



# Bismarck-Mandan Regional Freight Study

December 5, 2018

*Prepared by HDR*



# Introduction

In the Bismarck-Mandan Region ***Every day is a Freight day***. The movement of goods and commodities to their respective markets supports the regional economy. The efficient, reliable, and safe movement of freight allows existing businesses to remain competitive and helps to attract new businesses to the region. In turn regional economic development and quality of life for area residents can be enhanced.

Currently, rapid population growth in the region is expected to increase by 3.5% annually between 2010 and 2020. While traditional population growth is typically 1% to 1.5% the doubling of growth within the Bismarck-Mandan region can largely be attributed to energy exploitation and development in the area. Such rapid growth raised concerns as to public service costs, the continued ability of the MPO region to grow efficiently, and how best to maintain quality of life for area residents. Additionally, increased requirements by the FAST Act and emphasis by federal and state institutions on the identification and designated freight routes further necessitated the need to study freight mobility in the region.

The purpose of the Bismarck-Mandan Regional Freight Study is to find the most used freight routes, detail the first and last mile of freight movement as well as freight movement through the region, and determine the need for investing in the local infrastructure to facilitate efficient and effective freight movement.

The regional freight study consist of the following tasks:

- Task 1 – Project management
- Task 2 – Freight stakeholders committee
- Task 3 – Collecting stakeholder input
- Task 4 – Identifying quantitative data sources
- Task 5 – Compilation of Freight profile
- Task 6 – Identification of key issues
- Task 7 – Freight plan recommendations / strategic framework
- Task 8 – Performance measure matrix
- Task 9 – Public outreach and meetings
- Task 10 – INFRA funding

Over twelve months, the regular communication and coordination among the Bismarck-Mandan MPO and the study team facilitated a smooth development of the regional freight study. Contained in the study are key topical documents that fulfilled the requirements specified by Bismarck-Mandan MPO and answers key questions identified prior to the development of the study. Each document supported the development of subsequent documents and culminated in the recommendations. While each document can be viewed independently, the progressive flow of documents and collective information supports the recommendations. As such all documents should be viewed in order to gain the optimal understanding of freight mobility in the region and how the recommendations were determined.

These documents include:

- Regional Freight Profile
- Identifying Key issues
- Freight Performance Measures
- Freight Funding
- Recommendations

## **Private Sector Stakeholder engagement**

The Bismarck-Mandan MPO engaged private sector stakeholders to gain the users perspective of freight mobility needs in the region. The project team contacted and engaged freight professionals from trucking, rail, air cargo, manufacturing, and shipping. Additional stakeholders in this group included academe, state and federal government, and associations.

Two in-person freight stakeholder sessions were conducted. The objectives of the April meeting were to introduce the study goals and objectives to freight stakeholders, explain the role of a freight stakeholder, and to seek freight mobility issues and needs from the users' perspective. A total of 10 persons participated and most asked to be included in further meetings and expressed their interest to be included in future freight related projects. The objective of the October meeting was to present information and material developed, the freight profile, and key issues and needs. The project team asked the freight stakeholders for feedback on the accuracy and thoroughness of the information.

Throughout the development of the freight study, the topical documents were posted and maintained on the project website. Periodic messages were sent to the private sector stakeholders to alert them of the information and to seek their input and feedback.

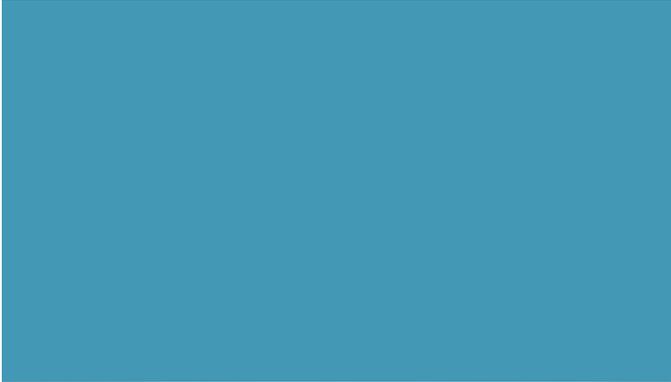
## **Public involvement**

Four in-person public involvement sessions were conducted. In April, one session in Bismarck and one session in Mandan focused on the introduction of regional freight study and its goals and objectives. Those in attendance were also encouraged to identify issues regarding the movement of goods and commodities in the region. In October, one session in Bismarck and one session in Mandan focused on presenting information and material developed, the freight profile and key issues and needs. The project team asked for feedback and responses to the information. It should be noted that attendance at these events was extremely low, only five attendees in April and none in October.

To enhance the dissemination of information to the public the October public involvement session was recorded and posted on Facebook. During the first week of November, over 7,000 persons were targeted regarding the freight information presentation. As a result over 1,000 persons opened the ad and viewed some portion of the presentation.

## **Data Collection**

A thorough data and information search was conducted to provide current and relevant information to support and inform the regional freight study. Numerous sources included federal, state and regional studies and reports, industry reports, multimodal carrier information, and federal commodity flow information. This information provided the foundation for the freight profile and were helpful in the preparation of the complete study. Sources of data and information are provided throughout the documents.



# Freight Profile

Bismarck-Mandan MPO Regional Freight Study

September 4, 2018



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# Introduction

Since the Bismarck-Mandan MPO region was first inhabited, the area has served as a commercial center along major trade routes. Its strategic location along Native American trade corridors led Lewis and Clark Expedition to cross the Missouri River in the region. Later, the area now known as Bismarck was initially founded as Edwinton when the North Pacific Railway reached the east bank of the Missouri River in 1872. Two years later, gold discoveries in the nearby Black Hills solidified the region as a freight-shipping center. Today, the Bismarck-Mandan MPO region remains an important freight junction point for several interstate and regional highways, as well as the BNSF and Dakota Missouri Valley & Western railroads.

Access to these key multimodal freight corridors is crucial to job creation and economic development in the region. While freight movement is a sign of a growing economy, it is also important to mitigate its negative impacts like noise, emissions, congestion and crashes. Through careful planning, freight movement can support an enhanced quality of life for the region's residents.

## Purpose of the Study

The Bismarck-Mandan Freight Study, sponsored by the Bismarck-Mandan Metropolitan Planning Organization (MPO) aims to improve freight movement in the region. The multimodal plan examines existing freight conditions, issues and trends. Using those lessons, goals and performance measures will be developed. To support those goals strategic recommendations will be developed to identify key initiatives they can undertake to support freight movement.

The Bismarck-Mandan MPO provides a forum to establish policies and plans for effectively addressing various regional transportation issues. Their area includes Bismarck, Lincoln, Mandan, and portions of Burleigh and Morton counties.

This document provides a profile of the existing freight system in the Bismarck-Mandan MPO region. It is divided into seven overall sections that detail the following:

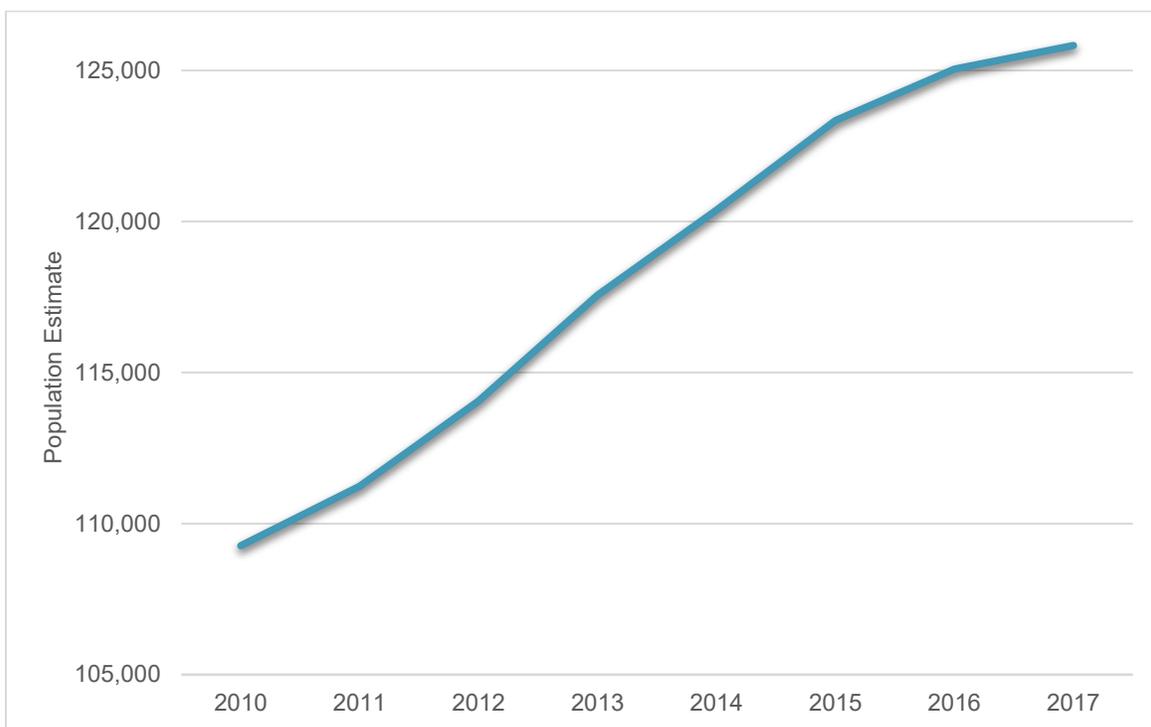
- Key Demographics
- Multimodal Freight Network
- Highway Freight Networks
- Highway Freight Network Performance
- Rail Profile
- Air Cargo Profile
- Pipeline Profile

# 1. Key Demographics

Before any transportation planning activity, it is important to understand the underlying demographic trends within the region. This is especially important to freight planning by capturing potential consumer demand.

## Population

The Bismarck-Mandan MPO region’s population growth is impacted by the crude oil industry’s business cycle. For example, The Bismarck-Mandan MPO region was the fastest growing metropolitan area in the nation between July 2012-2013. As drilling tapered off, so did the population growth rate.<sup>1</sup> In 2017, the US Census estimated the growth rate to be about one percent. Figure 1 illustrates historical population growth trends in the area between 2010 and 2017 for Morton and Burleigh counties. While significant population growth took place during peak drilling years, population growth has begun to trail off over the past three years.



**Figure 1 Morton and Burleigh County Estimated Population Growth, 2010-2017**

*Source: U.S. Census Bureau, Population Division*

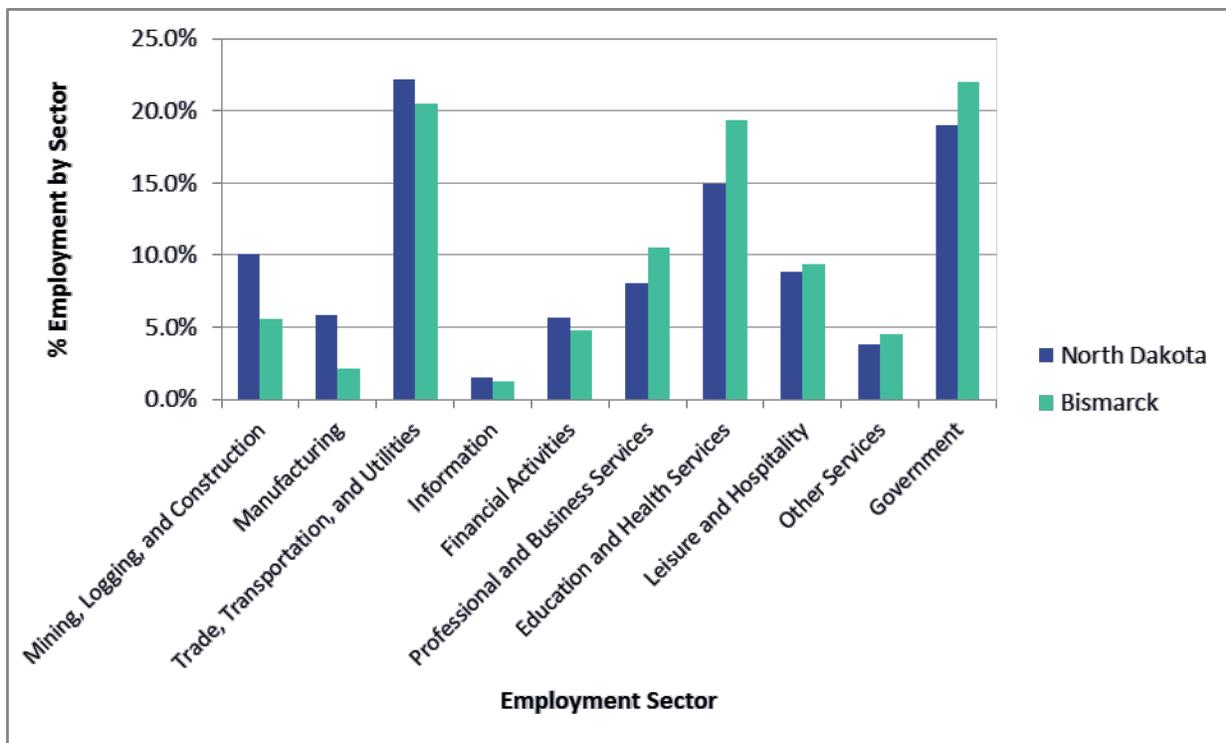
<sup>1</sup> [http://www.census.gov/newsroom/releases/pdf/CB14-51\\_countymetropopest2013tables.pdf](http://www.census.gov/newsroom/releases/pdf/CB14-51_countymetropopest2013tables.pdf)

## Employment

The Bismarck-Mandan MPO region’s economy is very freight dependent. Major industries in the Bismarck-Mandan MPO region which rely heavily on freight transportation include agribusiness, mining, manufacturing, and energy production. The corporate headquarters for many of the major energy companies working in North Dakota are located in this area. For example, Bismarck is the site of corporate headquarters for Dakota Gasification, which is a subsidiary for Basin Electric and is North America’s only commercial lignite coal to synthetic natural gas production facility. According to the Bismarck-Mandan Development Association, some of the largest freight-reliant and freight transportation related private employers in the area include:

- Bobcat/Doosan Company
- Dan’s Supermarkets
- Walmart
- BNSF Railway
- Cloverdale Foods
- Walmart Mandan

Employment (by sector) in the region is very similar to that of North Dakota, as shown in Figure 2. However, employment (just like population) is subject to a level of uncertainty given the crude oil business cycle.



**Figure 2 Comparison of Employment by Sector in North Dakota and Bismarck-Mandan MPO Region, February 2018**

Source: Bureau of Labor Statistics

## Location Quotient

Location quotients (LQs) provide a useful way to identify regional industrial clusters that are stronger than the national average. Essentially, which clusters are unique to the region and attract new dollars to the area. An LQ value greater than one indicates that the industry is stronger in the county than it is nationally. An LQ value lower than one indicates the opposite. Table 1 shows the annual LQs for Burleigh and Morton counties for 2016.

**Table 1: Location Quotients for Burleigh and Morton counties, 2016**

Industry	Morton	Burleigh
Construction	1.68	1.29
Natural resources/mining	1.27	0.41
Goods-producing	1.17	0.56
Trade, transportation, utilities	1.08	1.05
Other services	1.05	1.27
Education/health services	0.95	1.34
Service-providing	0.95	1.03
Professional services	0.92	0.83
Leisure and hospitality	0.90	0.92
Manufacturing	0.88	0.19
Financial activities	0.80	0.85
Information	0.64	0.62

## 2. Multimodal Freight Network

Freight movement provides economic benefits to the region through the shipment of parts to support production in the Bismarck-Mandan MPO region, its workers, as well as through the shipment of finished goods moved both into and out of the region. The economic vitality of the region relies on the multimodal freight system to support jobs and growth throughout the region.

### NDDOT Strategic (Multimodal) Freight System

North Dakota has developed the “North Dakota Strategic Freight System Index” that classifies “freight transportation infrastructure necessary to sustaining the state’s economic growth and competitiveness relative to International/Interstate, Regional/Intrastate, and Local movements of freight” (Table 2) (*North Dakota State Freight Plan, 2015: 4*).

**Table 2 North Dakota Strategic Freight System Index**

Mode	Level One Critical Rural Freight Corridors International/Interstate	Level Two Regional/Intrastate	Level Three Local
Highways	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

Source: *North Dakota State Freight Plan, 2015*

### 3. Highway Freight Networks

The continued development of an efficient and effective freight system relies on an understanding of the existing highway system. Decisions regarding future freight investments and policies are shaped by what exists today. This section discusses existing regional, state and national highway networks and key available performance characteristics of the system.

Among all of the networks, the following highways serve as the backbone of the region’s freight infrastructure:

I-94	Interstate 94 runs east-west across the state connecting Montana and Minnesota. It consists of two lanes in each direction with a separated median.
US 83	A north-south two-lane highway running through the state, ultimately connecting Canada to Mexico.
ND 6	A north-south highway. It runs from South Dakota Highway 63 to Interstate 94 Business Loop in downtown Mandan.
ND 1804	A northwest-southeast highway connecting South Dakota to Montana. ND 1804 is on the east side of the Missouri River.
ND 1806	A northwest-southeast highway connecting South Dakota to the Morton County border. ND 1806 is on the west side of the Missouri River.

#### National Highway Networks

##### National Highway Freight Network

The FAST Act replaced the Primary Freight Network and the National Freight Network with the National Highway Freight Network (NHFN). The network was established to help FHWA strategically direct Federal resources and policies toward improved performance of highway freight system. Figure 3 shows the NHFN in North Dakota. The NHFN system itself is a tiered system, which ranges from national corridors to last mile freight connections:

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data.
- **Other Interstate portions not on the PHFS:** These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities.
- **Critical Urban Freight Corridors (CUFCs):** These are public roads in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities.
- **Critical Rural Freight Corridors (CRFCs):** These are public roads not in an urbanized area which provide access and connection to the PHFS and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities.

The Bismarck-Mandan MPO region does not have any mileage on the PHFS. However, I-94 is included within the NHFN as an “Interstate Portion not on the PHFS.”

### **Critical Rural Freight Corridors and Critical Urban Freight Corridors**

Critical Rural Freight Corridors (CRFC) and Critical Urban Freight Corridors (CUFC) provide important regional and last mile connections within the NHFN. The North Dakota State Freight Plan identifies multiple CUFCs in the Bismarck-Mandan MPO area (Figure 4). A CUFC must be a public road in an urbanized area and meet one or more of the following criteria:

- Connects an intermodal facility to the Primary Highway Freight System (PHFS), the Interstate System, or an intermodal facility,
- Located within a corridor on a route on the PHFS and provides an alternative highway option important to goods movements,
- Serves a major freight generator, logistics center, or manufacturing and warehouse industrial land, or
- Important to the movement of freight within the region, as determined by the MPO or the State.

As of May 2018, NDDOT has not formally designated any CRFC routes.

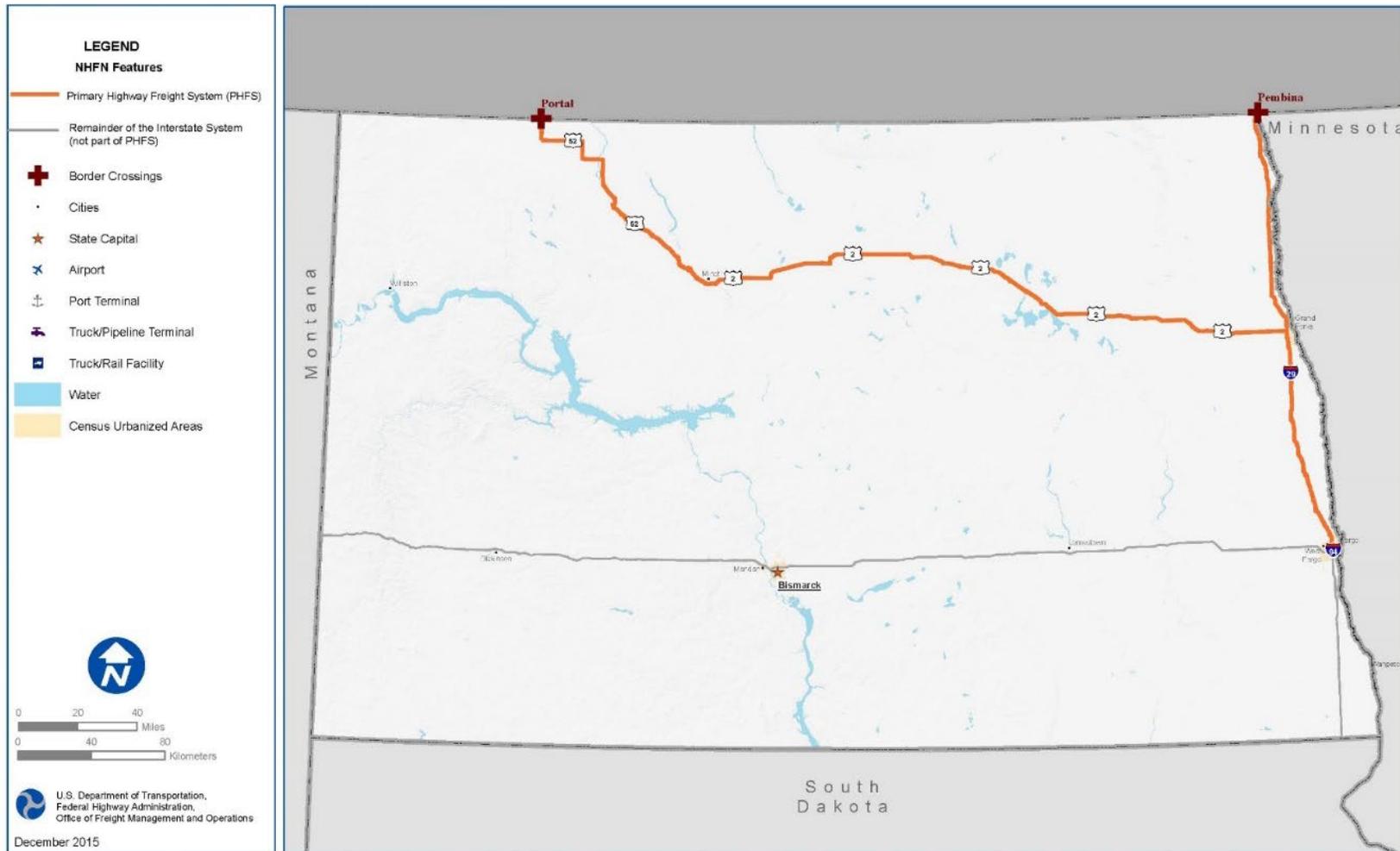
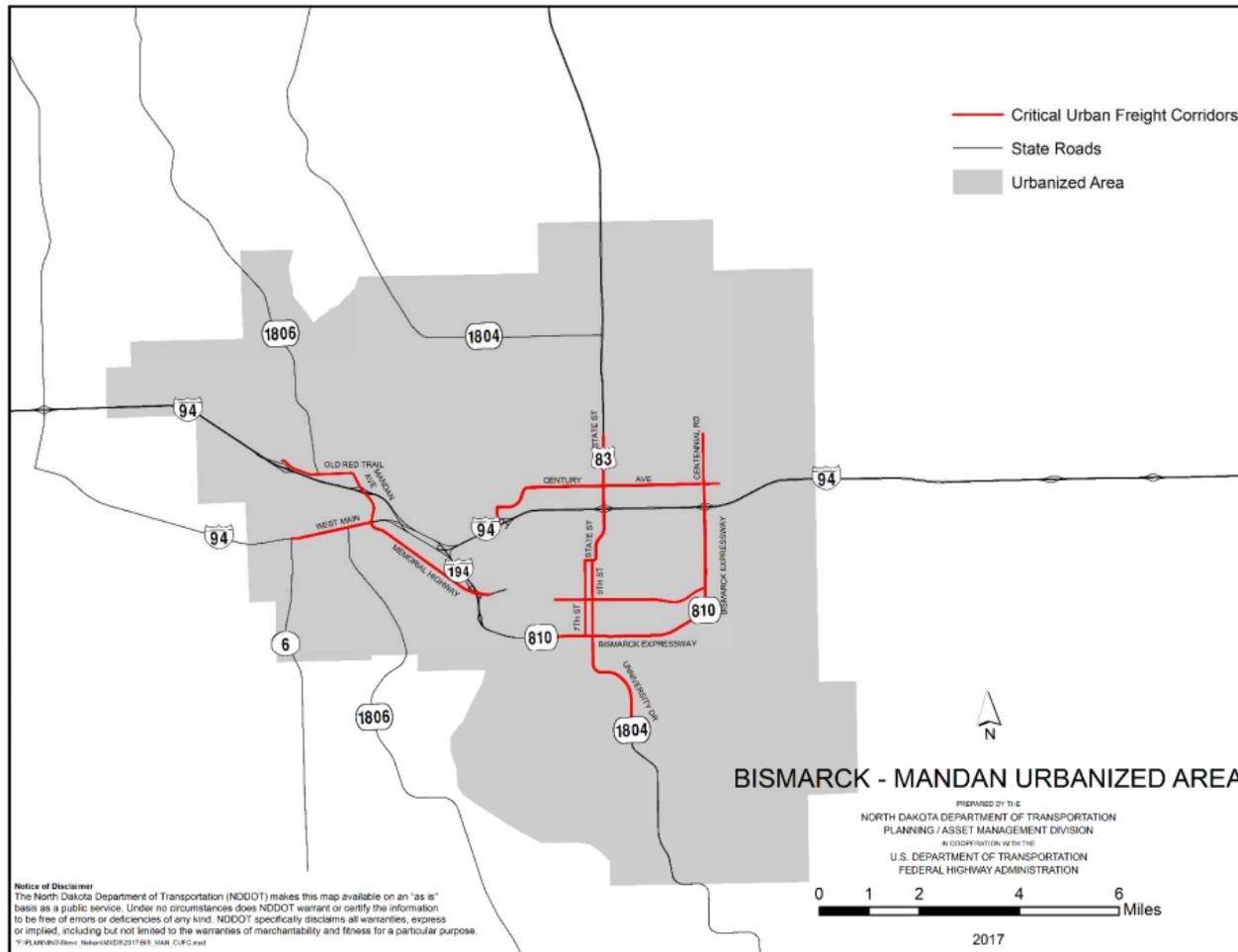


Figure 3 - National Highway Freight Network in North Dakota



**Figure 4 Critical Urban Freight Corridors – Bismarck-Mandan Urbanized Area**

*Source: North Dakota State Freight Plan Amendment for Compliance with the 2015 FAST Act, 2017*

**Strategic Highway Network STRAHNET**

The Strategic Highway Network (STRAHNET) was developed by the Department of Defense (DoD) to identify the roadways critical to the nation's defense and the deployment of troops overseas. During peacetime, these roadways support the movement of heavy armor, fuel, ammunition, repair parts, food, and other commodities to support military installations. Within the Bismarck-Mandan MPO region, STRAHNET includes I-94 and US 83 leading from I-94 to Minot Air Force Base.

