Envision 2040

Executive Summary

January 2015

2015-2040
BISMARCK-MANDAN
Long Range Transportation Plan

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EXECUTIVE SUMMARY

INTRODUCTION

The Bismarck-Mandan Metropolitan Planning Organization (MPO) is a consortium of five jurisdictions: **City of Bismarck**, **City of Mandan**, **City of Lincoln**, part of **Burleigh County**, and part of **Morton County**. The MPO is composed of two main committees:

- The Technical Advisory Committee (TAC), technical and administrative staff who provide professional assessment and recommendations for the MPO's Policy Board.
- The Policy Board is a five member board comprised of the mayors of Bismarck, Lincoln, and Mandan, and a commissioner from each Burleigh and Morton Counties. The Policy Board is the decision-making body of the MPO.

As required by *the Moving Ahead for Progress in the 21st Century Act* (MAP-21) transportation authorization, every MPO is required to develop a Long Range Transportation Plan (LRTP) that provides guidance for selecting a fiscally-constrained set of transportation policies, projects and programs through 2040. The LRTP must be updated every five years. The LRTP study area is documented in **Figure ES-1**.

The purpose of the MPO *2015-2040 Bismarck-Mandan Long Range Transportation Plan* (called the "2040 LRTP" in this document) is to:

- **Establish a community vision** for the LRTP by engaging community members to understand the community's transportation concerns and identifying opportunities for improved regional travel.
- **Evaluate current and long-term mobility, accessibility, and safety performance** and identify issue locations that do not meet locally-established performance standards.
- **Address all modes of travel**, including personal vehicle, bus / transit, bicycle and pedestrian.
- **Develop and test a range of improvement strategies, programs and projects** (called "alternatives") that address identified mobility and accessibility needs while fitting within the community fabric.
- **Develop a prioritized, financially-constrained implementation plan** for transportation investments through 2040.

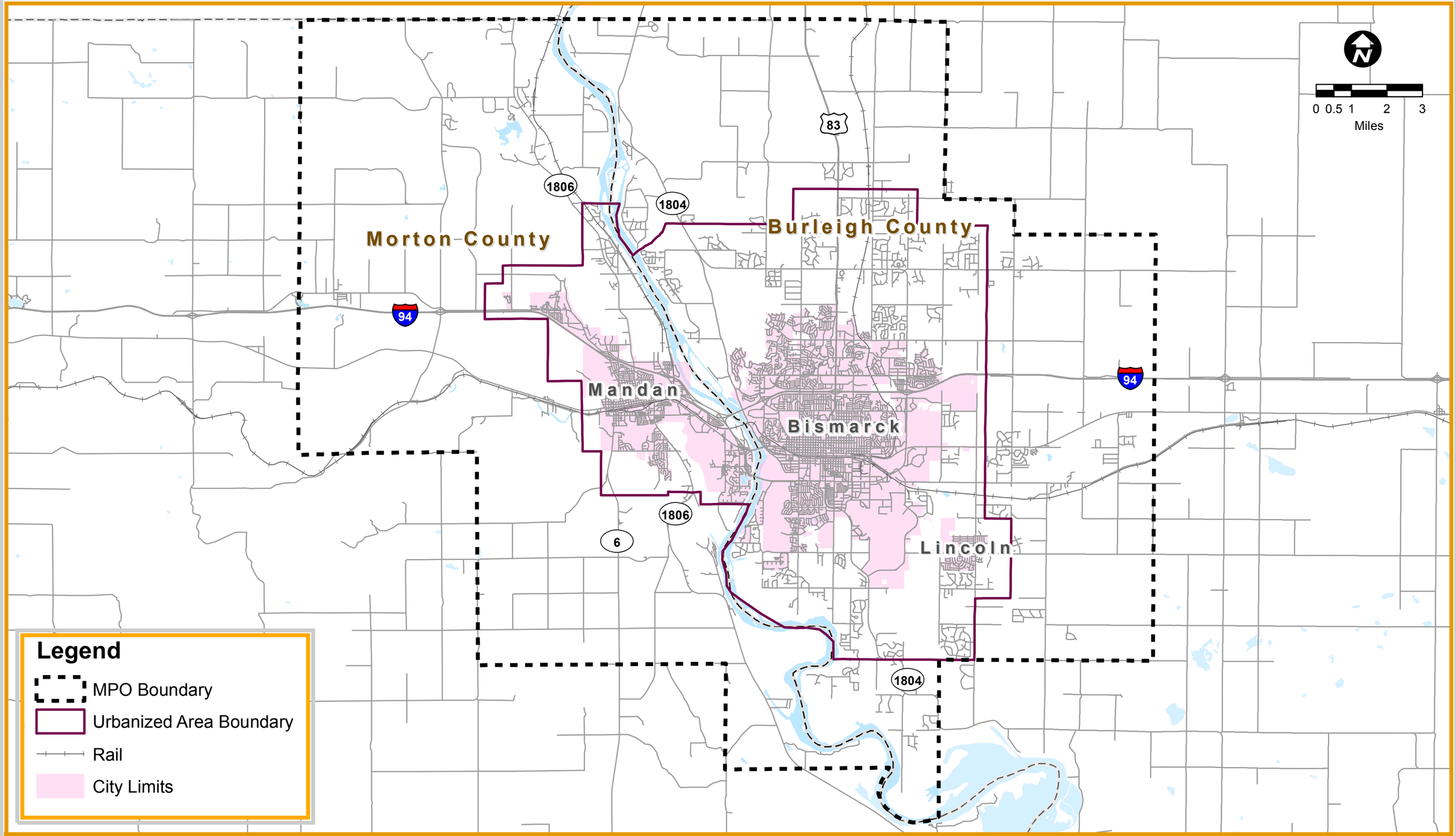
This executive summary provides a summary of the highlights of the 2040 LRTP document. A full LRTP report is available at the study website at: *envisionbisman2040.com*.

TRANSPORTATION GOALS AND OBJECTIVES

The Bismarck-Mandan community has a unique vision for its transportation system, and the 2040 LRTP included an **extensive outreach and engagement process** to develop goals and objectives. Goals and objectives for the 2040 LRTP are based on feedback received from the LRTP study management team, public workshops, the MPO Technical Advisory Committee and Policy Board members, state transportation plans, and Federal transportation guidance.

The goals and objectives developed for the transportation plan are provided below.

Goal 1: Maintain and Improve Regional Mobility and Connections	•**Objective 1A**: Implement projects and programs that reduce travel delays. •**Objective 1B**: Leverage the existing transportation system by emphasizing low-cost, low-impact solutions that may include incremental system improvements, system preservation, and technology applications. •**Objective 1C**: Provide and maintain corridors that facilitate longer-distance travel within the region. •**Objective 1D**: Improve the continuity of the multimodal system through improved network connections and reduction of system gaps. •**Objective 1E**: Manage and plan for a street and highway system that provides an appropriate functional balance of land access and travel mobility.
Goal 2: Enhance Regional Alternatives to Automobile Travel	•**Objective 2A**: Improve transit route efficiency, system productivity, and community awareness. •**Objective 2B**: Improve transit and rideshare opportunities for travelers commuting into Bismarck-Mandan from outside the urban area. •**Objective 2C**: Ensure reliable public transit service that is easily understandable to the public. •**Objective 2D**: Create multimodal connections between bicycle, pedestrian, automobile, and transit travel. •**Objective 2E**: Improve bicycle and pedestrian system accessibility and connectivity opportunities while maintaining safety. •**Objective 2F**: Improve the awareness and safety of bicycling, and educate both bicyclists and motorists on rules and responsibilities.
Goal 3: Maintain the Transportation System in a State-of-Good-Repair	•**Objective 3A**: Maintain pavement quality and bridges at acceptable levels. •**Objective 3B**: Improve street signage and visibility. •**Objective 3C**: Maintain the current bicycle and pedestrian system. •**Objective 3D**: Maintain transit fleet, equipment, and facilities in a state-of-good-repair.
Goal 4: Coordinate Transportation Planning with the Natural and Built Environment	•**Objective 4A**: Promote transportation investments that support infill, mixed use development patterns. •**Objective 4B**: Provide transportation infrastructure design guidance that fits within the context of the built environment. •**Objective 4C**: Plan for and address multimodal transportation system impacts / sufficiency when planning new developments. •**Objective 4D**: Minimize the transportation system's impacts on the natural and built environment. •**Objective 4E**: Ensure that mobility-challenged populations, such as low income, disabled, and senior citizens, have travel options in the region.
Goal 5: Provide a Transportation System that Effectively Moves Goods and Enhances the Local Economy	•**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.
Goal 6: Provide a Safe and Secure Transportation System	•**Objective 6A**: Reduce the incidence of all multi-modal crashes, with an emphasis on serious injury and fatal crashes and crash locations •**Objective 6B**: Provide a safe and secure environment for transit system riders. •**Objective 6C**: Enhance transportation security and reliability by developing strategies to address critical transportation assets identified.
Goal 7: Identify Transportation-Supportive Funding and Policy Opportunities	•**Objective 7A**: Identify non-traditional funding opportunities to support transportation needs. •**Objective 7B**: Develop policies to support consistent application of development-related improvement requirements and streamlined project development.



