DEPARTMENT OF TRANSPORTATION

NORTHWEST TWIN CITIES METRO AREA

Mississippi River Crossings' Feasibility Analysis

Executive Summary

DEPARTMENT OF TRANSPORTATION

NORTHWEST METRO

Mississippi River Crossings: Overview and Need

Project Overview

Population growth and development in the northwest Twin Cities Metro area has driven the need to evaluate regional traffic demand and guide future investment in the area. The Northwest Metro Mississippi River Crossings Feasibility Analysis was commissioned to update what we have learned from previous studies, re-engage cities and counties and understand the need for increased Mississippi River crossing capacity.

Throughout the past 20 years, numerous investments have been made on area roadways along with significant growth and changes in land use. Growth in this region will continue beyond 2040, resulting in additional congestion to the roadway network and the existing Mississippi River Crossings in this region. The Minnesota Legislature authorized funding for this Northwest Metro River Crossings Feasibility Analysis so MnDOT can complete a technical review of the existing crossings, travel patterns and demands and explore ideas for increasing capacity.

Area of Analysis

This image shows the analysis area for the study as the three river crossings, 101, 169 and 610 in the northwest metro as well as highway 10 through from 610 to 169 in Elk River and 610 in Brooklyn Park all the way to 101 and 94 in St. Michael and Rogers.

The existing Mississippi River crossings on Highways 101, 169 and 610 are approaching/exceeding capacity and experience several hours of congestion daily. Serving a total of more than 200,000 vehicles per day, these river crossings are key for commuter traffic, but they also serve as main routes for freight vehicles and recreational users.

Goals of the Feasibility Analysis

The feasibility analysis does not include project recommendations. It is a fact-finding investigation and the first of several steps in the project development process. The primary goals of the feasibility analysis are to assess the project's community and transportation context, identify the locations and sources of congestion, understand stakeholder perspectives and define a range of potential solutions to mobility challenges. These goals are described in more detail below.

- **Understand Past Efforts**
  Understanding how project partners have been planning for improved crossing capacity will serve as a baseline for this analysis.

- **Understand Travel Patterns**
  Developing a clear understanding of travel patterns for the three Mississippi River crossings at Highways 101, 169 and 610 to accommodate travel demands.

- **Understand System Performance**
  Addressing the cost of vehicle delay associated with each river crossing and evaluating delays or planned and programmed improvements will create an understanding of the reserve capacity in each river crossing and establish a baseline in performance.

- **Understand Land Use and Growth**
  Identifying and compiling community comprehensive plans will provide an understanding of the long-term population and employment growth along the corridor, the demand this growth will create and the mobility and access needed.

- **Understand Community Position**
  A strategic engagement process will allow the team to engage and inform the communities, understand previous work and present clear and consistent findings.

- **Evaluate Concepts to Serve Demands**
  Development of high-level concepts that address operational issues and maximize the value of existing infrastructure may include improvements to existing river crossings and exploration of new river crossings.

- **Develop Technically Feasible Concept**s
  Evaluation of improvements based on land use, system benefits, overall cost/benefit analysis and return on investment will examine the viability of concepts both on and off the existing road network.

- **Conclusion of this Effort**
  This effort is a technical analysis only. The final document will detail the overall findings of this effort but will not recommend a vision. Next steps for project partners will be identified and may include further analysis, environmental study, corridor studies and community engagement.

The Context Analysis provides a **look** at the studies and work that have been completed in the feasibility analysis area during the last three decades. Review of city and county comprehensive plans provides a **look** at what the communities expect to occur in the next 20 years and how they are planning and positioning for this to occur. In total, the context analysis considered:

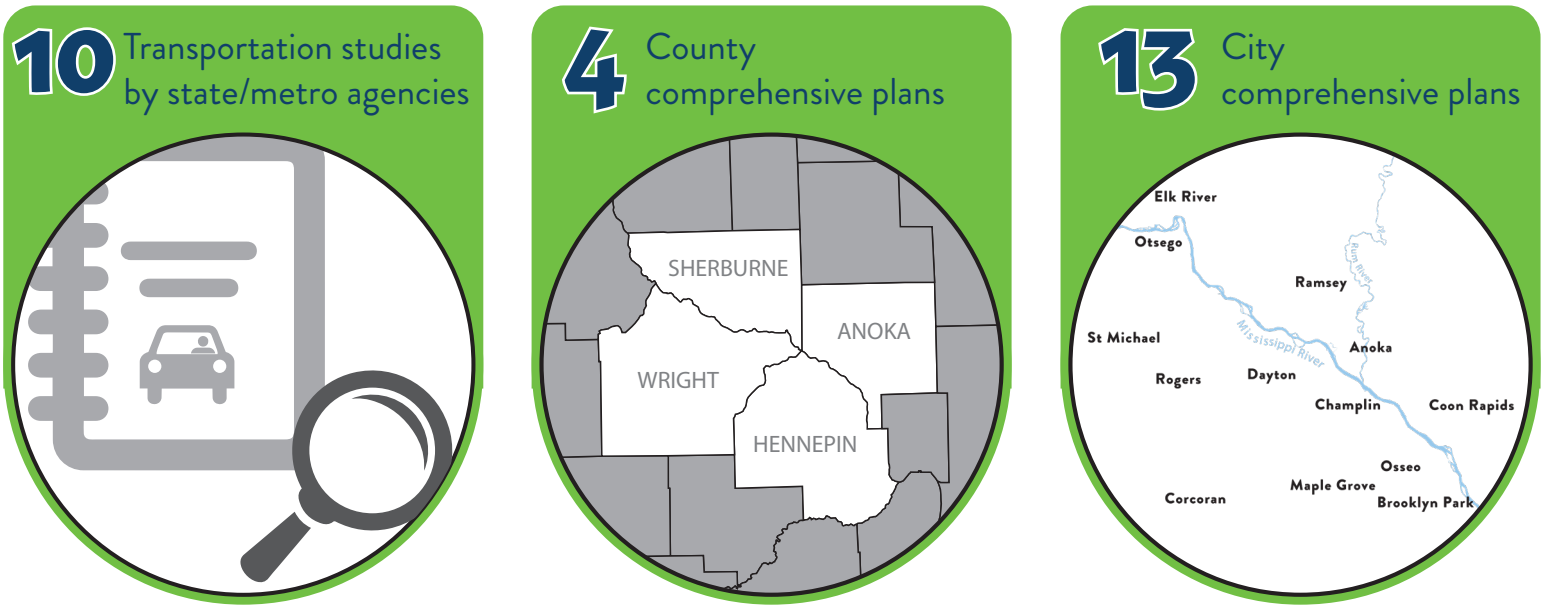


Image displays that 10 transportation studies, 4 county comp plans and 13 city comprehensive plans were reviewed.

Key Takeaways

- The need for additional capacity across and along the river has been studied multiple times in the last 30 years. Most of these past studies identified the **need for additional capacity** within the corridor. Some, but not all, identified the **need for additional Mississippi River crossings**.
- **Growth is anticipated to continue** throughout the analysis area. The cities of Ramsey, Corcoran and Dayton are among the fastest growing communities in the Twin Cities Metropolitan area.
- Comprehensive plans for many communities in the region identify a **concentration of more intense development along the major highway corridors (**101, 169 and 610). These plans include mixed use and higher density development. In some cases, the areas are targeted for transit-oriented development.
- **Capacity investments have been made** in the regional roadway network to address existing traffic congestion and future growth in the region.
- Some individual communities have made **investments on the north side of the Mississippi River to accommodate a future crossing**.

Area Growth

Regional growth in development, population and employment will reshape communities on both sides of the river. This means increased flow of people and goods across the river in an area where crossings are limited.