**State Freight Highway Networks**

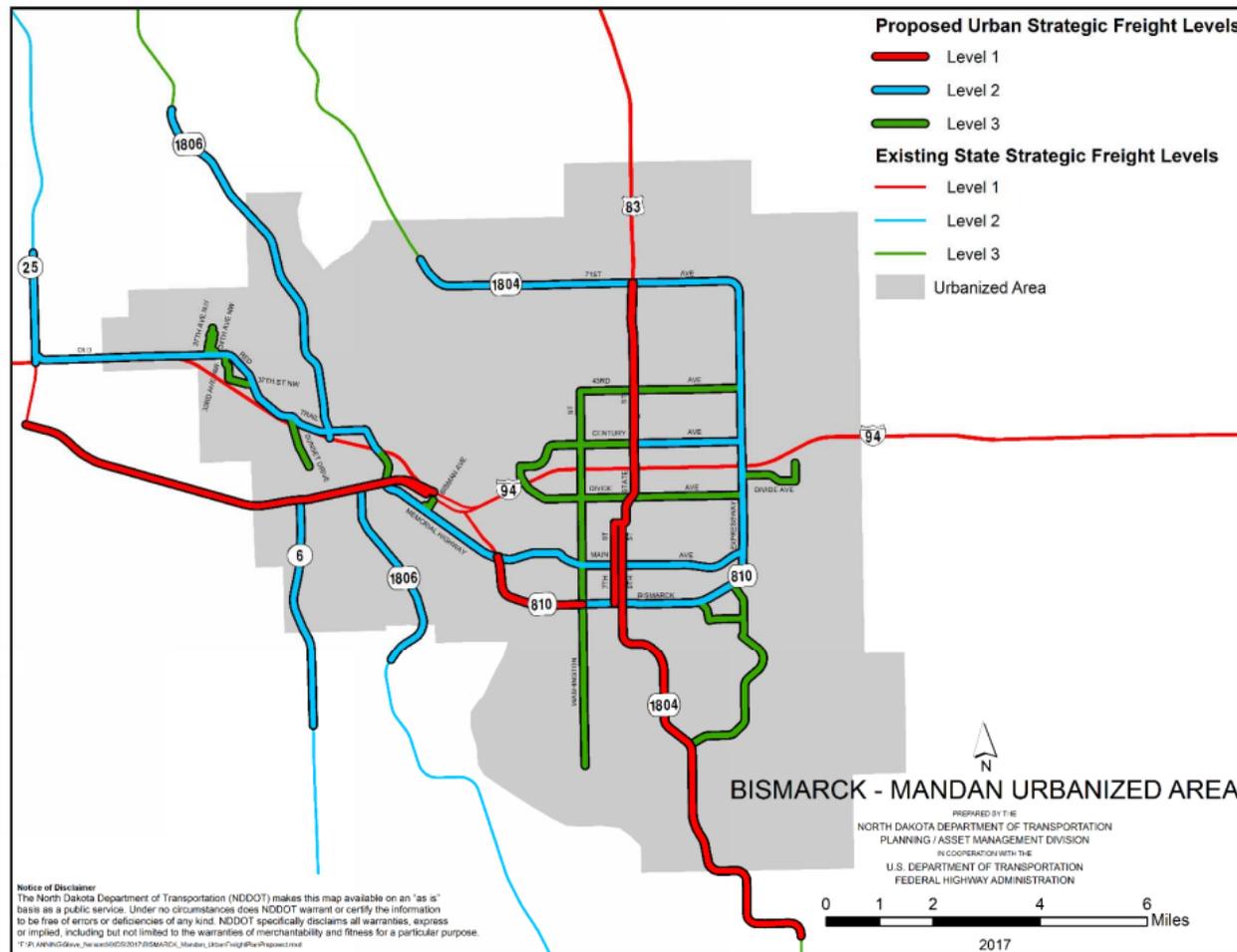
As described in Section 2, North Dakota DOT developed multimodal freight network that is focused on improving economic growth and competitiveness.

**State Strategic Freight System - Highways**

The State's Strategic Freight System includes several highways located in the Bismarck-Mandan MPO area (Figure 6). NDDOT describes these roads as necessary to sustain the state's economy and expand competitiveness.

**URBAN STRATEGIC FREIGHT SYSTEM**

Within the larger Strategic Freight System, the (proposed) Urban Strategic Freight System (USFS) that connects the State's Strategic Freight System to locally designated freight systems in urban areas. Figure 5 shows the proposed USFS in the Bismarck-Mandan MPO.



**Figure 5 Urban Strategic Freight System – Highways, Bismarck-Mandan MPO**

Source: North Dakota State Freight Plan Amendment for Compliance with the 2015 FAST Act, 2017

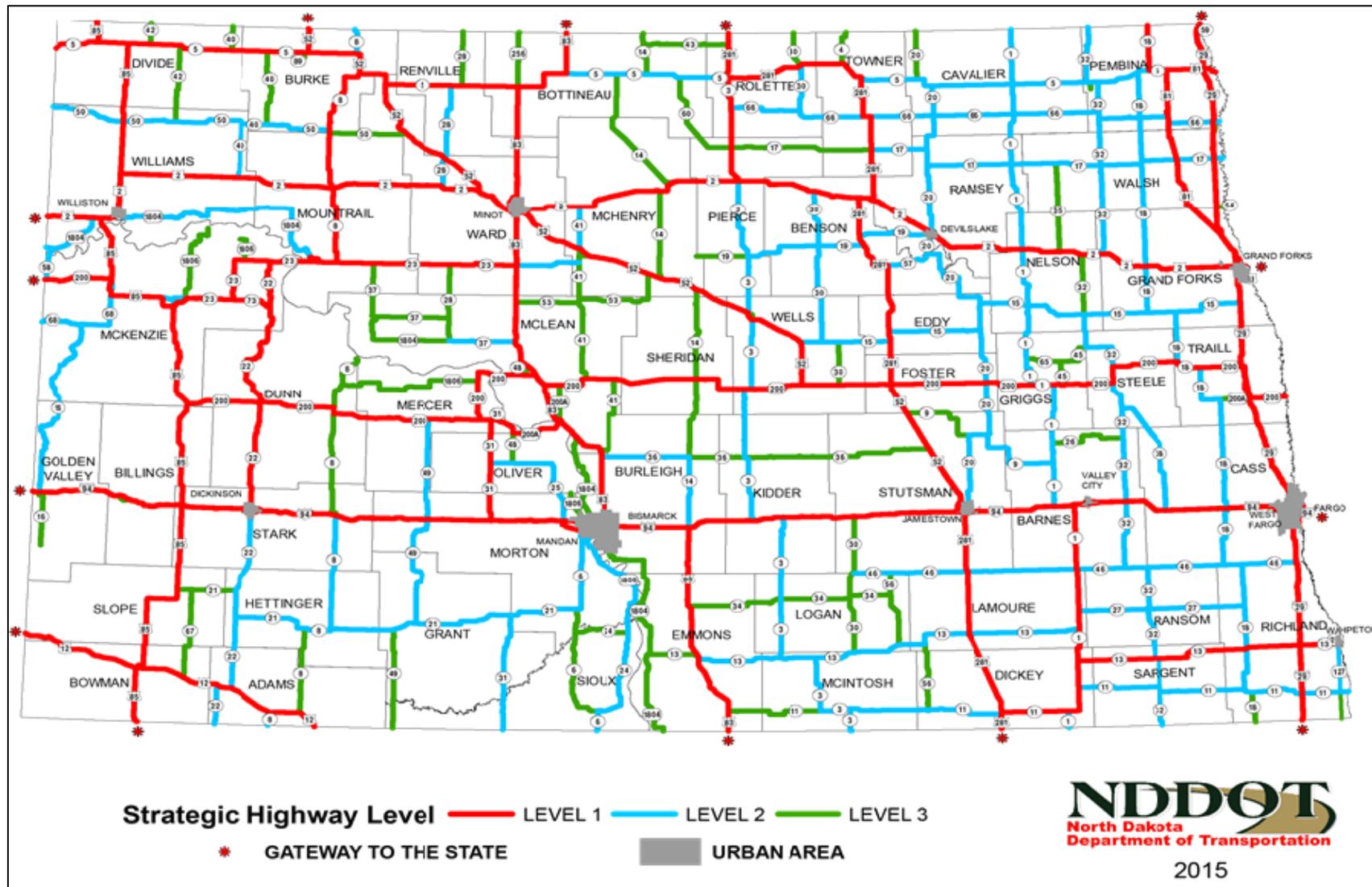


Figure 6 North Dakota – State Strategic Freight System - Highways

Source: North Dakota DOT

## Local Truck Routes

### City of Bismarck

The City of Bismarck has designated truck routes that vehicles with an actual or registered gross vehicle weight or 10,000 pounds or more must use. Trucks may leave the designated truck routes to travel to or from a destination with the shortest possible distance of travel on non-truck route streets (City of Bismarck, 2018). These truck routes are shown in Figure 7.

### City of Mandan

The City of Mandan does not have official designated truck routes. Main Street in Mandan currently functions as a freight route. The primary freight use of this road is to transport gravel from the Sunny Pit. Estimates indicate that this gravel operation contributes 60% of the peak seasonal truck traffic along Main Street. It is estimated that this activity will continue for 2-3 years until the gravel pit closes due to a lack of material. Other freight routes in the area that serve local businesses and industry directly are ND 6 and 1806.

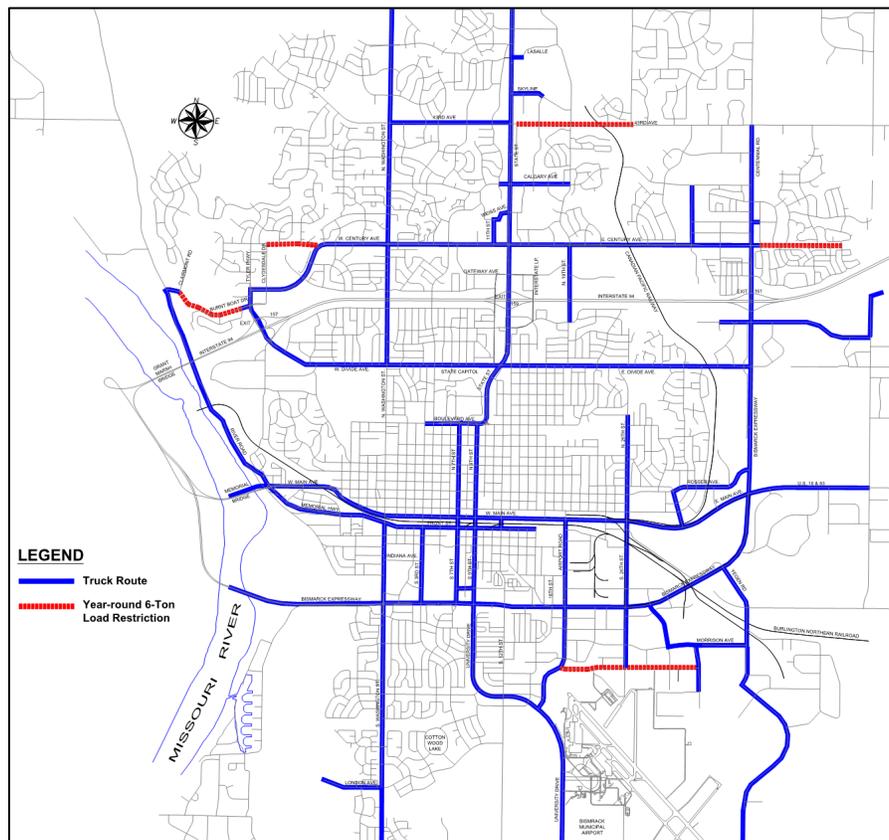


Figure 7 Truck Routes, Bismarck

Source: City of Bismarck ([Bismarcknd.gov](http://Bismarcknd.gov)), 2018 Truck Routes

## 4. Highway Freight Network Performance

While Section 3 described a series of federal, state and local highway freight networks, this section will explore how those networks perform. This data is important to understanding both how freight users utilize the system, but also how truck impact passenger traffic.

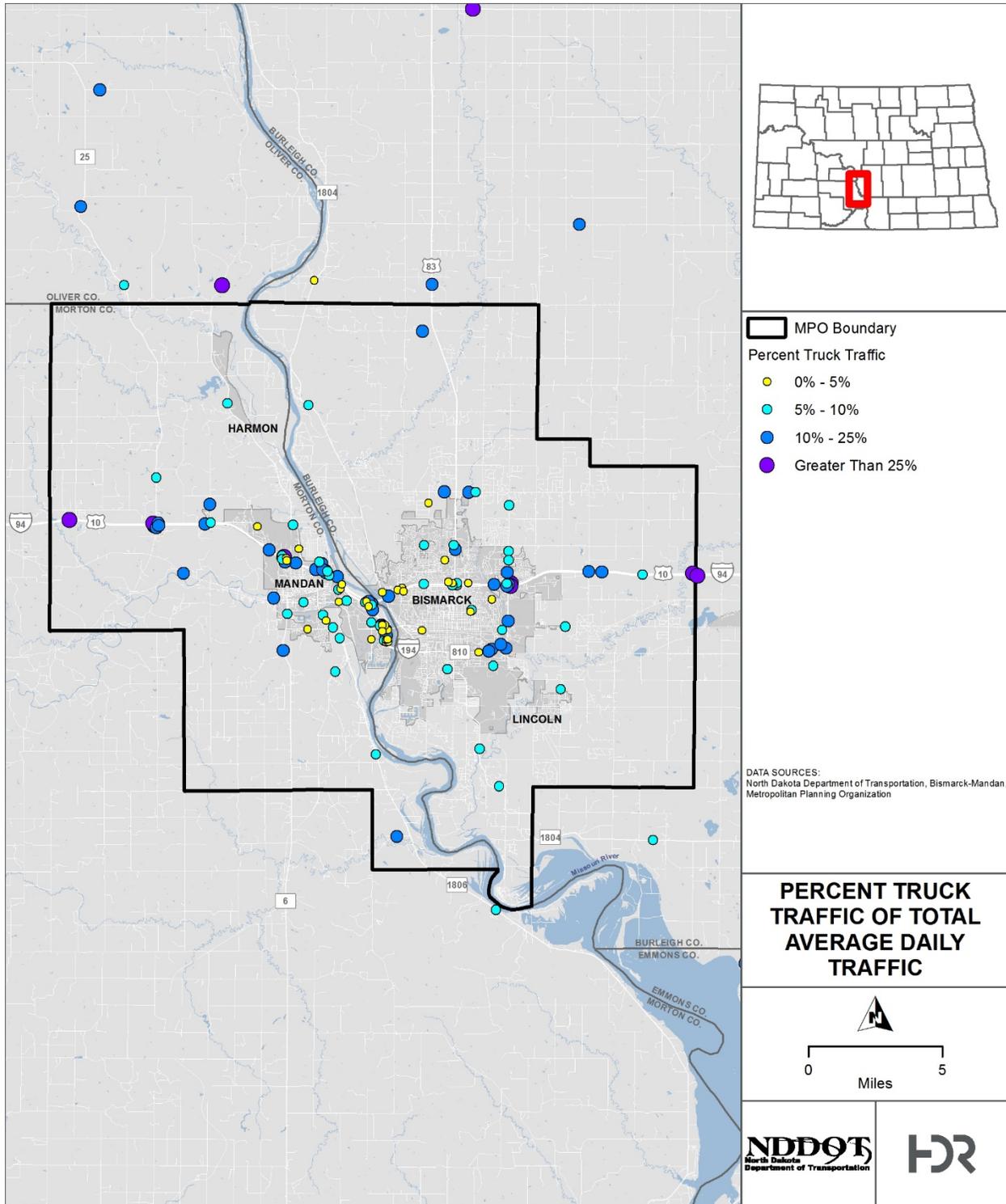
### Commercial Vehicle Use

Traditionally, Heavy Commercial Average Annual Daily Traffic (HCAADT) is used to evaluate a corridor’s utilization by trucks. However, the Bismarck-Mandan MPO region is very unique. It’s one of three metropolitan areas with a largely rural state. As such, the relative portion of truck traffic compared to total traffic is a better tool to evaluate truck activities. While truck volumes might be lower than expected, overall truck utilization of the system is significant. Table 3 and Figure 8 identify several areas where truck travel could potentially impact system operations.

**Table 3 Top Truck Percentage Locations, 2016-2018**

Corridor	Truck Traffic Percentage
I-94 Rest Area (Between Sunset Drive and Business I-94)	38.27%
Ramp from I-94 Eastbound to ND Hwy 25 (by Truck Stop)	37.50%
Ramp from ND Hwy 25 to I-94 Westbound (by Truck Stop)	29.25%
Ramp from I-94 Westbound to Centennial Road (East Bismarck Expressway)	24.4%
Ramp from East Bismarck Expressway to I-94 Eastbound	25.4%
I-94 Mainline Near 80th Street Southeast	21.26%
I-94 Mainline West of ND Hwy 25	17.6%

Source: NDDOT Traffic Count Data, 2016-2018



**Figure 8 Percent Truck Traffic of Total Average Daily Traffic, 2017**

*Source: NDDOT Traffic Count Data, 2017*

## Safety

From 2013-2017, crashes involving large trucks remained relatively constant (ranging from 2.9% to 4.0% of all crashes) in the Bismarck-Mandan MPO region. The crash rate has also remained relatively constant (ranging from 0.009 to 0.013).

**Table 4 Traffic Crashes in the Bismarck-Mandan MPO Region, 2013-2017**

Year	Crashes involving Large Trucks <sup>2</sup>	All Crashes	% of Crashes involving Large Trucks	Crash Rate for Crashes involving Large Trucks per Million Total Miles	Crash Rate for All Crashes per Million Miles
2013	90	3,077	2.9%	0.009	0.305
2014	112	2,811	4.0%	0.011	0.269
2015	86	2,909	3.0%	0.009	0.289
2016	126	3,193	3.9%	0.013	0.328
2017	99	3,287	3.0%	0.010	0.339

Source: North Dakota Department of Transportation, 2018

### Crash Variability by Truck Type

Table 5 shows the number of large trucks involved in traffic crashes in the region by truck type<sup>3</sup>. Unlike the overall crash figure, the truck type involved in crashes exhibited some variability. For example, the number of 3+ axle trucks involved in a traffic crash has declined while the number of single unit trucks has increased.

While these changes might be accounted for in a longer-term crash analysis, the Bismarck-Mandan MPO region should be mindful of the relative changes in crash frequency and severity that may come with freight intensive industries that have quick peak and valley business cycles. While safety is always an imperative of most freight operations, attention can be lost during quick ramp-up and down efforts.

**Table 5 Large Trucks Involved in Traffic Crashes in the MPO Region by Truck Type, 2013-2017**

Year	2-Axle Truck	3+ Axle Truck	Other Public Vehicle	Single Unit Truck	Truck Tractor	Unknown Heavy Truck	Total
2013	25	22	5	4	32	3	91
2014	37	21	2	10	43	3	116
2015	20	27	3	9	30	1	90
2016	33	15	2	9	45	24	128
2017	26	3	1	19	39	13	101

Source: North Dakota Department of Transportation, 2018

<sup>2</sup> Large Trucks include: 2-Axle Truck, 3+ Axle Truck, Single Unit Truck, Truck Tractor, Unknown Heavy Truck, and Other Public Vehicle.

<sup>3</sup> The number of large trucks involved in traffic crashes is not the same as the number of crashes involving large trucks because one crash could involve multiple large trucks.

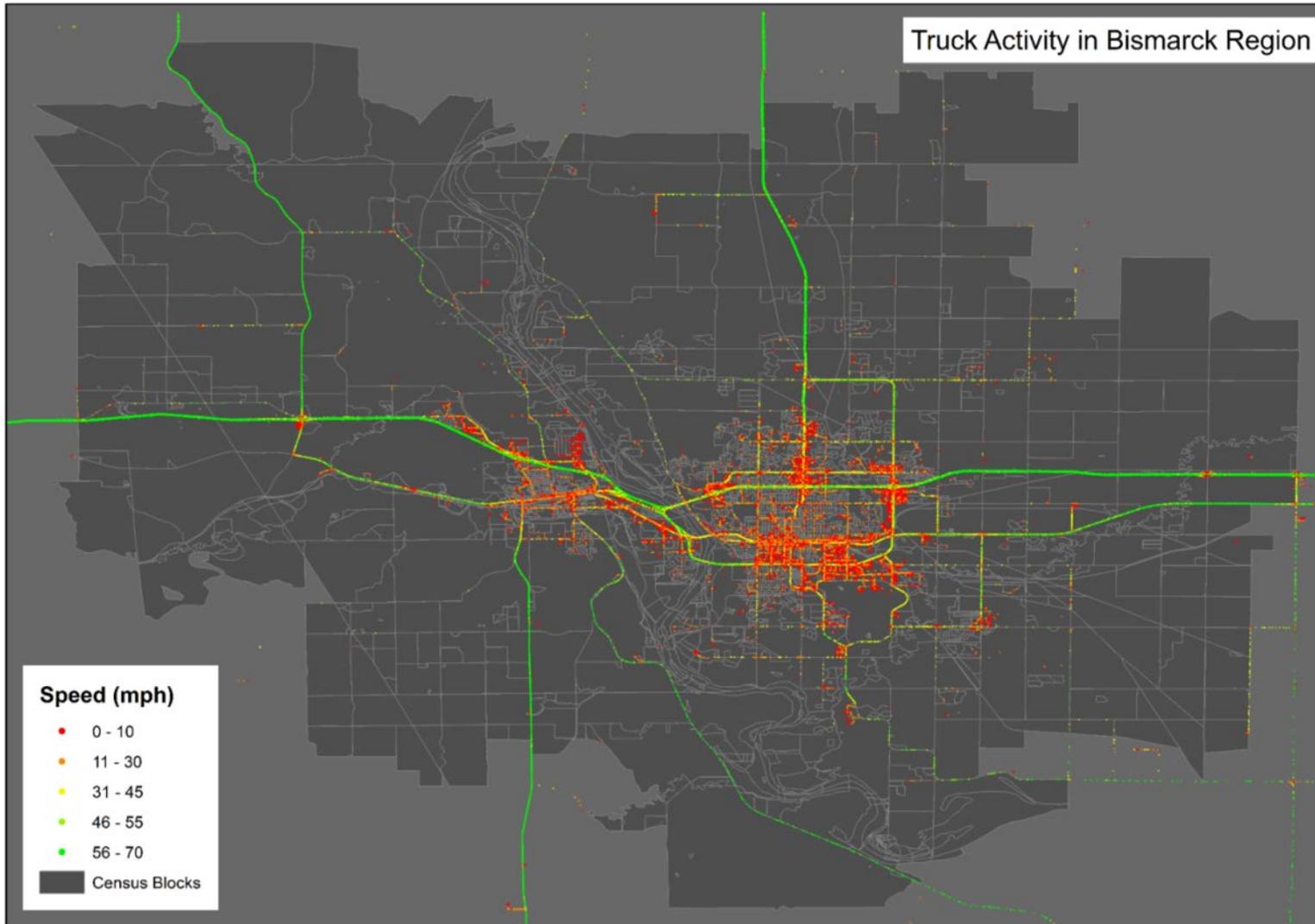
## Freight Bottlenecks

The study utilized GPS truck probe data from the American Trucking Research Institute (ATRI) to identify likely truck trip origins and destinations, and average speeds for trucks, shown in Figure 9. Areas that depict dense areas of red identify areas of congestion experienced by trucks with stop-and-go levels of movement. This data was used to confirm freight bottlenecks identified during the freight stakeholder outreach process. The top three regional bottlenecks include:

- I-94 at exit 161 (Bismarck Expressway): There is a truck stop at this exit and several truck & trailer dealerships/maintenance shops
- U.S. Hwy 83 Corridor between I-94 and ND Hwy 1804
- Century Ave: Between and include the intersections with U.S Hwy 83 and Centennial Road (Bismarck Expressway)

## Freight Trip Generation

The ATRI data was combined with Census Block Groups to produce a dataset showing where truck GPS pings occur. Areas with a high number of pings reflect commercial and industrial areas that experience higher truck volumes. The results are in immediate north part of Bismarck (Figure 10).



**Figure 9 Relative Truck Speeds and Bottlenecks**

*Source: American Transportation Research Institute, 2018*

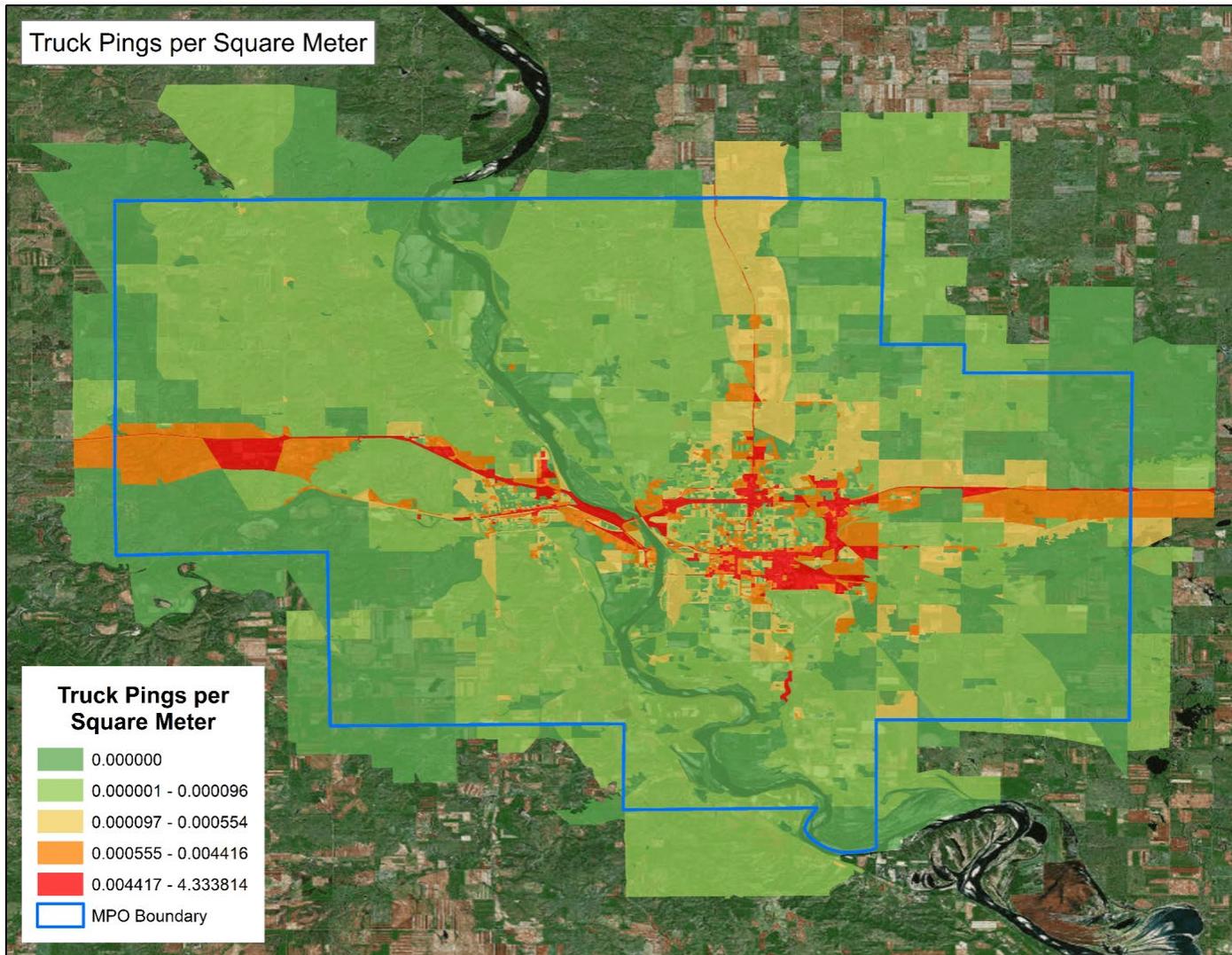


Figure 10 Likely Freight Origins and Destinations

Source: ATRI, 2018

Major freight generators in the area include:

- **Bobcat/Doosan Company** – Bobcat is a major industrial and construction equipment manufacturer. The Bismarck Manufacturing Facility manufactures Bobcat equipment attachments. This facility relies on the Bismarck Expressway, South 26<sup>th</sup> Street, I-94 and the DMVW railroad to receive supplies and ship products to market.
- **Cloverdale Foods** – Founded as Mandan Creamery in Mandan, North Dakota in 1915, Cloverdale Foods has evolved is a producer of premium pork and beef products. This facility uses the Old Red Trail and Sunset Drive to access I-94.
- **M & W Beef Packers** – M&W Beef Packers is a supplier of beef products and is located in Mandan. This facility uses ND 1806 to access the regional marketplace.
- **Northern Plains Commerce Center (NPCC)** - Located immediately north of the Bismarck Airport. The NPCC is an industrial park in close proximity to the Interstate system and direct multiple rail line access via the DMVW. It has no aircraft apron. The NPCC has the potential to develop a more extensive cargo operation at the airport. This facility includes the Bobcat Acceleration Center and a transload facility named the Tubular Transportation and Logistics (TTL) which handles bulk and dimensional cargo.

## Truck Parking

According to information provided by stakeholders, truck parking is not a substantial concern in the area. There are two primary truck stops in the area that include overnight parking facilities. They are:

- **Stamart Travel Center – I-94 Exit 161** – Located in Bismarck on Bismarck Expressway, this facility offers store, lounge area, Laundromat, restaurant, showers, load monitors, CAT scales, 75 parking spaces, along with other amenities and services
- **Flying J Travel Center – I-94 Exit 147 Truck Stop** – located in Mandan, this facility includes 125 parking spots, diner, showers, laundry, scales, in addition to other amenities and services.