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Source: Bismarck-Mandan MPO

Bismarck-Mandan MPO Study Area

Figure: ES-1

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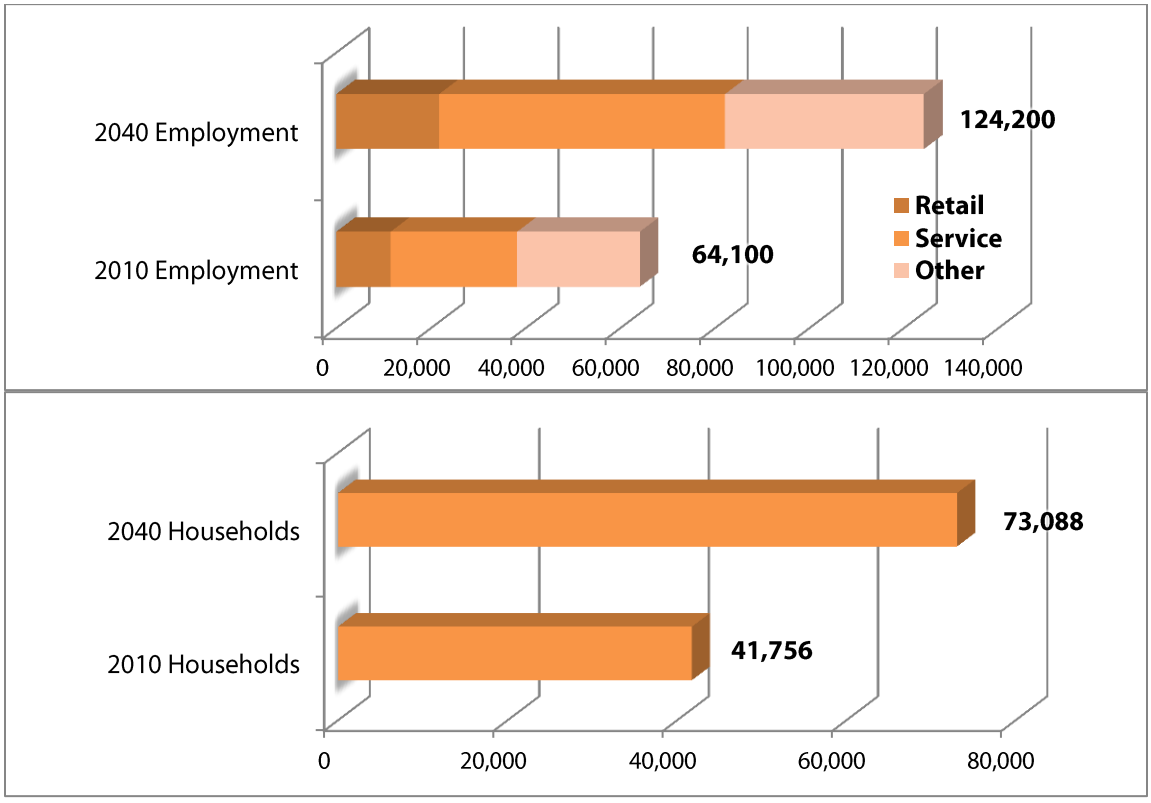
Land Use Trends / 2040 Forecasts

The Bismarck-Mandan area is currently experiencing rapid growth. The most recent data show that between July 2012 and July 2013, Bismarck-Mandan was the fifth fastest growing metropolitan area in the United States[1]. It is anticipated that relatively high levels of growth will continue into the future.

The MPO worked with staff from local jurisdictions and utilized the best available data to develop future households and employment projections through 2040. The projections were developed to forecast traffic demand growth to plan for future transportation system needs. Multiple growth scenarios were considered during the projection process, due to the uncertainty and the high growth happening across the region and North Dakota. The MPO policy board selected the *Aggressive Growth (Oil Boom) Scenario* as the scenario used to determine future transportation demand. This scenario assumed that regional population growth would be 3.5% per year until 2025, and would then return to the regional historical rate of 1% to 1.5% per year between 2025 and 2040. **Figure ES-2** illustrates the levels of household and employment growth projected through 2040.

Figure ES-2. Household and Employment Growth Projections, 2010 to 2040



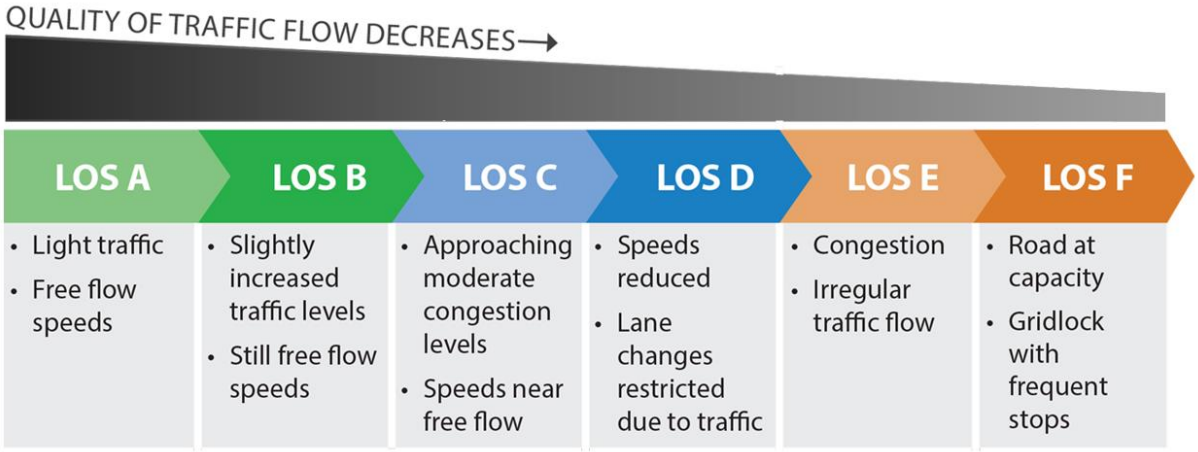
The MPO and local planning and development staffs worked together and agreed on where that future growth was likely to occur, and the MPO policy board reviewed and approved the growth assumptions used in the 2040 LRTP. The areas of anticipated future growth are documented in the full LRTP report.