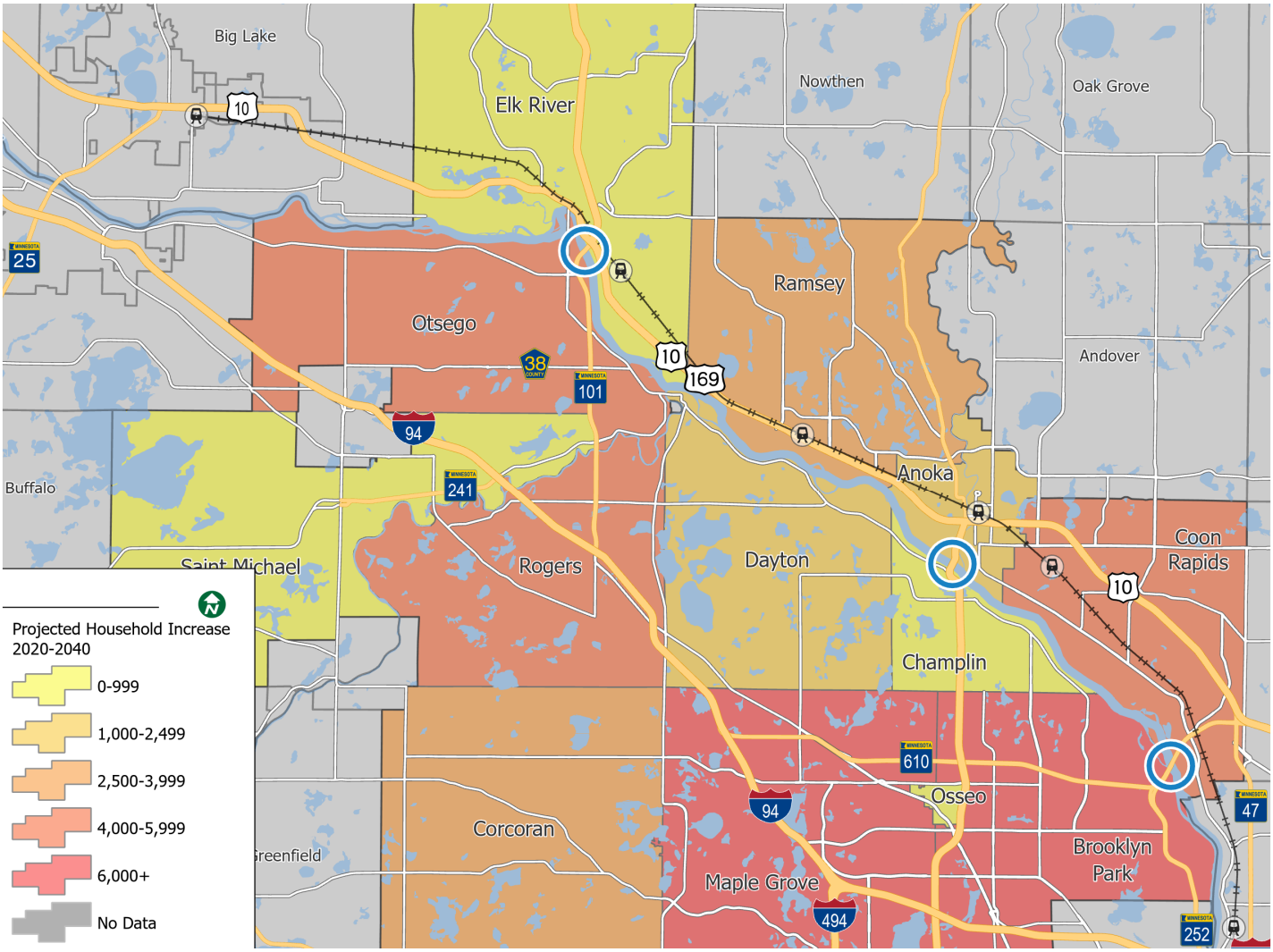


Image shows heat map displaying density of growth in the northwest metro area on both sides of the river.

Growth is likely to continue throughout the area.	Growth in past 20 years (2000-2020)	Growth in next 20 years (2020-2040)
Population	**30%** ↑	**20%** ↑
Households	**39%** ↑	**23%** ↑
Jobs	**54%** ↑	**17%** ↑

Look to the Future

A map of future land use within the analysis area was compiled using information pulled from city comprehensive plans. Land use for each city was summarized into six categories for easier comparison.

The resulting map (below) shows a concentration of commercial and mixed use activity along major corridors. Some areas are clearly targeted for mixed use development and are undergoing urbanization. Such areas include the Center of Ramsey (COR) on the north side of US Highways 10/169, central Anoka surrounding the Northstar Commuter Rail Station, the I-94 corridor from Maple Grove to Hwy 101, areas adjacent to Hwy 101 within Hennepin County and large areas in and around central Elk River.

The COR (Center of Ramsey) downtown development along US Highways 10/169 and the Ramsey Northstar Commuter Rail Station in Ramsey, MN.

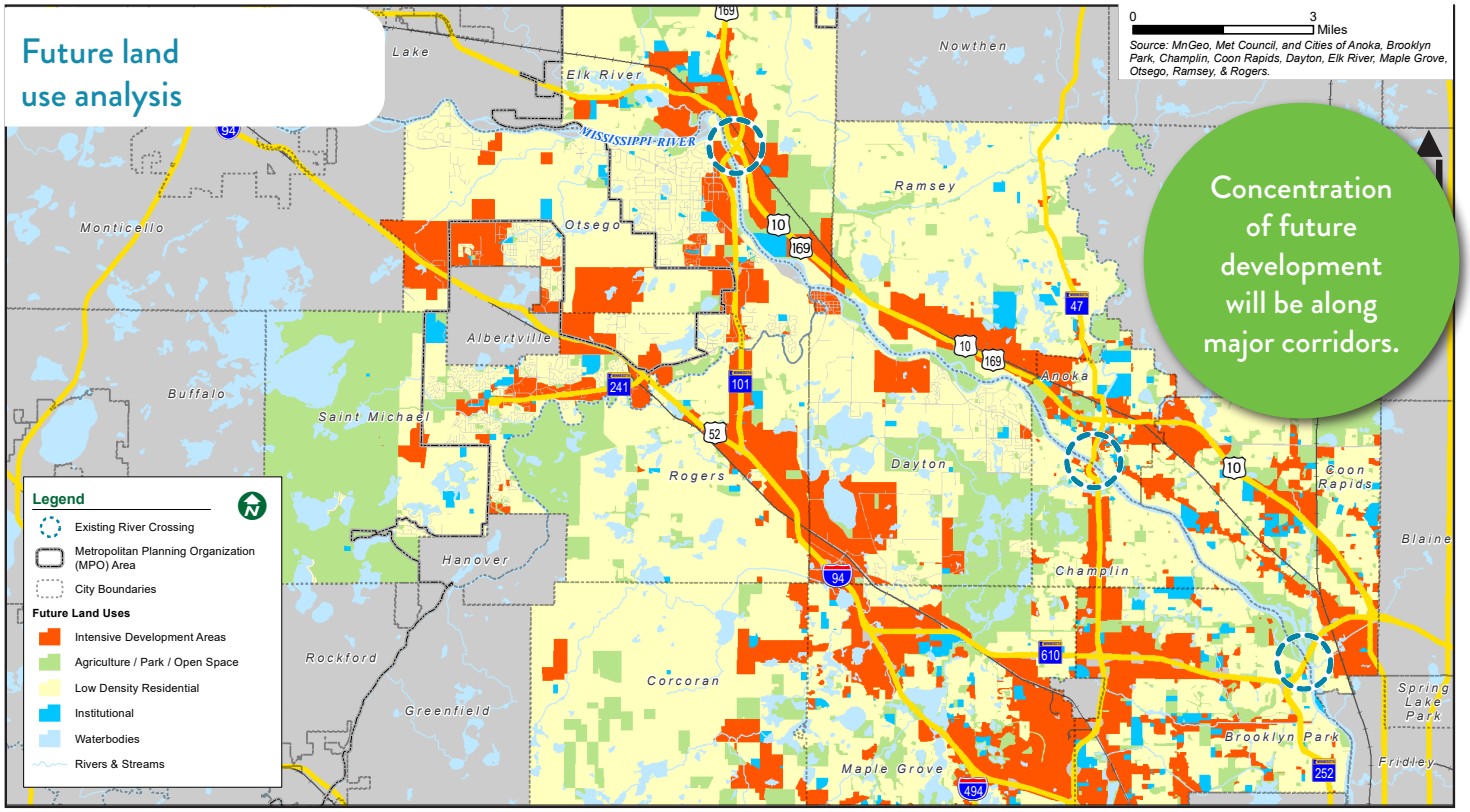


Image displays three future land use categories for the northwest metro area on both sides of the river.