There are other service stations that provide fuel and services on a limited basis.

## Freight System Constraints

According to NDDOT, there are several roadways, including ND 1806, ND 1804, and ND 14, within the Bismarck-Mandan MPO region that contain physical restrictions that limit its use for moving freight (Figure 11). These constraints limit the overall resiliency of the regional freight system and depending on the location, can significantly impact freight generators. While some of these constraints are geometric, most are bridge and pavement restrictions. The location of the Missouri River running through the center of the Bismarck-Mandan MPO region also presents a physical barrier for freight movement, as well as development and terrain.

### North Dakota State Highway Freight Constraints, 2018

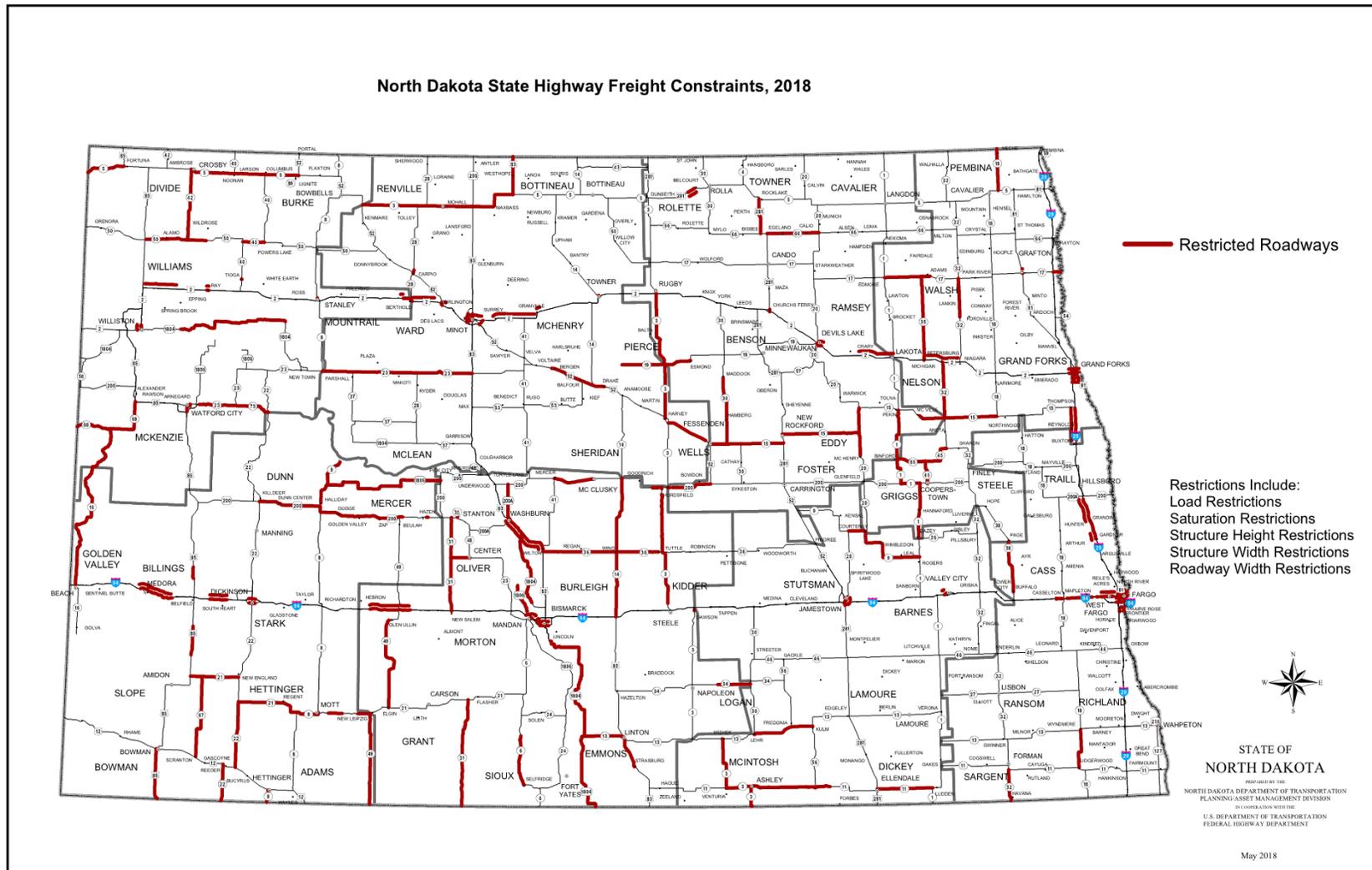


Figure 11 ND State Highway Freight Constraints 2018

## Bridges and Large Culverts

According to the MPO, there are 12 bridges in the area that are structurally deficient or functionally obsolete (Figure 12). Structurally deficient means the deck, superstructure, substructure or culvert have been rated in “poor” condition. It may also indicate that the bridge’s load carrying capacity is below current standards or that a waterway frequently overflows the bridge deck and impedes traffic. Functionally obsolete indicates that the bridges design elements are out of date but that the bridge is not considered structurally deficient. While both classifications do not indicate an unsafe bridge condition, they are indicators that the structure’s condition and/or design may be less than adequate for the current traffic needs.

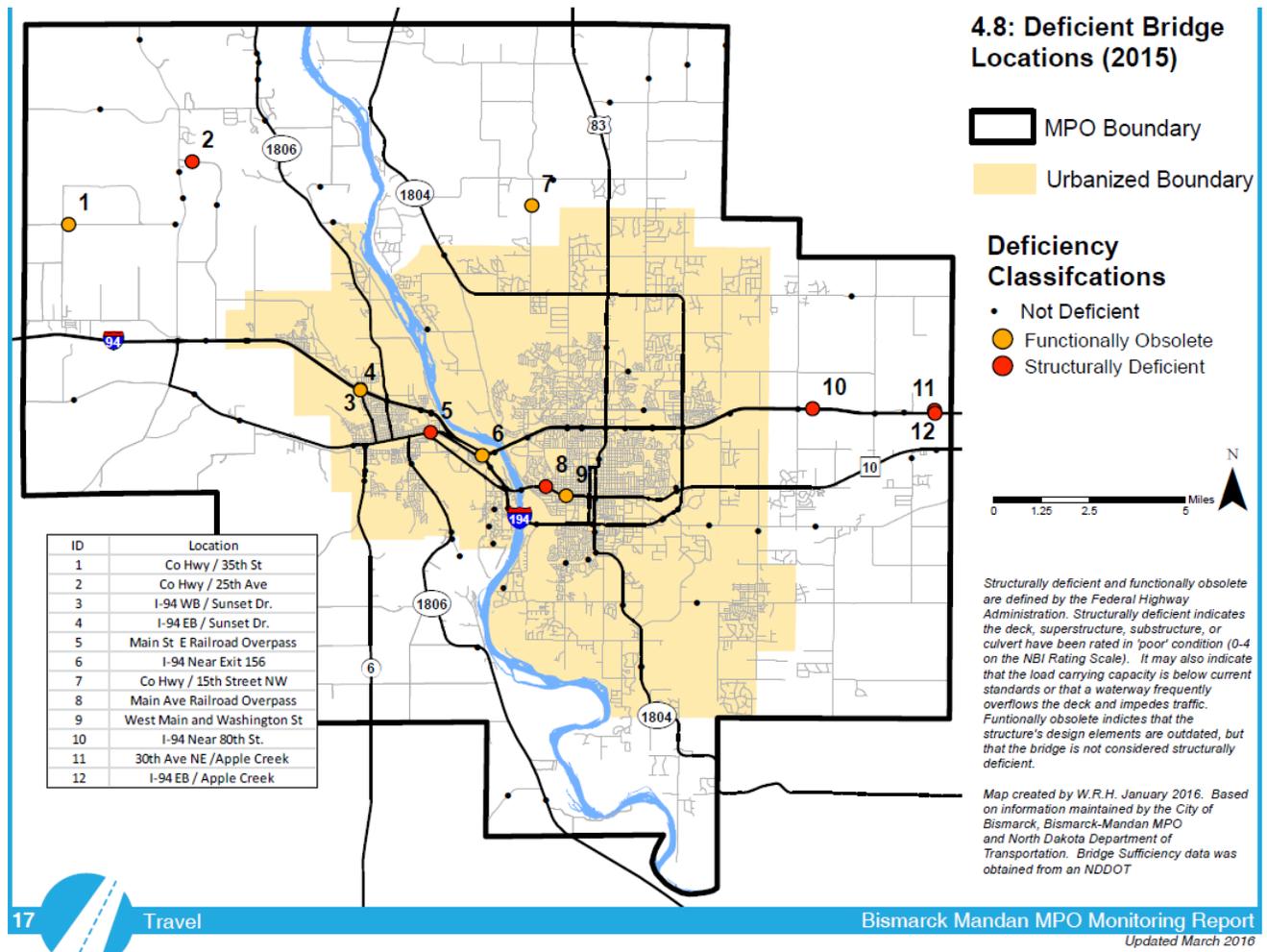


Figure 12 Structurally Deficient and Functionally Obsolete Bridges, 2015

Source: Bismarck-Mandan MPO Monitoring Report, 2016

## Load Restricted Routes

Within the City of Bismarck, several streets are limited year-round to 6-Ton axle limit and MGW of 80,000 pound Load Restrictions. No vehicles on these streets may exceed the 6-Ton Load Limit regardless of destination. These streets are listed below and in Figure 7:

- Country West Road from Clydesdale Drive to Century Avenue;
- Century Avenue from Yorktown Drive to Kost Drive;
- Airway Avenue from Airport Road to Northern Plains Dr.;
- 43<sup>rd</sup> Avenue from State Street to N. 26<sup>th</sup> Street; and
- Burnt Boat Drive from Grandview Land to Clairmont Road.

# 5. Rail Profile

Rail is an important element of the Bismarck-Mandan MPO region’s multimodal freight system. The rail industry classifies the freight rail network into three operating categories: Class I, II, and III. There are two railroads operating in the Bismarck-Mandan MPO area; BNSF (Class I) and Dakota, Missouri Valley & Western (Class III). Figure 13 shows the railroad elements of the State Strategic Freight System.

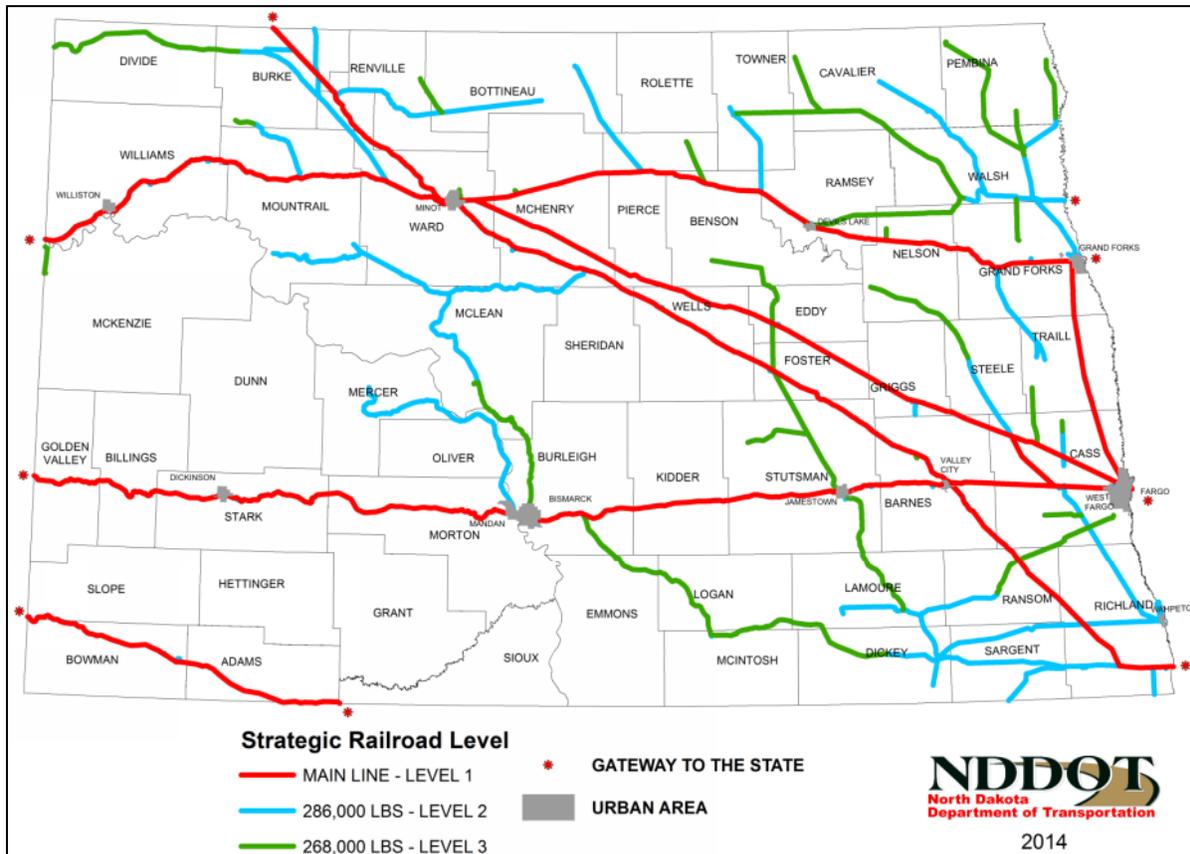


Figure 13 State Strategic Freight System - Railroads

Source: North Dakota State Freight Plan, 2015

## **BNSF Railway**

BNSF is the only Class I railroad that serves the Bismarck-Mandan MPO region. Its rail line that bisects the region is principally single track, with passing sidings to permit trains traveling in opposing directions to pass each other and faster trains to overtake slower trains. While this line is not the BNSF mainline between Seattle and Chicago (thereby being on the BNSF intermodal network), the route is designated on the BNSF coal network and transload networks (BNSF, 2018). The coal mines and coal fired power plants north of Mandan rely on this system to move coal.

There is an imbalance of tonnage in North Dakota with heavier traffic flows moving east. Considering that this volume appears to originate in northeastern Wyoming, it can be assumed that the traffic is predominately eastbound, coal from the Powder River Basin with the westbound flow being empty coal cars. (North Dakota State Rail Plan, 2017)

### **BNSF Divisions**

The Bismarck-Mandan MPO is home to two divisions of the BNSF Railroad.

#### **TWIN CITIES DIVISION**

Within the MPO, the Twin Cities Division contains the Zap and Jamestown subdivisions:

##### **Zap Subdivision**

This subdivision is an 80.5-mile branch line between the Jamestown Subdivision main line at Mandan and Zap. The maximum operating speed is 25 miles per hour (mph) with several specific locations with permanent speed restrictions of 10 mph. The entire line is rated for 286,000 pound railcars. In 2014, approximately three trains per day ran on the Zap Subdivision (North Dakota State Rail Plan, 2017).

##### **Jamestown Subdivision**

The 169.1-mile main line connects with the Montana Division's Dickinson Subdivision main line at Mandan and with the KO Subdivision main line at the Surrey Junction, 30 miles west of Fargo, ND. The maximum operating speed is 60 mph for rail cars loaded under 100 tons, and 45 mph for rail cars loaded 100 tons and over. Several segments of track have permanent speed restrictions ranging from 25 to 50 mph. The entire line is rated for 286,000 pound railcars. On the Jamestown Subdivision, there are approximately 20 trains per day (North Dakota State Rail Plan, 2017).

#### **MONTANA DIVISION**

Within the MPO, the Montana Division contains the Dickinson subdivision:

##### **Dickinson Subdivision**

The subdivision is a 215.8-mile main line between Mandan and Glendive, MT. Its maximum operating speed is 60 mph for rail cars loaded under 100 tons and 50 mph for rail cars loaded over 100 tons. The entire line is rated for 286,000 pound railcars. On the Dickinson Subdivision, there are approximately 20 trains per day (North Dakota State Rail Plan, 2017).

### **BNSF Highway/Rail Transloading Facilities**

Transloading is the process of transferring a shipment from one mode of transportation to another. Bismarck is an important location on BNSF's Transload Network and includes a rail transloading facility to/from pipeline which supports the energy sector in North Dakota. In addition, one transloading facility (NPCC - Tubular Transport & Logistics) has been identified in Bismarck.

### **Potential Future BNSF Projects**

As of May 2018, BNSF is planning to construct a new rail bridge over the Missouri River to the north of the existing rail bridge. Construction of the new rail bridge is anticipated to begin in 2019. According to the North Dakota State Rail Plan, BNSF is planning to develop a proposed rail-served industrial park (the Mandan Industrial Park) on Old Red Trail east of ND Hwy 25 but the timeline for that project is uncertain. As the proposed industrial park develops care should be taken to ensure the surrounding road network can physically and operationally handle increased truck volumes.

### **Dakota, Missouri Valley & Western**

The Dakota, Missouri Valley & Western (DMVW) is a Class III railroad that services North Dakota's agriculture, energy and biofuel industries. Approximately half (239 miles) of all of DMVW's track do not meet the industry standard of maximum gross-weight-on-rail per car to 286,000 pounds. This limitation impacts the long-term productivity of the route (i.e. railcars cannot be filled to their maximum weight) and reduces the speed in which all trains can safely travel. DMVW interchanges traffic with BNSF at Bismarck, ND and with the Canadian Pacific Railway at three other sites in North Dakota. DMVW's ramp at Arnold (4 miles north of I-94 and one half mile east of Hwy. 83) offers customers side loading and unloading capabilities. DMVW maintains a fleet of 24 locomotives.

### **Highway-Rail Grade Crossings**

Through the development of Quiet Zones, the region has invested heavily in the grade crossing safety improvements required for federal approval of the zones. Quiet rail crossings in Bismarck are located at 3<sup>rd</sup> Street, 5<sup>th</sup> Street, and 12<sup>th</sup> Street. These improvements include quadrant gates, road traffic channeling, closed crossings and improved railroad signaling technology. While these Zones are focused on improving quality of life through the reduction of train horn use, significant safety benefits are likely to occur in the future as well.

The North Dakota Crude Oil Response Preparedness report created a county-by-county grade crossing vulnerability assessment. According to the report, Burleigh and Morton counties both have a low likelihood of an incident occurring over the next 20 years. However, Burleigh County has a higher risk profile if an incident occurs due to population and potential land use impacts.

### **Highway-Rail Incidents**

Based on information from the Federal Rail Administration, the Bismarck-Mandan MPO area has very few highway-rail incidents.

Table 6 summarizes the highway-rail incidents since 2014.

**Table 6 Highway-Rail Incidents, 2014-2017**

Year	Morton County	Burleigh County
2017	0	0
2016	1	1
2015	1	1
2014	2	0

Source: Federal Railroad Administration, Office of Safety Analysis, 2018

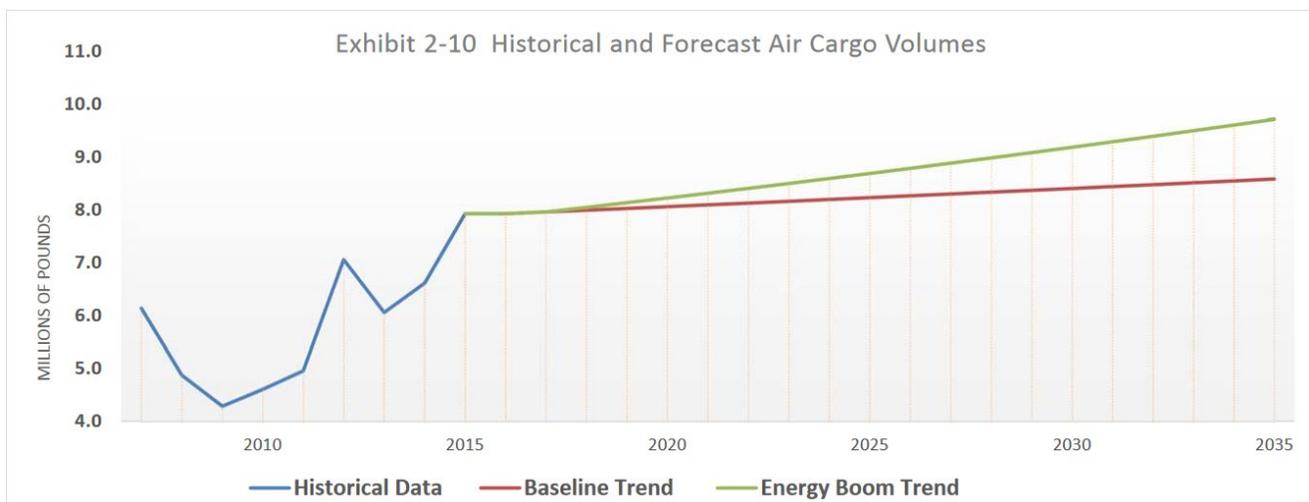
## 6. Air Cargo Profile

Cargo activity at the Bismarck Airport (BIS) is limited to express package, USPS and general cargo. The Airport does not have a building dedicated for cargo operations, cargo is moved to/from off-cargo facilities via truck to aircraft on the general aviation apron. Similarly, cargo carried by commercial passenger carriers is transferred directly to/from off-airport facilities.

At BIS, Federal Express (FedEx) operates Cessna Caravans filled with packages and flats on feeder routes to larger hubs. FedEx operates from the apron area between the main general aviation ramp and the terminal apron. United Parcel Service (UPS) and United States Postal Service (USPS) also have a presence at BIS. Occasionally, there are also other smaller cargo operators that move goods in and out of BIS using small aircraft. This area is accessed by Maverick Avenue from University Drive. Bismarck Airport’s average monthly cargo weight totals are approximately 330 tons, and this figure increases significantly during the peak seasons.

Of all modes, air cargo is the most unique. Compared to the other modes it is expensive and materials shipped must be light enough to fly. This leads to air cargo shipments being highly valued or perishable goods (flowers, computer parts, or drilling parts). As such, air cargo volumes are subject to the peaks and valleys of the shale oil industry. However, these peaks and valleys are increasingly mitigated with e-commerce shipments. While the effect of on-line shipping was not sufficient to counteract the decline associated with the ending of the present oil boom, but did delay the point at which volumes for individual cargo carriers began experiencing a decline. This is represented by of an overall four percent decrease in air cargo volumes at BTS over the past year. (BTS Air Summary Data)

The BIS Airport Master Plan anticipates modest growth in air cargo overall. However, if the energy boom returns, air cargo volumes are likely to increase. Figure 14 shows the forecasts air cargo volumes with and without an energy boom.



**Figure 14 Forecast of Air Cargo Volumes at BIS**

Source: *Bismarck Airport Master Plan, 2015 Update*

## 7. Pipeline Profile

In 2015, North Dakota was the second largest crude oil producing state. While this market has its swings, it is important to understand the role of pipelines to the state's economic success. Pipelines are used to move crude oil from the oil fields west of the region to storage locations and refineries. Then, pipelines are used to transport the refined product to storage and consumption locations.

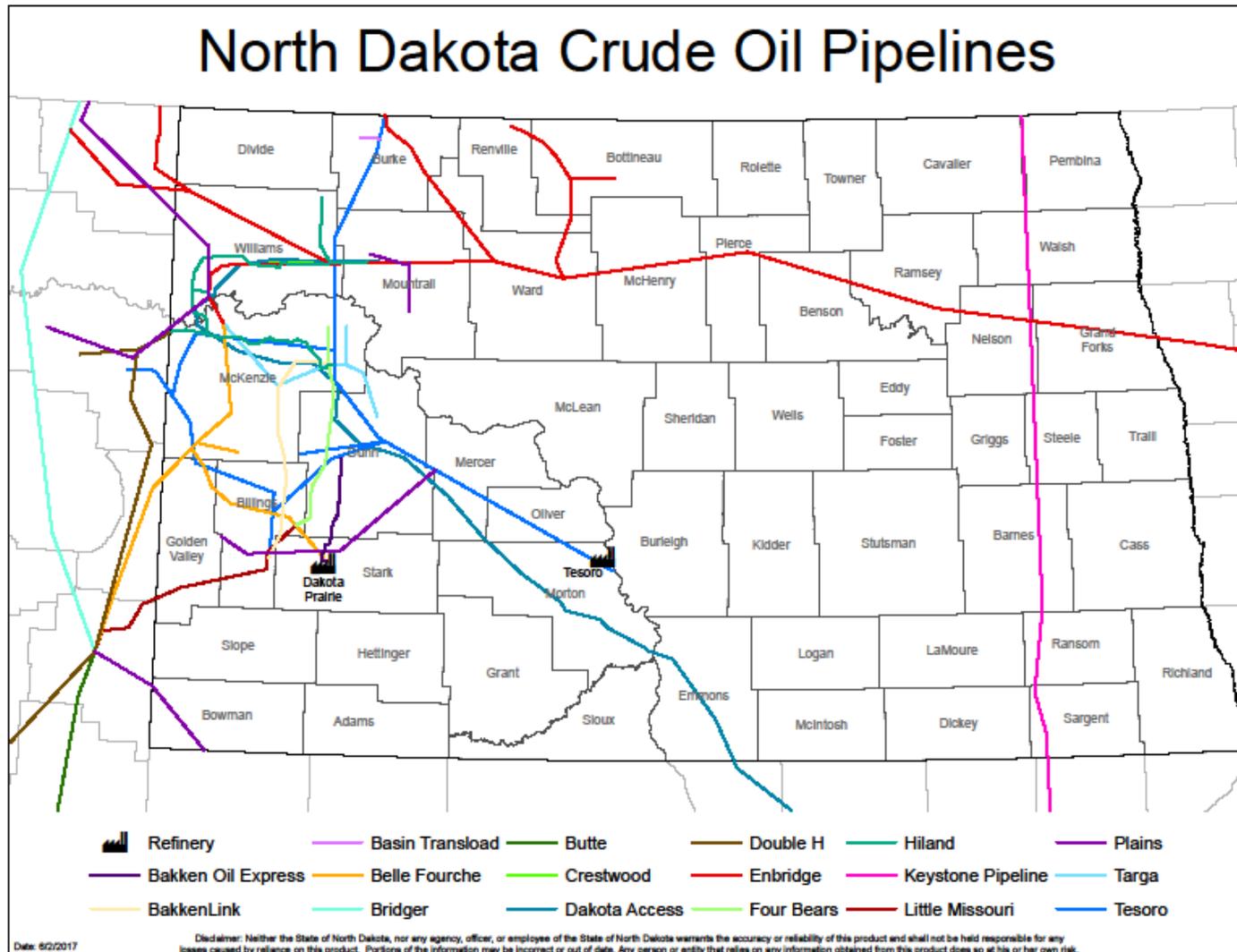
For example, the Tesoro Pipeline transports crude oil from the western oil fields to the Mandan Refinery (Figure 15) and then the North Refined Products Pipelines System (NUSTAR) pipeline conveys refined oil products from the refinery to northeast and southeast US (Figure 16). Similar patterns exist for natural gas pipelines (Figure 17).

### **Mandan Marathon Refinery**

Marathon<sup>4</sup>, formerly known as Tesoro Corporation, runs the 74 thousand barrels per day petroleum refinery. It processes primarily sweet (low sulfur) domestic crude oil from North Dakota. The facility manufactures gasoline, diesel fuel, jet fuel, heavy fuel oils and liquefied petroleum gas. Refined products are trucked and railed from Mandan, and also shipped east via pipeline to supply eastern North Dakota and Minnesota.

