway system includes 7,382 miles of roadway. There are 1,695 bridges on the state system, of which 88 or 5% are deficient. Approximately 4800 miles or 57% of the state highway system is affected by spring load restrictions and 2920 miles or 35% of the system has a poor ride quality.

In 2003, the total vehicle miles traveled on all roadways in North Dakota was 7.29 billion. This figure has been continuously increasing at the rate of about 3.7% annually. And although the state highway system only has 6.9% of the total roadway mileage in the state, it accounts for about 61% of the total vehicle miles traveled. Truck traffic accounts for about 17% percent of the total traffic on the state highway system and about 20.4% of the traffic on the Interstate System.

In 2003, North Dakota had a crash rate of 1.44 fatalities per 100 million vehicle miles compared to the national average of 1.50. Over the past ten years, the fatality crash rate has varied from a low of 1.13 fatalities per 100 million vehicle miles to a high of 1.68. The injury crash rate during this same period has exhibited a general decline while total crash rates and crash numbers have slowly edged upward.

North Dakota's highway system is administered by a central office in Bismarck and eight district offices located in Dickinson, Bismarck, Valley City, Fargo, Williston, Minot, Devils Lake, and Grand Forks. The central office staff provides planning, programming, design, construction, maintenance, and general administrative support services to the eight districts. The districts are responsible for overseeing construction projects and maintenance activities such as ice and snow removal, signing, and mowing ditches. The Department is led by a director appointed by the governor. The Department also has three deputy directors, one each for business support, engineering, and driver and vehicle services.

### **NDDOT HIGHWAY MODE EMPHASIS AREAS**

[TransAction](#) Initiative 1 calls for North Dakota to prioritize its use of transportation resources. Utilizing public surveys and input from the TransAction planning process, the department identified three highway modal emphasis areas in its [Strategic Plan](#); ride quality, load carrying capacity and safety. TransAction Initiative 2 calls for North Dakota to define the levels of transportation service it will strive to provide and maintain. Again, using an extensive public input process the Department developed a five-tier highway classification system called the [Highway Performance Classification System](#).<sup>6</sup>

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<sup>6</sup> The draft Highway Performance Classification System was presented to the public through a series of twenty public meetings held in April 2004. Presentations were also made at the annual meetings of the ND League of Cities and the ND Association of Counties.

**TransAction Initiative 1** states, “*North Dakota will strategically prioritize its use of transportation resources.*” NDDOT’s [Strategic Plan](#) identifies three emphasis areas: ride quality, load carrying capacity, and safety. The Strategic Plan also identifies objectives for each of the emphasis areas. Internal committees have been established to develop strategies for achieving each objective.

NDDOT Strategic Plan Objectives:

- Objective 1.3 Improve ride quality by 10 percent (March 31, 2008)
- Objective 1.5 Improve load carrying capacity of the state highway system by 20 percent (September 30, 2008)
- Objective 2.3 Develop and implement a safety plan that reduces transportation-related reportable crashes, injuries, and fatalities relative to vehicle miles traveled by 10 percent (December 31, 2007)

The NDDOT Strategic Plan also identifies three additional objectives that complement the three emphasis area objectives. These objectives are:

- Objective 1.1 Conduct customer satisfaction survey (April 30, 2004)
- Objective 1.4 Enhance maintenance service levels (April 30, 2007)
- Objective 3.2 Refine and implement the [Highway Investment Strategy](#) to include a [Pavement Preservation Program](#) (December 31, 2004)

**TransAction Initiative 2** states, “*North Dakota will define the levels of transportation service it will strive to provide and maintain.*” In 2001, NDDOT began developing a five-tier highway classification system called the [Highway Performance Classification System](#) (see Figure 4, page 13). Each year an analysis of the state highway system is completed applying the HPCS criteria.<sup>7</sup> The analysis allows department planners and engineers to identify system trends. The trends, in turn, may be used to update the department’s investment strategy and identify potential projects that will mitigate performance deficiencies.