[1] www.census.gov/newsroom/releases/pdf/CB14-51_countymetropopest2013tables.pdf

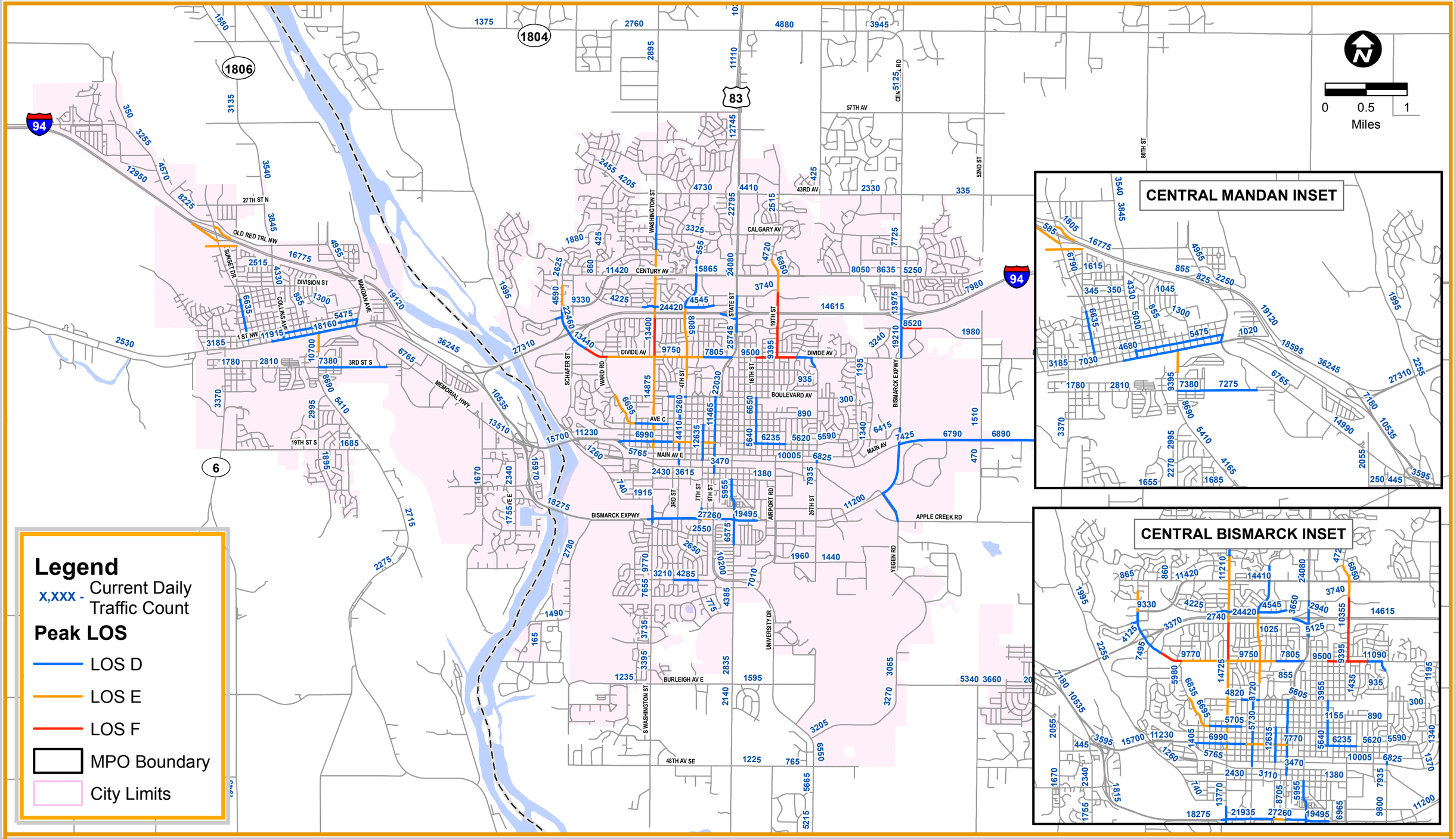
EXISTING SYSTEM PERFORMANCE

The LRTP provides an extensive overview of the existing performance of the r roadway, transit, and bicycle and pedestrian systems. The existing system performance assessment includes reviews of:

- **Roadway functional classifications.**
- **Regional travel summary.**
- **Traffic Mobility and Operations**. Current traffic volumes and peak traffic operations are documented in **Figure ES-3**. The traffic analysis was completed in terms of a level of service (LOS). LOS is a qualitative measure describing a technical analysis of traffic operational conditions, and ranges from LOS "A" representing free-flow conditions to LOS "F" representing grid lock. The illustration below shows **t**he various levels of service.



- **Traffic and Bicycle / Pedestrian Crashes**. A traffic crash summary is provided in **Figure ES-4**
- **Pavement and Bridge Condition**.
- **Transit System Performance**. The current bus route system is documented in **Figure ES-5**.
- **Bicycle and Pedestrian System Performance**. The current bicycle and pedestrian system is illustrated in **Figure ES-6**.
- **Freight System Performance.**
- **Air Transportation Summary.**
- **Bismarck North-South Mobility Summary.**



Sources: Bismarck-Mandan MPO Count Shapefile, NDDOT Counts, HCM ARTPLAN, HDR, I-94 Corridor Study, North Mandan Study, State Street Safety Study, 43rd Ave Study, City of Bismarck and Mandan Staff Interviews

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Current Conditions Daily Traffic Volumes and Peak Hour Level of Service

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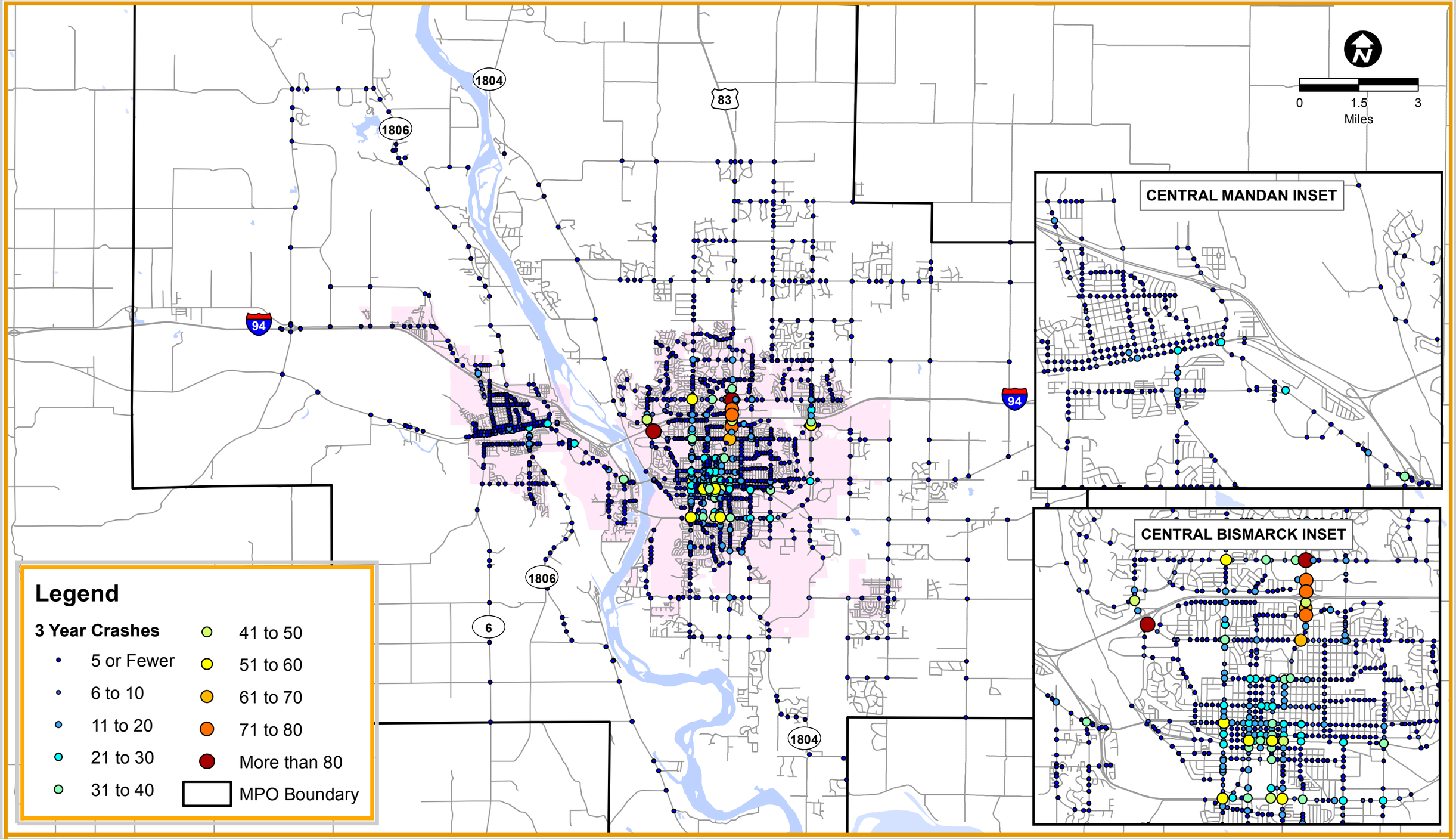

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Sources: NDDOT Crash Database, 2010-2012
HDR