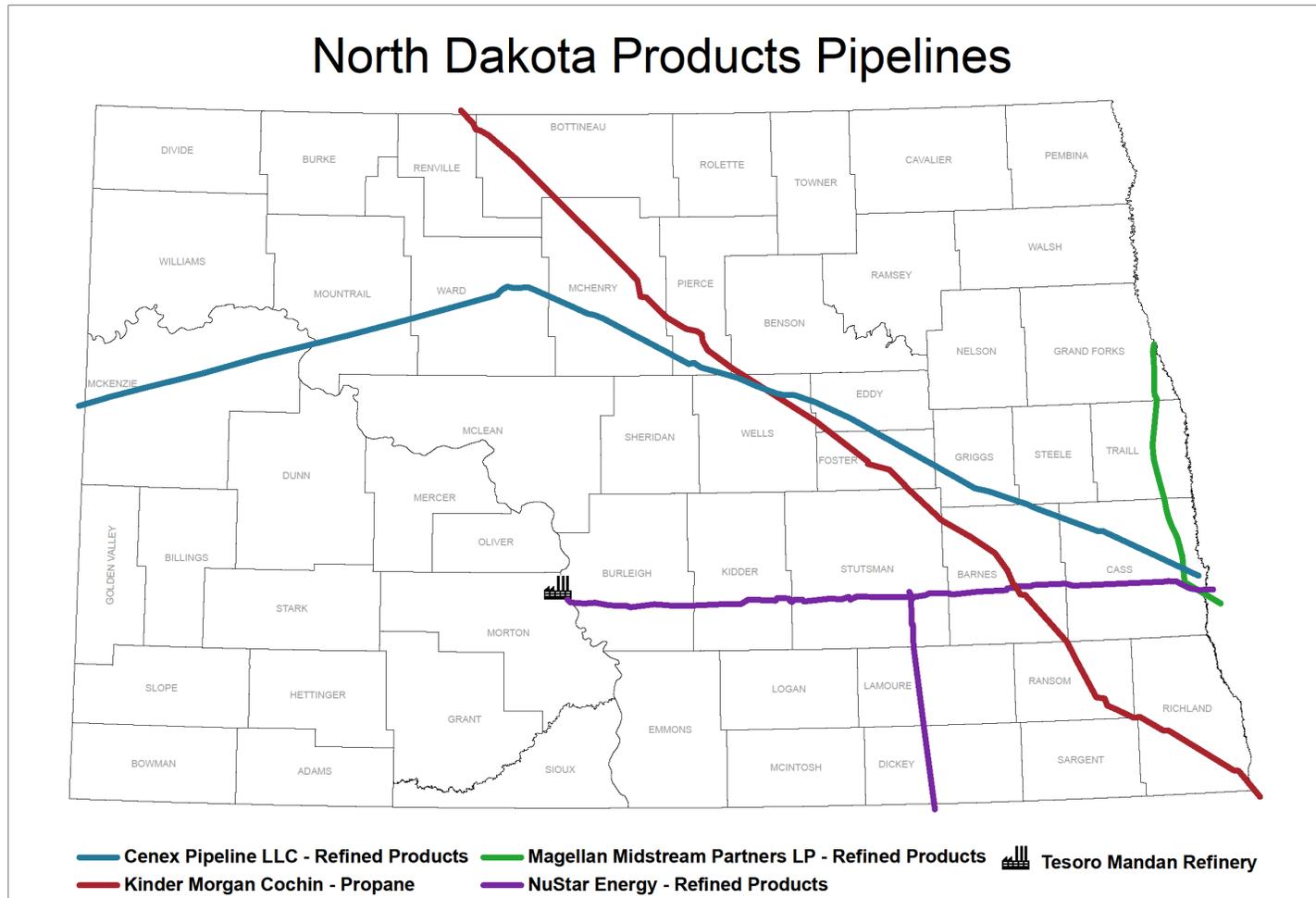
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<sup>4</sup> [http://www.andeavor.com/media/1297/andeavor\\_mandan\\_factsheet10.pdf](http://www.andeavor.com/media/1297/andeavor_mandan_factsheet10.pdf)



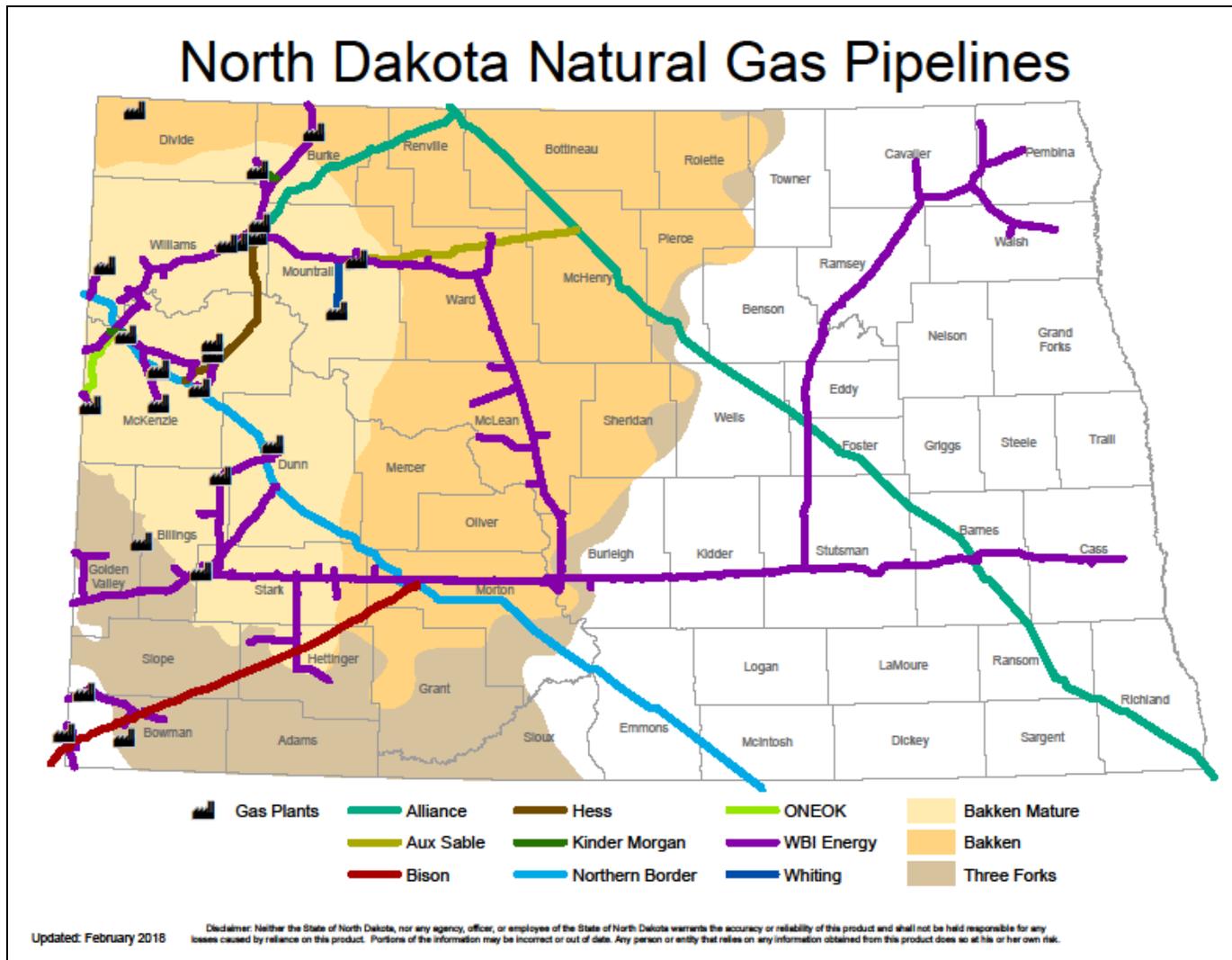
**Figure 15 North Dakota Crude Oil Pipelines**

Source: North Dakota Pipeline Authority, 2017



**Figure 16 North Dakota Products Pipelines**

*Source: North Dakota Pipeline Authority, 2012*



**Figure 17 North Dakota Natural Gas Pipelines**

*Source: North Dakota Pipeline Authority, 2018*



# Identifying Key Issues

Bismarck-Mandan MPO Regional Freight Study

November 2, 2018



# Identification of Key Issues

## Characteristics and Needs

The Bismarck-Mandan MPO region is intersected by Interstate 94, which runs east and west and experiences the area's most prominent freight movement. Additional highways that serve the region's freight infrastructure include: US 83, ND 6, ND 1804 and ND 1806. As the Freight Profile pointed out, the City of Bismarck currently has designated truck routes for vehicles with a registered gross vehicle weight of 10,000 pounds or more.

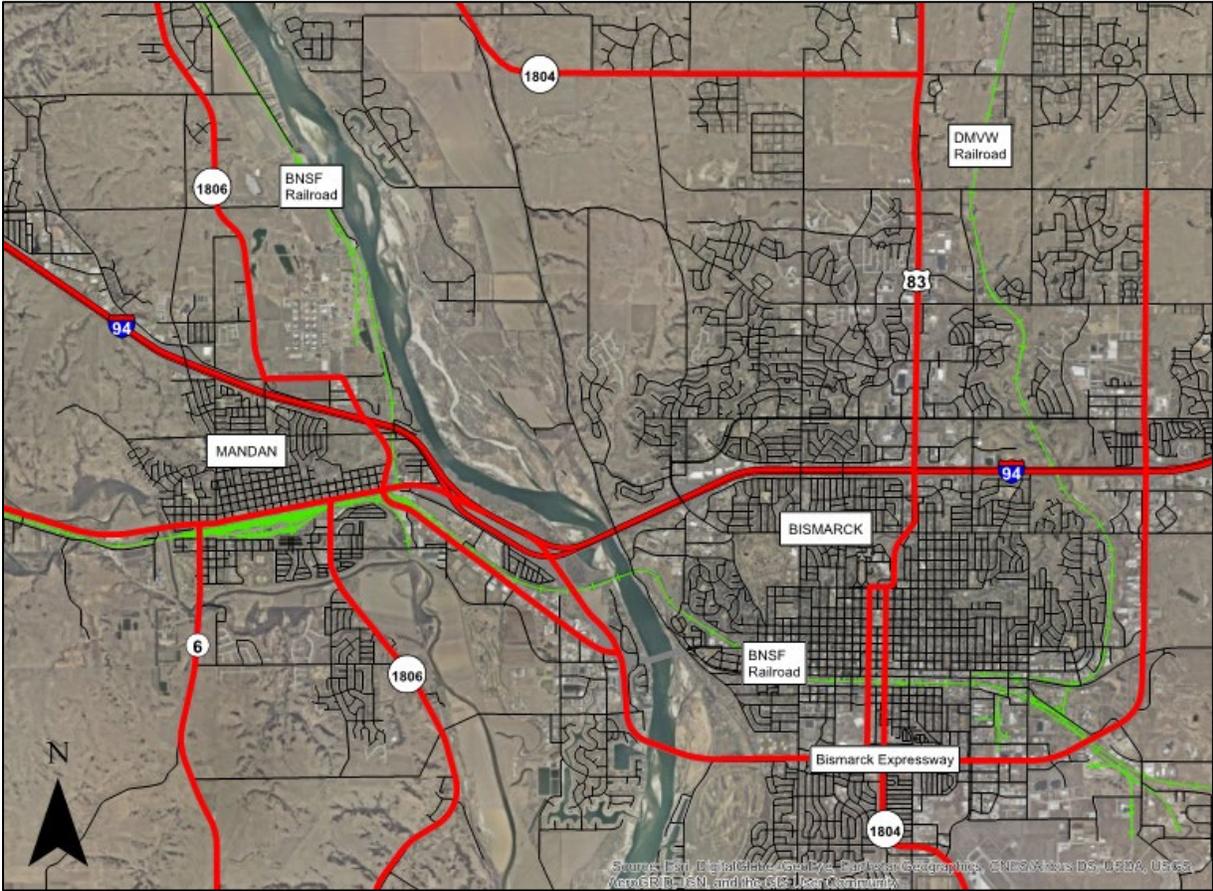


Figure 1: Key Regional Freight Corridors

## Regional Characteristics and Needs

Across the region, safety and mobility are major concerns for the freight industry. Without the presence of a truck-bypass, many corridors experience periodic truck traffic and congestion. Corridors – like Bismarck Expressway/Centennial and State Street – are lined with traffic signals. Due to the operational limitations of trucks – slow starts and stops – implementing and optimizing signal coordination would be beneficial for freight movement along these corridors.

There are two airports located within the Bismarck-Mandan MPO Region. The first is located in Mandan and the other in Bismarck, known as the Bismarck Airport (BIS). The Mandan Airport is largely not involved with moving air cargo or freight, so that airport is not included in the analysis. However, the BIS Airport Master Plan anticipates modest growth in air cargo over the next 17 years.

As discussed in the Freight Profile, there are two railroads operating in the Bismarck Mandan area: BNSF (Class I) and Dakota, Missouri Valley & Western (Class III) railroads. The BNSF rail line bisects the MPO region. It consists of a single track, with passing sidings to permit trains traveling in opposing directions. The line is currently not on the BNSF intermodal container network. The State Freight Plan identified a need for a bridge replacement over the Missouri River, a project which is expected to begin in 2019.

Approximately half of Dakota, Missouri Valley & Western railroad's track does not meet the current industry standard for maximum gross-weight-on-rail per car of 286K pounds. There is a great need to update the track to meet these current standards to eliminate the limitation it puts on long-term rail productivity.

### Major freight-related infrastructure assets include:

- I-94
- ND 1804
- ND 1806
- BNSF railroad
- DMVW railroad
- Rail Bridges
- Transload Facilities
- BIS Airport

There are currently three at-grade rail crossing locations within Bismarck designated as Quiet Zones. These locations include: 3<sup>rd</sup> Street, 5<sup>th</sup> Street, and 12<sup>th</sup> Street. The zones allow trains to silence their whistles though ensuring grade crossing safety with the addition of safety measures such as four-quadrant gates, flashing lights, and extra protection for pedestrians.

## City-Specific Freight Characteristics and Needs

One of Bismarck's greatest needs in terms of transportation, specifically for freight, is more efficient north/south corridors for drivers on the south side of town to get to the north side of town and the reverse flow. To help alleviate this challenge, the MPO undertook a study that focused on validating the need and identifying an alternative route for US 83, which would allow freight to bypass State Street's commercial area north of Interstate 94.

The City of Mandan does not currently have any established truck routes. Mandan's Main Street experiences the most truck traffic in comparison with other local roadways.

This can present freight-related conflicts since the street has numerous access points to adjacent downtown businesses, and multimodal considerations for pedestrians and passenger cars as well.

The City of Lincoln largely consists of rural residential housing and does not have any major commercial or industrial freight traffic generators. There are currently no designated truck routes within the City of Lincoln, nor is it anticipated that there will be need for any in the near future.

## Trends, Challenges and Opportunities

Before planning for the future needs of the freight industry, it is necessary to identify current regional industry-related trends and corresponding future challenges and opportunities for growth.

The goal of freight carriers is to efficiently move as many goods as possible. Jurisdictions may increase weight capacities for certain roadways that would allow carriers to haul more freight in less time and/or for less cost. Designating certain routes along these routes may affect the movement of freight and modes of transport utilized in the region.

This section details 9 current freight issues for the region and what they could mean for the Bismarck-Mandan MPO region. These issues are not presented in any prioritized order.

### Long Distance Truck Hauling

#### Trends

**TECHNOLOGY/CONNECTED VEHICLES** - At the moment, technology could arguably be the most significant influencer on the freight industry. Great efforts are currently being made to find ways to safely utilize automation and vehicle-to-vehicle communication in the movement of freight, specifically in the form of platoon trucking. Similarly, vehicle-to-infrastructure communication can greatly improve operational efficiencies and safety. Implementing sensors on infrastructure, such as a bridge for example, can allow trucks to receive real-time notifications and direction in inclement weather that the platoon needs to temporarily disengage or slow down due to icy conditions. Vehicle-to-infrastructure communication can also improve real-time data sharing such as signal prioritization, crash incidents, detour routes, traffic congestion and associated times, as well as roadway conditions.

**OVERWEIGHT CORRIDORS** - A unique aspect of the Bismarck-Mandan MPO region and the north central region of the United States is the movement towards designing roadways to allow for trucks that exceed the normal truck weight limit of 80,000 pounds. For example, I-94 was recently increased to a 129,000-pound corridor, a large increase from 105,000-pound, which it was previously designated. This increased weight capacity now provides truck carriers an opportunity to move goods more efficiently across the state. Other 129,000-pound corridors include:

- I-29
- US Highway 2 from Montana to MN

- US Highway 52 from Saskatchewan to Minot
- US Highway 83 from South Dakota to I-94 at Sterling
- US Highway 83 from Bismarck to Minot
- US Highway 85 from South Dakota to the US Highway 2 junction in Williston

**OIL AND GAS INDUSTRY FLUCTUATIONS** - Another trend that is likely to affect the Bismarck-Mandan MPO region is the rapid fluctuations in the oil and gas industry. While the Bismarck-Mandan MPO region does not experience the effects of drilling directly, their corridors are utilized by much of the related freight traveling east and west through the center of the state. During periods of rapid oil and gas expansion, the Bismarck-Mandan MPO region has historically experienced significant population growth. Oil-related freight activity fluctuates from year to year. It is anticipated that oil-related freight movement will increase as technology improves for horizontal drilling. The MPO region anticipates future growth occurring in the north and east directions.

### **Challenges**

Each of the trends identified brings challenges and opportunities for growth. In relation to technology and its impact on the freight industry, two of the biggest challenges are going to be safety and adequate infrastructure to support the technology.

First, the technology has to be reliable. Vehicles need to be able to communicate with one another and operating systems without glitches or technology crashes. Secondly, the existing infrastructure will need to be updated to support the technology. Fiber optic lines, cell towers and pavement/surfacing design will need to be installed and updated along major freight corridors.

Challenges in regards to trends in heavier loads on major corridors relate to traffic patterns and roadway geometrics. As mentioned previously, Long Combination Vehicles (LCV) will be become more common and as a result will develop a need to accommodate the increased volume of LCVs in the form of roadway geometric design, pavement design, and congestion. With the implementation of vehicle automation and connected vehicles, these high capacity corridors will most likely be the first to become truck platooning corridors. This could change future traffic patterns and lead to additional impacts and safety concerns.

**TRUCK DRIVER SHORTAGE/REGULATORY CHANGES/TRUCK PARKING** - Another challenge facing the trucking industry is the shortage of truck drivers. Recent changes in federal regulations limiting driver hours of service have impacted parking needs and affected the way drivers can strategically locate their rest stops to pre-position for pick-ups and deliveries. Likewise, recent changes in electronic logging devices to electronically tracking instead of paper logs have affected the number of hours drivers can log as well. While the electronic logging device reducing a driver's administrative burden, they also remove the driver's ability to round their time to the nearest one-quarter hour while drivers attempt to locate adequate parking. Drivers now have more difficulty balancing the hours of service (HOS) limits and productivity.

## **Opportunities**

Just as trends in freight movement can present challenges, they present opportunities for growth as well. The movement towards connected vehicles provides opportunities to be creative and proactive in planning out future infrastructure modifications and construction. During future improvements, critical freight routes like I-94 may need to feature non-traditional design improvements to incorporate advanced technology needed to accommodate freight truck platoons and LCVs. This will impact infrastructure needs such as higher weight restrictions, platoon lanes, wider shoulders, etc.

It also provides an opportunity to incorporate technology in roadway design. Integrating technology into the roadway design would allow for planning opportunities in terms of fiber optic and conduit installations and cell tower locations. ITS devices will become more prevalent and real-time information will be readily available for all drivers utilizing the roadway regarding roadway conditions, congestion, and even potential detour routes. Improving effective communication and improving accuracy of information shared with drivers can ultimately lead to safer roadway operations as well.

Vehicle automation provides an opportunity to address the driver shortage issue. One of the biggest deterrents of choosing to drive truck as a career to many potential employees are the long hours and required time away from family. If automated vehicles can be incorporated into the long-distance hauling, then that reduces the need for drivers. Once the commodity arrives at the destination, then the local trips can be handled by the drivers. This reduces the need for drivers to travel long distances and provides more incentive for people to choose truck driving as a career, thus potentially alleviating the shortage of drivers.

## **Urbanization and E-commerce Demands**

### **Trends**

There has been a significant trend towards urbanization and e-commerce. These trends create a higher demand for delivery services that may conflict with other nearby activities and traffic.

### **Challenges**

Deliveries in urbanized areas lead to the greatest challenges because roadway design characteristics may not be suitable for the heavy vehicles conducting the deliveries. For example, design characteristics regarding radii, curb and gutter design, lack of two-way left turn lanes (TWLTL), and double parking may present obstacles that affect the efficiency and safety of delivery operations.

Mobility-as-a-Service (MaaS) is a shift away from personally-owned modes of transportation and towards mobility solutions which are consumed as a service. The concept behind it is to offer travelers mobility solutions based on their travel needs. MaaS will free up parking spaces that should be re-designated for loading zones.

As technology leans toward connected automated vehicles, there will be challenges that arise regarding infrastructure and the transferring of goods from platooning long-distance trucks to the local delivery trucks.

## **Opportunities**

Continued regional growth largely lies in its ability to retain and expand businesses. From a freight perspective, this is supported by finding ways to enhance connectivity and reduce friction points on the region's roadway network. Properly designed freight corridors and not only reduce freight costs but will also minimize community impact of trucks driven on roadways not designed for this heavy use.

In urban areas, roadway geometrics are particularly important. Adequate turning radii and sufficient shoulders and pavement design will be critical to the long-term life duration and maintenance for all roadways utilized by freight carriers. Left turn bays and vehicles parked too close to intersections also pose large problems for trucks making turning moves. Access issues must be anticipated in planning and design as well. Businesses will ideally have two points of access, avoiding the one-way-in and one-way-out scenario that can be difficult for delivery trucks to navigate amongst busy everyday traffic.

Extra consideration should be given to what is known as the "last mile traveled" in moving freight. This "last mile" is the distance – often more than one mile – between the interstate or railroad transfer point and the final destination. Often this "mile" is the most expensive part of the trip. Ensuring the roadways are designed adequately to meet the needs of delivery vehicles will reduce overall transportation costs.

## **Lack of North and South Routes**

### **Trends**

Anticipated growth for Bismarck is expected to occur in the north and east directions.

### **Challenges**

Growth in the north and east sides of Bismarck could create increased freight mobility issues in the future. In particular, stakeholders shared safety concerns regarding operations and congestion on two corridors: State Street and Bismarck Expressway. Bismarck Expressway (near Stamart) serves as an arterial roadway and experiences bottlenecks during peak hours due to access issues and lack of adequate storage space between consecutive signals. Complicating things further, a new high school has been recently constructed in the northeast section of the City, which adds increased traffic demand during peak hours as well. State Street experiences congestion due to consecutive traffic signals and lack of signal coordination.

Heavy vehicles take longer to decelerate and stop, and then to accelerate again. As a result, heavy vehicles require increased deceleration and storage space at intersections causing turning bays at intersections to become backed up and leads to loss in capacity for the intersections.

### **Opportunities**

Recognizing this challenge, the Bismarck-Mandan MPO is currently undertaking a study to evaluate potential new alternatives routes for truck traffic utilizing US 83 and how those alternatives would affect traffic patterns of the area.

In the interim, operational improvements like signal interconnectivity and other ITS solutions could help mitigate impacts of this mobility challenge.

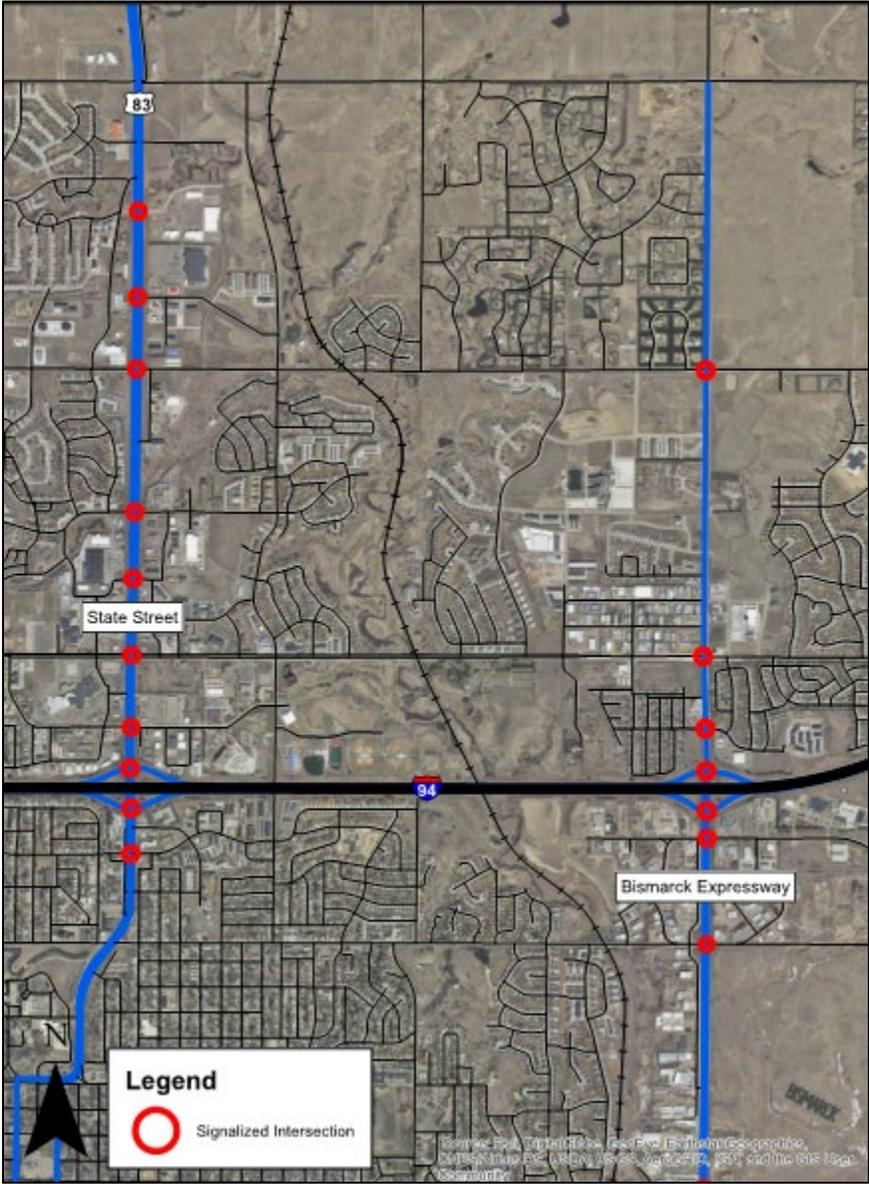


Figure 2: Successive signals can create congestion on heavy freight routes due to the operational nature of trucks (slow to start and stop)

## Rail Limitations

### Trends

Economic development on short lines has increased in recent years. Also, freight stakeholders have noted a growing demand in rail throughout the region.

### Challenges

Class I railroads, like the BNSF railroad, have largely stopped serving rail spurs for small business and industrial parks. Class II and III railroads have stepped in to fill this gap. In the Bismarck-Mandan MPO region, the DMVW fulfills this role. However, they have weight restrictions that limit their ability to move fully-weighted rail cars, i.e. 286K rated cars. This limits the opportunities to attract new and expand existing rail-dependent business to the region. While rail needs are growing, the demand is not currently high enough to consistently fill Class I train blocks.

### Opportunities

The existing rail lines also provide future opportunity for improvement. The goal of establishing a freight plan will be identifying critical Class III rail lines and identifying grant funding, investment tax credits, and strategically site rail essential businesses near those lines, as well as actively recruit those users. Consideration should be given to ensure that the rail system within the MPO region works efficiently with rail lines outside of the region as well. The new BNSF rail bridge being constructed over the Missouri River may also be an opportunity for greater rail loads as well.

Education and increased focus on economic development efforts will greatly impact tracking of rail growth and planning. For example, additional research into federal grants such as BUILD and INFRA, and value capture strategies should be conducted.

## Intermodal Containers

### Trends

The usage of intermodal containers, for domestic and international shipments, is growing nationwide. Metropolitan areas are beginning to understand the operational and economic benefits of incorporating intermodal facilities into their freight network. As a result, there has been increased focus on intermodal operations. Currently, there is no intermodal facility to transload freight between rail and trucking. This is a need that has been voiced by stakeholders as something that is critical for the future development and efficiency of multimodal freight operations in the MPO region.

### Challenges

Currently, the total volume of inbound products is greatly exceeded by the volume of outbound products. This presents a logistical challenge to intermodal operations because there are not enough inbound containers to meet outbound demand, and yet the demand is not high enough to justify a unit train of intermodal well cars. Therefore, it will be difficult to get Class I railroads to participate as they generally need a minimum number of cars, approximately 100, for a train.

Effectively, the region would have create enough import demand to induce a Class I to participate.

The case of exports versus imports is a unique issue for the Bismarck-Mandan region. Traditionally, most MPO regions import more than they export, however for Bismarck-Mandan this is not the case. The Bismarck-Mandan regions exports more products than it imports, therefore creating issues of getting containers to the area.