### Highway Performance Classification System Emphasis Area Goals

	Springtime Load Restriction	Ride Quality	Safety	Maintenance Priority
<b>Interstate System</b>	<b>Restricted by Legal Weight 80,000 lbs</b>	<b>Excellent</b>	<b>Very Important</b>	<b>Very High</b>
<b>Interregional Corridor</b>	<b>Restricted by Legal Weight 105,500 lbs</b>	<b>Excellent</b>	<b>Very Important</b>	<b>Very High</b>
<b>State Corridor</b>	<b>Class A 105,500 lbs</b>	<b>Good</b>	<b>Very Important</b>	<b>High</b>
<b>District Corridor</b>	<b>Class 1 80,000 lbs</b>	<b>Fair to Good</b>	<b>Important</b>	<b>Moderate</b>
<b>District Collector</b>	<b>Class 2 65,000 lbs</b>	<b>Fair</b>	<b>Important</b>	<b>Lower</b>

<sup>7</sup> See “Highway Performance Classification System (HPCS) Report 2004



## **The HPCS levels and their descriptions are:**

**Interstate System** – This is the highest level highway in the HPCS. Maintaining a high degree of reliability and mobility on these highways is critical to support and promote international, national, regional and statewide trade and economic activity. Movements are primarily long distance, interstate and intrastate traffic. Rural interstates are multiple lane facilities and have full access control. The goal is to be free of height restrictions and have unrestricted seasonal load limits. Ride and distress scores are generally in the good to excellent categories. High volumes of traffic, as well as a high percentage of trucks, are relatively consistent year round. Travel speeds average 65 to 75 miles per hour. Rural Interstates demonstrate a high degree of safety with crash rates below the statewide average. The Interstate System consists of 1141 centerline miles of highway, 13.6 percent of the state highway system's total mileage.<sup>8</sup>

**Interregional Corridor** – The Interregional Corridors functions similarly to the Interstate System, the main difference is that these highways are not eligible for Interstate funding and they do not have full access control. Maintaining a high degree of reliability and mobility on these highways is critical since they support and promote international, national, regional and state trade and economic activity. Movements on these highways are primarily long-distance, interstate and intrastate traffic. Interregional Corridors are either two-lane or multiple lane facilities. Segments of specific locations may have partially controlled access. The goal is to be free of height restrictions, have unrestricted seasonal load limits, and have limited passing restrictions. Accommodating truck traffic is a priority. Ride and distress scores are generally in the good to excellent categories. Moderate to high volumes of traffic, as well as a high percentage of trucks, are relatively consistent year round. Daytime travel speeds average 60 to 70 miles per hour. Interregional Corridors demonstrate a high degree of safety with crash rates below the statewide average. Interregional Corridors comprise 1828 centerline miles, or 21.7% of the state highway system.

**State Corridor** – State Corridors are the third level of highways in the HPCS. Maintaining a moderately high degree of reliability and mobility on these highways is critical since they support the movement of agricultural commodities, freight, and manufactured products within the state. State Corridors provide connectivity between lower and higher level roadways. Movements on these highways are primarily medium-distance intrastate traffic. State Corridors are typically two lane facilities and have segments or locations with partially controlled access. These highways have either paved or aggregate shoulders, some segments may have limited passing zone restrictions, and Unrestricted or Class A seasonal load limits. Bridges and overhead structures provide for the unrestricted movement of legal loads. Ride and distress scores are generally in the good category. Moderately high volumes of traffic are relatively consistent year round. Daytime travel speeds average 60 to 65 miles per hour. State Corridors demonstrate a moderately high degree of safety with crash rates less than the statewide average. There are 1402 centerline miles of State Corridors. State Corridors account for 16.5% of the total state highway system mileage.

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<sup>8</sup> Highway mileage is measured in road, centerline, or lane miles. For example, Interstate 94 from Montana to Minnesota has 354 road miles, 714 centerline miles and 1422 lane miles. One segment of I-94, approximately three miles long, has six lanes.