Look to the Future

The future vehicle transportation network map (below) shows funded and planned and funded improvements along I-94 and Hwy 10, as well as potential improvements and new roads identified in past studies and local comprehensive plans. The map shows that communities in the Northwest Twin Cities Metro intend to build a coordinated network that increases capacity and connects major economic and development centers in the region.

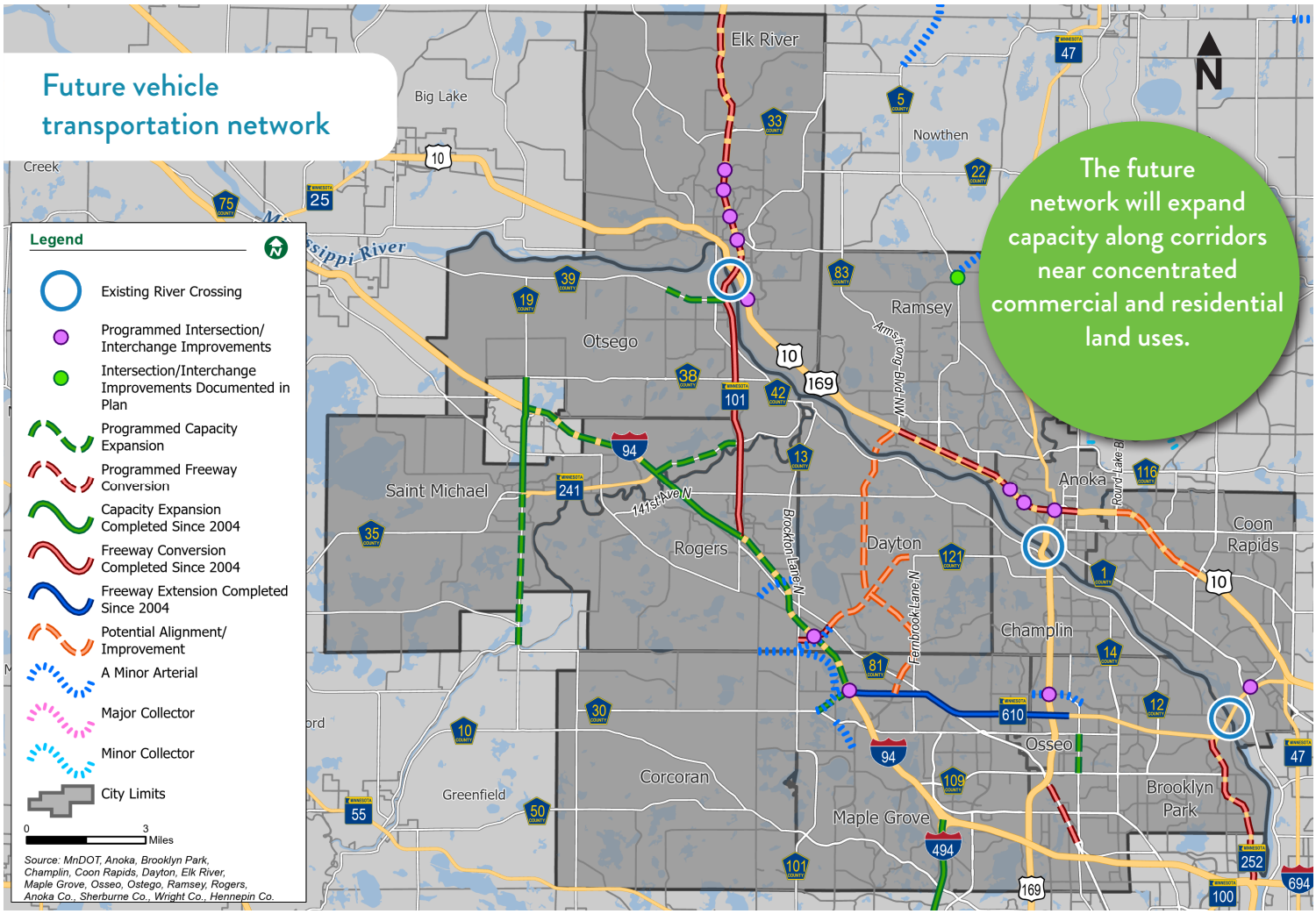


Image identifies completed, underway and planned roadway system improvements on 10, 94, 101, 169 and 610 in the northwest metro area.

Context Analysis Key Takeaways

- **Need for additional capacity**
- **Continued community growth**
- **Development along major corridors**
- **Investments to increase traffic capacity**
- **Community investments for future improvements**

Congestion Analysis

The congestion analysis looks at traffic flow in the Northwest Twin Cities Metropolitan Area to understand the extent, severity, duration and causes of congestion in the region. The analysis shows that travelers regularly experience reduced speeds on highways in the Northwest Twin Cities Metro.

Analysis Highlights

Several of the major highways in the study area experience congestion:

- Interstate 94
- Hwy 10
- Hwy 169
- Hwy 101
- Hwy 610

Congestion Analysis Measures

Severity – *how slow does it get?*

Duration – *how long does it last?*

Extent – *how far does it reach?*

Bottlenecks in each of the congested areas causes the congestion to extend upstream on the highway.

Upcoming projects have been identified for several of the congested areas and bottlenecks. These include Hwy 10 grade separation projects through the cities of Anoka and Ramsey.

Congestion in the Northwest Twin Cities Metro

Travelers encounter some form of congestion on several miles of highway in the Northwest Twin Cities Metro area on a typical workday. The most intense morning congestion occurs around the Hwy 610 and Hwy 252 interchange. There is also a stretch of heavy morning congestion on Hwy 169 between Hwy 10 and the Mississippi River. Afternoon congestion follows a similar pattern, with the heaviest congestion on Hwy 610 west of the Hwy 610 and Hwy 252 interchange and on northbound Hwy 169 approaching the river.

See maps on next page for peak hour congestion and issues.

