

North Dakota State Freight Plan



April 2015

NDDOT
North Dakota
Department of Transportation

Prepared by

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NDDOT extends a special thank you to Kim Vachal and the staff of the Upper Great Plains Transportation Institute for providing an overview of North Dakota Freight Supply Chains
(See Appendix L, page 126)

Links to Freight Plan Executive Summary and Full Freight Plan:

<http://www.dot.nd.gov/divisions/planning/freight/>



North Dakota Department of Transportation

Grant Levi, P.E.
Director

Jack Dalrymple
Governor

April 24, 2015

Fellow North Dakotans,

In 2012, the North Dakota Department of Transportation (NDDOT) published an update of its statewide strategic transportation plan entitled, ***TransAction III***. The plan stated the North Dakota Department of Transportation's (NDDOT) transportation mission, vision, goals, initiatives, and strategies for achieving improved personal and freight transportation mobility. While developing ***TransAction III***, North Dakota was experiencing a period of unparalleled population and economic growth. The entire state was suddenly challenged to respond to the need for new schools, additional housing, water and sewer system expansions, social services, expanded law enforcement, recreational opportunities, and health care facilities. The common connection among all of these elements was the business community and public's demand for an improved transportation system; one capable of moving both people and freight safely, securely, and efficiently.

Building on the foundation provided by ***TransAction III***, NDDOT embarked on the development of a plan to advance a freight transportation system that would meet North Dakota's unique freight challenges while complementing the goals of the National Freight Network. By reaching out to our stakeholders, the general public and surrounding states and provinces, freight system trends, issues, and needs have been identified. A "snapshot" of the state's freight system has been taken giving us a baseline comparison for evaluating system improvements over time. Strategies for improving the state's freight transportation system have been incorporated into NDDOT's statewide planning, project scoping, and programming processes. Perhaps most importantly, the role of freight in promoting our economy is better understood and more appreciated.

As we move forward with the implementation of ***TransAction III*** and *North Dakota's Freight Transportation Plan*, we pledge to work with our stakeholders to facilitate a freight system that allows the state to continue to be globally competitive.

Sincerely,

A handwritten signature in blue ink that reads "Grant Levi".

Grant Levi, P.E., Director

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NORTH DAKOTA FREIGHT PLAN - PREFACE

In October 2012, the North Dakota Department of Transportation (NDDOT) published *TransAction III* - North Dakota's Statewide Strategic Transportation Plan. The following excerpt from *TransAction III*'s preface provided the context and direction for the development of North Dakota's State Freight Plan.

“Today, unlike any time in its history, North Dakota is uniquely positioned. We are experiencing unparalleled growth in all sectors of our economy: agriculture, energy, tourism, and manufacturing. Our population is growing as people are coming to our state seeking a brighter, more prosperous future. As a result of this growth, people and businesses are expecting more of our transportation system; both infrastructure and services. They want more four-lane highways, wider roads, greater load-carrying capacity, expanded hours of snow removal, additional rural and urban transit services; and above all, they want safe and secure transportation.

While the expectations of people and businesses have been rising, transportation revenues from traditional sources such as the federal highway trust fund have either been flat or decreasing. Higher mileage vehicles, more people using public transit, increased reliance on non-motorized forms of transportation (pedestrian and bicycles), and most notably, the impact of inflation on highway construction costs have reduced the funding available to state and local governments to build and maintain their transportation systems.¹

During the development of this plan, people and businesses told us the transportation system should be safe, secure, sustainable, efficient, reliable and responsive. They envisioned a future transportation system that is multimodal, offering a variety of services, strategically developed and globally integrated. They identified goals, initiatives, and fundamental values to guide the development of our transportation system.”

Building on the guidance provided by *TransAction III*, the *North Dakota State Freight Plan* represents the next chapter in NDDOT's ongoing efforts to develop and maintain a world-class transportation system that is safe, secure and provides efficient freight mobility.

Like *TransAction III*, the *North Dakota State Freight Plan* is a policy plan that defines NDDOT's freight planning process. Implementation of the freight plan will consist of four components: (1) infrastructure projects that eliminate freight bottlenecks and delays, (2) new or modified operational strategies, (3) planning and feasibility studies, and (4) the application of innovative technologies to improve the safe, secure and efficient movement of freight.²

¹ During the last two legislative sessions the ND Legislature has provided one-time funding which offset some of the impact of inflation on state and local roadway construction budgets

² See, Freight Plan Implementation, page 25.

NORTH DAKOTA FREIGHT PLAN - PURPOSE, SCOPE & USE

Purpose

Define the process NDDOT uses to promote safe, secure, sustainable, and reliable freight mobility to enhance a diversified and vibrant economy.

Scope

The Scope of North Dakota's Freight Plan is **multimodal**; with primary emphasis on highways and secondary emphasis on last mile connections to railroad, pipeline transload and air cargo freight facilities.

The Scope of North Dakota's Freight Plan is **comprehensive**; inclusive of immediate and long-term freight planning activities and investment strategies at the state level while being cognizant and supportive of local, tribal, and private sector freight roles and responsibilities.

Use

1. Promote dialogue on the importance of safe, secure and efficient movement of freight
2. Provide a framework for public decision-making and investment
3. Promote public/private partnerships
4. Identify freight trends, needs, issues, and bottlenecks
5. Identify freight facilities critical to the state's economic growth and competitiveness
6. Identify state's freight transportation system
7. Identify potential freight infrastructure projects, operational and regulatory changes, and Intelligent Transportation System applications.
8. Qualify North Dakota for federal freight-related funding

NORTH DAKOTA FREIGHT PLAN - STRATEGIC TRANSPORTATION GOALS

In October 2012, the North Dakota Department of Transportation (NDDOT) published its state's statewide strategic transportation policy plan, *TransAction III*. During the development of the Plan, people and businesses indicated they wanted a transportation system that was safe, secure, sustainable, efficient, reliable and responsive. They envisioned the state's future transportation system as multimodal, offering a variety of services, strategically developed, and globally integrated. They identified goals and fundamental values to guide the development of our transportation system for **both personal and freight mobility**. The strategic transportation goals identified in *TransAction III* are also the goals for the state's freight transportation system.³

The following excerpt is from *TransAction III*

TransAction III – North Dakota's Transportation...

Mission – North Dakota will provide a safe, reliable, and sustainable transportation system.

Vision – North Dakota's multimodal transportation system is strategically developed and globally integrated.

Goals – North Dakota's personal and freight transportation mobility goals are interdependent, mutually supportive, and apply to our transportation system's infrastructure and services.

Safe and secure transportation, whether related to personal or **freight** mobility, **is North Dakota's Number One Goal**.

Goal 1 - Safe and secure transportation

Goal 2 - Sustainable and reliable mobility

Goal 3 - Diversified and sufficient funding

Goal 4 - Communication and cooperation

Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts

Section 1118 of Moving Ahead for Progress in the 21st Century (MAP-21) requires a state freight plan to include a description of how the plan will improve the ability of the state to meet the national freight goals established in 23 U.S.C. 167. See Appendix A – *TransAction III* North Dakota's Strategic Transportation Plan Goals Complement National Freight Goals- *North Dakota State Freight Plan*.

³ See Appendix B North Dakota's Goals and Priorities for Freight Transportation Infrastructure and Operations

NORTH DAKOTA FREIGHT PLAN – STRATEGIC FREIGHT SYSTEM

While all of the state’s roads, rail lines, airports, and pipelines are important in the movement of freight, strategically some are obviously more important than others. For example, Interstate I-29 is strategically important since it carries substantial amounts of freight and connects North Dakota with domestic and foreign markets. While each road, rail line, airport and pipeline is important, the various elements of the freight infrastructure system may be compared to a river system – small streams feed larger tributaries which combine to become a river. Local roads and rail road branchlines are the small streams for intrastate freight movements which in turn are the tributaries feeding the river of interstate and international freight movements.

To facilitate public discussion regarding the designation of a Strategic Freight System (SFS), NDDOT developed an index consisting of three levels called the “**North Dakota Strategic Freight System Index**” (see Table 1). The index classified freight transportation infrastructure necessary to sustaining the state’s economic growth and competitiveness relative to International/Interstate, Regional/Intrastate, and Local movements of freight.⁴ Next, NDDOT developed a matrix analyzing segments of the State Highway System in comparison to the components of the SFS. While no segment of the State Highway System exhibited all of the components of the SFS, enough segments exhibited multiple components to identify a SFS. The SFS focuses on the state roadway system and coordinates with local freight plans as they become available.⁵ The Strategic Freight System for Highways map may be found on page 5. Maps of the railroad, airports and pipeline portions of the SFS are shown on pages 6, 7 and 15, respectively.