### **Opportunities**

Bismarck-Mandan is a self-supportive region based on its exports versus imports. This is a unique opportunity, unlike most regions in the nation. Because the region is home to a variety of diversified industries, opportunities exist to increase exportation nationally and globally. This will not only create economic development locally but will also help create the demand needed for intermodal railroad service.

Beyond existing efforts being undertaken by local economic development officials, initiatives like the Brookings Export Initiative provides regions an in-depth and interactive regional trade and investment strategy designed to boost global trade and investment. The Brookings Institution is a nonprofit public policy organization led by experts in government and academia that conducts in-depth research for various societal issues including economics, development, governance and metropolitan policy and freight. The Export Initiative is led by the Brookings Institution's Global Cities Initiative, and is part of a collaboration between multiple states and a team of regional cross-sector leaders in efforts to develop strategies for integrated regional trade and investments. Currently, there are 29 metropolitan areas participating in the exchange. The Bismarck-Mandan MPO region is not currently not one of them.

As voiced by stakeholders, one of the greatest opportunities for growth in the Bismarck-Mandan MPO region is the establishment of a centralized multimodal transloading facility. Local freight movers are eager to find ways to consolidate and work together as an industry. A centralized distribution center would lead to higher volume and density of freight movement. Trucks and rail cars would have the ability to be loaded all the time, which in turn would reduce cost rates to consumers. Multimodal operations would require coordination and communication between trucking and rail. For example, platooning trucks would need to be able to communicate with rail lines to know when trains would be crossing at upcoming at-grade rail crossings, that way the platoon can re-route and avoid if possible.

Another opportunity for the future voiced by stakeholders is the development of a port service, similar to North Dakota Port Services (NDPS), located in Minot. NDPS is a transloading, intermodal and warehousing facility with a focus on agricultural and energy industries. It's also a regional distribution hub for the upper Midwest and lower Canadian provinces. As mentioned previously, the biggest obstacle would be getting empty rail cars back to the Bismarck-Mandan MPO region as currently, outbound products exceed inbound products.

## Funding Sources

### Trends

Many states have begun utilizing tolling and other innovative financing structures as a means to overcome funding challenges for major freight infrastructure projects.

### Challenges

A concern raised by stakeholders.

### Opportunities

Overall, funding is the most significant limiting factor for all infrastructure projects. The MPO, FHWA, NDDOT, and private stakeholders need to work together to start thinking how to meet current and future demands for freight movement long-term. Non-traditional funding sources such as public/private partnerships, INFRA, and BUILD grants, or NDDOT's Rail Loan fund could be used to help construct large freight projects.

## Truck Routes

### Trends

As freight movement increases throughout the Bismarck-Mandan region and as weight capacity regulations for loaded trucks continue to be an ongoing issue, there is an increased need for established region-wide truck routes. The City of Bismarck currently has established truck routes; however the City of Mandan does not.

### Challenges

Establishing designated truck routes presents challenges regarding connectivity both locally and regionally. One challenge unique to Mandan is that one of its major truck generators is located on Main Street. The major truck generator is a sand pit and is expected to close in the next few years. In the near future, the Knife River Sand facility is planning to relocate its operation from its current location in Mandan to new, multiple sites being developed north and east of Bismarck. As the transition occurs truck traffic on Main Street in Mandan will significantly decrease while truck traffic to support the new sites will increase, especially along U.S. Highway 83 and I-94.

### Opportunities

Determining which roadways would be best served as designated truck routes provide an opportunity for the Bismarck-Mandan MPO to be a regional convener and ultimately a facilitator of a master GIS file. This will be beneficial as well considering the influx of oil activity during booms or busts, as the MPO can ensure that major routes utilized by oil related activity can handle the equipment necessary.

## **Freight/Passenger Conflicts**

### **Trends**

As the Bismarck-Mandan MPO regional continues to develop and grow, there will be an increasing number of conflict points between freight and other modes such as passenger vehicles, pedestrian and/or bicycle activities.

### **Challenges**

Multimodal challenges arise as some modes travel at slower speeds and other modes, such as freight carriers, move at faster speeds. The agility of some modes can also present a challenge. Balancing this mobility versus access presents itself as a challenge when roadways and routes are utilized by multiple modes of transport. Many routes currently utilized by truck traffic in Bismarck are not designed or operated to prioritize mobility or freight movement, but rather passenger cars as is evident by the high number of consecutive traffic signals and limited access management.

### **Opportunities**

If the Bismarck-Mandan MPO can identify priority freight routes, they can work with each City to encourage implementation of interconnected signal systems to optimized signal timings and operational performance of the corridor. Analyzing platooning, peak hour traffic patterns, and potential safety improvements at major intersections such as left turn offsets will be beneficial as well.

## **Oversized and Overweight Permit Harmonization**

### **Trends**

Freight carriers will always try to move goods as quickly and as cost-effectively as possible. As a result, they will utilize opportunities to use oversized and overweight trucks when allowed legally.

### **Challenges**

There are issues in the Bismarck-Mandan MPO region in relation to oversized and overweight vehicles. Currently, each city does its own permitting, as well as each state. This requires carriers to interact with three different government offices in order to get three permits for one movement.

### **Opportunities**

Coordinated Oversized and Overweight (OSOW) permit harmonization is an efficient way to improve freight mobility in the region and improve customer service with roadway users. By allowing trucking firms to effectively apply for one permit – instead of one for each jurisdiction they planned to traverse – it could eliminate a significant administration burden on the local trucking industry. In addition, this harmonization will help identify regional truck routes due to the coordination and sharing of freight related transportation assets and impediments.

## Key Issues Anticipated to Face in Short, Mid, and Long-Term

The short-term issues are explained in the above sections. Therefore, this section will primarily discuss the low cost and high value solutions.

- Short-Term Solutions (1-5 Years)
  - Obtaining an accurate picture of where all weight restricted roads are located and identify which ones are critical.
  - Installing fiber and conduits during planned construction projects to position the region for future technological opportunities.
  - Installing cell towers to support future bandwidth needed for wireless connections. (ensuring demand continues to be met – or – 5G implementation)
  - Addressing safety and congestion issues regarding trucks/passenger cars conflicts, specifically along the northbound series of consecutive of Bismarck Expressway and the I-94 interchanges in east Bismarck.
  - NDDOT, Mandan and Bismarck working together as an MPO region to establish harmonized oversize and overweight permitting.
- Mid-Term Solutions (5-10 years)
  - Connected vehicles
  - Platooning trucks
  - Centralized distribution center – multimodal transloading facility
  - Potential port service
  - Integration between technology and infrastructure.
- Long-Term Solutions (10+ years)
  - Identify Funding Sources
  - Identify need based on forecasted traffic for potential locations for future interchanges.
  - Consistency between land use plan and designated truck routes.

## Project Ranking Methodology

As future roadway and rail alternatives are developed, it will be important to screen and prioritize all potential projects based on the transportation system goals and vision related to freight. First, as each potential project and alternative is developed, identification factors should be established, such as: the project's extent, project type, project goals/purpose and description. Additional considerations should be given to environmental impacts and access management polices as well.

One of the most challenging aspects of developing freight project selection and prioritization framework is to specifically define what does or does not constitute a "freight project." Freight projects are categorized by a three-tiered system. The first category, "Freight Focused," is for projects whose primary purpose is to address a specific freight transportation need. The second category, "Freight Related," is for projects whose primary purpose is to address multiple transportation concerns, of which freight is one element. The third category, "Freight Impacted," is for projects whose primary purpose is to address general transportation needs, however, freight mobility may be positively affected.

Potential projects can then be analyzed based on the various performance measures that correlate with the identified goals and vision of the transportation system. Roadway alternatives will be assigned and prioritized based on weighted scores associated with the following goals and measures:

- **Mobility & Access:**
  - Does the project prioritize trucks versus cars or other modes?
  - How does the alternative operate in the future?
  - Access management policies and guidelines, do they match the functionality of the corridor?
  - Does the project improve “last mile traveled” operations?
- **Safety:**
  - Does the proposed project address an identified safety issue?
  - Does the project proactively encourage safer conflict points between different modes (i.e.: pedestrians and rail, rail and roadway at-grade crossings, etc.)?
- **Efficiency and Connectivity:**
  - Does the project fill in a gap inhibiting the movement of freight?
  - Does it serve and prioritize freight truck traffic?
  - Is the project adjacent to anticipated industrial and employment growth areas?
  - Does the project promote multimodal coordination?
- **Technology**
  - Does the project incorporate ITS or technology related to freight movement?
  - Does the project contribute to future development or implementation of connected vehicles or automation?
- **Environmental Considerations**
  - Limited impacts on the environment. Does the project fit within the context of its surroundings?
  - Does the project reduce travel distance or travel times, which would in turn reduce truck emissions or fuel consumption?
- **Stakeholder Input**
  - Is the project a community priority based on safety or connectivity?
  - Is the project low priority or development driven?
  - Does the project promote multimodal activity?
  - Will the project positively impact freight operations and efficiency?

Each performance measure will be weighted and scored based on its individual effectiveness, as shown in the table below. Scores will be then be totaled and summarized to determine the overall ranking and prioritization of projects and alternatives. Projects with higher scores will be deemed as “higher priority” than projects with lower scores. High priority projects will have characteristics associated with being heavy prioritized on trucks or rail verses other modes. Low priority projects will have characteristics associated with having minimal impacts on freight movement.

**Table 1 Performance Measure Scoring**

Transportation System Goal	Performance Measure	Scoring
Mobility	Corridor Functionality	0 – Local 2 – Collector 4 – Minor Arterial 6 – Principal Arterial/Interstate
	Future Daily Truck Traffic	1 – 100 or Less AADTT 2 – 101 to 1,000 AADTT 3 – 1,001 to 5,000 AADTT 4 – Over 5,000 AADTT
Access	“Last Mile Traveled”	0 – No effects on last mile traveled. 2 – Improvements made to local streets 4 – Improvements made to major intersections on location streets specifically to accommodate large trucks (left turn lanes, signalization, turning radius, etc.)
Safety	Benefits to High Crash Corridor	0 – No Safety impact 2 – Adjacent project reduces traffic volumes (i.e. bypass) 4 – Safety improvement to a corridor with 2 or more crashes
	Intersection Improvements	0 – NA 4 - Intersection safety improvement at conflict point between two different modes (peds/rail/traffic)
Connectivity	Roadway Gap Distance	0 – NA (intersection improvements) 2 – Fills in gap up to 1 mile (roadway) 4 – Fills in gap over 1mile (roadway)
	Rail Gap Distance	0 – NA 2 – Updates made to rail to accommodate higher load capacities – consistency 4 – New rail added 6 – Transload Facility
Technology	Consideration for ITS and Connected Vehicles	0 – NA 2 – Infrastructure improvements to incorporate fiber, cell towers, etc. 4 – ITS implementation (DMS signing)
Environmental	Water Crossings/Wetlands	0 – Project is a new alignment with identified wetland crossing 2 – project is on an existing alignment with an identified wetland crossing 4 – Project is on an existing alignment with no widening at wetlands, or new alignment with no identified wetlands or water crossings.
	Travel Time/Distance	0 – No reduction in travel time or distance 4 – Reduction in travel time or distance – less idling for trucks
Stakeholder Input	Community Priority	0 – Low Priority or Development Driven 2 – Moderate Priority Project 4 – High Priority Project
	Freight Operations	2 – Improvements made to newly established truck route. 4 – Improvements to already established designated truck routes.

Transportation System Goal	Performance Measure	Scoring
		6 – Improvements made to incorporate multimodal operations (truck/rail)

Once the identified alternatives are ranked and prioritized, high-level estimated project costs can then be determined, and the projects can once again be ranked based on potential funding sources. The alternatives will then be summarized similar to Table 2. This table allows the MPO to organize projects based on prioritization, measures of effectiveness and feasibility.

**Table 2. Prioritization**

Level of Prioritization	Planning Range based on Funding		
	Short-Term	Mid-Term	Long-Term
	1-5 Years	6-10 Years	11+ Years
High Priority	Alternative 1	Alternative 4	Alternative 7
Medium Priority	Alternative 2	Alternative 5	Alternative 8
Low Priority	Alternative 3	Alternative 6	Alternative 9



# Freight Performance Measures

Bismarck-Mandan MPO Regional Freight Study

September 10, 2018



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# 1. Freight Performance Measures

By using a performance-based approach to this study, the Bismarck-Mandan MPO can prioritize, plan and implement freight investment decisions that align with regional goals for the safe and efficient movement of goods. Performance measures provide the Bismarck-Mandan MPO and its constituent agencies the strategic framework to evaluate how successfully transportation goals and objectives are met.

## Relevant Freight Goals

The freight performance measures in this chapter support the Goals and Objectives identified in various plans and initiatives, including:

- The current 2015-2040 Bismarck-Mandan Long Range Transportation Plan (LRTP)
- The current (2012) Statewide Strategic Transportation Plan, TransAction III
- Federal transportation goals and planning factors

The **2015-2040 Bismarck-Mandan LRTP** identified seven goal areas, many of which support the efficient and safe movement of freight. The most relevant goal area was Goal 5:

*Provide a transportation system that effectively moves goods and enhances the local economy.*

Relevant objectives were:

*Objective 5A: Enhance the efficient and safe movement of freight and goods*

*Objective 5B: Manage freight movement's impacts on the community, including addressing the movement of hazardous materials through the region.*

*Objective 5C: Promote transportation investments that enhance the local economy.*

North Dakota DOT's **TransAction III** identified five goals, with the most relevant goal being Goal 5:

*Strong economic growth with consideration of environmental, cultural, and social impacts.*

When discussing the scope of the metropolitan transportation planning process, the **Code of Federal Regulations (23 CFR 450.306)** lays out ten transportation planning factors. Three of these factors are particularly relevant:

*Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.*

*Increase accessibility and mobility of people and freight.*

*Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.*

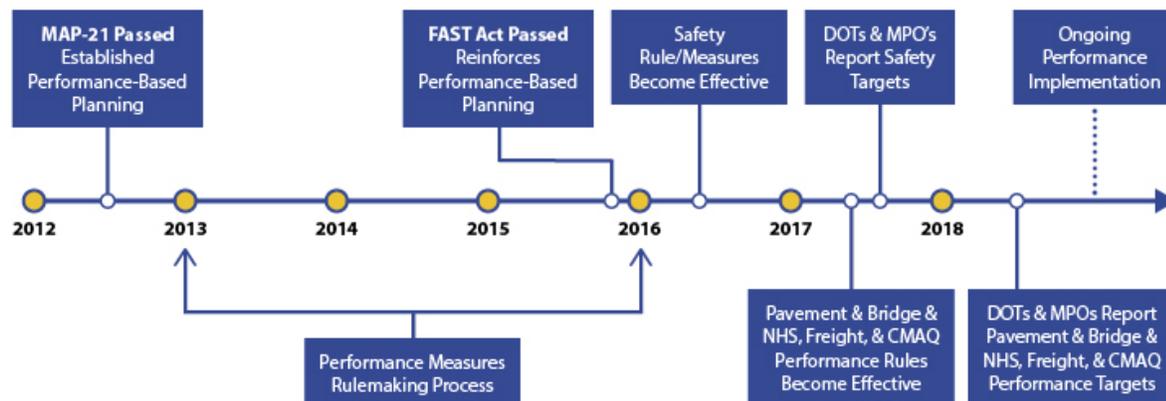
The **overall Freight themes** from these relevant resources include:

- Efficient goods movement
- Safe goods movement, limiting impacts to people and environment
- Regional economic enhancement

## Incorporating Performance Measures

The Bismarck-Mandan MPO and its jurisdictions have a history of employing performance measures to evaluate system performance and prioritize transportation investments. The MPO's ongoing **Monitoring Reports** have been performance-based documents with a regional focus. The MPO's Long-Range Transportation Plan incorporates performance measures to prioritize projects and evaluate the system, including aspects of the freight system. Thus, performance measures are how the MPO and its member jurisdictions do business.

This is important, as Federal performance-based planning requirements have emerged over the past few years. Federal performance measures became fully enacted with the passage of the *Moving Ahead for Progress in the 21st Century Act* (MAP-21) in 2012, and performance measures were reinforced when included as a part of the Fixing America's Surface Transportation (FAST) Act passage in 2015. Since that time, the US Department of Transportation has gone through a lengthy rule-making process. A timeline of the Federal performance measure process is shown below in Figure 1. Target setting and reporting has gradually begun to "go live" for the various performance categories since 2017.



**Figure 1 Federal Performance Measure Timeline**

Establishing performance measures is a critical step in a performance-based transportation planning approach. The performance-based decision-making framework:

- Establishes transportation performance measures that link with goals
- Sets performance targets for each measure
- Develops plans that support performance goals
- Reports results on a regular basis

- Makes adjustments to the planning process based on performance outcomes

Of the 17 performance measures specified in the Federal requirements, the freight-related measure is a Freight Reliability Measure to support freight movement on the Interstate system. More information on that performance measure is provided in the next section.

## Selection and Application of Performance Measures

Two freight performance measures have been identified for further consideration by the MPO to implement. This recommendation is based on an understanding of Federal requirements, past and on-going MPO planning efforts, and discussion with MPO staff on implementation of freight performance measures. Those two measures are:



### Freight Reliability on the Interstate System

This measure is required by the Federal government for State DOTs and MPOs, and assesses how reliable truck travel times are on the Interstate system. In the Bismarck-Mandan region, this measure would apply to I-94 and I-194. Reliability is essentially a measure of how repeatable or predictable travel on a corridor is; reliable travel corridors do not have much travel time variation while unreliable corridors do. More information on the Freight Reliability Measures is available through review of the US Code of Federal Regulations 23 CFR 490 Subpart F

**DATA SOURCE:** National Performance Measure Records Database (NPMRDS) is available at: <https://www.ritis.org/access>. This comprehensive source of vehicle probe data provides truck travel times on the Interstate system in 15-minute increments.

**MEASURE CALCULATION:** This measure compares the 95<sup>th</sup> Percentile Truck Travel time to the 50<sup>th</sup> Percentile Truck travel time to derive the Truck Travel Time Reliability (TTTR) for five analysis periods: Morning Weekday, Midday Weekday, Afternoon Weekday, Weekends, and Overnight. Tools available in the NPMRDS standardize calculations for MPO areas like Bismarck-Mandan.

**MEASURE APPLICATION:** The Truck Travel Time Reliability (TTTR) Measure is used for 2-year and 4-year reliability reporting (Federal requirements.) At a corridor level for planning, the MPO could give the area's least reliable corridors a higher priority for projects that would improve freight reliability.

## Freight Crash Rates

The MPO is already required to track the number and rate of serious injury and fatal crashes, and non-motorized crashes. This additional freight-related measure would use the same type of analysis and data to identify freight-related crash rates.

**DATA SOURCES:** Statewide crash record database, most recent 5-years. NDDOT's crash data include a "unit configuration" field that specifies the vehicle types involved, including configurations of heavy commercial trucks<sup>1</sup>.

**MEASURE CALCULATION:** As this is not a Federally-required measure, the MPO would have as much flexibility as desired in reporting and calculating this measure. For consistency with other safety performance measures, the Freight Crash Rate could be calculated as a 5-year "rolling average", which averages the past 5 individual, consecutive years. As with the other safety measures, vehicle-miles traveled (VMT) data would be required for the calculation, which is available from Highway Performance Monitoring System (HPMS). The safety performance measures use crash rates per 100 million VMT. Some MPOs may produce separate VMT estimates for their planning areas. If the MPO is able to track truck VMT, that might be a more effective ongoing measure of truck crash rates.

**APPLICATION:** This could potentially be an ongoing, annual 5-year rolling average reporting. At a corridor level for planning, there is the potential to use corridor-based crash rates and crash modification factors to help prioritize safety project selection.

## Other Freight Performance Emphasis Areas

Not all of the freight system priority areas identified through MPO planning processes are readily measurable with existing tools and data. However, there were some key performance areas identified as "freight performance emphasis areas" when planning for the freight system. These performance considerations are:



**Economic Development Considerations:** the regional economy is dependent on the efficient movement of freight. The direct economic impacts of freight and freight projects can be difficult to measure. Freight efficiency and reliability connects producers with markets, and can have multiplier effects on the economy within and beyond the Bismarck-Mandan region. More efficient freight can lead to lower producer costs, lower consumer prices, and higher regional, state, and National employment and wages. A more detailed freight plan and analysis might be able look at the economic benefits of freight at both a system and project level.



**Transportation Security Considerations:** Security in transportation planning tends to relate to issues of wider public safety, planning for and attempting to mitigate human-made and natural threats. Due to the nature of security considerations, these are not frequent events in a region that can or should be measured. Thus, planning efforts for the Bismarck-Mandan region can focus on security issues such as:

- Transporting hazardous materials, including oil tankers, across the metro area.

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<sup>1</sup> The MPO can decide what trucks they want to include in this analysis, but typically Heavy Trucks are Class 7 and higher on the FHWA's gross vehicle weight rating (GVWR) scale of 1-8.

- Coordinating with regional emergency responders and freight shippers for efficient response to incidents.
- Freight theft, which is an economic issue for shippers, and can be a human health threat if dangerous / hazardous freight is stolen.
- Environmental / Community Impacts



**Congestion in Freight Corridors:** For the purposes of maintaining reliable and efficient travel in freight corridors, planning efforts should focus on minimizing traffic congestion and reliability issues to the extent possible. Planning efforts should consider this network framework when considering freight congestion:

- Interstate 94 is part of the national Interstate system, on which the FHWA places a high degree of importance for national freight movement. As noted in the performance measures section, maintaining freight travel reliability on I-94 is part of the performance measures.
- North Dakota DOT has also designated a “Highway Performance Classification System (HPCS)” system. Beyond the critical role that I-94 plays, key statewide corridors on the HPCS system include:
  - U.S. Highway 83, Bismarck Expressway, I-194 and Main Street / I-94 Business Loop in Mandan are all designated “Interregional Corridors”. These corridors should maintain a high degree of reliability and mobility to support and promote international, national, regional and statewide trade and economic activity. NDDOT also notes that movements on these highways are primarily long-distance, interstate and intrastate traffic.
  - Highway 1804 south of Bismarck Expressway, Highway 1804 west of Highway 83, and Highway 1806 north of Main Street are designated as “State Corridors”. These corridors should maintain a moderately high degree of reliability and mobility, and provide connectivity between lower and higher level roadways.



**Community and Environmental Quality Balance:** The movement of freight is critical to our economy, but freight movement also tends to have some negative consequences. Freight vehicles tend to be louder and produce more vibrations than passenger vehicles, and can often produce more pollution. Thus, planning around freight should consider the “externalities” (or indirect / unintended impacts) of freight on the natural environment and neighborhood context. Planning approaches to project and program-level freight decisions can use a “triple bottom line” look at a sustainable balance between economic, social, and environment impacts and benefits.

## Performance Target-Setting

Target-setting identifies the quantifiable level of progress that an agency wants to achieve on a performance measure, by a given date. The target-setting process requires the agency to not only set its performance objectives, but to monitor and report performance targets by collecting and analyzing baseline data and applying planning tools. The goal of the target-setting process is to provide a quantifiable way to measure how well an agency’s strategies and investments

are moving it towards its ultimate performance measure goals. The process is ongoing, so the agency can adjust its decision-making process to respond to how well it is achieving its performance targets.

The MPO is actively working with NDDOT on the freight travel reliability performance measure targets. It is recommended that the MPO first review their current truck crash rates prior to setting targets, to gain an understanding of what a reasonably-attainable, yet effective and meaningful truck crash rate target might be.

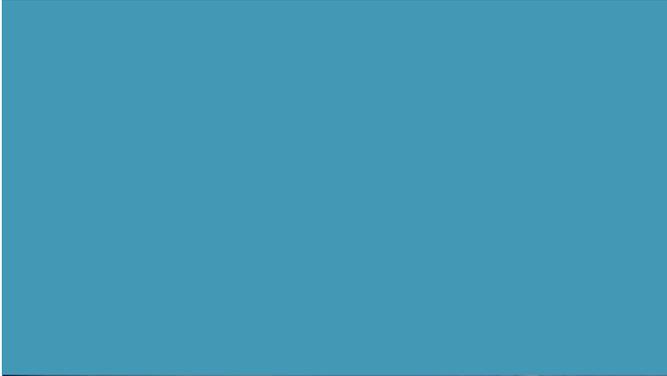
## Freight Performance – Next Steps

The regional planning process is, and has always been, a dynamic environment. The freight performance approach discussed in this chapter is part of the first steps in a continuing, performance-based freight planning approach for the Bismarck-Mandan region. As a part of this continuing process, the following presents the recommendations for the MPO planning process for freight performance measures.

**Table 1. Freight Performance Next Steps**

Action	Discussion
Continue finalizing and integrating the MPO's performance-based planning approach	<p>Over this year and near term, Bismarck-Mandan MPO will be working with NDDOT to <b>finalize targets and begin reporting progress towards achieving targets</b>. While formal target setting will only relate to the freight reliability on the Interstate system measure, there also is an opportunity to start testing and applying the freight crash rate measure. Specific options include:</p> <ul style="list-style-type: none"> <li>• It would be efficient to combine the calculation of the truck crash rates at the same time the MPO is calculating its Federally-required safety performance measures. This will streamline the effort required by combining several of the steps required in each process.</li> <li>• Consider additional ways to improve analysis and reporting all freight measures, and how that can be combined with other MPO functions such as TIP scoring, MTP updates, other to optimize the process.</li> </ul>
Evaluate the new freight performance measures	<p>Through the MPO planning process, there are opportunities to continue evaluating the relevancy of these two new freight performance measures, and consider changes or additions to freight performance measures that might provide benefits to the region. Particular opportunities include:</p> <ul style="list-style-type: none"> <li>• <b>TIP project selection:</b> As new projects are considered, scored, and prioritized through the TIP process, these performance measures can be tested for relevance in choosing projects that best meet regional needs and vision.</li> <li>• <b>MTP updates:</b> including the ongoing update, MTP updates provide the opportunity for a true system-wide test of these performance measures. Beneficial performance measures should provide utility in identifying freight issues and prioritizing freight projects for inclusion in the plan.</li> <li>• <b>Future Performance Report Updates:</b> The MPO's ongoing performance reports will likely be another test of these measures, and their relevance to the MPO's ongoing planning process.</li> </ul>

Action	Discussion
Monitor system performance and adjust measures and targets accordingly	<ul style="list-style-type: none"><li>• As <b>new tools and data sources</b> emerge, the MPO should be flexible in identifying ways to improve these freight performance measures, and identify new performance measures or change measures. Changes might be new functionality in the travel demand model, new sources of truck / vehicle probe data, or new “big data sources” that do not currently exist.</li><li>• The goal of performance-based planning is to identify ways in which the planning and decision-making process can best improve system performance. There are <b>external factors and trends</b>, beyond the control of local planners and engineers, which will impact performance and targets. These include factors such as truck volume growth, new or expanded regional industries, and increased congestion that need to be considered in the next round of target setting. Continue monitoring these trends, and adjust future targets accordingly.</li></ul>



# Freight Funding

Bismarck-Mandan MPO Regional Freight Study

September 10, 2018



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# 1. State Funding Opportunities

The 2015 North Dakota Freight Plan highlights what State grant and loans are available for freight-related transportation infrastructure. The following sections identifies funding opportunities for specific modes of transportation as well as provides non-mode specific programs.