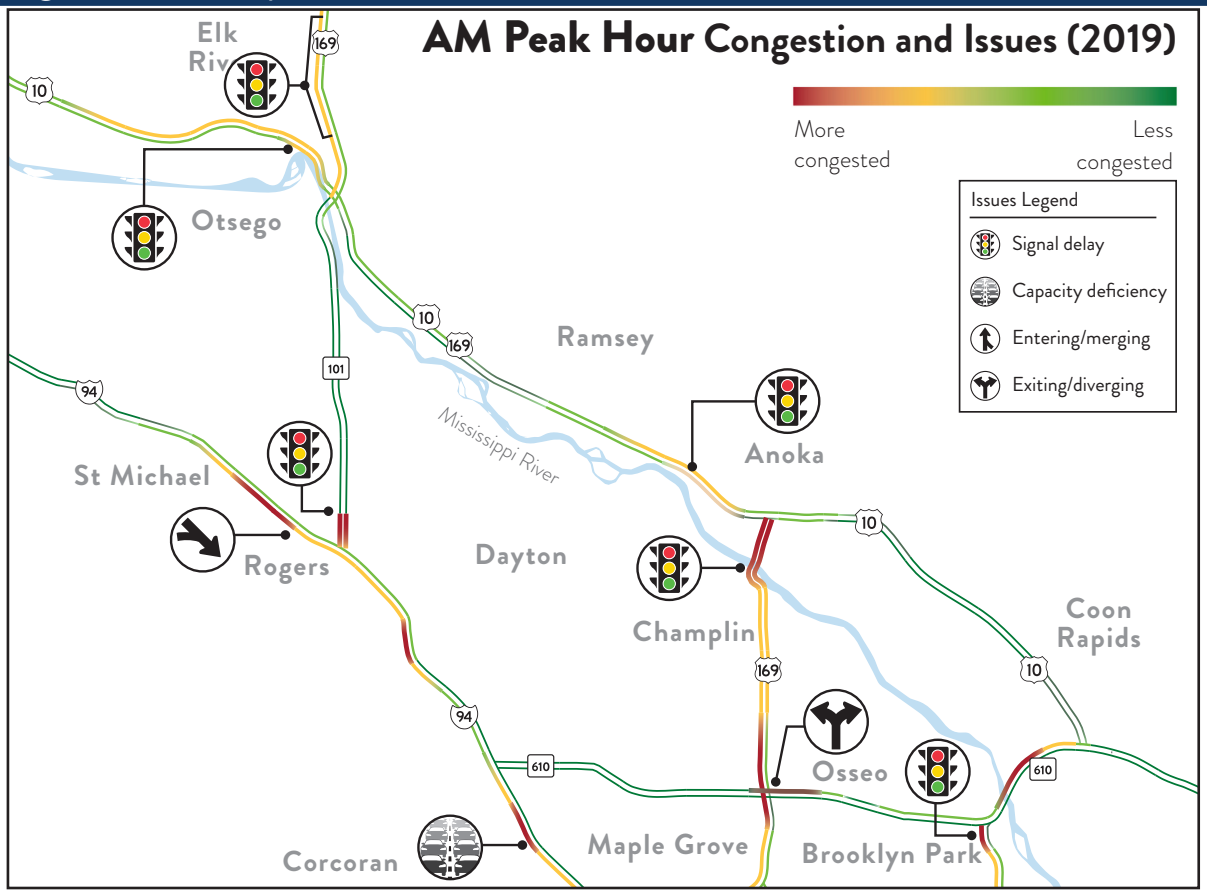


Image shows heat map identifying 2019 morning peak hour congestion on Northwest Twin Cities Metro Area highway system on both sides of the river.

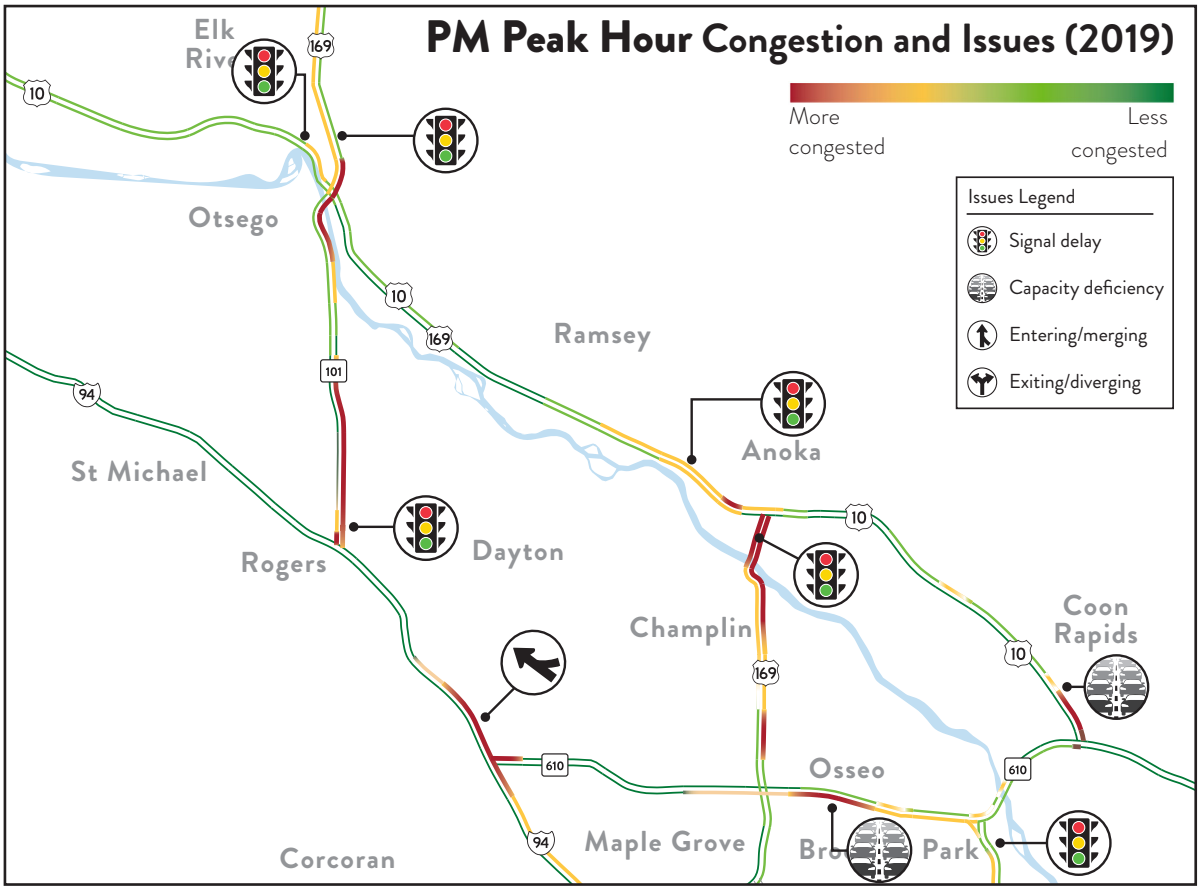


Image shows heat map identifying 2019 afternoon peak hour congestion on Northwest Twin Cities Metro Area highway system on both sides of the river.

Congestion Measurement

Traffic congestion happens on roadways whenever traffic flows at slower than intended speeds. This condition is caused by bottlenecks where travel demand approaches or exceeds roadway capacity.

Traffic congestion is a concern because it delays travelers, increases safety risks and has negative environmental impacts from wasted fuel and increased emissions. This analysis measures congestion in three ways: extent (where does the congestion occur?); intensity (how bad is it?); and duration (how long does the congestion last?).

Corridor Bottlenecks

This analysis identified the bottlenecks most responsible for traffic congestion on major highway corridors in the Northwest Twin Cities Metropolitan Area. Table 1 identifies these bottlenecks and presents information about the extent and duration of the resulting congestion on and off the highways.