Frequency of Crashes by Intersection, 2010-2012

Figure: ES-4

Date: November 2014

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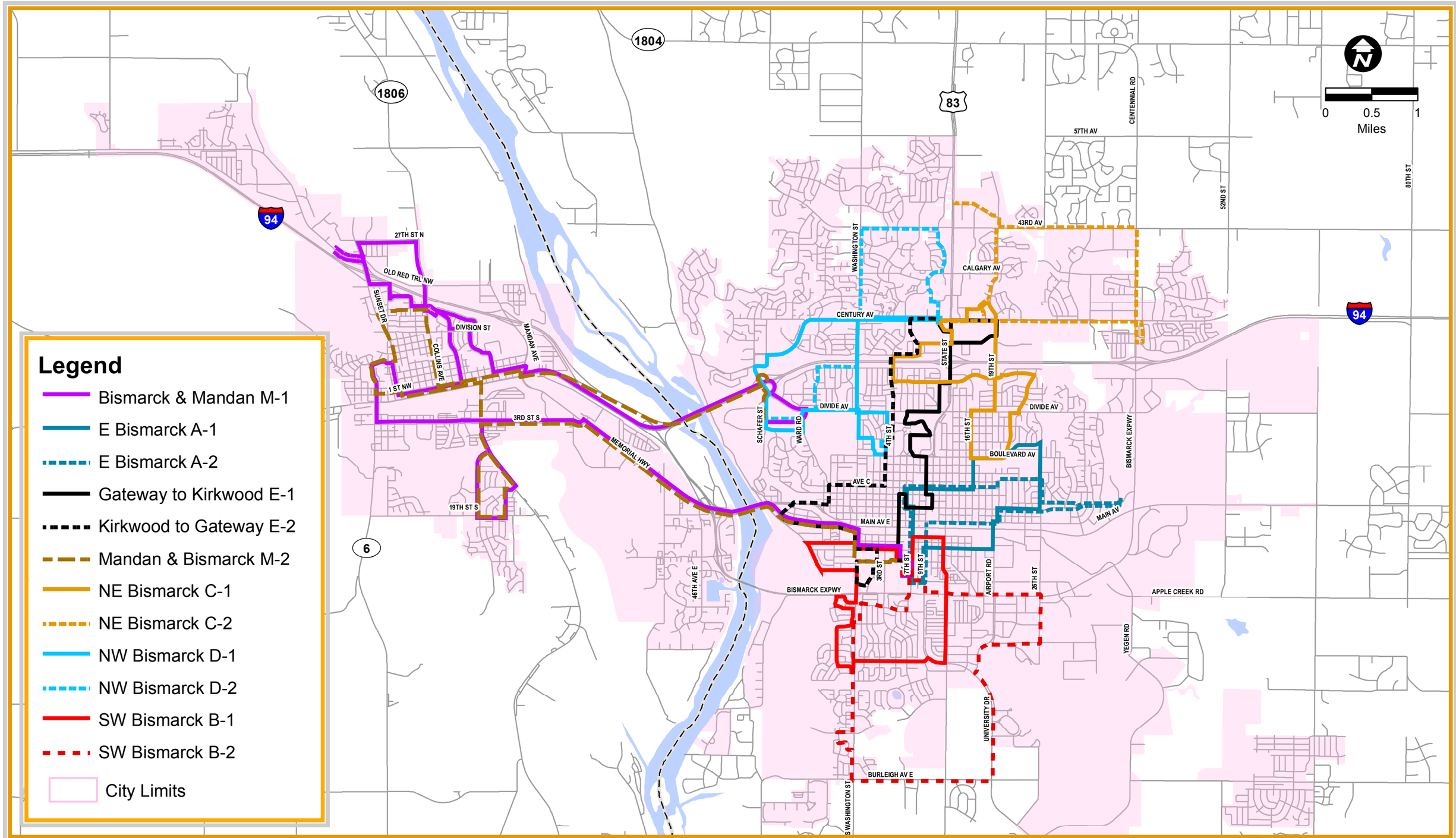

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Sources: Bismarck-Mandan MPO GIS.

Current Capital Area Transit Bus Routes

Figure: ES-5

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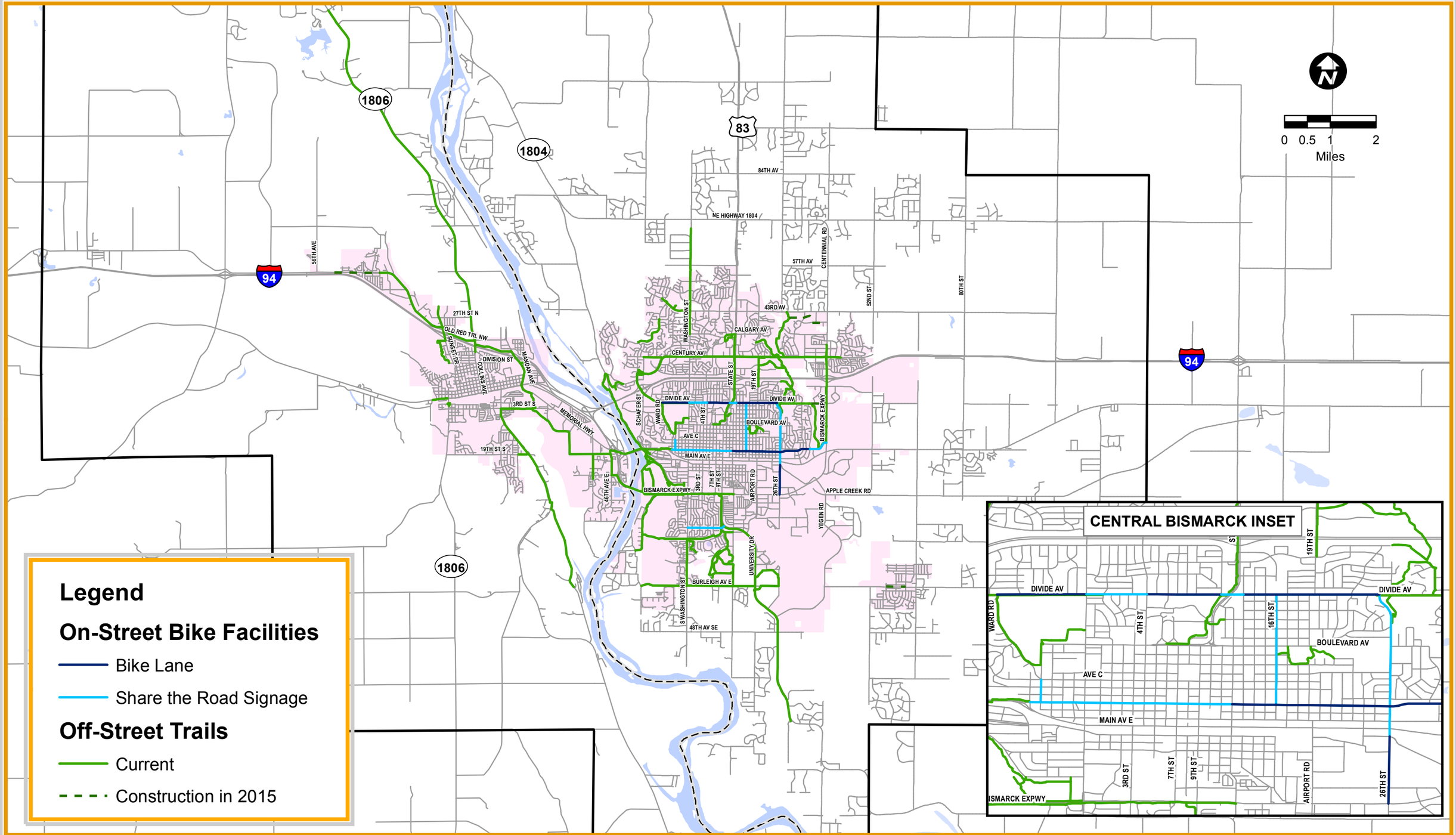

Legend

On-Street Bike Facilities

- Bike Lane
- Share the Road Signage

Off-Street Trails

- Current
- Construction in 2015

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Sources: Bismarck-Mandan MPO, HDR

Current Trail and On-Street Bicycle Network

Figure: ES-6

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Future System Performance

The LRTP provides future 2040 traffic forecasts using the MPO's travel demand model, a computer application that evaluates regional travel and helps the community make informed decisions on transportation investments. The forecasts were based on the household and employment growth projections outlined in the "land use trends / 2040 forecasts" section.