Table 1 - North Dakota Strategic Freight System Index

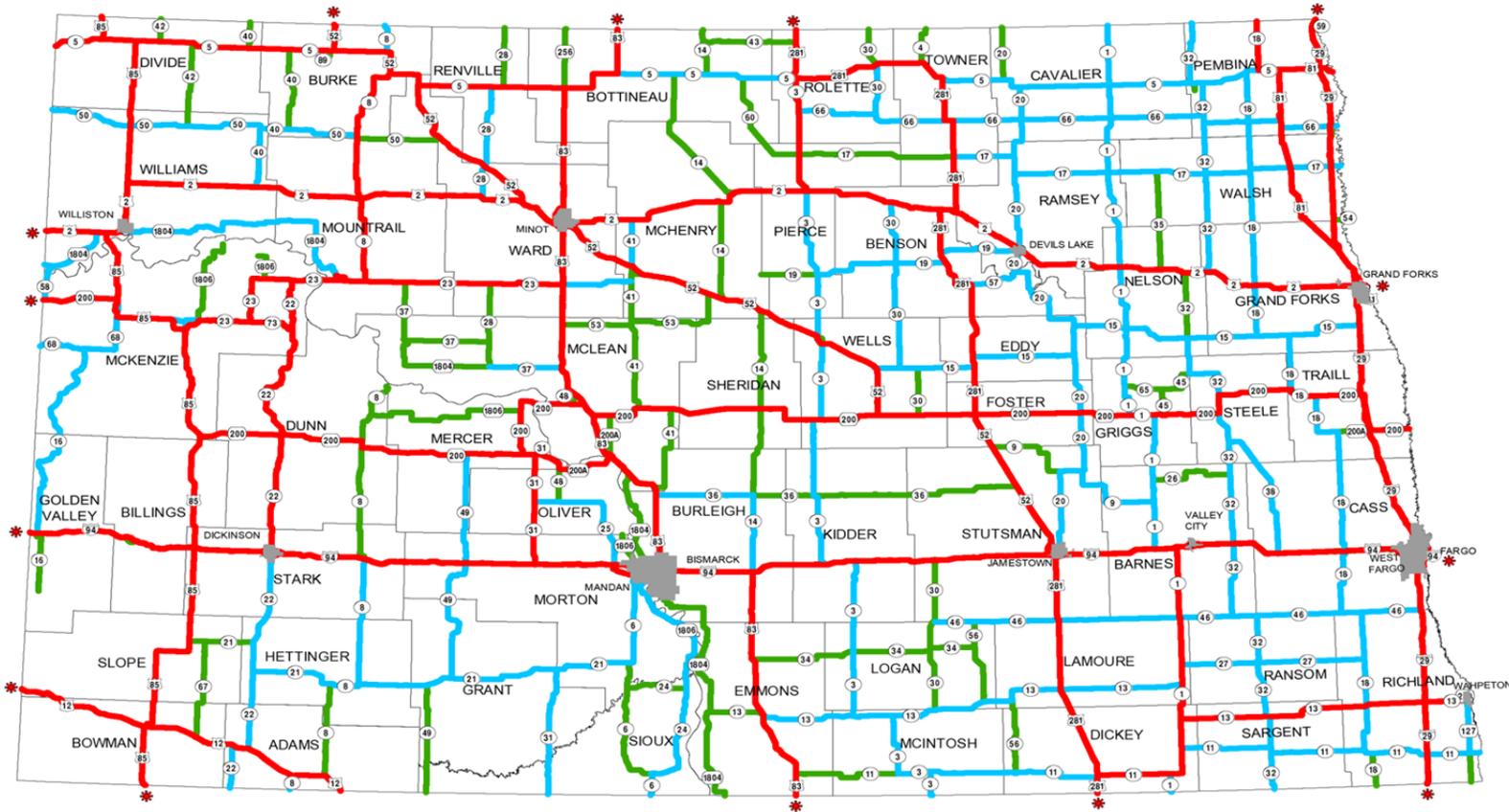
Freight Mode	<u>Level One</u> Critical Rural Freight Corridors International/Interstate	<u>Level Two</u> Regional/Intrastate	<u>Level Three</u> Local
Roads	Interstate & Interregional Highways Congressional Designated High Priority Corridors STRAHNET National Truck Network Energy/Agricultural Access Corridors High Truck Volume Principal Arterials	State Corridors District Corridors Limited County Major Collectors City Principal Arterials	District Collectors Some County, City, Township and Tribal Roads
Rail	Class I Mainlines STRACNET	Branchlines capable of carrying 286,000 lb. cars	Branchlines capable of carrying 268,000 lb. cars
Air	Commercial Airports Air Force Bases	General Aviation Airports	Public Use Airports Private Airports
Pipeline	Interstate Transmission Pipelines	Gathering Pipelines	Distribution Pipelines

⁴ See Appendix C for a list of the variables examined to designate the State’s Strategic Freight System components.

⁵ NDDOT will work cooperatively to coordinate the linkage of the state freight system with locally designated freight systems of the state’s urban areas, counties, townships, MPOs, neighboring states and Canadian provinces.

STATE STRATEGIC FREIGHT SYSTEM - HIGHWAYS

FIGURE 1



Strategic Highway Level — LEVEL 1 — LEVEL 2 — LEVEL 3
* GATEWAY TO THE STATE URBAN AREA