## Aviation

The North Dakota Aeronautics Commission (NDAC) administers a grant program that supports airport capital improvement projects.<sup>1</sup> The NDAC disburses funding annually to public airports across the State for airport improvement projects. According to the NDAC Airport Grant Funding Documents, these grant funds are derived primarily through aviation fuel taxes, aircraft taxes and aircraft registrations.<sup>2</sup> The NDAC also assists the Energy Impact and Infrastructure Office with reimbursement requests for oil impact grants.<sup>3</sup>

For more information on either of these grant programs, visit the NDAC website:

<https://aero.nd.gov/airports/airport-grant-funding/>

## Highways

Currently, there are no state grant or loan programs specifically available to pay for freight related transportation infrastructure improvements to North Dakota’s highway system. North Dakota Department of Transportation (NDDOT) does however use state and federal highway funding to construct highway projects that support the safe, secure and efficient movement of freight. These projects may provide for freight connectivity “last mile connections” between highway and other transportation modes.<sup>4</sup>

## Railroads

The following low interest loan program, with limited funding, is administered by NDDOT and supports infrastructure improvements to the State’s rail system, Freight Rail Improvement Program (FRIP) and Local Rail Freight Assistance (LRFA).<sup>5</sup>

The primary purpose of these two loan programs is to upgrade and enhance rail infrastructure that improves rail services. Eligible applicants include cities, counties, railroads, rail authorities, and other current or potential users of freight railroad service.<sup>6</sup>

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<sup>1</sup> 2015 ND Freight Plan (Appendix F):

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

<sup>2</sup> NDAC airport grant funding: <https://aero.nd.gov/airports/airport-grant-funding/>

<sup>3</sup> NDAC airport grant funding: <https://aero.nd.gov/airports/airport-grant-funding/>

<sup>4</sup> 2015 ND Freight Plan (Appendix F):

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

<sup>5</sup> 2015 ND Freight Plan (Appendix F):

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

<sup>6</sup> 2015 ND Freight Plan (Appendix F):

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

For more information on either of these loan programs, visit the NDDOT Planning Division website: <https://www.dot.nd.gov/divisions/planning/railinfo.htm>

## **Non-Mode Specific**

There are two non-mode specific programs both managed by the North Dakota Department of Commerce (NDDC), North Dakota Development Fund (NDDF) and Community Development Block Grant Program (CDBG).<sup>7</sup> Additionally, the North Dakota Department of Trust Lands is also an available source of funding through the State.

### **North Dakota Development Fund (NDDF)**

The NDDF provides “gap financing” through loans and equity investments not available from most conventional lenders. The NDDF is available to any primary-sector businesses as well as the community.<sup>8</sup> Additionally, the NDDF administers the Regional Rural Revolving Loan Fund, which is for primary-sector projects located in communities with a population of less than 8,000 or located more than 5 miles outside of the city limits.<sup>9</sup>

For more information on the Development Fund, visit the ND Economic Development & Finance website: [https://www.business.nd.gov/development\\_fund/](https://www.business.nd.gov/development_fund/)

### **Community Development Block Grant Program (CDBG)**

The CDBG provides financial assistance to eligible units of local government in the form of grants and loans for public facilities, housing rehabs, and economic development projects. In order to be considered for this program, the primary beneficiaries of the project must be very low and low income individuals.

For more information on this grant program, visit the ND Community Services website: <https://www.communityservices.nd.gov/communitydevelopment/Programs/CommunityDevelopmentBlockGrant/>

### **North Dakota Department of Trust Lands**

The Department of Trust Lands administers the Energy Infrastructure and Impact Grant Program. Eligible applicants include Counties, Cities, and other political subdivisions in oil and gas development impact areas for projects that may benefit freight movements.

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<sup>7</sup> 2015 ND Freight Plan (Appendix F):  
<http://www.dot.nd.gov/divisions/planning/freight/docs/FreightPlan.pdf>

<sup>8</sup> 2015 ND Freight Plan (Appendix F):  
<http://www.dot.nd.gov/divisions/planning/freight/docs/FreightPlan.pdf>

<sup>9</sup> 2015 ND Freight Plan (Appendix F):  
<http://www.dot.nd.gov/divisions/planning/freight/docs/FreightPlan.pdf>

## 2. MPO Funding Opportunities

Currently, there are three Metropolitan Planning Organizations (MPOs) operational in the State of North Dakota. The Bismarck-Mandan MPO is the only MPO located fully within the boundaries of State. Both the Fargo-Moorhead and Grand Fork-East Grand Form MPOs are bi-state MPOs with Minnesota.<sup>10</sup>

Federal funding for Metropolitan Planning Organizations (MPOs) in North Dakota is available and is administered through NDDOT. The two forms of available funding include the Federal Highway Administration (FHWA) Metropolitan Planning (PL) funds and the Federal Transit Authority (FTA) 5303 and 5304 funds.<sup>11</sup> The FHWA PL funds are only used to provide for a continuing, comprehensive and cooperative (3-C) metropolitan transportation planning process. These funds are available to each MPO designated for an urbanized area with a population of more than 50,000 individuals. The FTA provides funding and procedural requirements for multimodal transportation planning in metropolitan areas and States. Similar to FHWA, planning needs to provide for the 3-Cs, resulting in long-range planning and short-range programs reflective transportation investment priorities.

Both funding types are a percentage of transportation funds apportioned by Congress. The apportionment formula for the FHWA PL funding is equal to North Dakota's State base apportionment; plus the North Dakota's National Highway Freight Program (NHFP) funding; multiplied by the ratio of North Dakota's FY09 Metro Planning amount over North Dakota's total FY09 apportionment. More information regarding this formula is found on the FHWA Fast Act apportionment factsheet.<sup>12</sup>

The FTA funds are apportioned to states by a formula that includes each state's urbanized area population in proportion to the total urbanized area population for the nation, as well as other factors. States can receive no less than 0.5 percent of the amount apportioned. In North Dakota, funds are then sub-allocated to the three MPOs by a formula that considers the following factors, urbanized area population, individual planning needs, and a minimum distribution. This formula is approved by the State and Federal agencies.

Federal funds have a matching ratio equal to 80 percent federal and 20 percent local that is subject to obligation limits established by congress. All apportioned FHWA PL and FTA funds for the three MPOs operating in North Dakota are combined annually into a Consolidated Planning Grant (CPG) and are managed by the NDDOT.<sup>13</sup>

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<sup>10</sup> ND Local Government Manual 2016:

<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>

<sup>11</sup> ND Local Government Manual 2016:

<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>

<sup>12</sup> FHWA Apportionment Factsheet: <https://www.fhwa.dot.gov/fastact/factsheets/apportionmentfs.cfm>.

<sup>13</sup> ND Local Government Manual 2016:

<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>.

## North Dakota Urban Programs

The Urban Program funds are balanced equally between the Regional and Urban Road systems, though each system are distributed in different ways.<sup>14</sup> Regional system funds are distributed according to specific projects based on their needs, rather than by a predetermined formula. Urban road funds are distributed using amount per Local Planning Agency (LPA), with the balance distributed according to population (based on latest census data).

Funding responsibility for federal, state and local agencies is presented in Table 1 by project type.<sup>15</sup>

**Table 1. Federal, State, and Local Agency Funding Responsibility**

	Federal	State	LPA
Primary Regional	80.93%	19.07%	0.00%
Secondary Regional	80.93%	9.07%	10.00%
Service Roads	80.93%	0.00%	19.07%
LPA Roads	80.93%	0.00%	19.07%

### Project Selection:

The LPAs must coordinate a project list submission with their respective NDDOT district office. The LPA and district office will then submit the project list to their corresponding MPO for prioritization. The MPO will then submit the prioritized list to the Local Government Division (LGD) to be included in future planning documents.

**Primary and Secondary Regional Systems** – The LPA will concur with the selected projects when the LPA is requested to provide either the funding match or maintenance responsibility is being transferred.<sup>16</sup>

**Urban Roads** – The LPA chooses project to be completed under the Urban Roads program and submits the list of projects annually to NDDOT describing the LPA’s federal aid program for the next four years. The first two years must be firm, any changes may result in loss of funding.<sup>17</sup>

Both the Urban and Regional Roads Programs are could be used for freight routes. Local agencies, NDDOT District Offices, and MPOs would need to include these identified routes within project lists and then prioritize these projects to be included in future planning documents. Local agencies and MPOs can utilize existing state level evaluation criteria and weighting to evaluate the specific goals of for the metro area identified by the MPO.

<sup>14</sup> ND Local Government Manual 2016 (Section 3-6):  
<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>.

<sup>15</sup> ND Local Government Manual 2016 (section 3-6):  
<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>.

<sup>16</sup> ND Local Government Manual 2016 (section 3-6):  
<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>.

<sup>17</sup> ND Local Government Manual 2016 (section 3-6):  
<http://www.dot.nd.gov/manuals/localgov/localgovernmentmanual.pdf>.

### 3. Public Private Partnership (P3) Funding Opportunities

As State and local governments find themselves carrying a larger burden for transportation funding, innovative approaches to solve this funding short fall become necessary. One such innovative technique is the use of Public-Private Partnerships or P3s. A public-private partnership is defined as a “contractual agreement formed between a public agency and a private sector entity that allows for greater private sector participation in the delivery and financing of transportation projects.”<sup>18</sup>

Typically, transportation P3 delivery methods fall into the following categories:<sup>19</sup>

- Design Build (DB)
- Operate-Maintain (OM)
- Design-Build-Operate-Maintain (DBOM)
- Design-Build-Finance (DBF)
- Design-Build-Finance-Operate-Maintain (DBFOM)

P3s offer a wide range benefits as well as concerns for both the public and private sectors, some of which are highlighted in Table 2.

**Table 2: Public-Private Partnership Benefits and Concerns<sup>20</sup>**

Public Sector	Private Sector
<b>Benefits:</b>	
<ul style="list-style-type: none"> <li>• Expedited project delivery</li> <li>• Protection against some risk</li> <li>• Construction and operational efficiencies</li> <li>• Increased investment in transportation assets where unmet needs are the greatest</li> <li>• Opportunities for “new” money</li> <li>• Brings together multiple financing sources required for large scale projects</li> <li>• Enhanced cost control</li> <li>• More certainty regarding cost and schedule</li> <li>• Brings innovation</li> <li>• Introduces life-cycle perspective – better quality up front and improved maintenance</li> <li>• Improved customer focus</li> <li>• Leverages each partner’s strength</li> <li>• Conserves public sector debt capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Private concessionaires are looking for a ROI that is long-term, stable, predictable, and moderate risk</li> <li>• Opportunity to increase return through efficiencies, innovation and managing risks</li> <li>• But “profits of private sector are generally more visible – and controversial – than the benefits to the public sector</li> </ul>

<sup>18</sup> The Office of Innovative Project Delivery, P3 Defined (Washington, D.C.: Federal Highway Administration, n.d.), <http://www.fhwa.dot.gov/ipd/p3/defined>.

<sup>19</sup> <http://www.ncsl.org/research/transportation/public-private-partnerships-for-transportation-categorization-and-analysis-of-state-statutes-january-2016.aspx#Recent>

<sup>20</sup> [https://www.fhwa.dot.gov/ipd/pdfs/p3/intro\\_p3.pdf](https://www.fhwa.dot.gov/ipd/pdfs/p3/intro_p3.pdf)

Concerns:	
<ul style="list-style-type: none"> <li>Loss of public control and flexibility</li> <li>Private profits at the public's expense</li> <li>Loss of future public revenues</li> <li>Risk of bankruptcy or default</li> <li>Accountability and transparency</li> <li>Environmental issues</li> <li>Labor concerns</li> <li>Use of foreign companies</li> <li>Toll road and controversies</li> <li>Special contract terms</li> </ul>	<ul style="list-style-type: none"> <li>Risk of bankruptcy or default</li> <li>High cost of private capital: limited access to low-cost PABs and TIFIA</li> <li>Difficulty in identifying and pricing risk and proper risk allocation</li> <li>Private sector returns: less than anticipated</li> </ul>

For agencies interested in pursuing a P3 arrangement to complete a project, FHWA provides guidance and adheres to a specific process, as shown in the figure below.

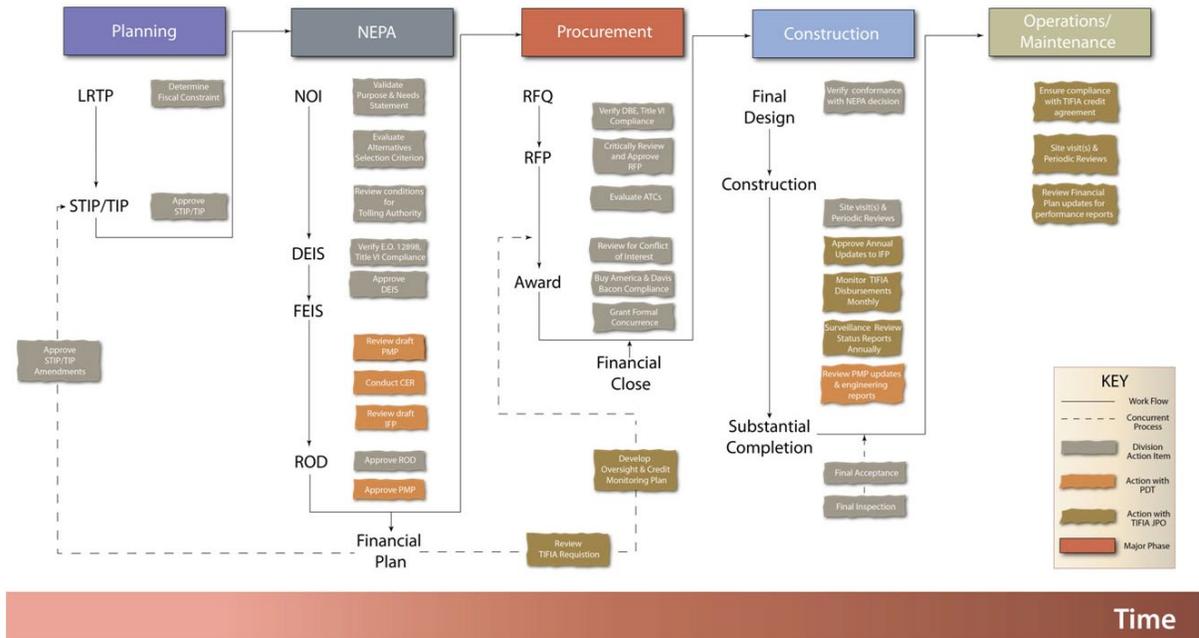


Figure 1: FHWA Review Process for P3 Projects

Source: [www.fhwa.dot.gov/ipd/p3/toolkit/publications/guidebooks/fhwa\\_review/](http://www.fhwa.dot.gov/ipd/p3/toolkit/publications/guidebooks/fhwa_review/)

As shown in Figure 1, FHWA will review the Long Range Transportation Plan, approve the STIP and approve any amendments to the STIP. The agency will note whether the use of P3s was included as a goal, objective, or strategy in these plans and ascertain whether the LRTP financial plan and STIP reflect any anticipation of private financing. If the state does not have P3 enabling legislation, FHWA will try to determine whether there are efforts underway or if there is some support by the governor and legislature. Other considerations include whether there is a dedicated source of revenue available to fund the project, whether the private sector is

interested in funding part of the project, and whether the project is dependent upon USDOT funding to move forward.

During the NEPA phase, there are a number of factors that FHWA considers, particularly related to right of way and tolling. For example, if the facility will rely on tolling revenue, FHWA is interested in knowing whether that decision was documented during the planning process. FHWA is also interested in understanding whether there is a rationale for eliminating the non-tolled facility, other than financial feasibility. Specifically, FHWA will complete the following during the NEPA phase:

- Approve federally-funded early acquisitions
- Approve Draft Environmental Impact Statement (EIS) – note that an EIS may not be the appropriate environmental document for all P3s
- Review draft Project Management Plan (PMP)
- Review Cost Estimate
- Review draft Initial Finance Plan (IFP)
- Approve Record of Decision (ROD)
- Approve written reevaluation
- Authorize Supplemental EIS

FHWA is also involved during procurement and pre-construction. Specifically, FHWA will:

- Approve the Request for Proposal (RFP) and major addenda
- Evaluate Alternative Technical Concepts (ATCs)
- Approve the final Project Management Plan (PMP)
- Review Cost Estimate Review (CER)
- Approve the Initial Finance Plan (IFP)
- Concur with award, price reasonableness, and authorization of federal funds
- Review TIFIA requisition if applicable
- Assist development of Oversight and Credit Monitoring Plan

Issues of interest to FHWA at this stage of the project generally relate to unnecessary restrictions or limitations on competition, conflicts of interest, whether the agency has an approved and compliant Disadvantaged Business Enterprise (DBE) program, and the transparency of the NEPA process. Other important considerations include compliance with requirements of Buy America, Davis-Bacon prevailing wage rate, and Title VI/Nondiscrimination. Civil rights provisions are also reviewed, and the credit-worthiness of the project is determined if it is applying for TIFIA.

During the construction phase, FHWA will:

- Conduct site visits and periodic reviews
- Participate in TIFIA oversight and monitoring activities
- Approve Annual Updates to the IFP
- Review updated PMP

- Review engineering reports
- Assist in completing project status reports and annual TIFIA credit surveillance reports
- Monitor TIFIA disbursements
- Final Inspection
- Final Acceptance

FHWA is particularly interested in whether there are unique risks to the project as a P3 compared to traditional procurement. Whether FHWA staffing will be required to oversee the project is another important consideration. Finally, FHWA will review whether the state has provisions for P3 included in the general Stewardship and Oversight Agreement. Project Management Plan updates are required when the project reaches major milestones of significant changes are made.

The following section goes into the specifics of public-private partnerships for the State of North Dakota. Though there is State Century Code permitting P3s in the state, transportation projects are not identified explicitly in the law.

## North Dakota Specific Law

The State of North Dakota Century Code 48-02.1-01, enacted in 1993, allows private operators to construct, improve, rehabilitate, own, lease, manage and operate fee-based facilities.<sup>21</sup> According to the code, public authorities may solicit or accept and enter into development agreements with any private operator.<sup>22</sup> If the proposal is deemed to be in the public interest, the public agency may accept following a hearing. A development agreement, between a public agency and private operator, may permit the private operator to assemble funds from any available source, including Federal, State, and local grants, bond revenues, contributions, and pledges.<sup>23</sup>

In terms of cost recovery, private operators may impose a fee-based charge for the use of the facility and must require that the fee revenues be applied to one or more of the following, (1) Repayment of indebtedness incurred for the fee-based facility; (2) Lease or fee-based concessions payment (if any); (3) Costs associated with the operation, administration, and maintenance of the facility; and (4) Reasonable reserves for future capital outlay (if any).<sup>24</sup>

According to the 2017 State Statute Report, published by the Design-Build Institute of America (DBIA), North Dakota's Design-Build and Public Procurement Laws include:

- The State Water Commission is authorized to use design-build for construction of the Devils Lake Outlet. (NDCC 61-02-23.2)<sup>25</sup>

<sup>21</sup> ND Century Code 48-02.1-02. Private Operators

<sup>22</sup> ND Century Code 48-02.1-03. Public authority may enter into a development agreement

<sup>23</sup> ND Century Code 48-02.1-04. Content of development agreements

<sup>24</sup> ND Century Code 48-02.1-10. Cost Recovery

<sup>25</sup> 2017 State Statute Report DBIA (page 17): <https://www.dbia.org/advocacy/state/Documents/2017-State-Statute-Report-DBIA.pdf>



## P3 Opportunity – Centralized Freight Hub

Since alternative delivery is more often an accepted method of delivery for vertical construction, one possible P3 opportunity for North Dakota could be a centralized hub for multimodal freight connecting rail, air, and other modes of transportation. One of the most important questions when considering a P3 is what is the return on investment for investors? With this example, the return for investors could be some economies of scale from combining freight options at a centralized location.

Currently, North Dakota does not have a mechanism to fund a centralized hub P3 project, however, other states have successfully funded freight projects using combined public and private funding. Two possible approaches may be considered to when thinking about P3 freight projects in North Dakota, establishing an industrial rail access program (IRAP) or applying for an existing federal grant. These two scenarios are presented below using existing case studies.

### Establish an Industrial Rail Access Program (IRAP)

North Dakota could set up an IRAP in which a private railroad invests some money into a specific industry-based freight access project and then applies for available state funds for use toward the project. This type of program successfully exists in Massachusetts. Additionally, neighboring states to North Dakota also have similar grant and loan programs that could be used as funding models within North Dakota.

**Case Study:** Created in 2012, The Massachusetts IRAP is a competitive state-funded public/private partnership program that provides financial assistance to eligible applicants interested in investing in freight rail infrastructure access improvement projects. IRAP aims to enhance industrial development opportunities, leverage private investment, and encourage freight shipment by rail to help reduce roadway congestion and emissions. In Massachusetts, no more than 60% of project costs are supported with state IRAP funds and the remaining 40% (at a minimum) must be provided by the private railroad operator or industry project sponsor. The maximum IRAP grant award cannot exceed \$500,000.<sup>29</sup>

Past Massachusetts IRAP funded projects include:

- Pan AM Freight Hub Improvements (Ayer, MA)
- United Materials Management Rail Facility (Holyoke, MA)
- Pioneer Valley Railroad (PVRR) Yard Capacity Project (Westfield, MA)

### Neighboring Peer State Existing Loan and Grant Programs

#### MINNESOTA:

**Rail Line Rehabilitation Program (Loan)** – Loan program intended to rehabilitate economically viable, but deteriorating rail lines serving MN.<sup>30</sup>

<sup>29</sup> Mass IRAP: <https://www.mass.gov/industrial-rail-access-program>

<sup>30</sup> MNDOT: <http://www.dot.state.mn.us/ofrw/Reports/MRSI%20Rail%20Line%20Rehabilitation.pdf>

**Capital Improvement Loan Programs (Loan)** – Loan program used to assist rail users improve the efficiency of their rail transportation. Funds are available for capital improvement projects that increase rail usages; (e.g., expanding industrial spurs, adding storage and transfer capacity, loading efficiency improvements).<sup>31</sup>

**INDIANA:**

**Industrial Rail Service Fund (Mostly Grants)** – Program aims to provide low interest loans to Class II & III railroads to purchase or rehabilitate real or personal property that will be used by the railroad in providing transportation services.<sup>32</sup>

**IOWA:**

**Railroad Revolving Loan & Grant Program (Loan / Grant)** –The program provides financial assistance to improve rail facilities that will create jobs, spur economic activity and improve the rail transportation system in three categories: job creation, rail network improvements, and rail port planning & development.<sup>33</sup>

**KANSAS:**

**State Rail Service Improvement Fund (Loan/Grant)** - Program aims to improve rail access for businesses and preserve the condition of the state's railroad network.<sup>34</sup>

**Economic Development (Grants)** – The State grants to cities or counties are loaned to provide gap financing for private businesses that create or retain permanent jobs. Eligible activities include infrastructure, land acquisition, fixed assets and working capital.<sup>35</sup>

**WISCONSIN:**

**Freight Railroad Preservation Program (Grant)** - Provides grants to local units of government, industries, and railroads for the purpose of preserving essential rail lines and rehabilitating them following purchase.<sup>36</sup>

**Freight Railroad Infrastructure Improvement Program (Loan)** - Enable the state to encourage a broader array of improvements to the rail system, particularly on privately owned lines. Also provides funding for loading and trans-loading facilities.<sup>37</sup>

**Apply for a Federal Discretionary Grant**

A private railroad could partner with the state or MPO to provide funding for a freight project and apply for an available federal grant including. Federal discretionary grant programs include Better Utilizing Investments to Leverage Development (BUILD), formerly known as the Transportation Investment Generating Economic Recovery (TIGER). Currently, the BUILD grant program is accepting applications with a July 19, 2018 deadline.

<sup>31</sup> MNDOT: <http://www.dot.state.mn.us/ofrw/Reports/MRSI%20Capitol%20Improvement%20Loans.pdf>

<sup>32</sup> INDOT: <https://www.in.gov/indot/files/FY17%20IRSF%20Guide.pdf>

<sup>33</sup> IowaDOT: <https://iowadot.gov/iowarail/financial-assistance/rrlqg>

<sup>34</sup> KDOT: [http://tworks.ksdot.org/EcoDevo/downloads/fact-sheet\\_rail\\_2012.pdf](http://tworks.ksdot.org/EcoDevo/downloads/fact-sheet_rail_2012.pdf)

<sup>35</sup> Kansas Commerce: <http://www.kansascommerce.com/129/Economic-Development>

<sup>36</sup> WisconsinDOT: <http://wisconsin.gov/Pages/doing-bus/local-gov/astnce-pgms/aid/frpp.aspx>

<sup>37</sup> WisconsinDOT: <http://wisconsin.gov/Pages/doing-bus/local-gov/astnce-pgms/aid/friip.aspx>

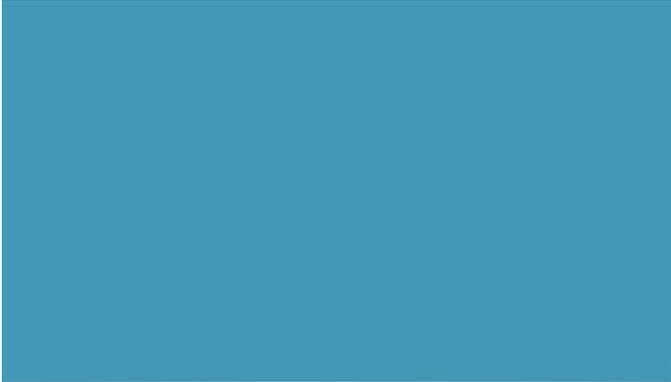
For more information on the specifics of the BUILD grant project see:

<https://www.transportation.gov/BUILDgrants/about>

**Case Study:** In 2013, New Hampshire won a \$1.4 million Federal TIGER Grant to upgrade a section of a freight line from Rochester to Ossipee. This section of rail is privately owned by the NH Northcoast Corp., who committed \$450,000 to this project. Additionally, the State of NH also allocated \$150,000 to the project. <sup>38</sup> The updates aim to attract tenants to the Granite State Business Park in Rochester and reduce the amount of truck traffic along Route 16 – easing congestion and wear and tear on the highway.

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<sup>38</sup> <http://www.nhbr.com/September-6-2013/Rochester-to-Ossipee-rail-upgrade-wins-14m-fed-grant/>



# Recommendations

Bismarck-Mandan MPO Regional Freight Study

November 29, 2018



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The Bismarck-Mandan MPO Regional freight plan identifies a series of project, planning and policy recommendations to improve regional freight mobility, safety, and overall economic development. The following recommendations were identified by analyzing previous planning efforts, local/national trends and issues and stakeholder input. These recommendations focus on developing big picture solutions for the specific needs and opportunities identified in the previous chapter. Each specific recommendation is followed by a general implementation strategy for the MPO.

# 1. Capital Improvements

## Roadway Improvements

### 2040 MTP Freight Related Improvements

The Bismarck Mandan 2015 – 2040 Long Range Transportation Plan (LRTP) identified a fiscally constrained list of capital projects to meet future transportation needs over the short, medium and long term. Within that larger list, several freight-related projects emerge. These projects are identified in Appendix A. This list is intended to be used only as an informative tool, and is based on the best information available in the LRTP and project team expertise.

Implementation Plan	Short Term:	See Appendix A
	Medium Term:	See Appendix A
	Long Term:	See Appendix A

### US 83 Study Implementation

The MPO's US Highway 83 Alternative Study will be completed in early 2019. The study is focused on identifying, analyzing and developing highway alternatives to improve mobility on US Highway 83. Once the study is complete, its recommendations should be integrated in future updates of the MTP.



Implementation Plan	Short Term:	Implement low cost/high value recommendations
	Medium Term:	ITS/Signalization improvements
	Long Term:	Monitoring of US 83 traffic volumes and operations

### Intersection Improvements Program

During the development of this study, stakeholders identified several intersections that needed improvements to better accommodate freight users. Typically, this type of project only has a localized benefit and does not compete well for funding on a regional level. However, these small improvements often have the potential to make a substantial improvement to the immediate area. An intersection improvement program would allow the MPO to make improvements as needs are identified and as funding allows.

As part of this program, the MPO should maintain and prioritize a list of needed intersection improvements as funding permits. One example of the type of project that could be funded through this program is an extension of the left turn lane on Bismarck Expressway into Tubular Transport and Logistics.

This would allow trucks (who are slow to start and stop) waiting to turn left to move their trucks out of the main lanes of traffic – decreasing congestion and improving safety.

Implementation Plan	Short Term:	Identify overall needs
	Medium Term:	Develop program and fund projects
	Long Term:	Implement projects and monitor results

### **Integration of Fiber and other ITS Solutions in all MPO Projects**

Emerging technologies are likely to have a substantial impact on freight mobility, operations, and safety. Innovations in vehicle-to-vehicle communications has resulted in successful truck platooning pilots across the country. Similarly, vehicle-to-infrastructure communication improvements can facilitate signal timing improvements that better facilitate the operational characteristics of truck traffic in a given area. To facilitate the Bismarck-Mandan MPO and its partners should consider adopting a policy that requires the consideration of including ITS elements such as the installation of fiber optic cables and conduits in any transportation-related capital improvement project.