The 2040 conditions in this section reflect an "existing-plus-committed" (E+C) network. This baseline 2040 E+C scenario assumes that in addition to the current roadway network, only those projects included in the Bismarck-Mandan MPO's 2015-2018 Transportation Improvement Program (TIP) are constructed, including:

- Traffic signal improvements to Bismarck Expressway and University Drive (Bismarck).
- Reconstruction and widening of Washington Street to 4-lanes between Calgary Avenue and 57th Avenue (Bismarck).
- Turn lane additions along State Street / US 83 between Divide Avenue and Calgary Avenue (Bismarck).
- Traffic signal improvements to Memorial Highway / 40th Avenue SE, Memorial Highway / 46th Avenue SE, and Main Street / Twin City Drive (Mandan).
- Reconstruction and widening of Old Red Trail to 3-lanes between Highland Road and 47th Avenue NW (Mandan).
- Intersection improvement (signal and turn lanes or a roundabout) at 66th Street / Highway 10 (Burleigh County).
- Turn lane and safety improvements at Highway 6 / 19th Street SW (Mandan).
- Traffic signal improvements along Main Street between ND Highway 6and ND Highway 1806 (Mandan).
- Reconstruction and turn lane additions to 27th Street between ND Highway 1806 and 8th Avenue NW (Mandan).

The forecasted 2040 E+C condition daily traffic forecasts and estimates of 2040 peak hour traffic operations are documented in **Figure ES-7**. As shown, the projected high growth rate in households and employment will be combined with increased levels of congestion by 2040 (on the existing and committed network). The analysis provided in the LRTP projected significantly lower future travel speeds on the roadway system and increased levels of system delays.

Alternatives Development and Evaluation

A comprehensive list of potential transportation alternatives was developed to capture the range of reasonable improvements or programs that were considered and further analyzed for potential inclusion in the 2040 LRTP. Alternatives were developed in locations where the technical analyses of existing or future traffic congestion, crash assessment, multimodal system connectivity, or public and stakeholder input indicated a system improvement might be warranted. Once the range of potential multimodal alternatives were developed, the alternatives were screened and then assessed against the performance measures developed for the 2040 LRTP. Extensive public outreach was conducted via several methods to get public feedback on the alternatives, prior to project selection for inclusion in the fiscally-constrained plan.

Alternatives were developed for each of the modes being considered in the 2040 LRTP, and generally fell within one of three categories below:

System Management – Minor Improvements to the Current System

- Turn Lane Additions
- Intersection Control
- Technology / Intelligent Ttransportation Systems / Traffic Signal Upgrades
- Bike / Pedestrian Crossing Improvements
- Transit Route Schedule Changes
- "Road Diet" - reducing traffic lanes (e.g. converting a four-lane roadway to three-lanes)

System Expansion – Significant Capacity Additions to the System

- New Through Lanes
- New Roadways
- New Trails / Bike Lanes
- New Transit Routes

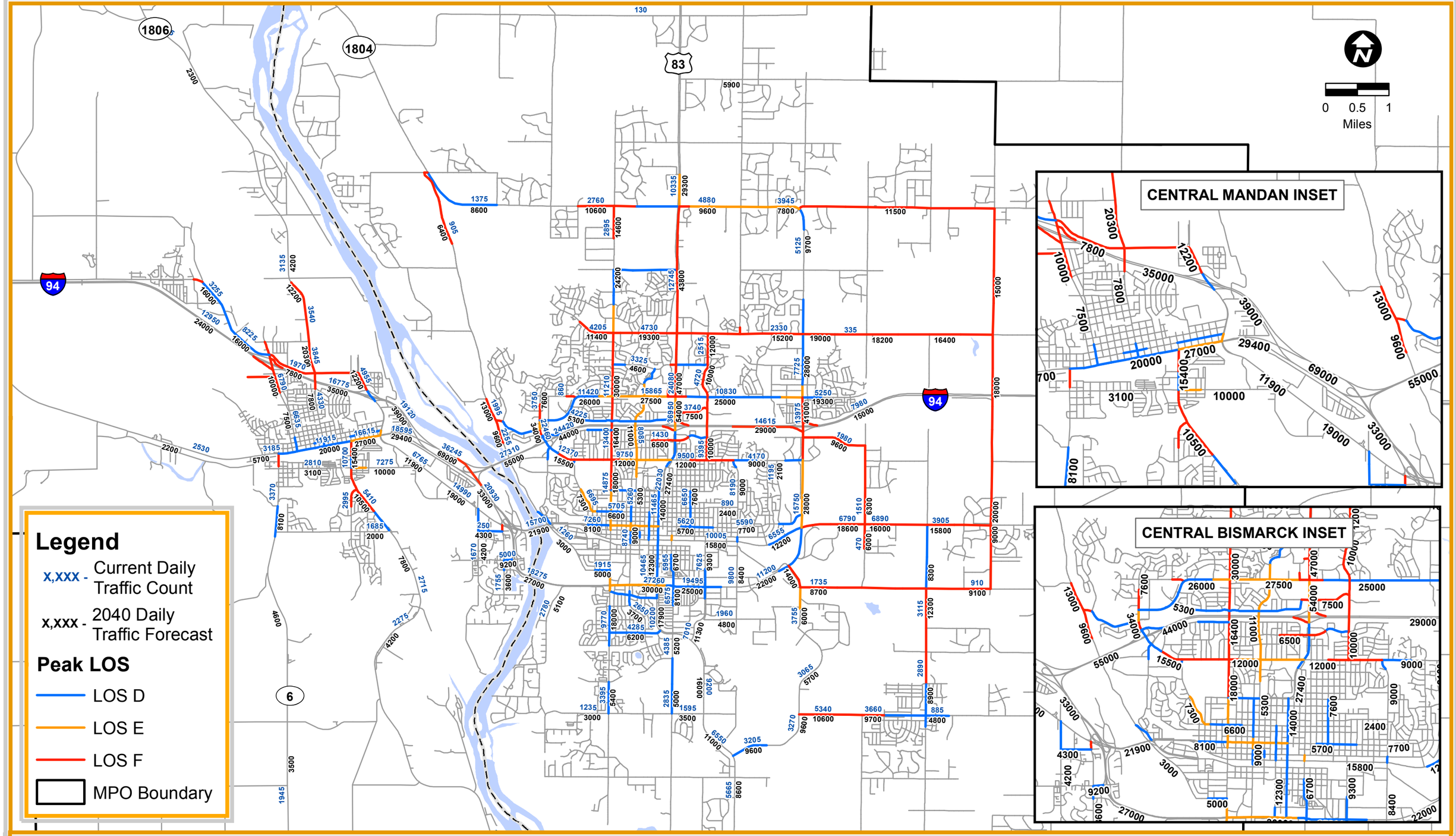
Demand Management - Adjusting System Demand Mode / Time

- Carpooling / Vanpooling
- Flexible Work Schedules
- Transit and Bicycle Pedestrian Promotion

Performance measures were developed to provide a means of evaluating how each alternative would help the region progress towards goals and objectives, to help in making informed investment and policy decisions. The 2040 LRTP created a set of performance measures that reflected:

- Direction provided by MAP-21 and the draft rules that had been released as of June 2014 when the alternatives analysis task was underway.
- The community vision, goals, and objectives developed for the 2040 LRTP.

The performance measures used for the LRTP are documented in **Figure ES-8.**



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Sources: Bismarck-Mandan MPO Travel Model, NDDOT Counts, HCM ARTPLAN, HDR, I-94 Corridor Study, State Street Safety Study

Future 2040 Existing-plus-Committed Network Traffic Forecasts and Peak Hour Operations

Figure: ES-7

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Figure ES-8. Alternatives Performance Areas and Measures

Maintain and Improve Mobility and Connections

- Level of Service / Delay Improvements
- Cost Efficiency: VMT / VHT Benefits per Dollar Spent
- Regional Route Connection Improvements
- North-South Travel Improvement
- Roadway Connectivity / Continuity
- Access Management

Enhance Modal Alternatives

- CAT Fixed Route Productivity / Ridership
- Paratransit to Fixed Route Ridership Shift
- Rideshare Component
- Multimodal Connectivity Elements
- Bicycle Route or Trail Connectivity / Continuity
- Sidewalk Connectivity

Limit Impacts on Natural and Built Environment

- Level of Environmental and Built Impacts
- Environmental Justice Access and ADA elements

Effectively Move Goods / Enhance the Local Economy

- Retail Center Access
- On-street Parking Availability
- Improved Mobility / Safety in Freight Corridors

Safety and Security Needs

- Vehicle Safety Issue
- Bike / Ped Safety Issue

Plan Consistency

- Consistency with Other Plans or Studies

FUTURE TRANSPORTATION FUNDING

A key element of the 2040 LRTP is providing a financial plan that demonstrates how the projects and programs included in the transportation plan can be implemented. The forecasts of future transportation

funding levels were completed by reviewing historical MPO funding levels, an understanding of anticipated future transportation revenue changes and transportation construction cost trends. **Figure ES-9** illustrates how annual roadway funding expenditures on both preservation and expansion projects are expected to change through 2040.