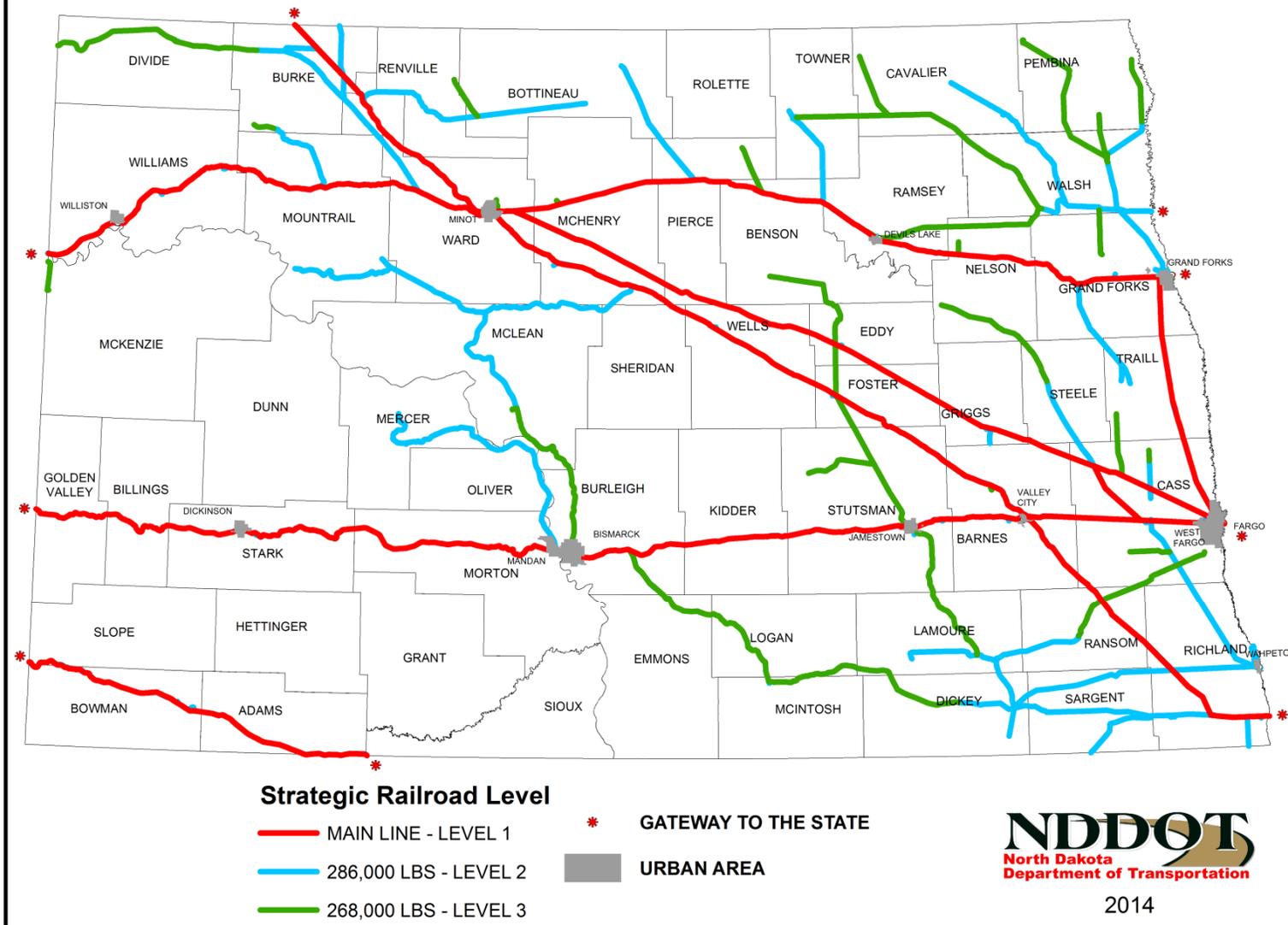


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STATE STRATEGIC FREIGHT SYSTEM - RAILROADS

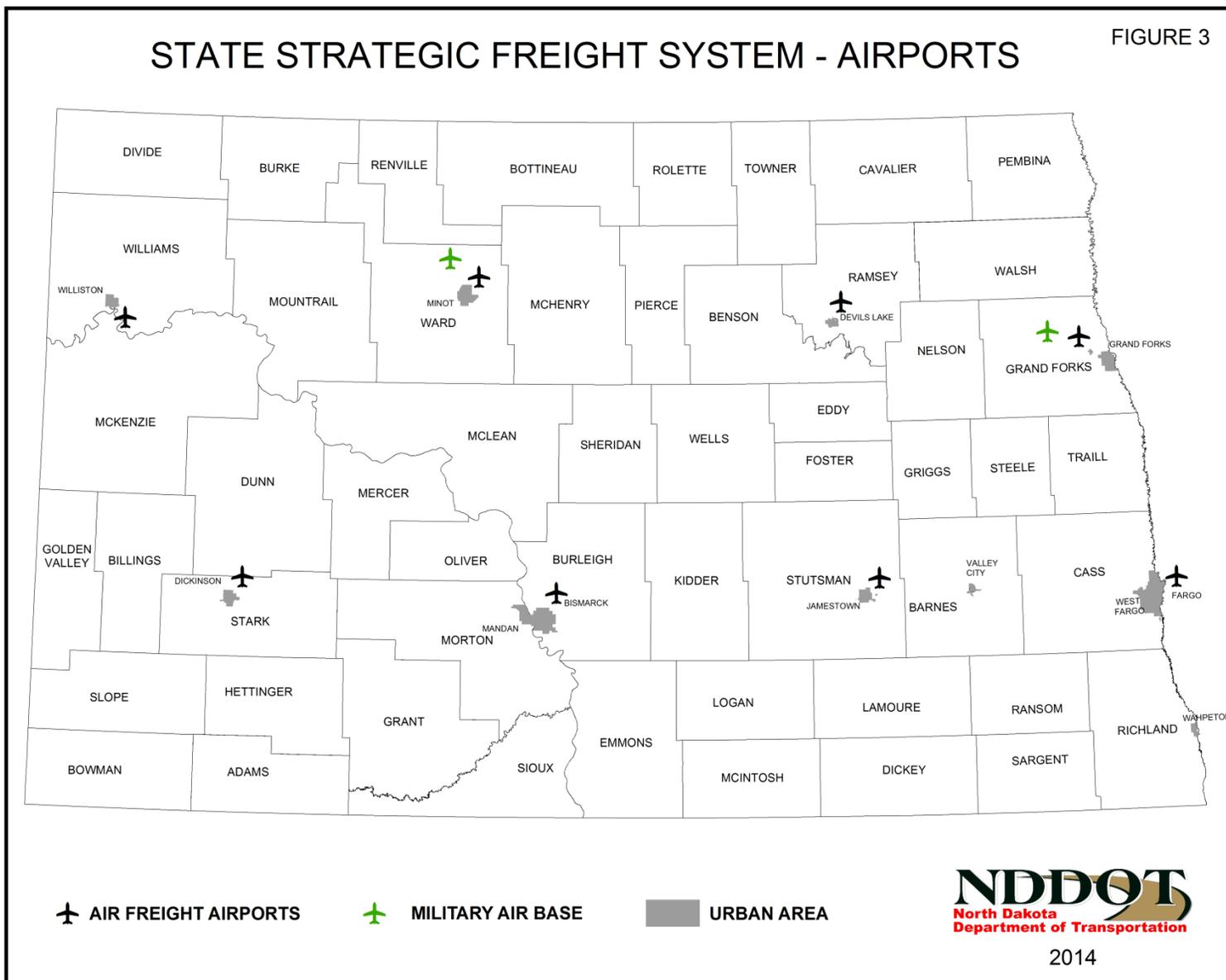
FIGURE 2



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STATE STRATEGIC FREIGHT SYSTEM - AIRPORTS

FIGURE 3



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Source: North Dakota Aeronautics Commission

Table 2 - Freight Facility Traffic Generator Index (continued)

Mode	<u>Level One</u> Critical Rural Freight Corridors International/Interstate	<u>Level Two</u> Regional/Intrastate	<u>Level Three</u> Local
Air	Air Freight Delivery Services Commercial Airline Freight US Air Force Bases Large to Mid-sized Cities	Crop Sprayers Air Taxi Services Mid-sized to Small Cities	Crop Sprayers Small Cities and Hamlets
Rail	Shuttle Bulk Grain Elevators Non-Shuttle Elevators Intermodal COFC/TOFC Facilities Transload Facilities (Frac Sand, Pipe, Oil, Coal) Large to Mid-sized Cities	Shuttle Bulk Grain Elevators Non-Shuttle Elevators Transload Facilities (Frac Sand, Pipe, Oil, Coal) Mid-sized to Small Cities	Non-Shuttle Elevators Small Cities and Hamlets
Pipeline	Pipeline Terminals Pipeline Tank Farms Natural Gas Processing Plants	Pipeline Terminals Pipeline Tank Farms Natural Gas Processing Plants	

Highway, Road & Street Infrastructure

Figure 4 depicts the state’s roadway infrastructure which is owned and maintained by state, tribal and federal governments, counties, municipalities, and townships.⁶ Table 3 – Roadway Mileage and Ownership, shows the roadway mileage owned and maintained by the various levels of government. The freight volumes carried, and the level of service provided by the state’s roadway system varies significantly from the fully-controlled, multi-lane Interstates to unmaintained prairie trails.

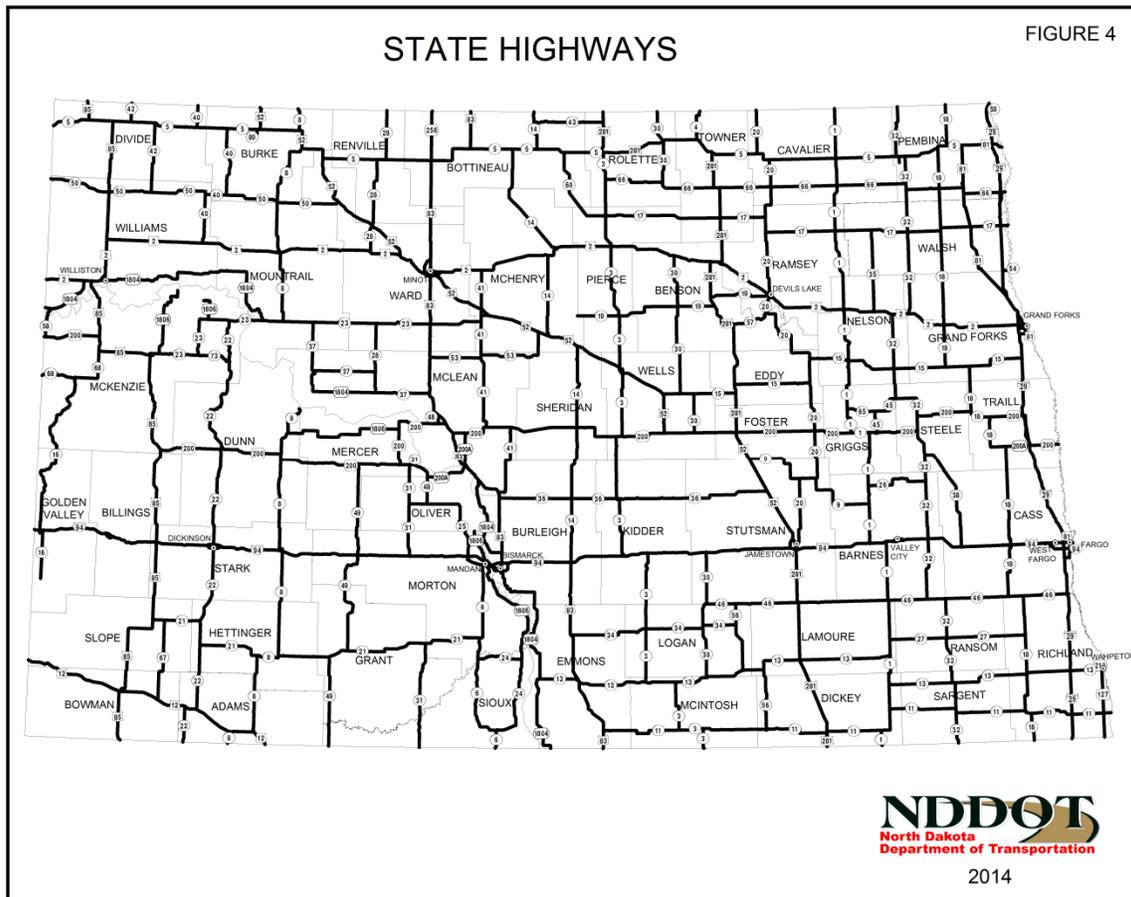
Unlike many other states, in recent years North Dakota has continued to see an increase in Vehicle Miles Traveled (VMT). In 2012, North Dakota’s highways, roads, and city streets carried a total of 10.1 billion vehicle miles traveled (VMT). State highways accounted for 6.7 billion, or 66.1% of all VMT. Truck traffic on state highways accounted for 1.5 billion VMT. With 55.4% of NDDOT’s total roadway miles, the Interstate, Interregional and State Corridors accounted for 87.7% of the total truck VMT on the State Highway System.⁷

Between 2000 and 2012, daily truck VMT on the State Highway System grew from 1.8 million VMT to 4.1 million VMT, a 130% increase. During this same period of time the percentage of

⁶ Appendix F - Statutory Authority and Constitutional Restraints on Freight-Related Investments

⁷ Interstate, Interregional and State Corridors are highway levels in NDDOT’s Highway Performance Classification System (HPCS)

trucks as a percent of total VMT increased from 14.7% to 22.4%. It is assumed a similar increase in truck VMT on the state's local roads occurred.