		AM Peak	PM Peak
Highway	**Direction**	**Bottleneck (duration)**	**Bottleneck (duration)**
I-94/Hwy 610 between Hwy 241 and Hwy 65	Eastbound	Hwy 101 (~2 hours) Hwy 610 (~1 hour) Hwy 252 (~1.5 hours)	Hwy 252 (2.5 hours)
	Westbound	Hwy 252 (~2 hours) Hwy 169 (1.5 hours)	Hwy 252 (1.5 hours) Zane Ave (1 hour) Hwy 101 (2.5 hours)
US Hwy 10 Between Orono Lake Bridge and Hwy 65	Eastbound	Signal-related in Elk River and congestion (1.5 hours) in Ramsey	Signal-related in Elk River and congestion (1.5 hours) in Ramsey
	Westbound	Signal-related in Elk River and congestion in Ramsey (1 hour)	Signal-related in Elk River and congestion in Ramsey (2.5 hours) and Hanson Blvd (2 hours)
US Hwy 169/Hwy 47 between Bunker Lake Blvd and Hwy 610	Southbound	Signal-related and congestion between Bunker Lake Blvd and Dayton Rd (3 hours), Hwy 610 (2 hours)	Signal-related between Bunker Lake Blvd and Dayton Rd
	Northbound	Signal-related between Bunk Lake Blvd and Dayton Rd	Signal-related and congestion between Bunk Lake Blvd and Hayden Lake Rd (3.5 hours), 109th Ave (1.5 hours)
Hwy 101 between 193rd Ave and I-94	Southbound	Signal-related between 193rd Ave and US Hwy 10 and congestion at Diamond Lake Rd (3 hours)	Signal-related between 193rd Ave and US Hwy 10 and at Diamond Lake Rd
	Northbound	Signal-related at Diamond Lake Rd and between 193rd Ave and US Hwy 10	Signal-related at Diamond Lake Rd and congestion between 193rd Ave and US Hwy 10 (2 hours)

Holiday Congestion

Holiday weekend traffic increases the extent, severity and duration of congestion on highways in the NW Twin Cities Metro. It also shifts where the congestion occurs, with I-94 and Hwy 10 experiencing much more severe congestion on a Friday afternoon before a holiday weekend than on a typical afternoon rush hour.

The Hwy 101 Mississippi River Crossing experiences the greatest holiday weekend congestion impacts of any river crossing in the NW Twin Cities Metro. This is due to a four-fold increase in interregional traffic and the traffic signals on Hwy 169 north of the Highway 10/101/169 intersection.

With 4 times more traffic,
the Hwy 101 Mississippi River Crossing
has the most holiday weekend congestion in the Northwest Metro.

Image illustrates holiday traffic with a car pulling a camper.

Key Takeaways: Congestion Analysis

Hours of Congestion on a Typical Workday

I-94/Hwy 610	Up to 2 hours
Hwy 10	Up to 2.5 hours
Hwy 169/Hwy 47	Up to 3.5 hours
Hwy 101	Up to 3 hours

Origin-Destination Analysis

An analysis of origin and destinations of travel in the study area was undertaken to understand traffic patterns, especially at the three existing river crossings. This analysis used data from StreetLight Insights, a software platform that summarizes traffic movements from mobile devices such as smart phones and GPS navigation units. The analysis provides useful information about trips using the river crossings and other study area roadways, such as:

- Communities where trips start and end
- Common routes used by trips crossing the river
- Time of day trip patterns
- Directional distribution of traffic throughout the day
- Breakdown of autos and truck numbers
- Distribution of typical trip lengths by time and distance

This section summarizes the key findings for the existing Mississippi River crossings and other study area roadways from the origin-destination analysis.

Communities Served

The Hwy 101, Hwy 169 and Hwy 610 river crossings serve the NW Twin Cities Metro in unique and important ways. The Hwy 101 crossing provides an interregional connection serving communities in Sherburne, Wright and Hennepin Counties, while Hwy 169 supports primarily shorter distance and/or local trips between destinations on either side of the river. Hwy 610 is an east-west link in the Twin Cities regional freeway system connecting the large suburban communities of Maple Grove and Brooklyn Park with southern Anoka County and downtown Minneapolis.

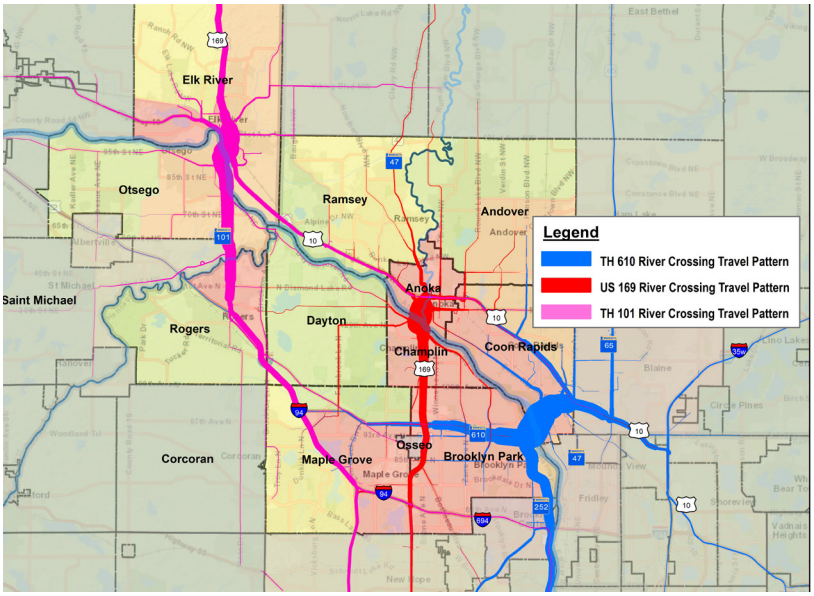


Image uses line thickness to illustrate travel patterns at the Hwy 610, Hwy 169 and Hwy 101 river crossings in the Northwest Twin Cities Metro area.

Key Takeaways

The Hwy 101, Hwy 169 and Hwy 610 river crossings serve the NW Twin Cities Metro in unique and important ways.

Crossing Location	Highest Proportion of:
Hwy 101	**Long trips** to and from the Metro
Hwy 169	**Short trips** typical of shopping
Hwy 610	**Medium trips** typical of commutes

Trip Length

The average trip length of each NW Twin Cities Metro River Crossing varies according to trip type. As illustrated to the right, the Hwy 169 crossing has the shortest average trip distance. This is consistent with the role Hwy 169 plays carrying short trips between the cities of Champlin, Anoka and Ramsey. Trips using the Hwy 101 and Hwy 610 crossings have similar trip length profiles, although there is greater variation in trips using Hwy 101 due to its function as an interregional corridor.