# Highway Performance Classification System

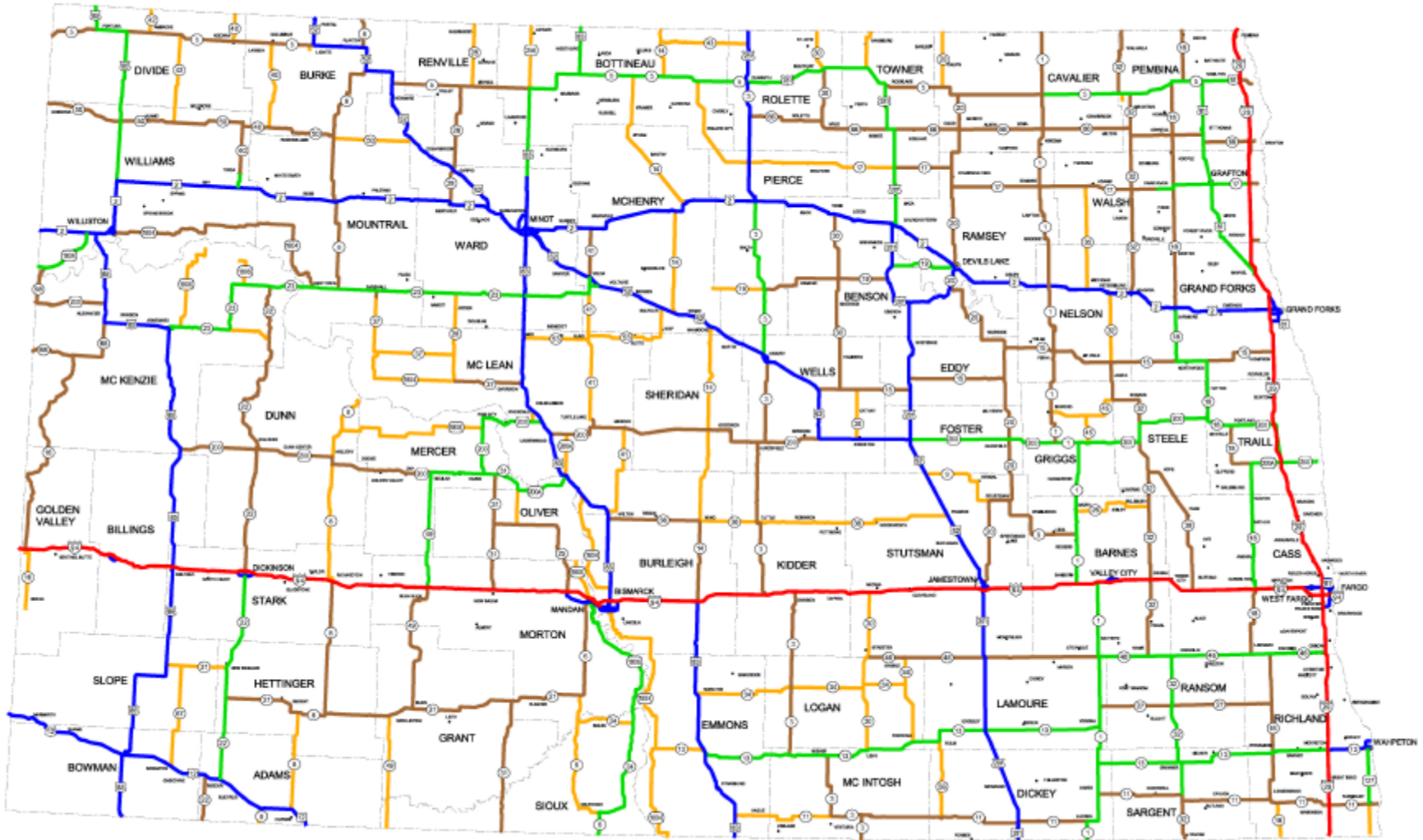


Figure 4

**District Corridors** – District Corridors are the fourth level of highways in the HPCS. Maintaining a moderate degree of reliability and mobility on these highways is desirable. Movements on these highways are primarily short to medium distance intrastate traffic. District Corridors are two lane facilities. Generally, access control is not purchased. These highways have narrow paved or gravel shoulders, segments with restricted passing zones, and Class A, of Class 1 seasonal load limits. Bridge structures provide for the unrestricted movement of legal loads. Ride and distress scores are generally in the fair and good categories. Moderate volumes of traffic are relatively consistent year round. Occasional increases in seasonal traffic volumes and truck movements occur. Daytime travel speeds average 55 to 65 miles per hour. District Corridors are safe highways with crash rates at or near the statewide average. District Corridors account for 2,568 centerline miles or 30.8% of the state highway system.

**District Collector** – District Collectors are the final level of highways in the HPCS. Maintaining reliability and mobility on these highways is a lower priority. These highways are generally short routes that provide connectivity to the higher road level systems. Movements on these highways are primarily short distance, local, farm-to-market traffic. District Collectors are two lane facilities. Generally, access control is not purchased. These highways generally have no shoulders. Segments with restricted passing zones exist. Class 1 or Class 2 seasonal load limits are normal although some segments may have year round load restrictions. Bridge structures provide for the movement of typical legal loads. Some structures have load, height, and width restrictions. Ride and distress scores are generally in the fair category. Low volumes of traffic are normal year round. Small increases in truck movements may occur during spring planting and fall harvest periods. Daytime travel speeds average 50 to 55 miles per hour. District Collectors are moderately safe highways with crash rates near the statewide average. District Collectors represent 17.4%, or 1,466 centerline miles of the state highway system.