North Dakota's truck VMT increase is primarily attributable to increased freight traffic associated with its rapidly expanding energy, agricultural and manufacturing sectors. From January 2007 to January 2014, oil production in the state increased from 122,470 to nearly 933,130 barrels per day, and exceeded a million barrels per day in April 2014.⁸ Agricultural production in the state increased from 30.3 billion tons in 1980, to 89.4 billion tons in 2010. Farmers shifting to higher yielding crops (e.g. wheat acres to corn) coupled with literally hundreds of thousands of Conservation Reserve Program acres being converted to agricultural production are the primary causes of increased agricultural production. Also contributing to increased truck traffic is the state's growing manufacturing sector.⁹ North Dakota was also only one of three states to experience an increase in manufacturing between 2000 and 2012.

⁸ Department of Mineral Resources, Oil & Gas Division

⁹ Through 2008, North Dakota was one of only three states whose manufacturing employment had increased (+2,100) since 2000 (the other two states were Alaska and Nevada).

**Table 3
Roadway Mileage and Ownership**

<u>Ownership</u>	<u>Mileage</u>
State Highways	7,377
Other State Owned Roads	19
County Roads	18,762
Municipal Streets	3,905
Township Roads	56,753
Federal Roads (includes BIA roads)	1,546
Tribal Roads	51
<u>Trails/Unmaintained</u>	<u>18,257</u>
Total North Dakota Road Mileage	106,670

Source: NDDOT

Railroad Infrastructure

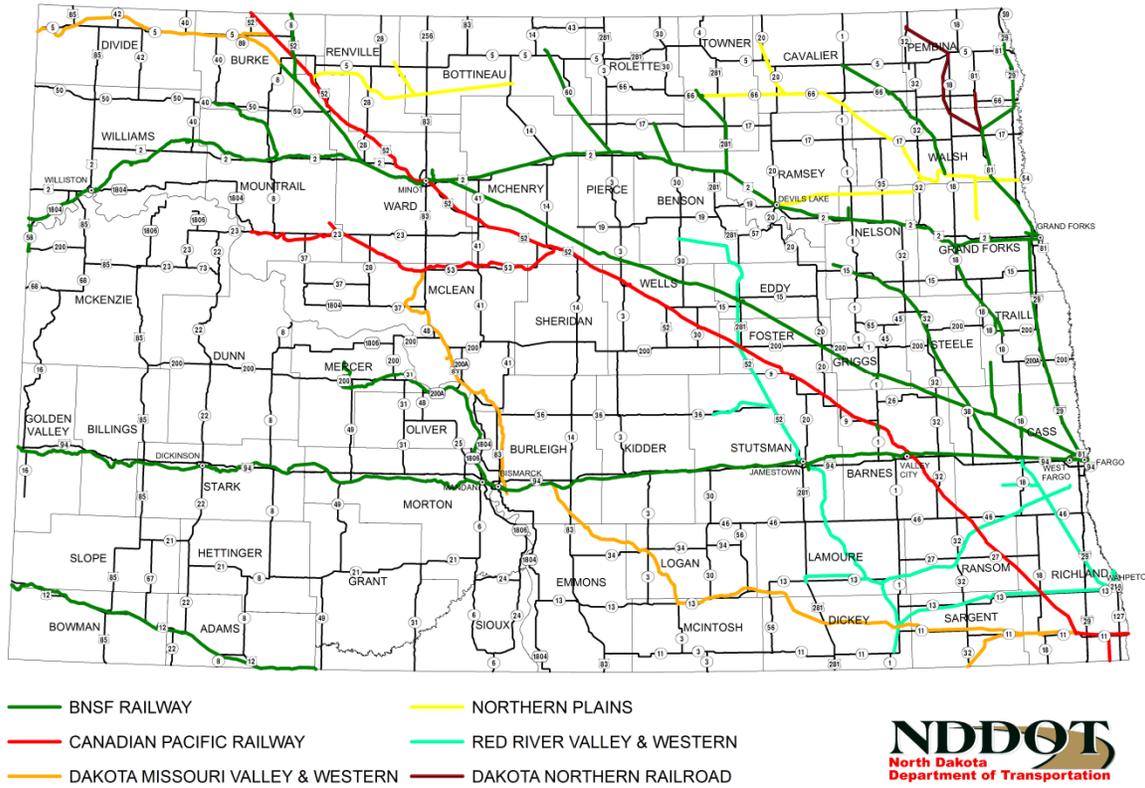
The state’s railroad system is privately owned, maintained, and operated by two Class I Railroads, three Regional Railroads, and one Short Line Railroad (see Figure 5). The two Class I Railroads, (BNSF Railway and CP Railway) that serve the state operate systems that extend beyond North Dakota’s borders. These railroads traverse the state linking sea ports to major urban areas, resource production areas such as North Dakota’s rich agricultural region to food processors, the Bakken Oil Formation to out-of-state refineries, and the state’s manufacturers to domestic and international consumers. The Regional and Short Line railroads serving North Dakota primarily operate within the state, however, all of them except the Dakota Northern Railroad also operate on track in adjacent states. In the case of the Northern Plains Railroad, it operates on track in another state in order to access its affiliated Class I Railroad.

Like highways, rail lines are subject to weight limitations based on gross carload weight. The current standard for rail cars comprising unit trains is 286,000 lbs. Lines not capable of carrying 286,000 lb. cars are more likely candidates for abandonment or in need of substantial upgrades (see Table 4).

Rail traffic in the state has grown substantially due to the same factors: growth in energy, agricultural, and manufacturing production. A summary of public waybill data shows rail freight originating in North Dakota doubled between 2000 and 2011. Between 2000 and 2011, the daily number of trains on BNSF’s Glasgow Subdivision increased from 20 to 38. Train traffic through Fargo, ND has increased from 68 trains per day in 2008 to 100 daily trains in 2014 (Source: BNSF). Increased rail freight traffic has resulted in an upswing in at-grade rail crossing incidents, and requests for crossing improvements, signalized crossings and additional rail quiet zones. Table 5 indicates the number of public railroad at-grade crossings on North Dakota’s rail system.

RAIL OWNERSHIP

FIGURE 5



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Table 4
Railroad Mileage – Mainline & Branchline 286,000 lb. & 268,000 lb.

Railroad	Mainline Mileage	286,000 lb. Branchline Mileage	268,000 lb. Branchline Mileage	Total Mileage
BNSF	1,112	451	134	1,697
CPR	359	124	0	483
DMVW	0	157	237	394
DN	0	0	51	51
NPR	0	104	190	294
RRVW	0	189	223	412
Totals	1,471	1,025	835	3,331

Source: BNSF et al.

Table 5
Railroad Public Crossings¹⁰

Railroad	Signalized¹¹	Stop Signs	Crossbuck/Yield	Over/Under	Total
BNSF	368	27	1,182	126	1,703
CPR	98	18	404	19	539
DMVW	30	8	365	4	407
DN	16	1	95	0	112
NPR	22	0	330	2	354
RRVW	53	3	440	5	501
Total	587	57	2,816	156	3,616

Source: BNSF et al.

Crude oil production in the state has increased at phenomenal rates and the pipeline industry has struggled to keep pace. Since the state has lacked adequate pipeline capacity (see Table 6), this created an opportunity for the state's Class I Railroads to transport oil by tanker cars. Even though rail transportation of crude oil is approximately three times more expensive than pipeline, rail crude oil transportation shipments has grown from 30,000 barrels per day in 2008, to 700,000 barrels per day in 2014¹². In September 2014, rail tanker cars carried approximately 60% of the crude oil produced in North Dakota.