Implementation Plan	Short Term:	Identify connected/automated vehicle corridors
	Medium Term:	Develop/adopt policy to require conduit/fiber to be integrated in MPO funded projects
	Long Term:	Monitor results

## **Rail Improvements**

### **Development of an Intermodal Container or Transload Facility**

The Bismarck-Mandan MPO area currently does not have a facility to transfer freight between the rail and trucking modes. The addition of an intermodal or transloading facility could improve efficiency and reduce shipping costs for the region. The region should consider developing a study to explore future options that fit the region’s needs and the BNSF Railway business model. This study would focus on market feasibility, location and ownership options.

Implementation Plan	Short Term:	Develop regional partnership and develop relationship with BNSF
	Medium Term:	Pursue justification study/discretionary grants
	Long Term:	Build facility

### **Dakota, Missouri Valley & Western Track Upgrades**

The Dakota, Missouri, Valley & Western (DMVW) serves an important role in the region’s freight system; it provides the link between the BNSF tracks and local businesses/industrial parks. Approximately half of DMVW’s track cannot accommodate the current industry standard of 286,000 pound gross weight railcars. Upgrading the DMVW track will help improve the operational efficiency of the region’s rail system.

Implementation Plan	Short Term:	Help DMVW define business case
	Medium Term:	Work with DMVW to pursue funding/financing through NDDOT or other means
	Long Term:	N/A

### **New Missouri River BNSF Bridge**

BNSF is developing plans to build a new Missouri River bridge. This project will significantly improve the operational efficiencies, reliability, and safety of rail movement through the MPO region.

Implementation Plan	Short Term:	N/A
	Medium Term:	N/A
	Long Term:	N/A

## **Aviation Improvements**

### **Bismarck Municipal Airport Runway Rehabilitation**

A three phased project to reconstruct the main runway at Bismarck Municipal Airport has been underway since 2017. The third phase, the northern edge of the runway, is scheduled for construction in 2019. This is a key project to support air cargo’s long-term viability of in the region.

Implementation Plan	Short Term:	Monitor progress on 2019 construction
	Medium Term:	N/A
	Long Term:	N/A

# **2. Planning and Policy Recommendations**

## **Planning Recommendations**

### **Sub-Area Studies**

Through the data collection, analysis, and stakeholder outreach efforts, several locations were identified as potentially needing improvements. As conflict points and bottlenecks are identified, reconnaissance studies should be performed to identify what improvements are needed. Two potential sub-area studies include Exit 161 of I-94 Interchange with Bismarck Expressway, Sunset Drive bridge clearance issues under I-94, and the East Century Avenue Intersection.

Implementation Plan	Short Term:	Develop two pilot sub-area studies
	Medium Term:	Implement solutions and document results
	Long Term:	Identify and prioritize next round of studies

### **Railroad Grade Crossing Study**

Railroad/roadway grade crossings can create delays and potential safety risks for communities and transportation users. The MPO should conduct a study to identify and prioritize all grade crossings in the region for potential grade separations and where appropriate closure.

Implementation Plan	Short Term:	Execute Study
	Medium Term:	Work with state/railroads to fund improvements
	Long Term:	Construct prioritized grade crossings

### Downtown Delivery Study

Freight stakeholders identified that downtown Bismarck can be problematic for deliveries. A study that explores ways to improve deliveries in the downtown areas should be performed. The study should explore ideas such as intersection improvements, loading dock improvements, modifications of on-street parking, encouraging off-peak hours for deliveries, and using smaller vehicles or bikes should be considered.

Implementation Plan	Short Term:	Engage local business owners and the community about current delivery needs and freight related issues
	Medium Term:	Develop programs/small improvements to improve deliveries without significantly impacting the community
	Long Term:	Monitor/revise programs

### Prioritize and Address Functionally Obsolete and Structurally Deficient Bridges

The MPO and NDDOT should prioritize the replacement of structurally and functionally obsolete bridges on roads with heavy truck volumes or percentages. Similarly, these bridges should be considered when identifying a regional truck route network.

Implementation Plan	Short Term:	Identify FO/SO bridges on heavy freight corridors
	Medium Term:	Fund improvements on those corridors
	Long Term:	Integrate with formal truck route system (see Page 7)

### Implement Performance Measures

Performance measures are used to assess how well the transportation system is operating; provides data to support decision making; and provide greater transparency and accountability. Using performance measures, the MPO can improve project selection and delivery in order to meet its transportation planning goals. Monitoring how effective a project is relative to established goals, allows the MPO to better understand the impact a project has on the transportation system. From there, the MPO can use this information in future decision-making. Implementing the performance measures will not only help the MPO comply federal regulations but more importantly improve their transportation system.

Implementation Plan	Short Term:	Develop freight performance measures
	Medium Term:	Implement, monitor and adjust MPO activities to move the needle towards meeting goals
	Long Term:	N/A

### Address Freight Conflicts with Active Transportation Users

The MPO should identify roadway areas where heavy truck movements have the potential to create safety conflicts with active transportation users (i.e. pedestrians, bicyclists, etc.). By engaging stakeholders and readily available traffic and crash data, the MPO could identify potential areas of concern and mitigation strategies. Potential strategies could range from education and enforcement to constructing/adapting physical infrastructure. For example, freight plan stakeholders suggested that additional bicycle/pedestrian signage around the Bismarck Expressway and the I-94 interchange(s) could improve safety.

Implementation Plan	Short Term:	Traffic/safety analysis to identify areas of concern
	Medium Term:	Work within existing funding programs to build needed infrastructure
	Long Term:	

### Continue Data Collection Efforts

Data collection and analysis is important part of the planning process. The MPO should continue to collect its existing datasets and encourage NDDOT to do the same. The MPO should periodically review the data being collected to determine if additional data should be collected. As part of this assessment process, The MPO should consider the data quality, cost of collection, and use as data should be collected to improve the analysis of the transportation system rather than just because it is available. As more relevant regional and local freight data becomes available, it will be important to revisit this freight plan – likely once, every five years.

Implementation Plan	Short Term:	Monitor, collect, analyze, act (where appropriate)
	Medium Term:	Monitor, collect, analyze, act (where appropriate)
	Long Term:	Monitor, collect, analyze, act (where appropriate)

## Policy Recommendations

### Overweight Corridors Design Standards

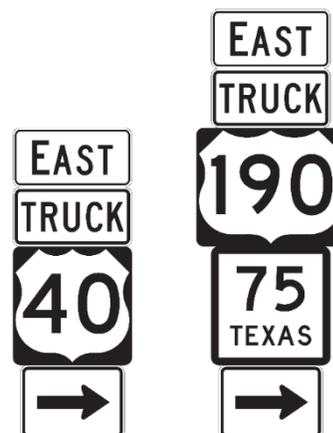
As an increasing number of roadways are converted to handle trucks up to 129,000 pounds, the MPO and NDDOT should coordinate efforts to adopt region-wide overweight pavement/bridge design standards. This would allow consistent region-wide design and help ensure that all overweight corridors can accommodate the weight.

Implementation Plan	Short Term:	Work with NDDOT and locals to identify likely future corridors and design standards
	Medium Term:	Implement standards
	Long Term:	Adjust as pavement and bridge technologies change

### Regional Truck Routes and Wayfinding

Working with its local partners and NDDOT, the MPO should adopt an overall truck routing network. This network would allow the region to better accommodate freight vehicles in an efficient manner while reducing the impact to local residents.

Heavy truck movements (i.e. through and regional moves) could be focused on principal arterial routes designed for truck movement. While local streets would integrate land use and how deliveries interact with neighborhoods. Similarly, hazardous material routes would steer dangerous cargo away from major residential and civic centers.



After the regional truck route is adopted, the MPO region should install wayfinding to help trucks navigate the region.

**Figure 1: Truck Wayfinding**  
(Source: TxDOT)

In addition, to signage these changes should be shared with firms that provide mapping for truck drivers and dispatch centers.

Implementation Plan	<table border="0"> <tr> <td style="padding-right: 10px;">Short Term:</td> <td>Use Freight Advisory Council members to advocate for coordinated routing with local governments</td> </tr> <tr> <td>Medium Term:</td> <td>Define regional truck routes</td> </tr> <tr> <td>Long Term:</td> <td>Implement routing, wayfinding and data sharing with freight mapping services</td> </tr> </table>	Short Term:	Use Freight Advisory Council members to advocate for coordinated routing with local governments	Medium Term:	Define regional truck routes	Long Term:	Implement routing, wayfinding and data sharing with freight mapping services
Short Term:	Use Freight Advisory Council members to advocate for coordinated routing with local governments						
Medium Term:	Define regional truck routes						
Long Term:	Implement routing, wayfinding and data sharing with freight mapping services						

### Freight Engagement in Design Process

Freight mobility often involves large vehicles with different handling characteristics. When roads are built or improved, the responsible agency should consider involving the freight community in the design process. This is particularly useful when the proposed facility anticipated to have high freight volumes or routinely have oversize/overweight loads. While design teams often try to engage stakeholders in the process, this communication will allow responsible agency to better address the concerns of all stakeholders and result in a more supportable design.

If there are concerns about a designs ability to accommodate freight needs, the responsible agency should consider doing simulations or a trial to determine the viability of the design. For example, stakeholders in one community was concerned about the ability of larger vehicles to use a roundabout. The project team replicated the design using pylons and had a variety of trucks drive through the area. Not only did the trial provide information to the design team that refined the design, it gave the freight community confidence that the design could handle a variety of freight vehicles.

Implementation Plan	<table border="0"> <tr> <td style="padding-right: 10px;">Short Term:</td> <td>Pilot project to provide regional stakeholders the value proposition for freight stakeholders involvement</td> </tr> <tr> <td>Medium Term:</td> <td>Establish a framework for determining which projects are chosen for involvement</td> </tr> <tr> <td>Long Term:</td> <td>N/A</td> </tr> </table>	Short Term:	Pilot project to provide regional stakeholders the value proposition for freight stakeholders involvement	Medium Term:	Establish a framework for determining which projects are chosen for involvement	Long Term:	N/A
Short Term:	Pilot project to provide regional stakeholders the value proposition for freight stakeholders involvement						
Medium Term:	Establish a framework for determining which projects are chosen for involvement						
Long Term:	N/A						

### Formalization of the Freight Advisory Council

The FAC should become as a standing permanent committee within the MPO. This will facilitate freight planning activities and the development of the freight program in the region, as well as support and promote freight infrastructure project assessment and implementation in the overall transportation planning process in the Bismarck-Mandan area. When invited by a local government, the FAC could even participate as part of the site plan/design review process. The FAC can provide valuable input regarding site access, loading zone configuration, etc.

Implementation Plan	<table border="0"> <tr> <td style="padding-right: 10px;">Short Term:</td> <td>Continue holding FAC meetings and identify quick-win activities for the FAC to undertake to keep their interest</td> </tr> <tr> <td>Medium Term:</td> <td>Formalize the FAC as an MPO committee</td> </tr> <tr> <td>Long Term:</td> <td>N/A</td> </tr> </table>	Short Term:	Continue holding FAC meetings and identify quick-win activities for the FAC to undertake to keep their interest	Medium Term:	Formalize the FAC as an MPO committee	Long Term:	N/A
Short Term:	Continue holding FAC meetings and identify quick-win activities for the FAC to undertake to keep their interest						
Medium Term:	Formalize the FAC as an MPO committee						
Long Term:	N/A						

### Promote Public Private Partnerships/Innovative Finance

In recent years, there has been heightened interest in having public agencies and private entities work together to construct and operate critical transportation facilities and services.

While not all projects are suitable for public-private partnerships, the MPO should consider this option for projects when it is practical and mutually beneficial.

Implementation Plan	Short Term:	Become the voice for innovative funding and financing technique
	Medium Term:	N/A
	Long Term:	N/A

### Monitor Emerging Trends

The MPO should monitor the condition of the freight system to identify new issues and needs as they emerge. For example, truck parking does not appear to be a problem within the MPO at this time. However, nationally, more communities are finding that existing truck parking area are not adequate to meet the needs of the freight community. The MPO should stay aware this and similar issues to determine if they have the potential to negatively impact freight mobility locally and the appropriate response to each issue.

Implementation Plan	Short Term:	Monitor and act when necessary
	Medium Term:	Monitor and act when necessary
	Long Term:	Monitor and act when necessary

### Public Education

The MPO should engage with regional partners to develop an awareness campaign of the role of freight in people’s day-to-day lives. By better understanding the freight system, people will gain additional knowledge and hopefully support projects and policies designed to make the overall freight system operate more efficiently and safely. Figure 1 shows an infographic used by the City of Seattle to help illustrate how freight mobility is important to daily living.



**Figure 2: Freight Education Piece (Source: Seattle DOT)**

Similarly, the MPO could partner with NHTSA and NDDOT to expand their campaign to educate drivers on how to better share the road with commercial vehicles. Many people do not realize the operational differences between how cars and large trucks. For example, trucks and buses have larger blind spots, need longer stopping distances, need longer time to stop, and may need to swing left to make a right-hand turn. Driver education can increase the safety for everyone using the road system.

Implementation Plan	Short Term:	Develop freight education strategy
	Medium Term:	Execute strategy
	Long Term:	N/A

# Appendix A: Bismarck-Mandan MPO MTP Freight Related Improvements (Informative Use Only)

## Short-Term (2015-2023) Freight Projects from 2015-2040 LRTP

MTPID	Project Description	Project Purpose	Likely Funding Sources	2015 Cost	Year of Expenditure Cost
B3	71st Ave and 66th St, Centennial Rd to 43rd Ave: Construct in tandem with B4 as arterial/ truck route. Grade for 5-lanes, but build as a 2- lane rural roadway with turn lanes. Restrict full access points to 1/2 mile. Include sidepath in project.	Congestion Reduction, Freight Flow, Safety Benefits to Adjacent Corridors	Urban/ Regional/ Rural and Other	\$7,400,000	\$9,370,000
B4	66th Street, Highway 10 / Main Ave to 43rd Ave with 1-94 Crossing: Extend 66th St as arterial roadway between Highway 10 and 43rd Ave with 1-94 crossing. Restrict full access points to 1/2 mile. Grade for 5-lanes, but build as a 2- lane rural roadway with turn lanes. Build 1-94 bridge to accommodate 4-lanes. Include sidepath trail with project.	Connectivity, Congestion Reduction, Freight Flow, Safety Benefits to Adjacent Corridors	Urban/ Regional/ Rural and Other	\$8,850,000	\$11,200,000
B8a	Divide Ave, Expressway to 52nd St: Extend Divide as a 3-lane urban arterial from Expressway to 52nd Street; adjacent to future industrial and urban residential.	Connectivity, Freight Flow, Congestion Reduction.	Urban/ Regional/ Rural	\$7,900,000	\$10,000,000
B8b	Divide Ave, 52nd St to 66th St: Improve Divide as a 2-lane rural road with turn lanes from 52nd Street to 66th Street.	Connectivity, Freight Flow, Congestion Reduction.	Other	\$1,500,000	\$1,900,000
B39	66th Street at BNSF Railroad: Grade separate 66th Street from BNSF railroad. Construct 4-lane bridge for future needs. Realign 66th Street to construct Apple Creek/ 66th Street roundabout.	Congestion Reduction, Freight Flow, Safety	Urban/ Regional/ Rural and Other	\$7,980,000	\$10,100,000
B55	Bismarck Expressway, Yegen Rd to Main Ave: System management along Expressway, includes dual SB left-turn lanes at Hwy 10, acceleration lane from Yegen to Northbound Expressway, SB right-turn lane at Main Ave.	Freight Flow, Congestion Reduction, Safety	Other	\$800,000	\$1,010,000
B77	71st St I Centennial Rd Intersection: Improve geometry I improve advanced warning at Centennial Rd/ 71st St intersection to address safety concerns.	Safety, Freight Flow	Other	\$450,000	\$570,000
B78	Tyler Parkway/ Divide Ave I-94 Interchange: Ramp reconstructions and taper adjustments per 1-94 corridor study to address safety and congestion issues.	Safety, Freight Flow, and Congestion Reduction	Interstate and Urban/ Regional	\$2,500,000	\$3,160,000

MTPID	Project Description	Project Purpose	Likely Funding Sources	2015 Cost	Year of Expenditure Cost
M7a	Highway 1806 / Collins Ave, 27th St to Old Red Trail: add turn lanes along Highway 1806 and traffic signal at Old Red Trail/ Highway 1806.	Safety, Congestion Reduction, Freight Flow	Other	\$400,000	\$510,000
M22	Old Red Trail: Sunset Ave to Mandan Ave Interchange: Reconstruct Old Red Trail as a 2- lane urban with turn lanes between Collins Ave and Mandan Ave. Restripe for 3-lanes between Sunset and Collins. Add NB truck lane for Tesoro entrance, improve eastbound radius at Old Red Trail/ Mandan Avenue curve by Tesoro. Widen turn radii and add turn lanes at Collins.	Safety, Freight Flow, and Congestion Reduction	Urban/ Regional/ Rural	\$4,880,000	\$6,170,000
M30	Boundary Rd / Sunset Dr Inter section: Signalize and stripe turn lanes on all approaches at Sunset/ Boundary Rd. Coordinate with new I-94 interchange signals. Minor reconstruction to improve drainage on west side of Sunset.	Congestion Reduction, Safety, Freight Flow	Other	\$520,000	\$660,000
M33a	Mandan Ave Interchange with 1-94: Short-term project to reconstruct ramps to reduce skew, add signals at ramp terminals, and restripe taper.	Safety, Freight Flow	Interstate and Urban/ Regional	\$820,000	\$1,040,000

Note: Year-of-expenditure costs are grown at 4% per year to 2021 dollars, the mid-point of the period 2019-2023.

## Mid-Term (2024-2032) Freight Projects from 2015-2040 LRTP

MTPID	Project Description	Project Purpose	Likely Funding Sources	2015 Cost	Year of Expenditure Cost
B1b	State Street, 43rd Ave to 57th Ave: Widen and reconstruct State St to 6 lanes 43rd to 57th. Freeway concept discarded due to access impacts.	Congestion Reduction, Freight Flow, Safety	Urban/ Regional/ Rural	\$11,000,000	\$18,320,000
B1c	State St, Calgary Ave to 43rd Ave: Widen and reconstruct State St to 6 lanes Calgary to 43rd Avenue.	Congestion Reduction, Freight Flow, Safety	Urban/ Regional/ Rural	\$5,500,000	\$9,160,000
BS	66th St, Lincoln Rd to Highway 10 / Main Ave: Reconstruct 66th St as a rural 2-lane road with turn lanes and shoulders between Lincoln Rd and Hwy 10. Restrict full access points to 1/2 mile. Reserve right-of-way for 5-lanes. Include trail with 3-lane widening.	Congestion Reduction, Safety, Freight Flow	Urban/ Regional/ Rural	\$10,545,000	\$17,560,000
B7	Interstate 94@ 66th St: New 1-94 Interchange at 66th St.	Connectivity, Freight Flow, Congestion Reduction	Urban/ Regional/ Rural and Other	\$13,950,000	\$23,230,000
B25	Bismarck Expressway, 12th St to Yegen Rd: 3/4 access control along Bismarck Expressway and widening at Airport Rd for right-turn lanes for freight access.	Freight Flow, Safety, Congestion Reduction	Other	\$1,500,000	\$2,500,000
B57	71st Ave and Centennial Rd, State St/ US 83 to 43rd Ave: Widen 71st Ave/ Centennial Rd to 3-lane roadway, improve access control similar to 71st and Centennial study. Grade separation with DMVW railroad. Sidepath trail adjacent to roadway.	Freight Flow, Safety, Congestion Reduction	Other	\$8,640,000	\$14,400,000
B76	State St Interchange with 1-94: Reconstruct and reconfigure State St   1-94 interchange to improve safety and flow per 1-94 Corridor Study.	Freight flow, Safety, Congestion Reduction	Interstate and Urban / Regional / Rural	\$18,000,000	\$29,970,000

MTPID	Project Description	Project Purpose	Likely Funding Sources	2015 Cost	Year of Expenditure Cost
M5b	56th Ave NW Crossing of 1-94: Old Red Trail to Boundary Road: Extend 56th Ave south across 1-94, to connect with extended Boundary Road. Project includes extension of Boundary Road for 1.5 miles from assumed developer-funded Boundary Road extension.	Connectivity, Freight Flow	Urban/Regional/Rural	\$9,558,000	\$15,910,000
M7b	Highway 1806 / Collins Ave, 37th St to Old Red Trail: Add turn lanes at key intersections: Beretta St, 39th St, 38th St, Sioux St and 37th St Assume minor Highway 1806 realignment at 38th St to improve angle of intersection with future Sunset Ave extension.	Safety, Congestion Reduction, Freight Flow	Other	\$1,200,000	\$2,000,000
MI 1	Main St, 8th Ave W to 3rd Ave E: Targeted turn lane additions and limited on-street parking removals west of 2nd St NW. Potential conversion of cross-streets to one-way traffic operation. New traffic signal in the corridor. Implementation plan will come from future Mandan Downtown Corridor Study.	Safety, Congestion Reduction, Freight Flow	Other	\$420,000	\$700,000
M12	McKenzie Rd, 39th Ave E to Highway 1806: Extend McKenzie across Heart River to Hwy 1806 as rural 2-lane roadway with turn lanes (where needed). Reserve 100' right-of-way.  New bridge across Heart River. Signalize intersection with Highway 1806. Add signals at McKenzie/ Expressway interchange ramps and at McKenzie/ 46th Ave. Include trail with new roadway.	Connectivity, Congestion Reduction, Freight Flow, Safety Benefits to Adjacent Corridors	Urban/Regional/Rural	\$7,700,000	\$12,820,000
M13b	20th Ave West, Boundary Rd Extension to Lohstreter I Division Ave: 20th Ave West: Proposed Boundary Rd Extension to Lohstreter / Division Ave	Connectivity, Freight Flow	Urban/Regional/Rural	\$2,475,000	\$4,120,000

MTPID	Project Description	Project Purpose	Likely Funding Sources	2015 Cost	Year of Expenditure Cost
M16	Highway 180616th Ave E, 19th St SE to Main St: Add Hwy 1806 turn lanes and signals at 8th Ave and 19th St intersections. Improve pedestrian crossing at 3rd St intersection. Consider additional NB turn lane@ Main. Evaluate segment north of 8th Ave in low-cost urban street study.	Safety, Congestion Reduction, Freight Flow	Urban/ Regional/ Rural	\$1,060,000	\$1,760,000
M18	32nd Ave W, Boundary Road to 1-94 Business Loop (Main St) : West Mandan arterial connection/ truck route for potential 32nd Ave W crossing of or interchange with 1-94 to Old Red Trail.	Connectivity, Freight Flow	Urban/ Regional/ Rural and Other	\$6,250,000	\$10,410,000
M29	Sunset Drive Interchange at 1-94: Reconstruct and reconfigure 1-94 I Sunset interchange to reduce skew, improve capacity on Sunset under 1-94.	Freight Flow, Safety, Congestion Reduction	Interstate and Other (NHPP)	\$19,200,000	\$31,970,000
M32	Old Red Trail/ Collins Ave Intersection: Project adds turn lanes on all approaches through urban reconstruction and signalization. Near-term project is assumed (with City funds) to add turn lanes and a temporary signal (100% locally-funded as documented "Locally-Funded Roadway Projects" section in [the MTP]).	Congestion Reduction, Safety, Freight Flow,	Other	\$2,310,000	\$3,850,000

Note: Year-of-expenditure costs are grown at 4% per year to 2028 dollars, the mid-point of the period 2024-2032.

### Long-Term (2033-2040) Freight Projects from 2015-2040 LRTP

MTP ID	Project Description	Project Purpose	Likely Funding Sources	2015 Cost	Year of Expenditure Cost
M28	At Highway 6 and Main St. Assumes eastbound right-turn lane. Limited options for northbound movement due to Highway 6 bridge,	Safety, Freight Flow, Congestion Reduction	Other	\$200,000	\$460,000



Appendix A  
Bismarck-Mandan Region  
Truck Activity

# Bismarck, ND Truck Activity



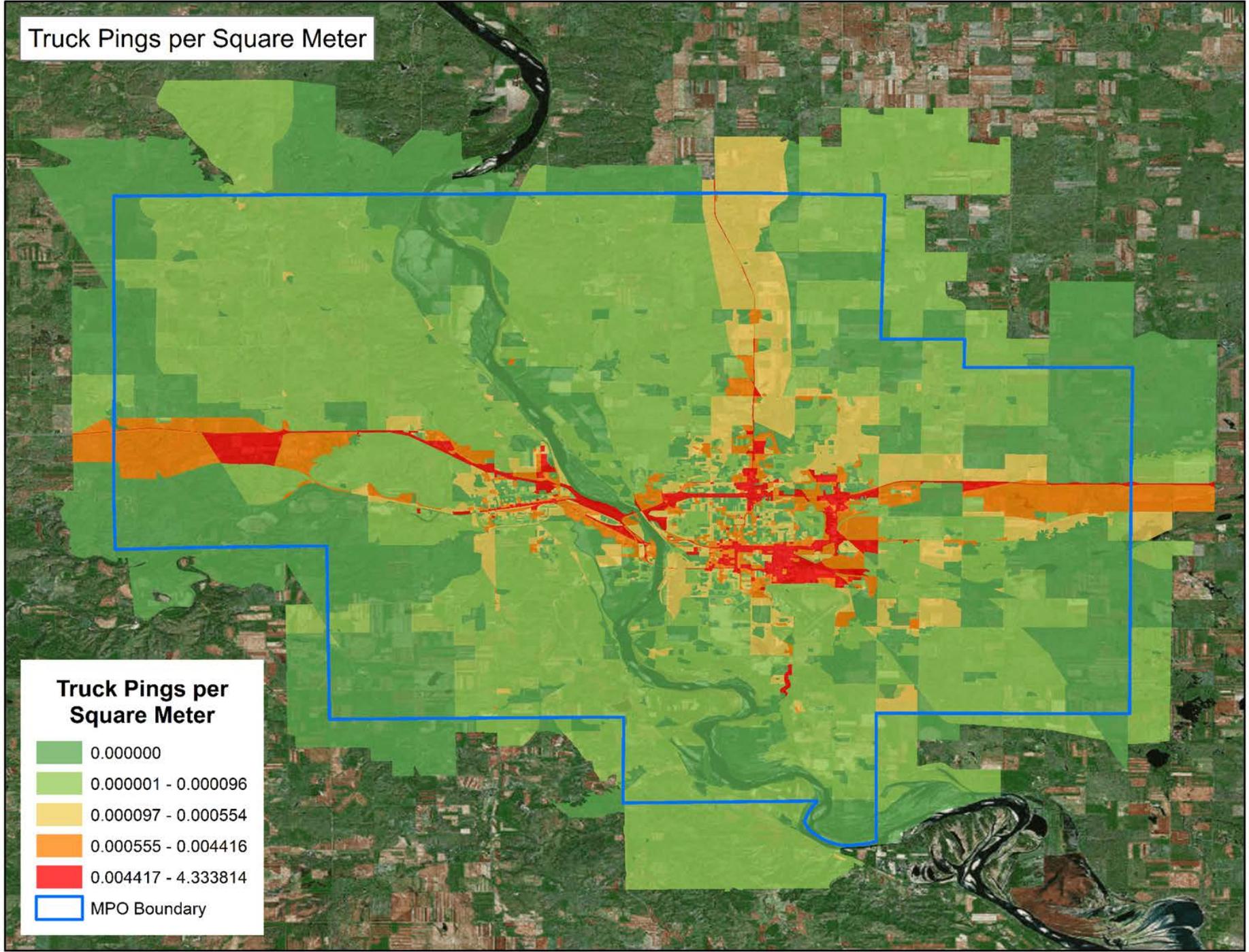
# ATRI Truck GPS Data

- ATRI Freight Performance Measures (FPM) Truck GPS data consists of:
  - Latitude and Longitude
  - Spot Speed
  - Day and Time
  - Heading
  - Unique identifier

# Methodology: Bismarck, ND

- ATRI truck GPS data from October, 2017 was utilized
- Census blocks within the MPO boundary and surrounding the MPO were joined to the data
- Truck pings were totaled for each census block
- Census block shapefile included square meters
- Pings per square meter were calculated for each census block
- Maps were created (in following slides) to show truck activity throughout the Bismarck region