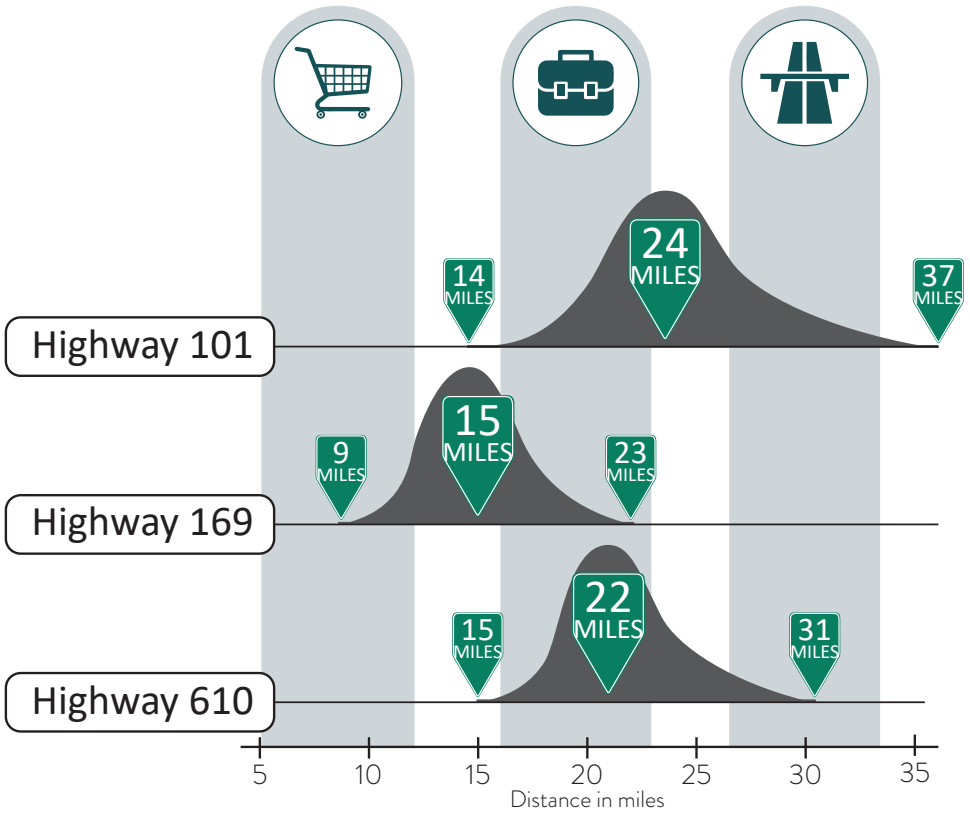


Image shows the average length in miles of trips on Highways 101, 169 and 610 in the Northwest Twin Cities Metro area on both sides of the river.

Trip Volume

Nearly 240k daily trips cross the Mississippi River using the Hwy 101, 169 or 610 river crossings. Hwy 610 carries the heaviest traffic (55 percent of trips), followed by Hwy 101 (27 percent) and Hwy 169 (18 percent).

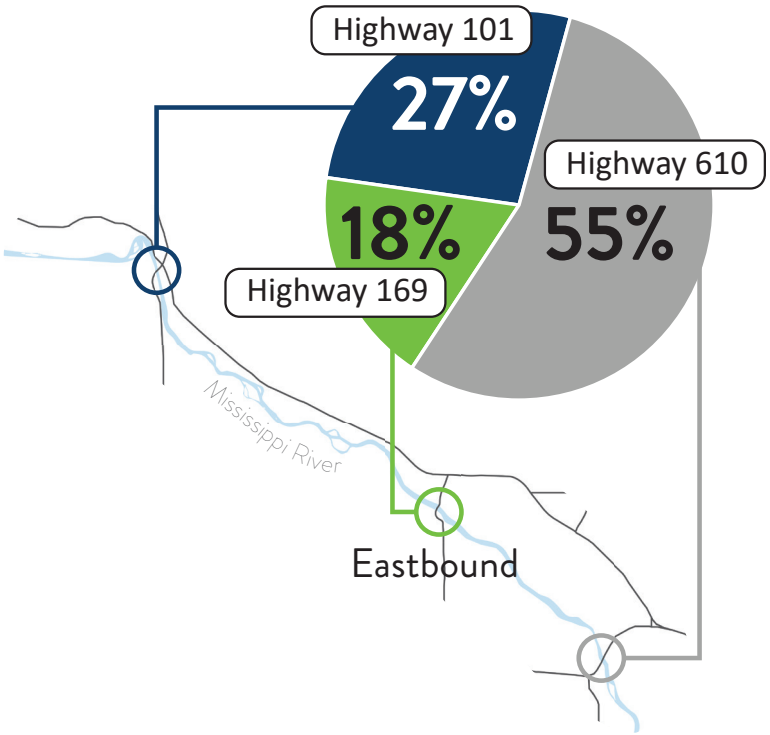


Image is a pie chart identifying the percentage of total trips using each river crossing in the Northwest TwinCities Metro area.

Daily Profile

Trip type also effects the timing and direction of traffic using the Highways 101, 169 and 610 Mississippi River crossings. Commute trips using a NW Twin Cities Metro river crossing generally travel inbound during morning peak hours and outbound during afternoon peak hours. As a result, between 60 and 70 percent of morning crossings are southbound on Highways 101 and 169 or westbound on Hwy 610. A similar pattern occurs in the afternoon, with 60 to 70 percent of crossings occurring on Hwy 101 northbound, Hwy 169 northbound or Hwy 610 eastbound.

	Number of vehicles per river crossing		
Peak Period	Highway 101	Highway 169	Highway 610
AM peak (10 am to 6 am)	N **10,300** / 5,000 S	N **6,500** / 4,100 S	N **20,900** / 11,800 S
PM peak (3 pm to 7 pm)	N 8,600 / **13,500** S	N 5,000 / **8,500** S	N 17,600 / **27,600** S

Image uses clocks to identify the morning peak hours of 6-10 and the afternoon peak hours of 3 to 7. (Arrows are used to illustrate direction of trips.)

Holiday Weekend Travel

The Hwy 101 crossing supports four times as many interregional trips on holiday weekend Fridays compared to typical weekdays.

Image is a calendar identifying the major summer weekends, including Fishing Opener, Memorial Day, 4th of July and Labor Day.

Improvement Concept Overview

Improvement concepts were conceived throughout the study area to address mobility concerns identified in the traffic analysis. The improvements were meant to address bottlenecks and congestion on existing highways either through spot mobility or strategic capacity. In addition, several new options for Mississippi River crossing connections concepts were also explored. All of the improvements were evaluated with respect to the following factors:

Improvements that performed well across these factors were included in concept development. A concept graphic was created for each improvement to convey the location and type of improvement. The range of concepts were reviewed by the MNDOT team and then shared with project stakeholders including city and county staff and elected officials. Based on the traffic analysis and input received, the concepts were revised and narrowed to the four identified in the following pages.

The concepts identified included a range of improvements with different magnitudes of costs and mobility benefits. Additional project development, technical analysis and public participation will be required to fully determine what, if any, improvements should be constructed. The planning-level improvements considered in each location are illustrated on the following pages.

		Range of Possible Improvements	Improves traffic flow across Mississippi River	Consistent with local & regional planning	Potential residential & community impacts	Natural resources impact considerations	Eligible for inclusion in Concept Development
	NO BUILD		✗	✗	High	High	Yes
I-94	Do nothing		✗	✓	None	None	No
US Hwy 10	US Hwy 10 A1*	**Ramsey to Elk River** - Spot mobility improvements from Armstrong Blvd (Ramsey) to Hwy 101 (Elk River) | (6 miles)	✓	✓	High	Low	Yes
US Hwy 10	US Hwy 10 A2*	**Ramsey to Elk River** - Convert to four-lane grade-separated corridor from Armstrong Blvd (Ramsey) to Hwy 101 (Elk River) | (6 miles)	✓	✓	High	Low	Yes
US Hwy 10	US Hwy 10 B**	**Coon Rapids Lane Add** - Add lane from Hanson Blvd to Round Lake Blvd (2.5 miles)	✓	✓	High	Low	Yes
Hwy 101	Hwy 101 A1	**Hwy 101 SB Capacity Improvements** - Signals remain. Ideas include adding an additional right turn lane dedicated to WB I-94 or I-94 interchange could be converted to a DDI	✓	✓	Low	Low	Yes
Hwy 101	Hwy 101 A2	**SB 101/94 System Interchange Improvements** - Introduce a southbound Hwy 101 to eastbound I-94 flyover	✓	✓	High	Low	Yes
Hwy 610	Hwy 610 A***	**Hwy 610 Mobility Improvement** - From Hwy 169 to Hwy 252 (4 miles)	✓	✗	Low	Low	Yes
Hwy 610	Hwy 610 B	**Hwy 610 East River Rd Interchange** - Reconfigure interchange to provide full movements (today ramps only on west side)	✗	✓	High	Low	No
US Hwy 169	US Hwy 169 A***	**US Hwy 169 Mobility Improvement** - 101st to W. River Road (3 miles)	✓	✗	High	High	No
US Hwy 169	US Hwy 169 B***	**US Hwy 169 Mobility Improvement** - West River Road to Hwy 10 (1.5 miles)	✓	✗	High	High	No
NEW RIVER CROSSING	A	**Zanzibar/Armstrong Alignment**	✓	✓	High	High	Yes
NEW RIVER CROSSING	B1	**Hwy 169 to Ramsey Blvd Alignment**	✓	✗	High	High	No
NEW RIVER CROSSING	B2	**Hwy 169 to Sunfish Lake Blvd Alignment**	✓	✗	High	High	No
NEW RIVER CROSSING	C	**Hwy 169 to 117th Ave to Round Lake Blvd Alignment**	✓	✗	High	High	No
NEW RIVER CROSSING	D	**Hwy 252 Extension to Hanson Blvd Alignment**	✓	✗	High	High	No