In addition to available pipeline capacity, the transportation of crude oil by pipeline versus rail is largely driven by economics. Other factors affecting the choice of mode for shipping North Dakota crude oil include the product's ultimate destination since rail transportation offers access to areas of the country that cannot be reached via pipelines. In 2013, the state had 15 rail oil transload facilities on BNSF rail lines and five on CP rail lines.

¹⁰ In addition to public rail crossings, there are 1,219 private crossings on North Dakota's rail system.

¹¹ Signalized crossing numbers also include four-quadrant gates and flashers

¹² Figures obtained from the North Dakota Department of Mineral Resources, Oil and Gas Division

Table 6
Daily Rail & Pipeline Crude Oil Transportation Capacity (barrels per day)

	2007	2008	2009	2010	2011	2012	2013	2014*
Pipeline Capacity	230,000	272,000	286,000	337,500	413,000	463,000	583,000	783,000
Rail Transload Capacity	0	30,000	95,000	115,000	265,000	660,000	865,000	1,175,000
Total	230,000	302,000	381,000	452,500	678,000	1,123,000	1,448,000	1,958,000

*Projected

Source: North Dakota Pipeline Authority

Intermodal Rail Container Service – North Dakota does not have any rail facilities that offer dedicated intermodal container service. North Dakota Port Services in Minot and the Northern Plains Commerce Center in Bismarck both provide shippers access to non-dedicated intermodal service.

The nearest dedicated intermodal rail container service available to North Dakota is:

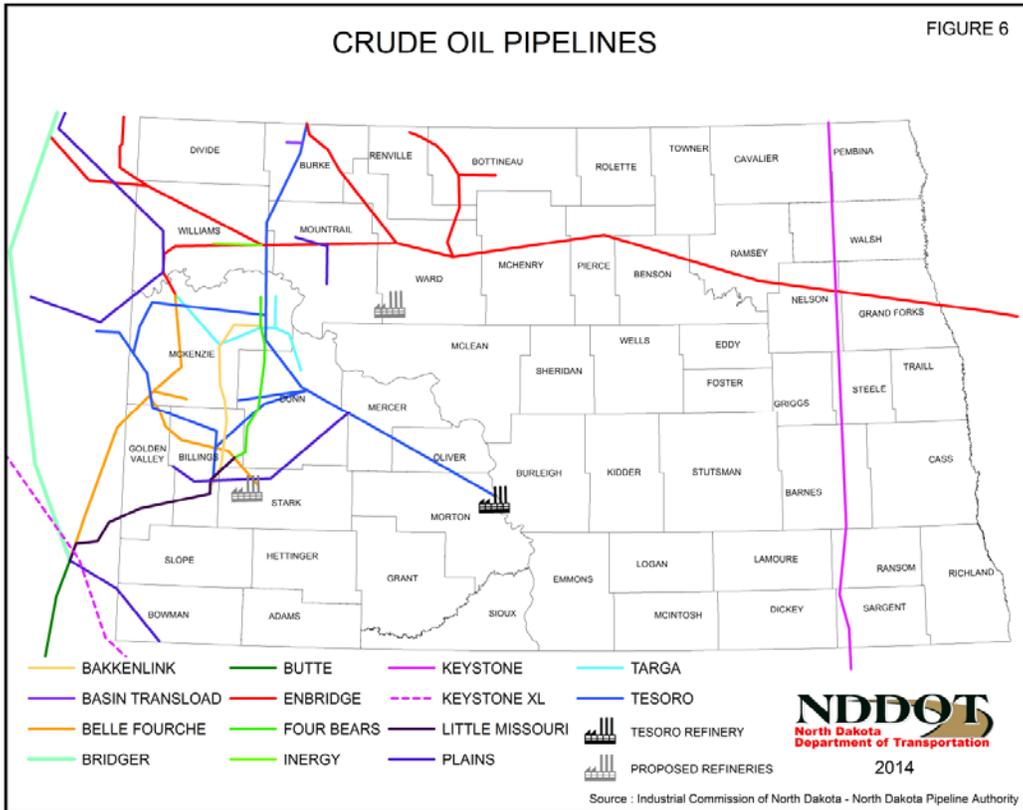
- BNSF Railway – St. Paul, MN, Chicago, IL, Omaha, NE, and Denver, CO
- Canadian Pacific Railway – Minneapolis, MN, Regina, SK, and Winnipeg, MB
- Canadian National Railroad – Chicago, IL, Winnipeg, MB, and Saskatoon, SK
- Union Pacific Railroad – Chicago, IL, Council Bluffs, IA, and Denver, CO

Pipeline Infrastructure

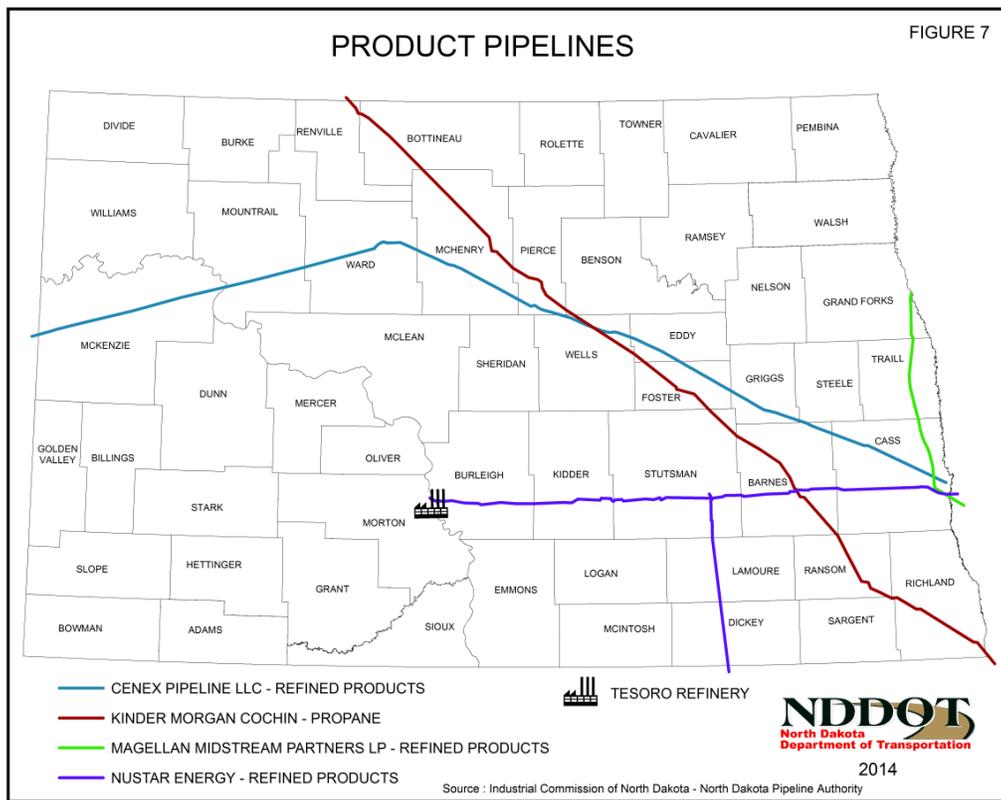
North Dakota’s pipeline system is comprised of three levels of pipelines: Interstate Transmission, Gathering, and Distribution. In 2013, a total of 47 companies owned and operated 17,540 miles of transmission pipelines in North Dakota (see Table 7 on pages 17 and 18). Pipelines serving the state transport several commodities including: crude oil, oil products, natural gas, carbon dioxide and other gases, and water. The state freight plan only considers Interstate pipelines used to transport energy-related commodities (see Figures 6, 7 & 8).

North Dakota’s tremendous increase in crude oil and natural gas production has made it difficult for pipeline companies to keep pace with demand. Between 2008 to September 2014, crude oil production increased from 122,470 barrels to 1,184,635 barrels per day, and natural gas production increased from 380 MCF¹³ to 1,403 MCF per day. In 2013, the state’s crude oil pipeline capacity was 583,000 barrels per day which is up from 230,000 barrels per day in 2007. In the case of natural gas, processing plant construction has lagged behind production due to large supplies and depressed market prices. Currently, nearly 30% of the natural gas produced in North Dakota is flared; the remainder is being transported by pipelines.