### **Highway Performance Classification System (HPCS) Analysis**

All five levels of the [Highway Performance Classification System](#) have highways with deficiencies according to HPCS guidelines. Generally, the higher HPCS levels have fewer deficiencies, although this is not necessarily true for some characteristics. HPCS analysis examines three main components. These components are Ride, Distress, and Load Capacity. Additionally, these three components can be aggregated to create four additional combinations, Ride/Distress/Load Capacity, Ride/Distress, Ride/Load Capacity, and Distress/Load Capacity. It is important to note that when looking at the data, each of the possible seven combinations of data is listed separately.<sup>9</sup> For example, the cell on the matrix corresponding to Interstate and Ride shows 46.3 miles. This cell only includes mileage where Ride is deficient. To determine the total amount of mileage with deficient Ride, four cells (Ride, Ride/Distress/Load Capacity, Ride/Distress, and Ride/Load Capacity) must be added together. In this case the total mileage of Ride deficient miles on the Interstate is 130.1. The total number of miles with Distress deficiencies on the Interstate is 138.1 miles. This figure includes 83.8 miles of Ride/Distress which was also included in the total Ride mileage. It is important to exercise care not to double count mileage. At the end of the 2003 construction season, there were 3571.0 miles of highway with HPCS deficiencies.

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<sup>9</sup> Refer to the Highway Performance Classification System Report, page 18, 2003 HPCS Deficiencies Matrix.

## **Highway Performance Classification System Relationship to the NDDOT Design Manual**

For each level of the [Highway Performance Classification System](#) a corresponding set of design guides is included in the [NDDOT Design Manual](#). These design guides include lane widths, curves, grades, shoulder types, design speeds, stopping distances, vertical clearance, and other features.

### **CHAPTER THREE**

#### **IMPLEMENTATION**

Ultimately the goal of the Highway Modal Plan is to clearly communicate how department integrates its various planning and engineering processes to achieve the ride quality, load carrying capacity and safety objectives identified in [TransAction](#) and NDDOT [Strategic Plan](#). There are three documents that form the Highway Modal Planning Process implementation strategy. These documents are the Statewide Transportation Improvement Plan, Highway Safety Improvement Program, and Highway Safety Plan.

#### **Statewide Transportation Improvement Program (STIP)**

The key element of the department's implementation strategy is the annually produced [Statewide Transportation Improvement Program](#) (STIP). The STIP is a multiyear, fiscally constrained capital improvement program that utilizes all available state and federal funding to:

1. Preserve the state highway system, and
2. Achieve the ride quality, load carrying capacity and safety objectives identified in [TransAction](#) and the department's Strategic Plan

The STIP also incorporates the Transportation Improvement Programs of the state's Metropolitan Planning Organizations (MPO).<sup>10</sup> The STIP in its draft form is made available for public comment before it is finalized. After incorporating appropriate public comments the STIP is submitted to the Federal Highway Administration and Federal Transit Administration for final approval. Upon approval of the final STIP by these agencies projects identified in the STIP are eligible for federal funding. The projects identified in the STIP are scheduled for bid openings, constructed, and the highway modal planning process continues.

#### **Highway Safety Improvement Program (HSIP)**

The [Highway Safety Improvement Program](#) (HSIP) is an annual program that identifies proposed highway safety improvements. Included are projects related to high crash locations, roadway improvements such as slope flattening, guardrail installation or upgrades, intersection modifications, and railroad crossing protection. These projects may occur on any type of road - state, county, township or city.

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<sup>10</sup> The state's three MPOs are; Fargo-Moorhead Council of Governments, Grand Forks-East Grand Forks Metropolitan Planning Organization, and Bismarck-Mandan Metropolitan Planning Organization.

## **Highway Safety Plan (HSP)**

The [Highway Safety Plan](#) (HSP) is a planning document, federal grant request, and a state budget document. The plan contains a problem identification section which analyzes crash data and other traffic information to develop Problem Solution Plan sections. Annually the HSP outlines projects to reduce the number of traffic crashes on the state's public roadways.