Key to symbols

✓ Yes

✗ No

Impact level:

None
Low
Medium
High

Yes

No

All improvements

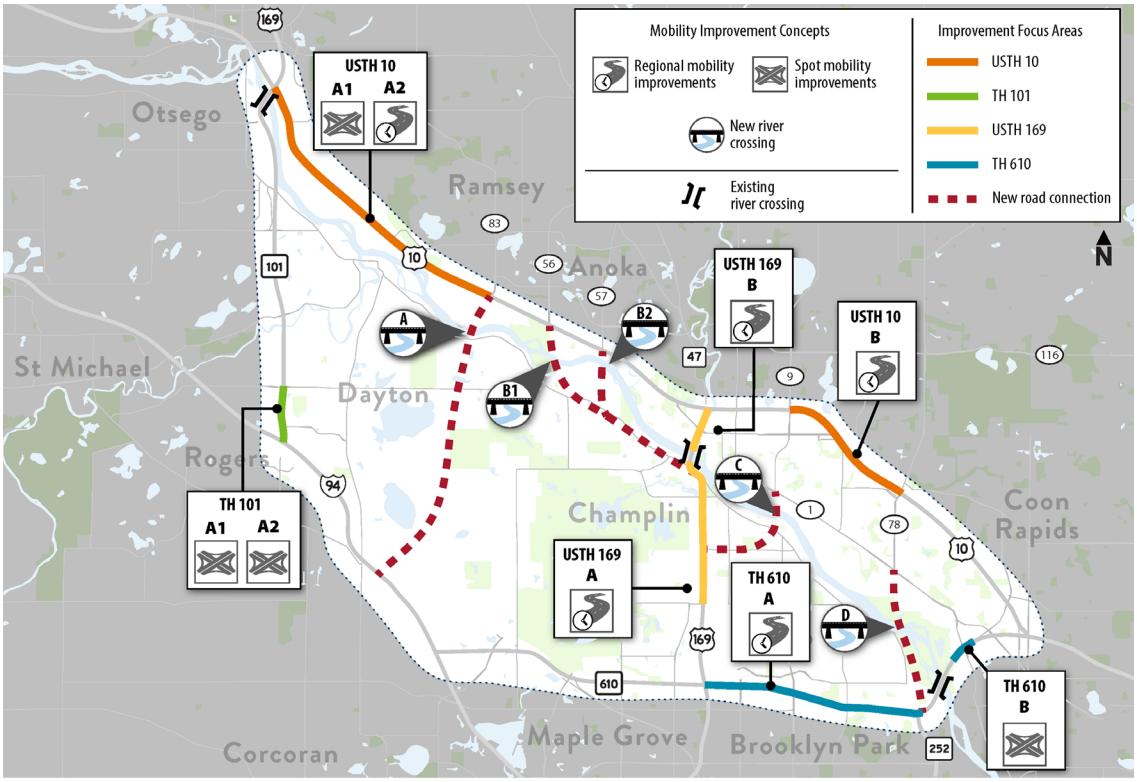


Image is a line map showing all potential improvement concepts on Highways 10, 101, 169 and 610 and new river crossing alignments in the Northwest Twin Cities Metro area.

Improvements carried forward to technical evaluation

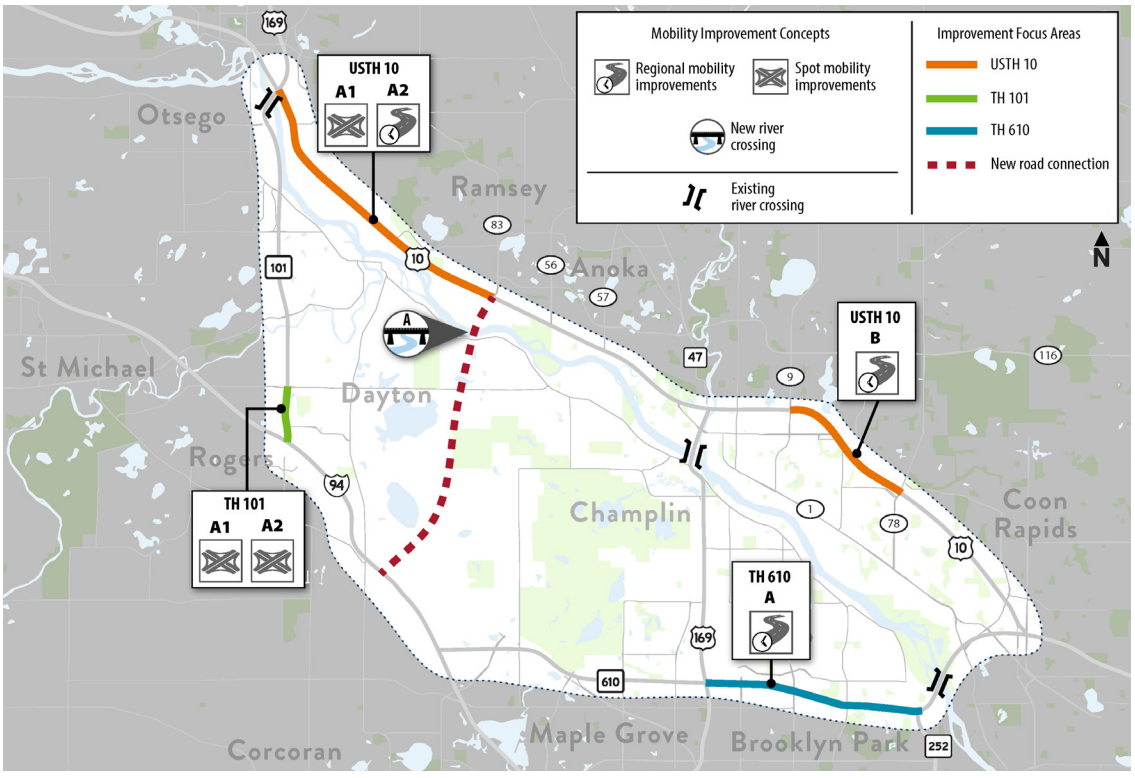
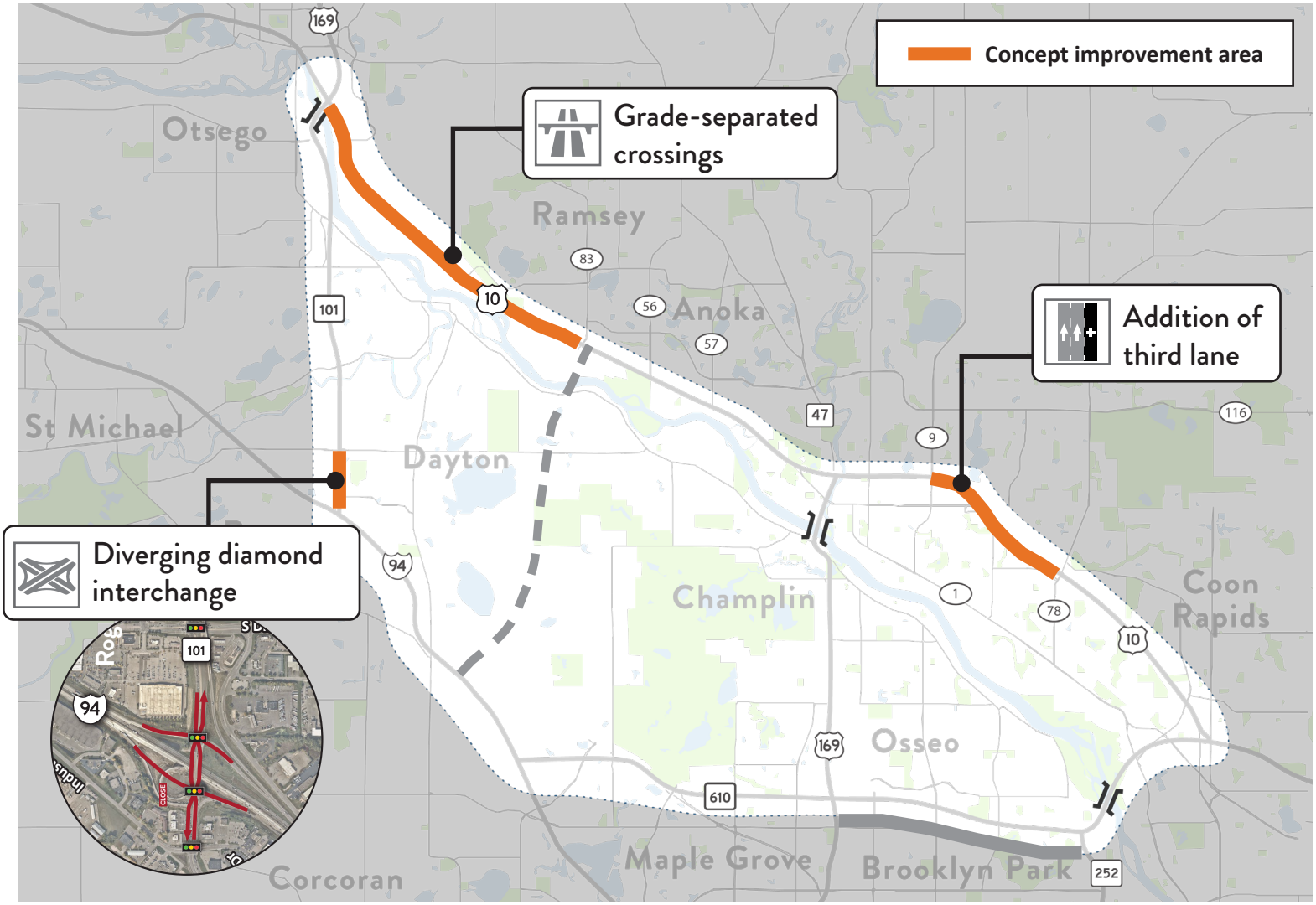