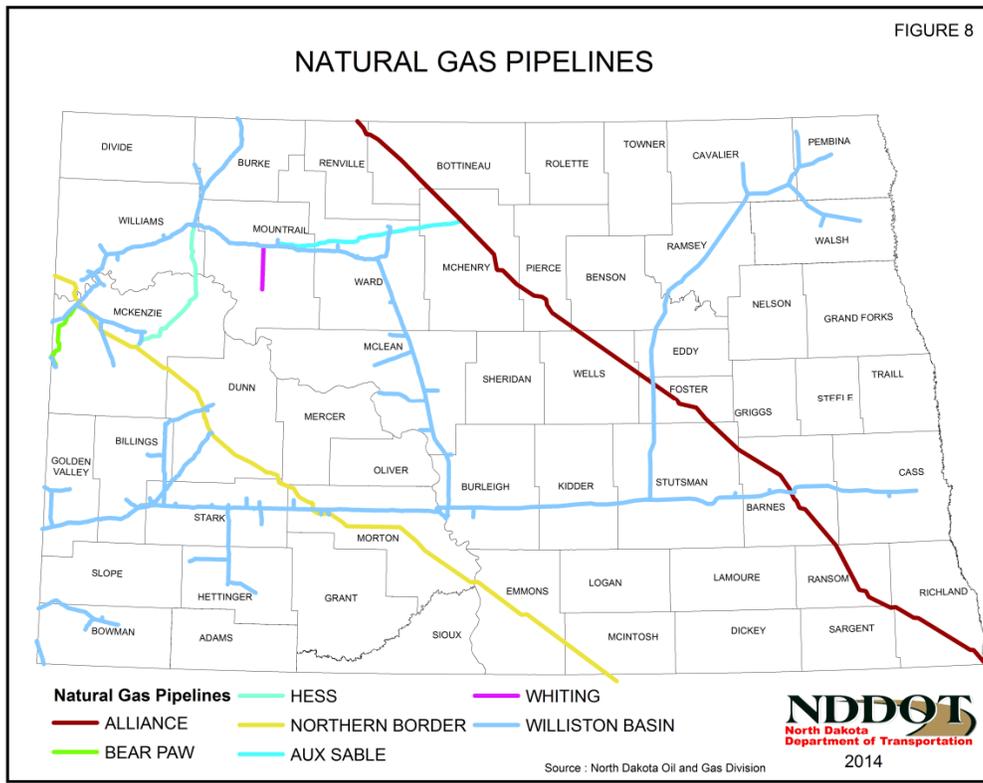
¹³ MCF abbreviation denotes a thousand cubic feet of natural gas.



Source: North Dakota Pipeline Authority



Source: North Dakota Pipeline Authority



Source: North Dakota Pipeline Authority

Table 7
Pipeline Company Mileage & Product

<u>Oil Pipeline Companies</u>	<u>Mileage</u>	<u>Product</u>
18 Companies	5,062.0	Crude Oil
<u>Natural Gas Companies</u>		
5 Companies	2,223.9	Natural Gas
<u>Gathering Companies</u>		
21 Companies	10,219.1	Gathering Oil & Gas
<u>CO2 Pipeline</u>		
1 Company – Synthetic NG Pipeline	34.7	CO2
<u>Miscellaneous & Loading Facilities</u>		
2 Companies	0.00	Rail Loading
TOTAL PIPELINE MILEAGE	17,539.7	
	Source: North Dakota Pipeline Authority	
<u>Natural Gas Processing</u>	<u>2008</u>	<u>2014</u>
Number of Gas Processing Plants	12	24
Processed Natural Gas in Million Cubic Feet Per Day	380	1403
	Source: North Dakota Pipeline Authority	

Airport Infrastructure

North Dakota has 89 airports that are publicly owned and operated by municipal, county, and township governments. The airport at Fort Yates, North Dakota is owned and operated by the Standing Rock Sioux Tribe. The state also has 220 privately owned airports, and two Air Force Bases at Minot and Grand Forks owned by the US Department of Defense.

Two air freight companies serve the state; United Parcel Service (UPS) and Fed Ex. UPS flies freight directly to eight North Dakota cities (Fargo, Grand Forks, Devils Lake, Jamestown, Minot, Bismarck, Williston and Dickinson) from its regional facility located in Sioux Falls, SD. Fed Ex flies directly in to six cities (Grand Forks, Fargo, Minot, Bismarck, Williston and Dickinson). UPS also delivers air freight from Grand Forks via truck to Fargo, Devils Lake, and Jamestown; truck deliveries are also made from Fargo to Jamestown. Additionally, the commercial airlines operating in North Dakota transport air freight and several small air service companies deliver air freight in addition to their passenger service. Large volumes of specialized military freight, and in rare instances emergency relief related freight, are delivered to the state's two air force bases by the US Air Force.

Although air freight constitutes the least amount of total freight by weight and volume, the corresponding value of air freight tends to be quite high and very important to a segment of the state's economy. As North Dakota's economy continues to grow and diversify, air freight, and in particular, overnight air freight is increasingly becoming more important in North Dakota. A wide variety of air freight is transported daily into and out of North Dakota. Commonly shipped items include: parts for oil field equipment and electrical power plants, sophisticated computer software and hardware, medical supplies and laboratory equipment, pharmaceuticals, human and livestock vaccines, parts for automobile, truck and farm equipment, and a host of other time-sensitive or high value freight. One of the more unusual air freight movements out of the state has been the air shipment of cattle to Kazakhstan which is done to reduce animal mortality associated with long transit times.

NORTH DAKOTA FREIGHT PLAN – STAKEHOLDER AND PUBLIC INPUT

Stakeholder and public input is a vital component of NDDOT’s planning and project development processes. To develop the *North Dakota State Freight Plan*, NDDOT employed a series of three surveys soliciting input from more than 350 stakeholders representing all levels of government, economic sectors, businesses, industry associations, and individuals. The first survey solicited stakeholder opinions on significant trends and issues affecting the future of freight movements. The second survey was designed to identify the needs of North Dakota’s freight system. The third survey’s questions were asked to identify freight bottlenecks, freight generators with transportation problems, and conditions that cause freight delays.

In addition to being included as stakeholders responding to the three-part survey mentioned above, the states and provinces surrounding North Dakota were asked to complete a fourth survey regarding cross jurisdictional issues affecting freight movements including bottlenecks, gateways and corridors, and future freight system infrastructure needs. This survey was conducted electronically. All of North Dakota’s neighboring states (Minnesota, South Dakota, and Montana) and Canadian provinces (Manitoba and Saskatchewan) responded. Full results of NDDOT’s stakeholder and public input process may be found in Appendix J – Stakeholder and Public Involvement Freight Plan Survey Responses, and Appendix K – Freight Trend Survey Responses Surrounding States and Provinces.

North Dakota freight stakeholder comments were evaluated to formulate freight related goals for the North Dakota State Freight Plan. After an analysis of comments it was determined that the stakeholder identified Needs had strong correlation with the public comments used to formulate North Dakota’s long range transportation plan, *TransAction III*, as displayed in Table 8. Ultimately it was determined to use the goals from the State’s long range transportation plan given the strong similarities.

**Table 8
Freight System Needs**

Stakeholder/Public Identified Need	<i>TransAction III</i> Goal
Access to competitively-priced intermodal container rail service	Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts
Additional interstate pipeline capacity to export North Dakota crude oil	Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts
Expansion of the crude oil and natural gas pipeline gathering system	Goal 1 - Safe and secure transportation Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts
First/Last mile connections linking freight generators to the state’s strategic freight system	Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts
Targeted highway improvements to eliminate freight impediments (load restrictions, overhead structures, etc.) to the movement of freight	Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts
Additional mainline railroad capacity and safety enhancements at rail crossings	Goal 1 - Safe and secure transportation
Upgrading some short line railroad branch lines to carry 286,000 lb. rail cars	Goal 5 - Strong economic growth with consideration of environmental, cultural, and social impacts
An access management program for the State Highway System	Goal 1 - Safe and secure transportation Goal 2 - Sustainable and reliable mobility
A statewide, coordinated system (state & local roads), for permitting and routing of oversize/overweight vehicles, similar to the existing permitting system for state routes	Goal 4 - Communication and cooperation Goal 3 - Diversified and sufficient funding
Improved harmonization of truck size and weight regulations with neighboring states and provinces	Goal 4 - Communication and cooperation

Survey 1 - Freight System Trends and Issues.

The following identified trends and issues are listed in random order.

Trend/Issue 1 North Dakota's oil and natural gas production is expected to double by 2017, and to continue to rise for the next 10 to 15 years. Additional freight system capacity (highway, rail and pipeline) will be necessary to meet this challenge.

Trend/Issue 2 While the volume of ND crude oil moved by rail may increase; downward pressure on world crude oil prices coupled with increased pipeline capacity will lower rail's share of total movements.

Trend/Issue 3 North Dakota is experiencing unprecedented population growth resulting in increased volumes of inbound consumer-related freight; most of this freight will be transported by trucks.

Trend/Issue 4 North Dakota's increasing agricultural production will result in higher volumes of freight; in-bound seed, fertilizer, machinery, fuel, etc. and outbound bulk commodities, processed agricultural products, etc.

Trend/Issue 5 While the number of licensed grain elevators may decline, total elevator storage and throughput capacity will increase.