Figure ES-9. Projections of Future Roadway Preservation Spending and Expansion and Interstate Funding Trends

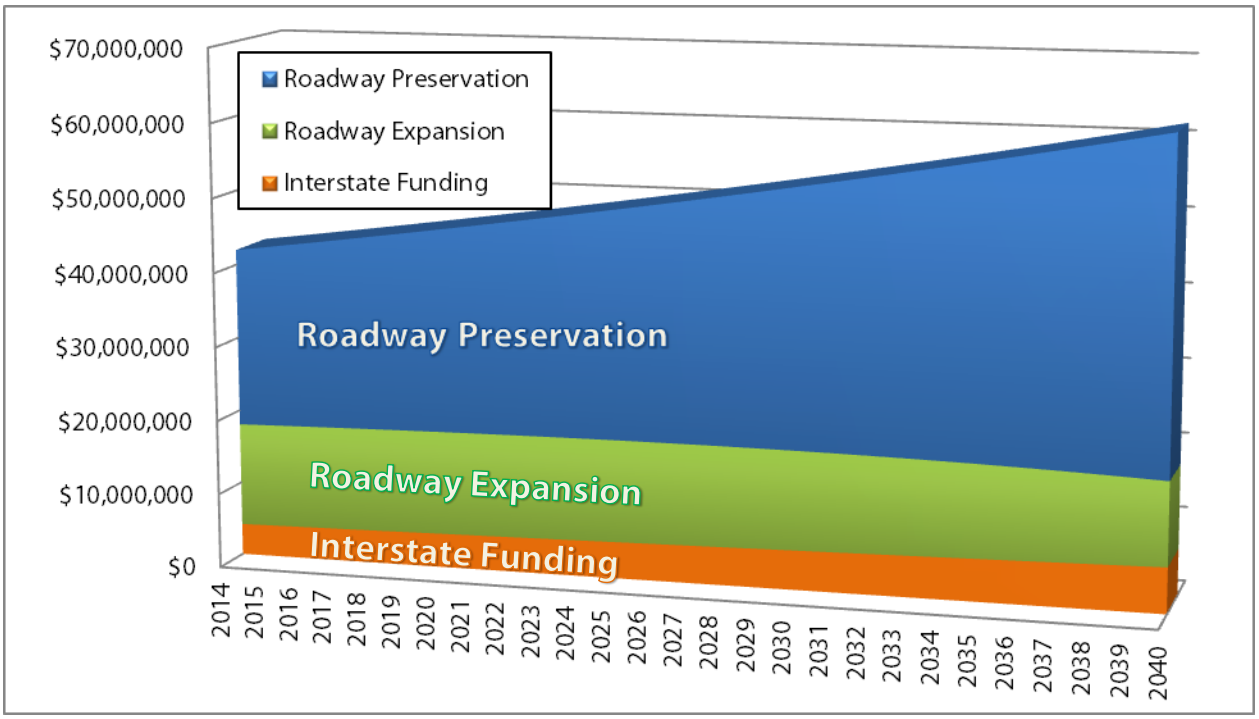


Figure ES-9 reflects a trend of increasing needs for system preservation. The forecasted funding levels for roadway (non-interstate and interstate), bicycle and pedestrian expansion, and transit projects were:

- **Non-interstate roadway expansion funds through 2040**: $332,800,000. Generally, the breakdown is expected to be:
  - $205,530,000 in Urban / Regional / Rural expansion funds.
  - $127,800,000 in other roadway expansion funds (safety, bridge, ITS, etc.).
- **Non-interstate roadway preservation funds through 2040**: $865,685,000
- **Interstate total funds through 2040**: $123,000,000
- **Bicycle and pedestrian expansion funds through 2040**: $35,700,000
- **Transit System Funding through 2040**: $137,215,000

MAP-21 Implementation and Environmental Considerations

The final element of the LRTP is a summary of MAP-21 implementation considerations and environmental coordination activities, including:

- Baseline Performance Measures

- Environmental Screening
- Agency Coordination
- Opportunities for Future Project Planning-Environmental Coordination
- Environmental Justice Assessment
- Security Considerations

Fiscally Constrained Plan

The 2040 LRTP has identified more system needs than expected future resources available. Many of the alternatives identified in the LRTP are desirable from a system performance perspective, but will not fit within the fiscally-constrained plan. Those alternatives included in the fiscally-constrained plan were selected based on several factors, including:

- Degree to which candidate projects were complementary with other projects in creating comprehensive set of transportation system improvements.
- Feedback received from the public and stakeholders when the alternatives were presented to the public.
- Level of performance benefits consistent with MAP-21 direction and our 2040 LRTP performance measure scoring.
- Degree to which candidate projects were implementable from a public support and project development perspective.

The fiscally-constrained 2040 LRTP plan elements include:

Street and Highway system improvements intended to address system performance needs from the perspectives of mobility / congestion reduction, safety, and connectivity.

Signal system improvements across the region, including technology / Intelligent Transportation System (ITS) upgrades for the Bismarck signal system to improve system efficiency.

Bicycle and pedestrian system improvements that address system connectivity and safety needs. These include on-street and trail system improvements to complete system connections.

Transit system changes that emphasize more efficient bus routes and maintaining the current paratransit service, while shifting able-bodied riders to the fixed route system.

A funding plan that addresses the increasing **operations and maintenance and state-of-good-repair needs** for the mutimodal system.

Roadway, transit, and bicycle and pedestrian projects included in the current **Transportation Improvement Program (TIP)**.

Additional programs and initiatives, including **travel demand management programs and complete streets** that address the travel demand in the region, in attempt to get more out of the current and future transportation system.

A list of **recommended regional and corridor studies** of areas and issues that require more detailed evaluation than what is possible within the context of the 2040 LRTP.

The 2040 LRTP includes multimodal projects placed in the following anticipated implementation phases:

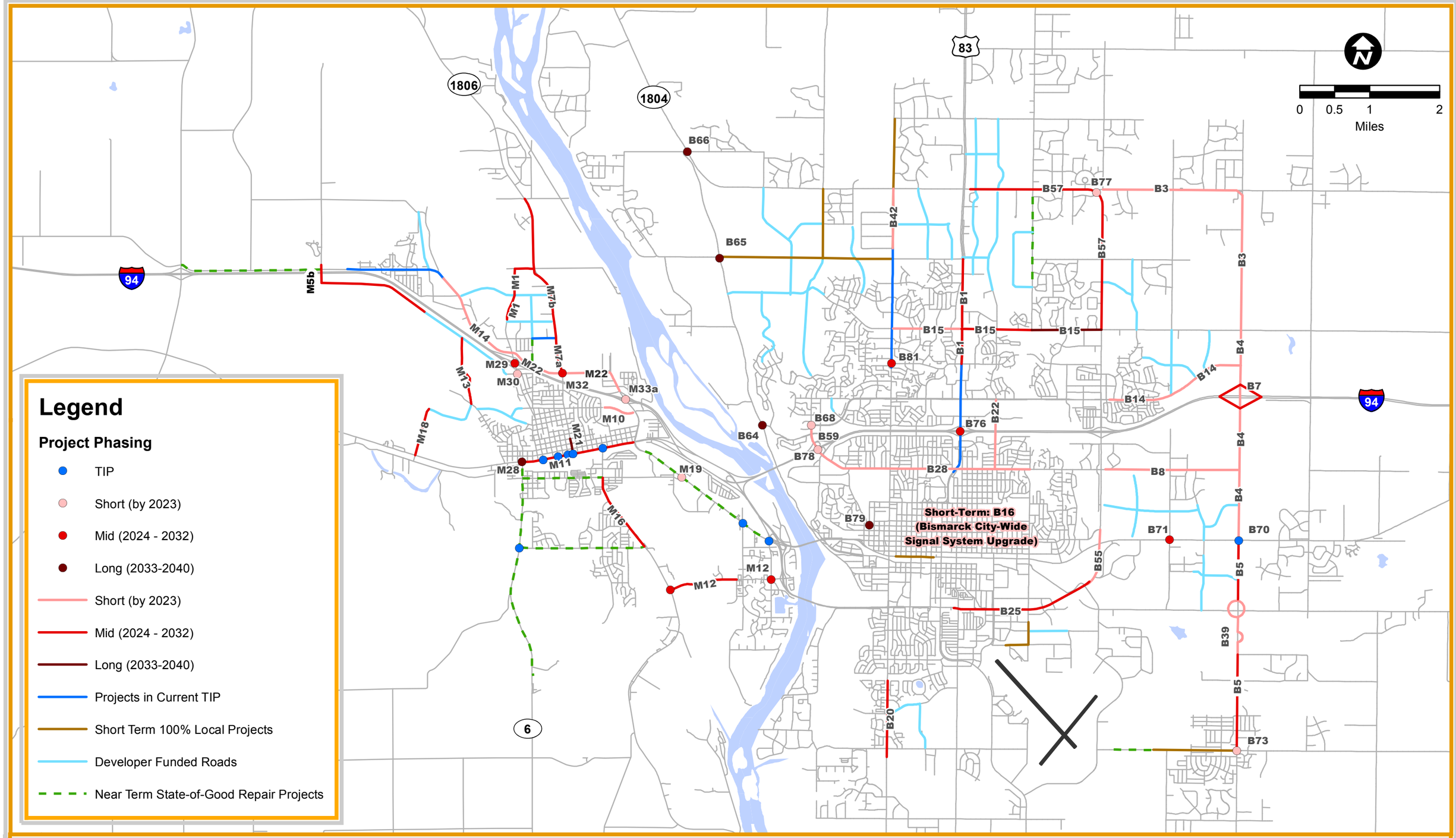
- Current 2015-2018 TIP projects
- Short-Term Projects (2015 through 2023)
- Mid-Term Projects (2024-2032)
- Long-Term Projects (2033-2040)