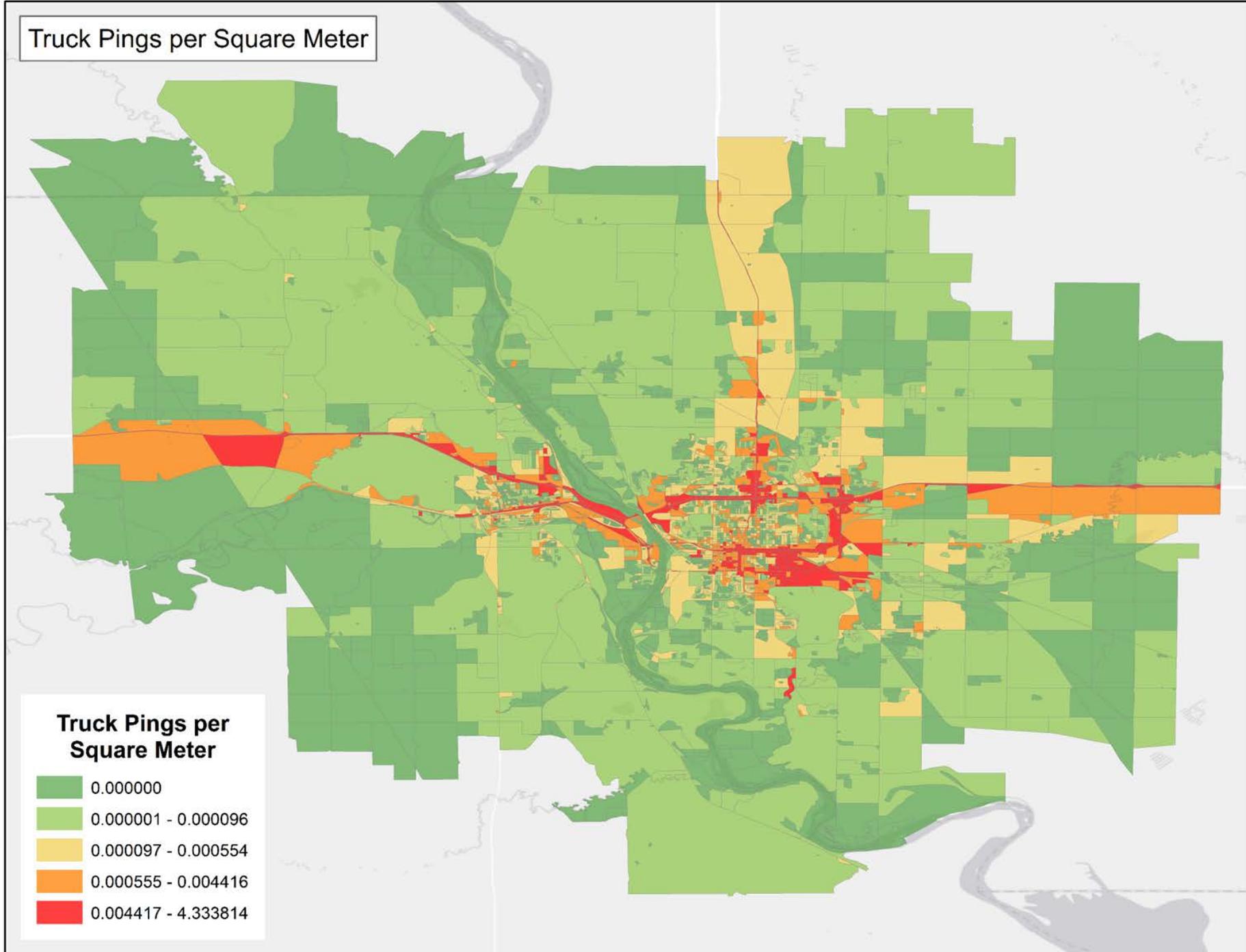
Truck Pings per Square Meter



**Truck Pings per Square Meter**

- 0.000000
- 0.000001 - 0.000096
- 0.000097 - 0.000554
- 0.000555 - 0.004416
- 0.004417 - 4.333814
- MPO Boundary

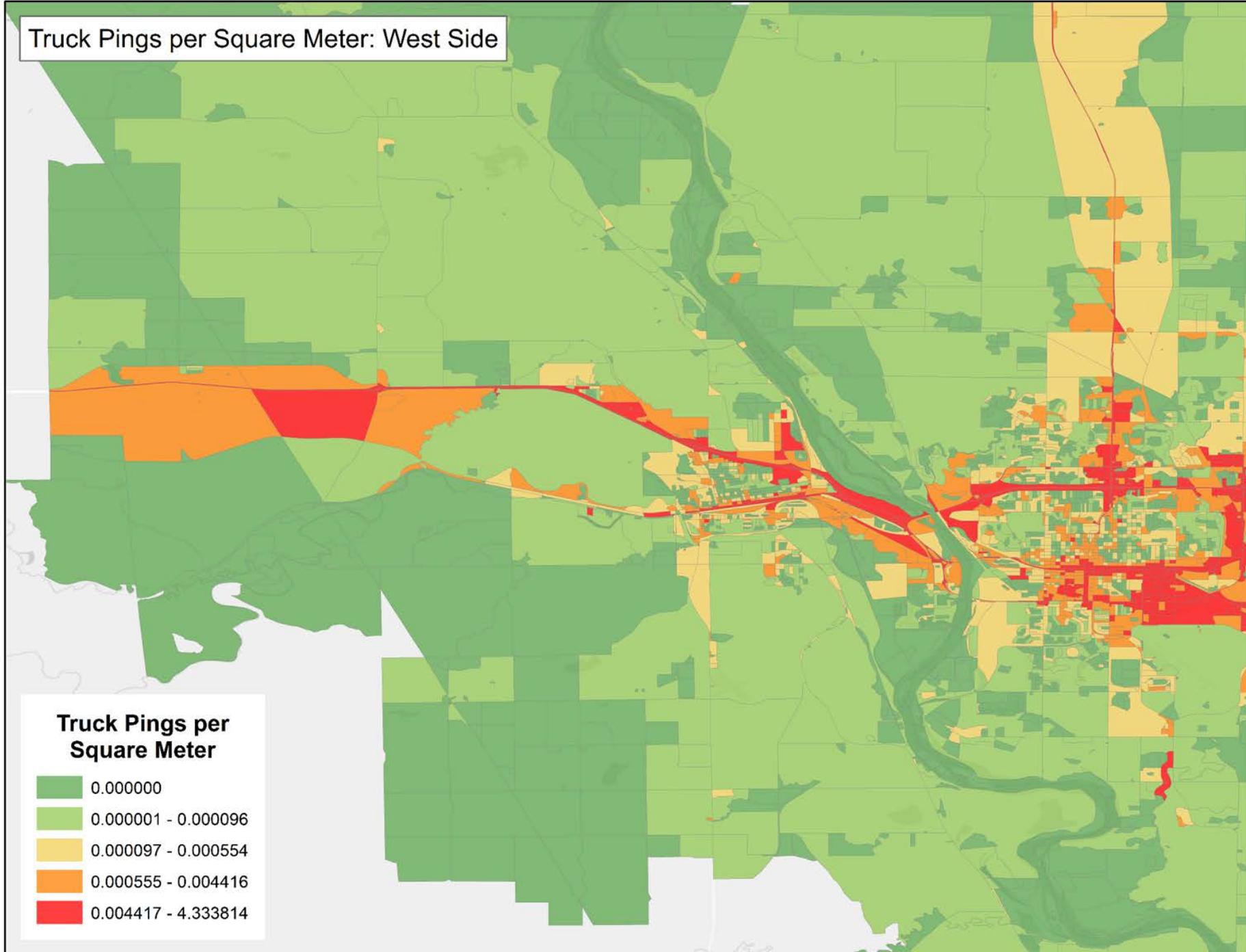
# Truck Pings per Square Meter



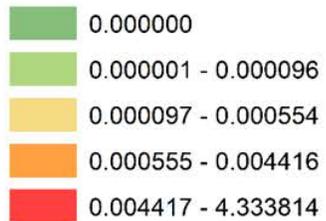
## Truck Pings per Square Meter

- 0.000000
- 0.000001 - 0.000096
- 0.000097 - 0.000554
- 0.000555 - 0.004416
- 0.004417 - 4.333814

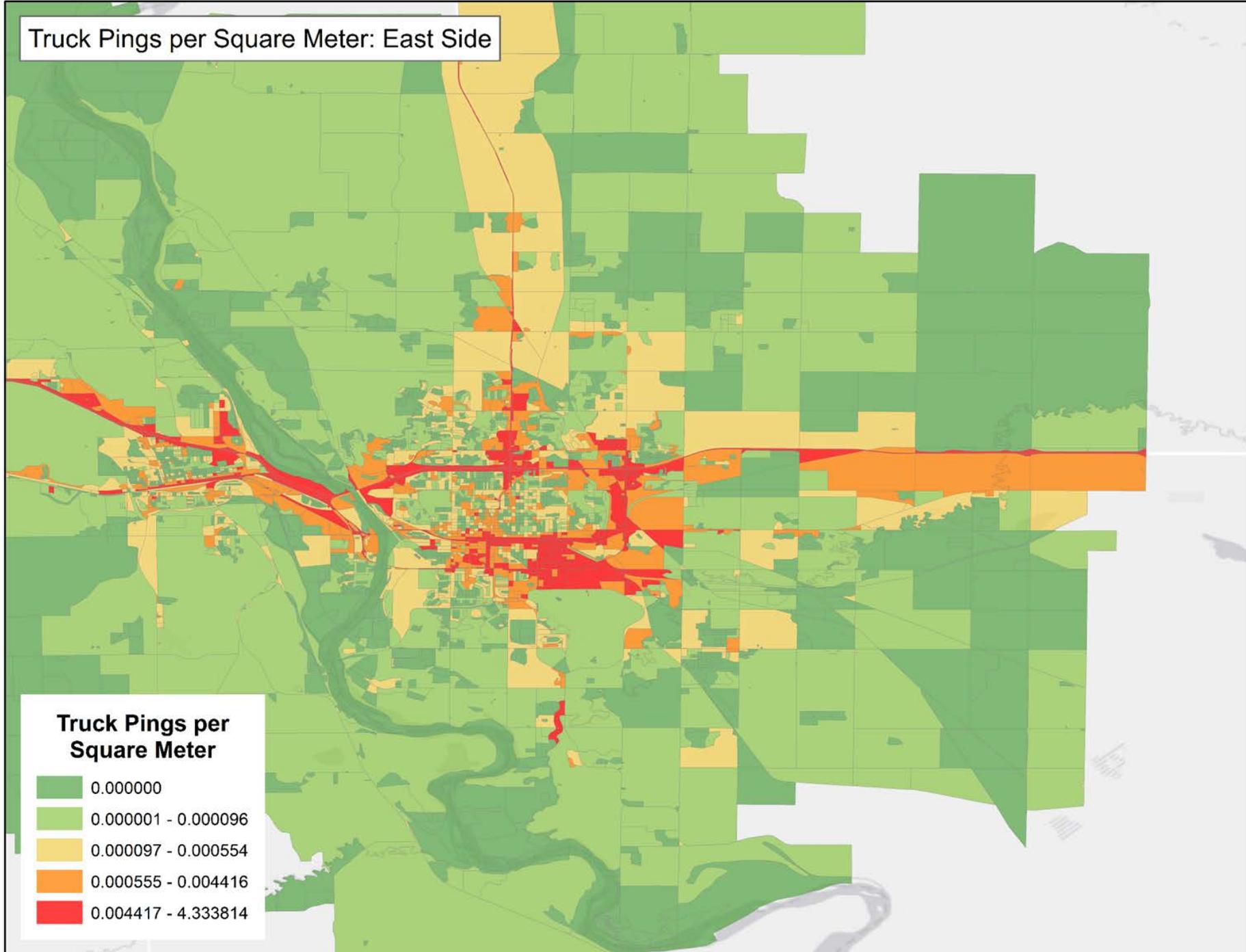
# Truck Pings per Square Meter: West Side



## Truck Pings per Square Meter



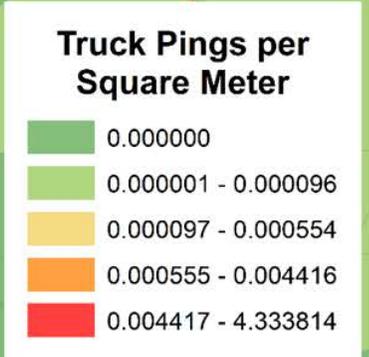
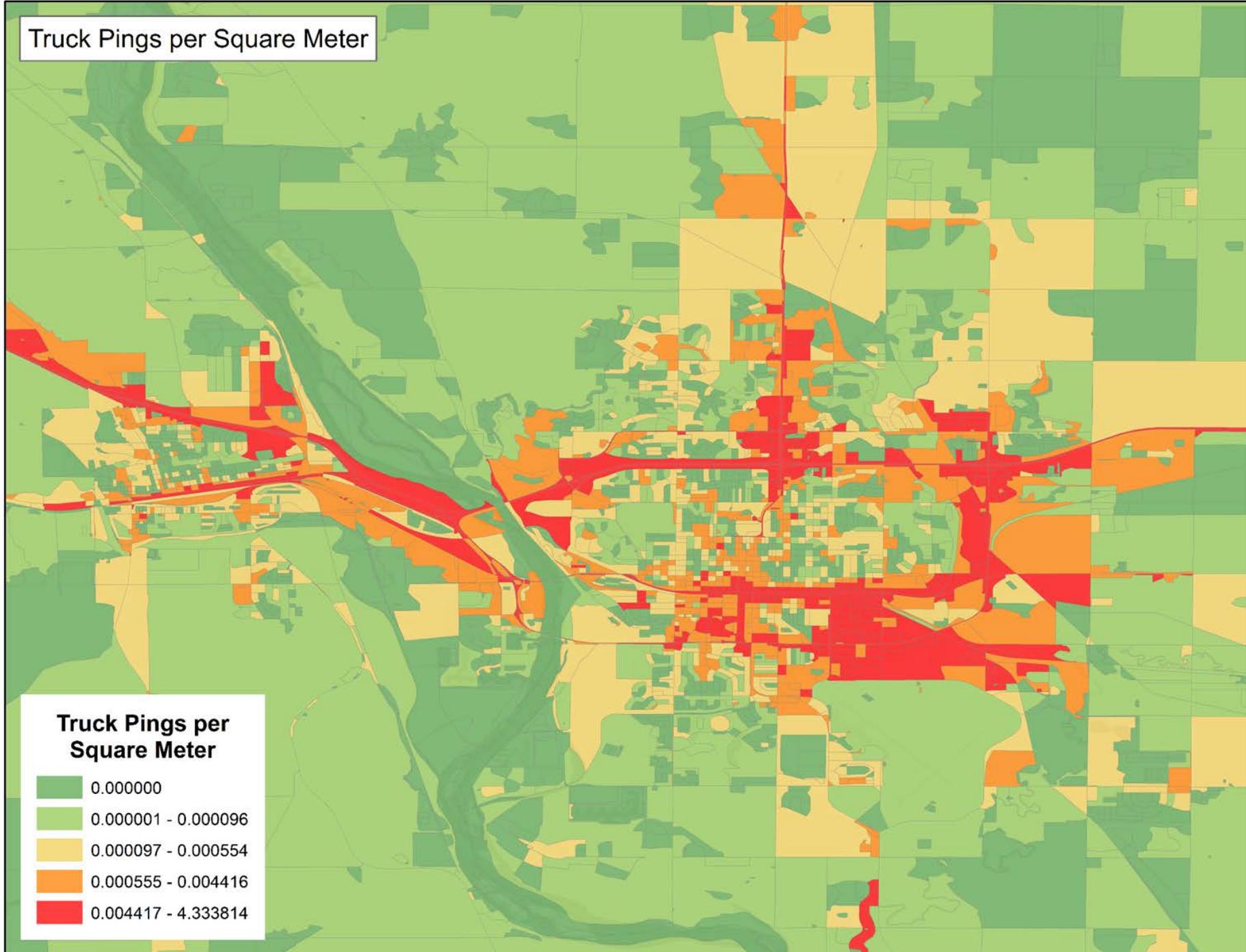
# Truck Pings per Square Meter: East Side



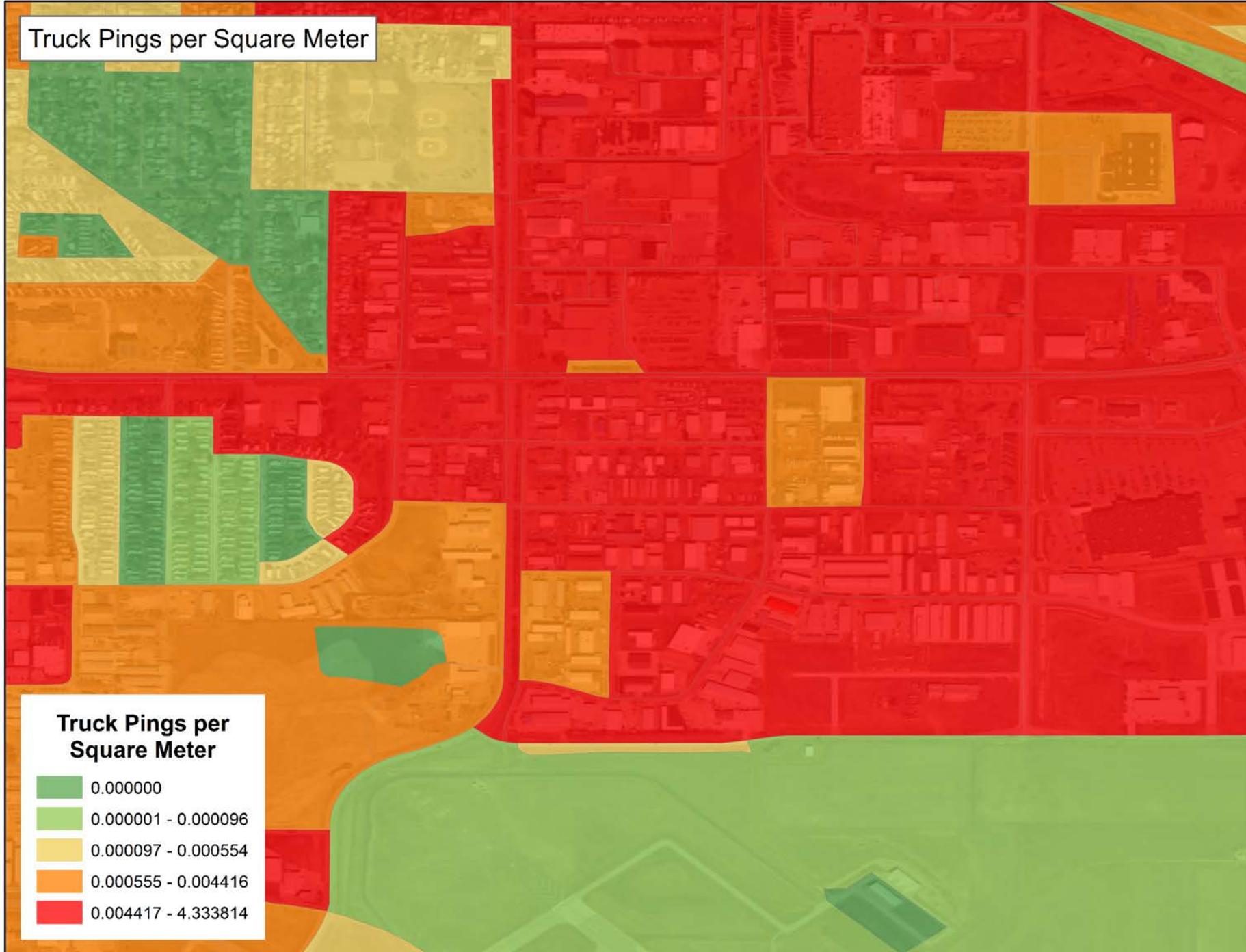
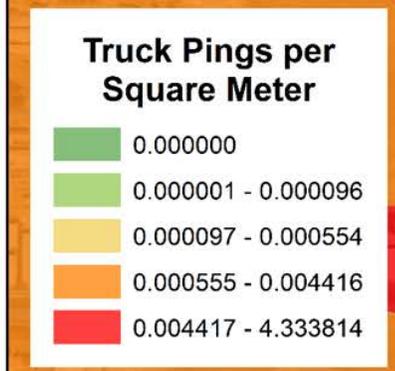
## Truck Pings per Square Meter

- 0.000000
- 0.000001 - 0.000096
- 0.000097 - 0.000554
- 0.000555 - 0.004416
- 0.004417 - 4.333814

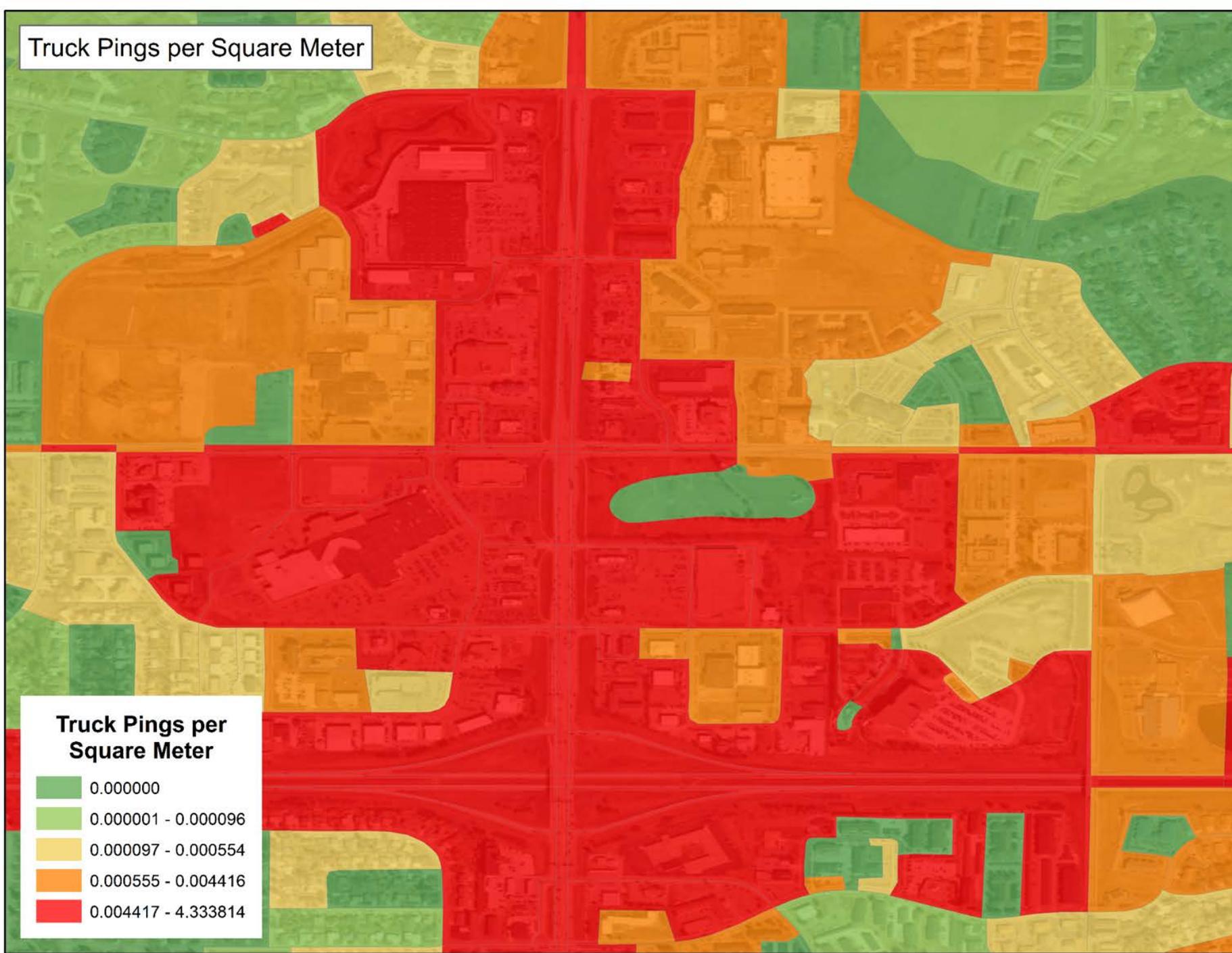
Truck Pings per Square Meter



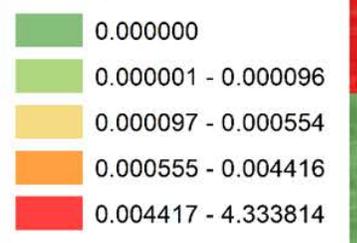
Truck Pings per Square Meter



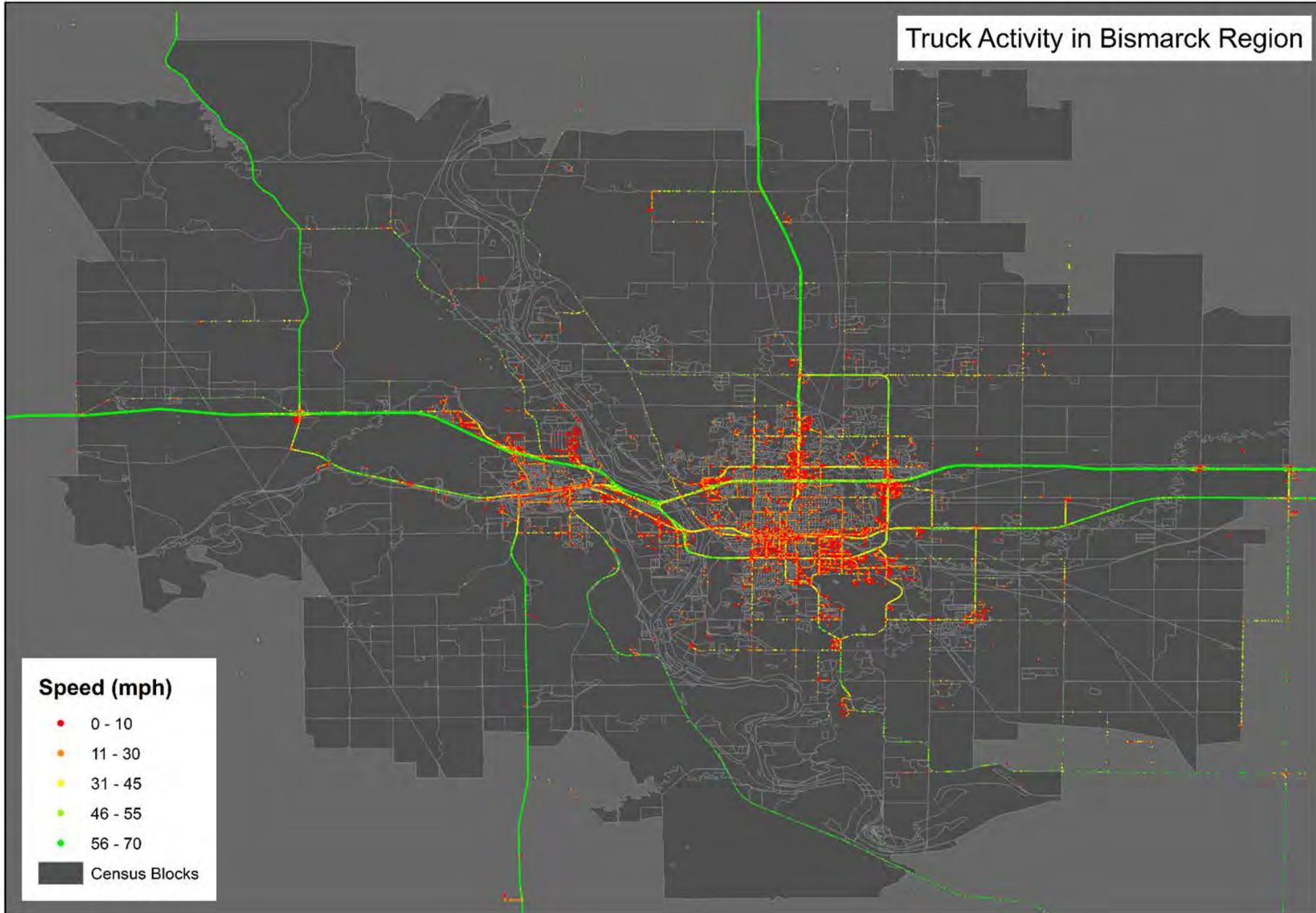
Truck Pings per Square Meter



Truck Pings per Square Meter



# Truck Activity in Bismarck Region



**Speed (mph)**

- 0 - 10
- 11 - 30
- 31 - 45
- 46 - 55
- 56 - 70

■ Census Blocks