Trend/Issue 6 Spin-off industries producing equipment, supplies, and technology supporting the state's growing agricultural, manufacturing and energy sectors will create new freight movements and significantly increase the volume of freight.

Trend/Issue 7 Worldwide demand for high value-added food products will continue to grow. Reaching consumers will require North Dakota's freight system to be globally integrated, service and rate competitive, and technologically advanced.

Trend/Issue 8 Worldwide, many industries participate in an economy that is reliant on time-definite transactions, production flexibility and speed; air freight will play an ever increasing role meeting these demands.

Trend/Issue 9 North Dakota's agricultural producers and manufacturers, reacting to their customer's demands, will require containerized rail service that is accessible and affordable.

Trend/Issue 10 Differences in truck size and weight regulations between North Dakota and neighboring states and provinces hamper the region's economic competitiveness. Industries dependent on trucking would benefit significantly from harmonization of regulations.

Survey 2 - Strategic Freight System Needs.

The following identified needs are listed in random order.

- Need 1** Access to competitively-priced intermodal container rail service
- Need 2** Additional interstate pipeline capacity to export North Dakota crude oil
- Need 3** Expansion of the crude oil and natural gas pipeline gathering system
- Need 4** First/Last mile connections linking freight generators to the state's strategic freight system
- Need 5** Targeted highway improvements to eliminate freight impediments (load restrictions, overhead structures, etc.) to the movement of freight
- Need 6** Additional mainline railroad capacity and safety enhancements at rail crossings
- Need 7** Upgrading some short line railroad branchlines to carry 286,000 lb. rail cars
- Need 8** An access management program for the State Highway System
- Need 9** A statewide, coordinated system (state & local roads), for permitting and routing of oversize/overweight vehicles, similar to the existing permitting system for state routes
- Need 10** Improved harmonization of truck size and weight regulations with neighboring states and provinces

Survey 3 - Conditions Creating Freight Bottlenecks and Delays

Conditions Creating Freight Bottlenecks

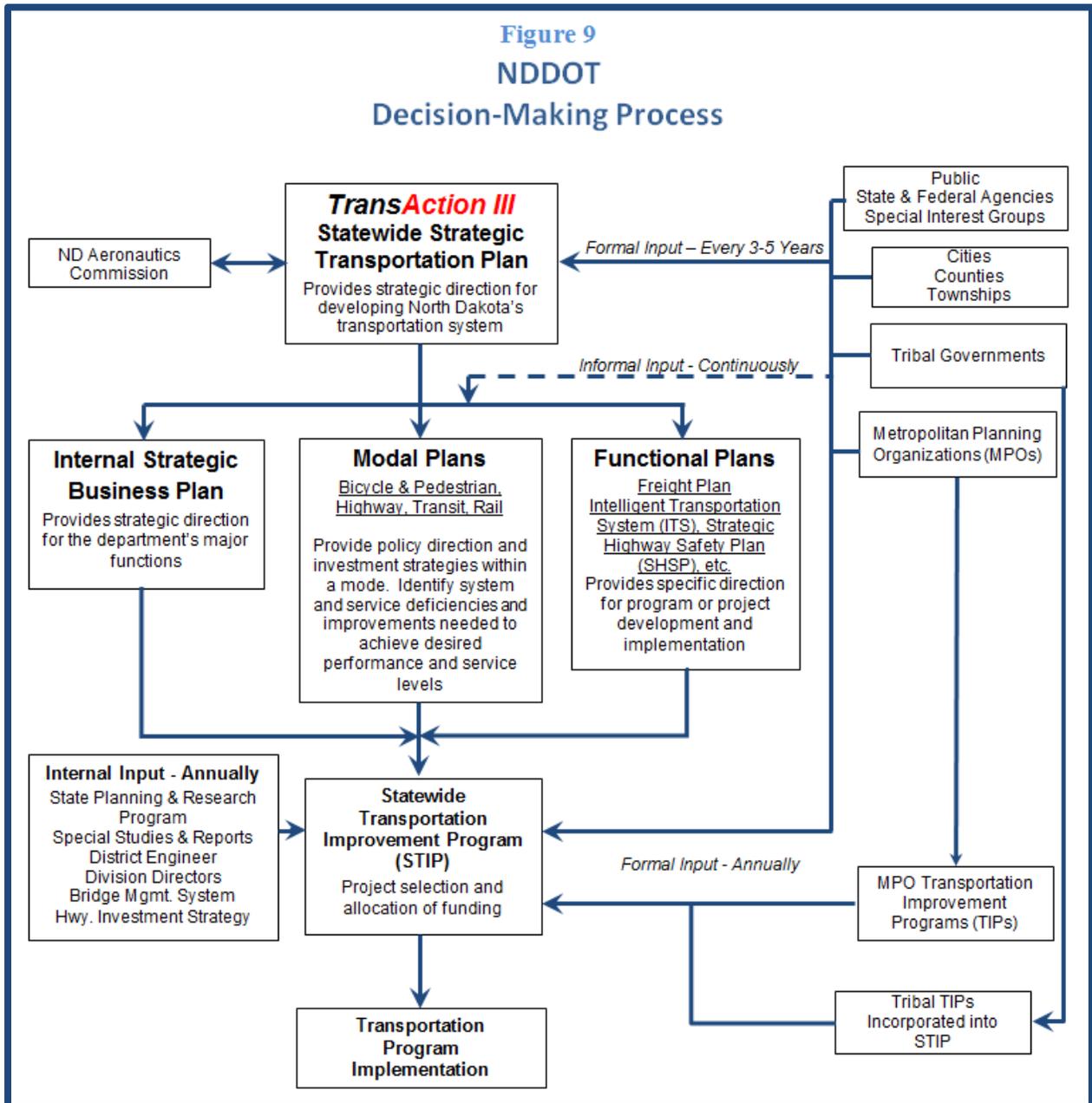
1. **Deficient Infrastructure**
 - a. Load Restricted Segments (Seasonal and/or Year-Round)
 - b. Height/Width Restricted (Structures & segments)
 - c. Bridge Restrictions (Height, Width, Load)
 - d. Speed Restricted Segments
 - e. Capacity/Congested Segments
 - f. Non-Friendly Truck Segments
 - g. Weather Impacted Segments (Flooding, Snow Blockage, Crosswinds, Etc.)
 - h. High Truck Volume Intersections
 - i. Safety Issues
2. **Inadequate Modal Connections** – bottlenecks exist where freight movement exchanges between transportation modes occur due to inadequate infrastructure and operational issues
3. **Lacking “First and Last Mile Connections”**
 - a. State Highway System – Local System (Differing Standards)
 - b. Traffic generators built on inadequate roads
4. **Lacking Access to Dedicated Intermodal Container Service**

Conditions Creating Freight Delays

1. **High Truck Volume Highway Segments (number and/or percent)**, particularly in the state’s oil producing region, is resulting in:
 - a. Real and perceived traffic safety issues (increased crashes, limited passing opportunities, over-sized movements on narrow roadways, etc.)
 - b. Slower overall traffic speeds and longer trip times (congested segments, traffic backing up due to an absence of left hand turns, platooning of trucks, intersections with inadequate turning radii, lack of passing and acceleration lanes, etc.)
 - c. Truck/Automobile conflicts in communities lacking truck reliever routes
2. **At-Grade Rail Crossings** – blocked crossings due to the increased number and length of trains is resulting in:
 - a. An increase in the requests for crossing improvements – signals, separations, Quiet Zones, etc.
 - b. Concerns regarding cross rail access for emergency response units (police, fire, ambulance, etc.)
3. **Construction Work Zones**
4. **Inadequate Inter-Jurisdictional Coordination**
 - a. Infrastructure (construction schedules, differing design characteristics, etc.)
 - b. Operations (snow removal, trip permitting, etc.)
 - c. Intelligent Transportation System applications
 - d. Land use/transportation plan
5. **Inadequate Incident/Emergency Response** (vehicle crashes, derailments, pipeline spills, incident response, etc.)

NORTH DAKOTA FREIGHT PLAN – NDDOT FREIGHT IMPROVEMENT DECISION-MAKING PROCESS

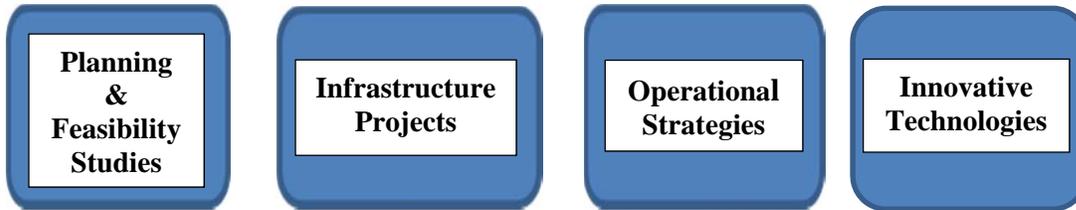
NDDOT’s decision-making process is guided by *TransAction III*, the State’s strategic transportation plan (see Figure 9). Within the context and direction provided by *TransAction III*, NDDOT develops modal and functional plans, such as the State Freight Plan, which are implemented through actions defined in the Department’s Strategic Business Plan (SBP). In addition to *TransAction III*, NDDOT’s freight investment strategies are guided by Section 24-01-03.1 of the North Dakota Century Code which states, “To the extent possible, the department of transportation shall implement the highway performance classification plan.”