The fiscally-constrained 2040 LRTP is presented by mode in this section. The modal elements are illustrated in the following figures:

- **Figure ES-10** shows the **roadway plan**. The roadway plan also includes roadways that are considered **developer-funded** collector roads based on input from the Fringe Area Roadway Plan and from jurisdiction staff. Additionally, the roadway plan includes roadways that are anticipated to be **locally-funded** roadway projects within the short-term period; these locally-funded projects are listed in this section. Near-Term **state-of-good-repair** / preservation projects are also shown. The developer- and locally-funded roadways are not included in the Federal-Aid element of the LRTP.
- **Figure ES-11** shows the **bicycle and pedestrian plan**. Current trails, trail projects in the current TIP, and current on-street bike and pedestrian system are shown for reference. Illustrative trails, those considered important connections but not included in the fiscally-constrained plan, are also shown.
- **Figure ES-12** shows the **transit plan** for the CAT bus route adjustments**.** The recommended short-term transit elements focus on the recommendations provided in the *Mobility 2017* Final Report. That report referred to those recommendations as the "**Expansion Scenario**".

Figure ES-10 also identifies several projects anticipated to be **state-of-good-repair / preservation projects** in the short-term, including:

- Memorial Highway between Main Street and I-194/Bismarck Expressway (Mandan)
- Reconstruction of Highway 6 / 10th Avenue SW (Mandan)
- Reconstruction of 3rd Street SW (Mandan)
- Reconstruction of 19th Street SW (Mandan)
- Reconstruction of 26th Street between Deadwood Drive and 71st Avenue (Bismarck)
- Reconstruction of Old Red Trail / County Road 139A between 56th Avenue NW and Highway 25 (Morton County)
- Reconstruction of Lincoln Road west of 52nd Street (Burleigh County)



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Draft Roadway Plan by Implementation Phase

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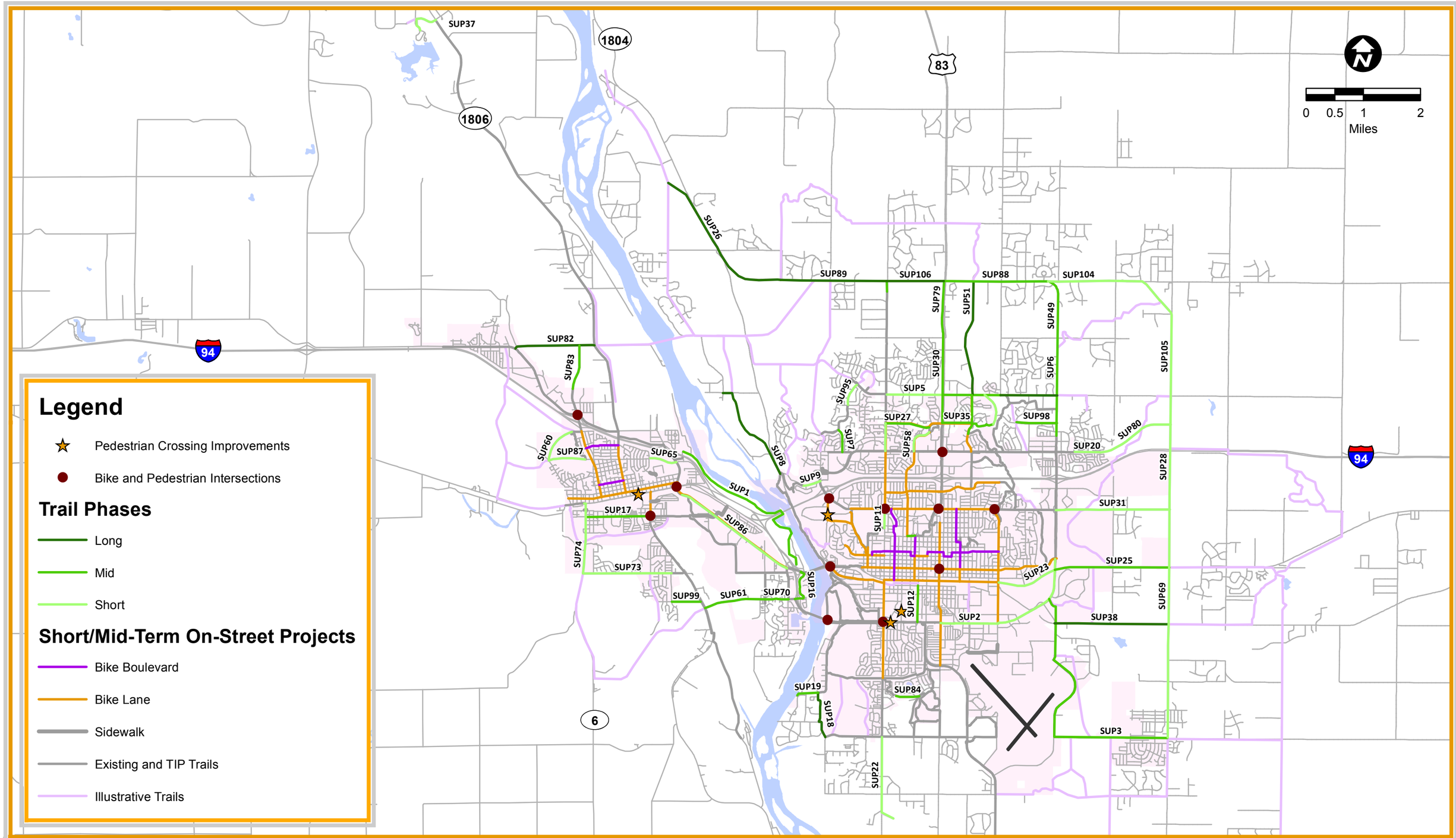

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Draft Bicycle and Pedestrian Plan by Implementation Phase