Freight Plan Implementation

North Dakota's State Freight Plan will be implemented using four components consisting of: (1) planning and feasibility studies, (2) infrastructure projects that eliminate freight bottlenecks and delays, (3) new or modified operational strategies, and (4) the application of innovative technologies to improve the safe, secure, and efficient movement of freight.

Freight Plan Implementation Components



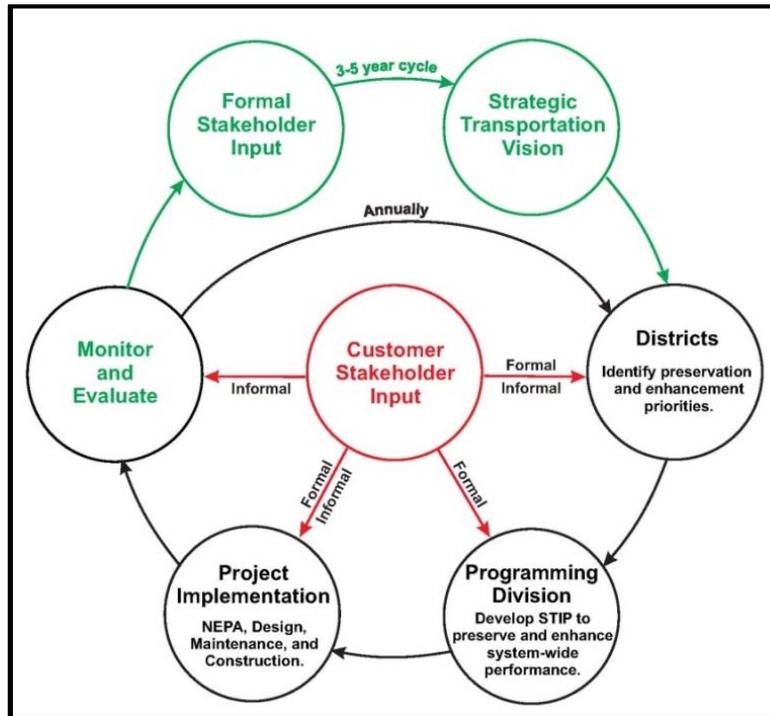
Planning & Feasibility Studies

NDDOT will conduct and support planning studies to improve the safe, secure, and efficient movement of freight. NDDOT's Planning/Asset Management Division (P/AM) will annually analyze the highway portion of the State Strategic Freight System to identify the location of potential freight bottlenecks. P/AM will use the conditions creating freight bottlenecks identified in Survey No. 3 to guide its analysis. P/AM will share the information it develops with the department's district engineers for their use to develop their annual list of project priorities. NDDOT's Planning/Asset Management and Materials and Research Divisions will also consider including freight-related studies as they develop their annual State Planning and Research Programs. NDDOT's Safety Division will consider freight safety as it develops the Highway Safety Plan, and the Local Government Division will consider supporting freight-related planning studies conducted by Metropolitan Planning Organizations and local governments. Internally, the development of other modal plans, such as the State Rail Plan, will be coordinated with the State Freight Plan. Externally, NDDOT will coordinate with the North Dakota Aeronautics Commission when updating the State Aviation System Plan. The Department will also cooperatively work with the state's tribal governments, institutions of higher learning, the consulting industry, and other states through pooled fund studies.

Infrastructure Projects

The development of freight-related projects is a cyclical and ongoing process (see Figure 10). Potential freight-related improvement projects may be identified by NDDOT's internal planning and engineering processes and by the department's customers and stakeholders. Annually, each of the department's eight district engineers will consider freight-related projects as they develop their list of project priorities to preserve and/or enhance the State Highway System. NDDOT district engineers submit their prioritized project lists to the department's Programming Division for consideration in the development of the annual Statewide Transportation Improvement Program (STIP). Generally, freight-related projects will typically enhance the State Highway System's functional capacity by eliminating conditions that create freight bottlenecks and delays, improve safety, or expand the operational efficiency of existing infrastructure.

**Figure 10
Freight Project Development Process**



In addition to NDDOT’s investment strategies and legislative guidance, the Programming Division considers numerous factors including available funding, statewide system needs, and workload type to annually develop the STIP.¹⁴ Projects identified in the STIP are engineered, designed, and constructed. Opportunities for meaningful customer and stakeholder input, both formal and informal, are available at each step of the freight project development process.¹⁵

Monitoring and Evaluating through Performance Measurement

Once constructed, freight-related projects are monitored and evaluated to determine their effectiveness for eliminating freight bottlenecks and delays, and improving safety and operational efficiencies. Data generated during the monitoring and evaluation phase is analyzed and incorporated into NDDOT’s planning and engineering processes. A map identifying freight constraints on the state’s roadway network may be found here:

<http://www.dot.nd.gov/divisions/planning/freight/docs/NDFreightConstraintsMap.pdf>.

Currently, the NDDOT measures the state’s highway infrastructure capabilities and bottlenecks via a trending report of the Highway Performance Classification System (HPCS). Many resources including elements from the Highway Performance Monitoring System (HPMS) build the data for trends in this report. The HPCS analysis examines three main components (and

¹⁴ The Statewide Transportation Improvement Program also includes projects in the Transportation Improvement Programs of the state’s Metropolitan Planning Organizations and the Bureau of Indian Affairs Great Plains Regional Office.

¹⁵ NDDOT’s current investment strategy annually establishes expenditure targets for increasing the highway system’s functional capacity inclusive of projects to eliminate freight bottlenecks and delays.

combinations thereof): ride, distress, and load carrying capacity (load) on five levels of highways: Interstate, Interregional, State Corridor, District Corridor, and District Collector. The HPCS strives to balance the system's performance while maintaining the infrastructure through an investment strategy differentiated by the level of highway.

Based on characteristics identified by stakeholders, the NDDOT has drafted a functional capacity related performance measure to assess when and where improvements may be necessary to meet the needs of its customers. Functional capacity is an asset class that provides a network measure of roadway functional restrictions. Functional restrictions are defined as factors that impede traffic flow such as load restrictions, high traffic flow, and roadway width, etc.

The measure will assess the state network for restrictions over time and assist the NDDOT in identifying possible treatments to alleviate the restrictions. Using this measure and following trends over time will ultimately provide statistics as to the effects of the implemented improvement on the functional service provided to the system users. Once implemented, the functional capacity measure is expected to help guide future freight-related investment decisions at NDDOT.

Operational Strategies

Through its internal business planning process NDDOT will review its major functions to identify operational strategies for improving the movement of freight at the district and division level. Ultimately, activities such as snow removal operations will be reviewed to improve the reliability of freight movements, and the project scoping process will be expanded to consider freight-friendly alternatives such as intersections designed to accommodate trucks movements.

NDDOT will also collaboratively work with its public and private sector stakeholders to identify and implement operational strategies to improve the safe, secure, and efficient movement of freight. Partnerships with businesses, local and tribal governments will be explored, as will cross-border initiatives with surrounding states and provinces. Some operational strategies may require advancing proposals to change state and federal laws and regulations.

Innovative Technologies

NDDOT will employ the use of innovative technologies and best practices to advance the safe, secure, and efficient movement of freight. In particular, the Maintenance Division will consider the expanded use of freight-related innovative technologies in the update of the Department's Intelligent Transportation System Plan. Additionally, NDDOT is launching an Innovation Program (infrastructure projects and operations) designed to improve system safety and reliability benefitting both personal and freight movements.

Other innovative technologies are outlined in the NDDOT Statewide ITS Draft three-year Plan, anticipated for adoption by early 2015 and include:

- Pre-trip Travel Information;
- En-route Driver Information;
- Traffic Control devices;

- Incident Management;
- Commercial Vehicle Electronic Clearance Capability;
- Commercial Vehicle Administrative Processes to include electronic purchase of credentials, automated mileage and fuel reporting and auditing, and international border electronic clearance;
- Hazardous Material Security and Incident Response Service;
- Emergency Notification and Personal Security Functionality;
- Archived Data Function in Information Management; and
- Maintenance and Construction Operations Functions to include fleet management, traffic monitoring, work zone management and more.

The NDDOT will continue to work with partners and stakeholders to identify new technologies and priorities into the future.

A summary of the current NDDOT ITS Inventory may be found beginning on page 12 of this linked document:

<http://regional.atacenter.org/northdakota/downloads/NDReportUpdate.pdf>