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Date: November 2014

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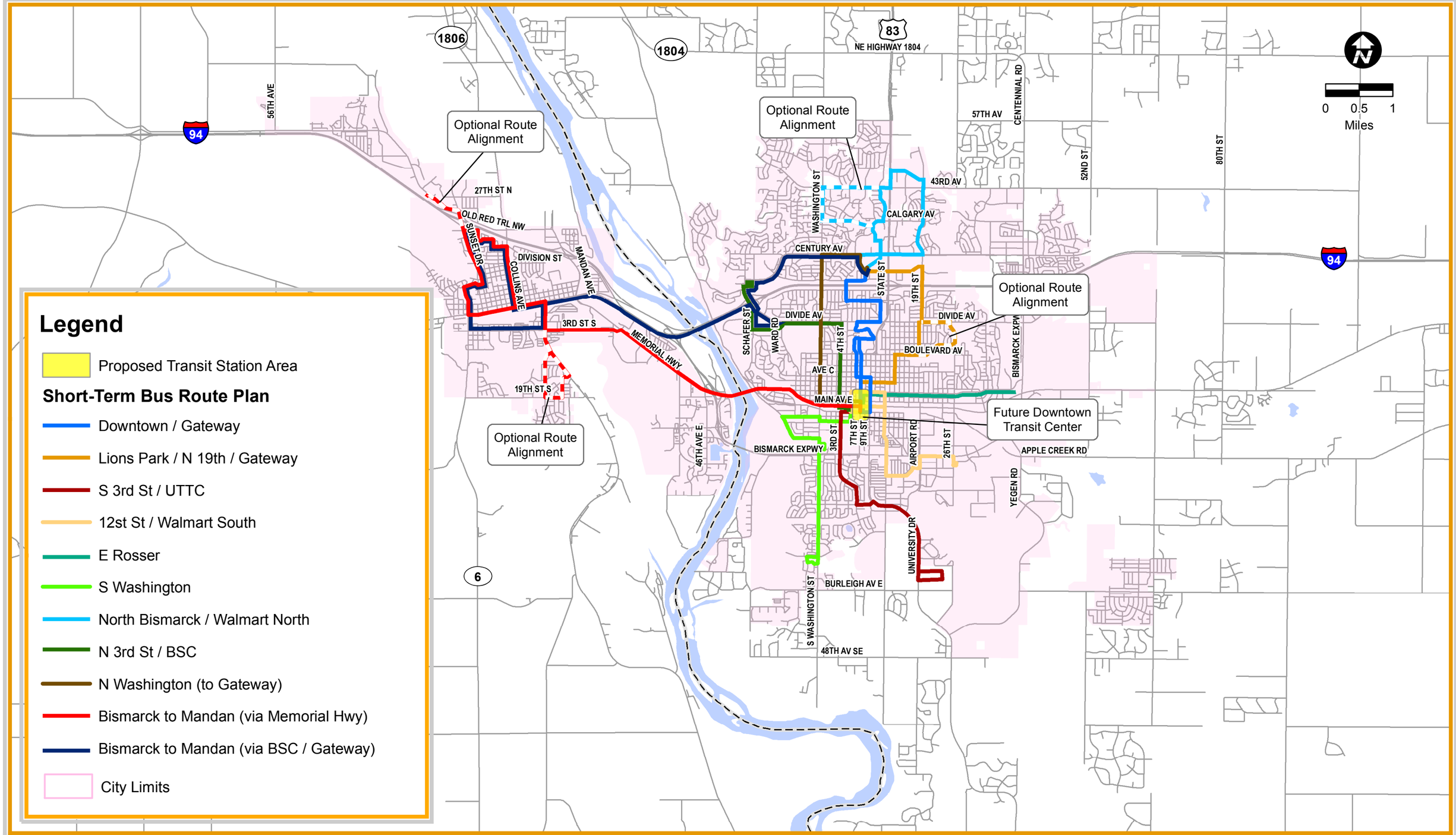

Legend

- Proposed Transit Station Area

Short-Term Bus Route Plan

- Downtown / Gateway
- Lions Park / N 19th / Gateway
- S 3rd St / UTTC
- 12st St / Walmart South
- E Rosser
- S Washington
- North Bismarck / Walmart North
- N 3rd St / BSC
- N Washington (to Gateway)
- Bismarck to Mandan (via Memorial Hwy)
- Bismarck to Mandan (via BSC / Gateway)
- City Limits

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Source: Mobility 2017 Report.

Short-Term Bus Route Plan

Figure: ES-12

Date: November 2014

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Figure ES-10 also identifies several projects anticipated to be **constructed with only City and / or County funds**, and are not included in the Federal-Aid project list for the 2040 LRTP, but provide useful mobility, accessibility, and safety improvements that should be considered as a part of the overall plan, including:

- Add turn lanes and temporary traffic signal at the intersection of Collins Road and Old Red Trail in Mandan (mid-term Project M32 would reconstruct this intersection as an urban roadway with curb and gutter and provide a permanent traffic signal.)
- 57th Avenue extension between Washington Street and River Road.
- Lincoln Road reconstruction and turn lane additions between 52nd Street and 66th Street.
- Main Avenue conversion to 3-lane cross-section, with bike lanes between 1st Street and 6th Street, pedestrian and streetscape improvements per Downtown Bismarck Study.
- 15th St NW (Burleigh County) extension between 71st Avenue / Highway 1804 and 57th Avenue.
- Reconstruction / paving of Airway Avenue west of 26th Street and 26th Street between Wal-Mart entrance and Airway Avenue.

The roadway plan addresses many critical mobility and safety issues identified through the LRTP process. One of the key performance improvements associated with the 2040 LRTP-recommended roadway plan is the improvement in regional mobility compared to the 2040 existing-plus-committed (E+C) scenario. **Table ES-1** shows the significant reduction in vehicle miles traveled (VMT), vehicle hours traveled (VHT), and increase in estimated peak hour system speeds forecasted for the LRTP network scenario compared to the E+C scenario. These indicate improved regional mobility and improved connectivity in the 2040 LRTP scenario compared with E+C scenario.

Table ES-1. 2040 Draft LRTP Network System Performance: Comparison to E+C Scenario VMT, VHT and System Speeds

	Vehicle Miles Traveled		Vehicle Hours Traveled		System Speeds (miles per hour)	
Functional Class	2040 E+C	2040 LRTP Network	2040 E+C	2040 LRTP Network	2040 E+C	2040 LRTP Network
Interstate	497,754	538,186	9,989	10,641	49.8	50.6
Major Arterials	1,345,633	1,310,568	56,708	40,324	23.7	32.5
Minor Arterials	770,826	631,070	40,924	19,395	18.8	32.5
Collectors	563,084	485,577	30,607	17,157	18.4	28.3
Total System	3,177,297	2,965,401	138,228	87,517	23	33.9

Source: ATAC, Bismarck-Mandan Travel Model

Due to the expanded future system needs and limited resources for system expansion there were not sufficient levels of projected future funding to include several high-priority projects in the plan; high-priority projects as defined by the performance measures and alternatives scoring used for this study. Among some of the **high-priority projects that are not part of the fiscally-constrained plan** include:

- **Alternative B1:** Widen US 83 north of 57th Street.
- **Alternative B4b:** Widen future 66th Street to 4-lanes between Century Avenue and I-94.

- **Alternative B9:** Widen Highway 10 / add turn lanes between Bismarck Expressway and 66th Street.
- **Alternative B12:** Hamilton Street connection between Divide Avenue and Century Avenue with I-94 Crossing.
- **Alternative B18:** 43rd Avenue widening west of Centennial Road.
- **Alternative B19:** 3-lane widening of 43rd west of Washington.
- **Alternative B22b:** 3-lane widening along 19th Street between Century Avenue and 43rd Avenue.
- **Alternative B54:** Widen Centennial Road at I-94.
- **Alternative B75:** Reconstruct Centennial Road / I-94 Interchange.
- **Alternative M5:** West Mandan Interchange at 56th Avenue.
- **Alternative M6:** Connection at 32nd Avenue NW between Boundary Road and Old Red Trail.
- **Alternative M26:** I-94 at I-194 / Bismarck Expressway / Main St interchange.
- **Alternative M33b:** Reconstruct Mandan Avenue / I-94 Interchange Bridge for wider Mandan Avenue.

Two bicycle and pedestrian projects from the *Downtown Bismarck Study* were not included in the fiscally-constrained plan, but generally scored relatively highly and would fit well within the multimodal framework included in the 2040 Plan:

- **Downtown Bicycle and Pedestrian Rail Trail.**
- **5th Street Pedestrian Underpass of the BNSF railroad.**

As noted in the Downtown Study, both of these projects will require significant investment, additional study, project development, and coordination with the BNSF railroad. As elements of the Downtown Study come together, it is suggested that both of these projects be evaluated more fully.

The 2040 LRTP is a regional document that sets priorities and identifies future projects and programs at a planning level. There are some programs / projects identified in the 2040 LRTP that will require more detailed study during the project development process. Some **future recommended MPO-sponsored studies** that may be considered in the near term include:

- **Regional Traffic Safety Study**
- **Bike and Pedestrian Master Plan**
- **Bismarck Signal System Master Plan**
- **System Management / Low-Cost Urban Corridor Improvements Study**
- **Downtown Mandan Subarea Study**
- **Regional Household Survey for Travel Model Support**
- **Travel Demand Management Study**
- **Continued Pavement Asset Monitoring and Management**
- **Neighborhood Parking Assessment**