Image is a line map showing all potential improvement concepts on Highways 10, 101, 169 and 610 and new river crossing alignments in the Northwest Twin Cities Metro area carried forward for technical evaluation.

Concept 1 – Mobility Improvements (Hwy 101 + Hwy 10)



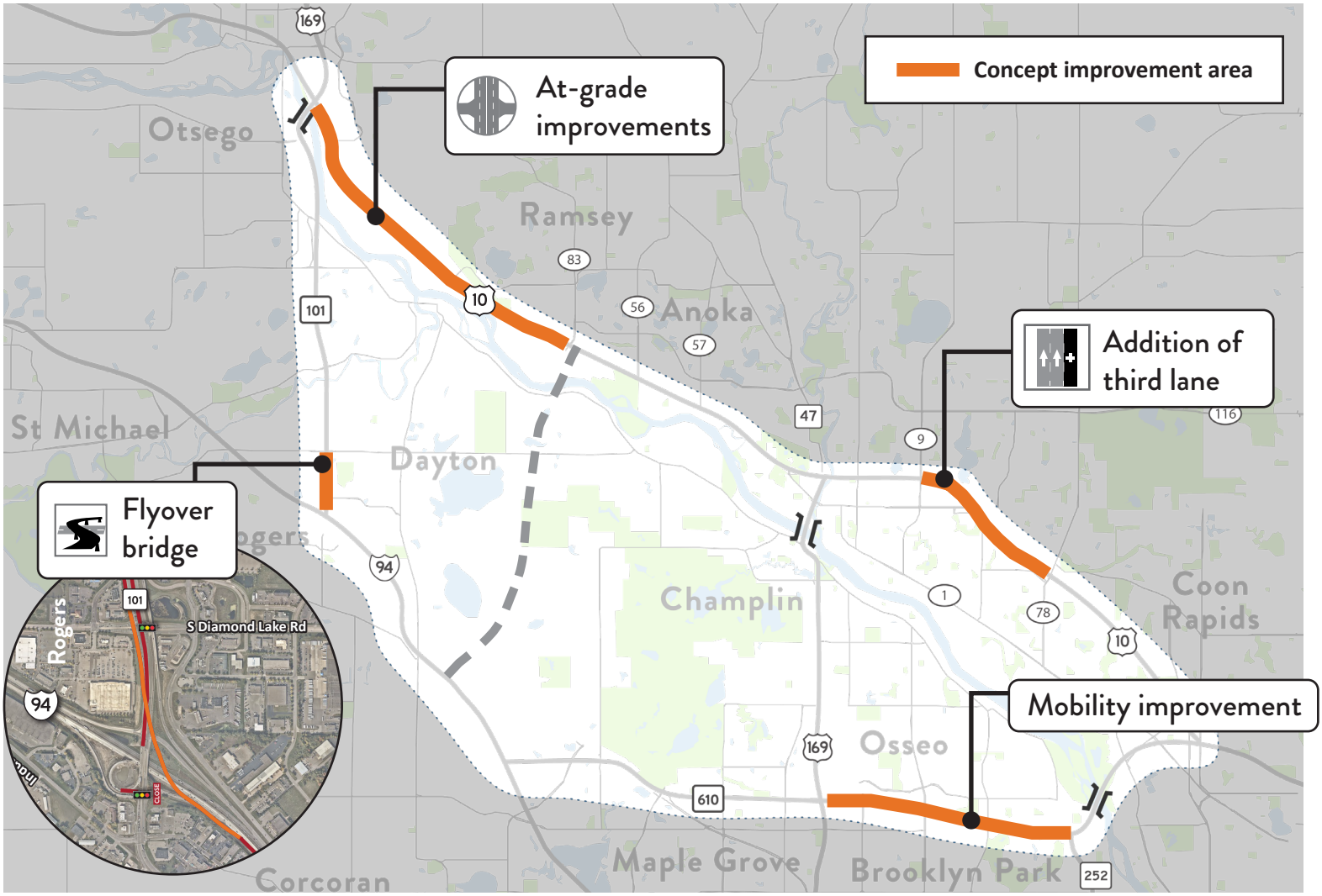
Improvement Details and Cost Range

Hwy 10	Grade Separated Crossing	Elk River (US Hwy 169) to Ramsey (Armstrong Blvd)	$115-290 Million*
Hwy 10	Lane Addition	Eastbound and Westbound Lane Add from Hanson Blvd to Round Lake Blvd	$36 Million*
Hwy 101	Diverging Diamond Interchange	Diverging Diamond Interchange at Hwy 101 and I-94	$22-26 Million*

Net Cost: $175-350 Million*	**Benefit/Cost Ratio: 1.0**

**Total project cost estimate in 2030 dollars*

Concept 2 – Mobility Improvements (Hwy 101 + Hwy 10 + Hwy 610)

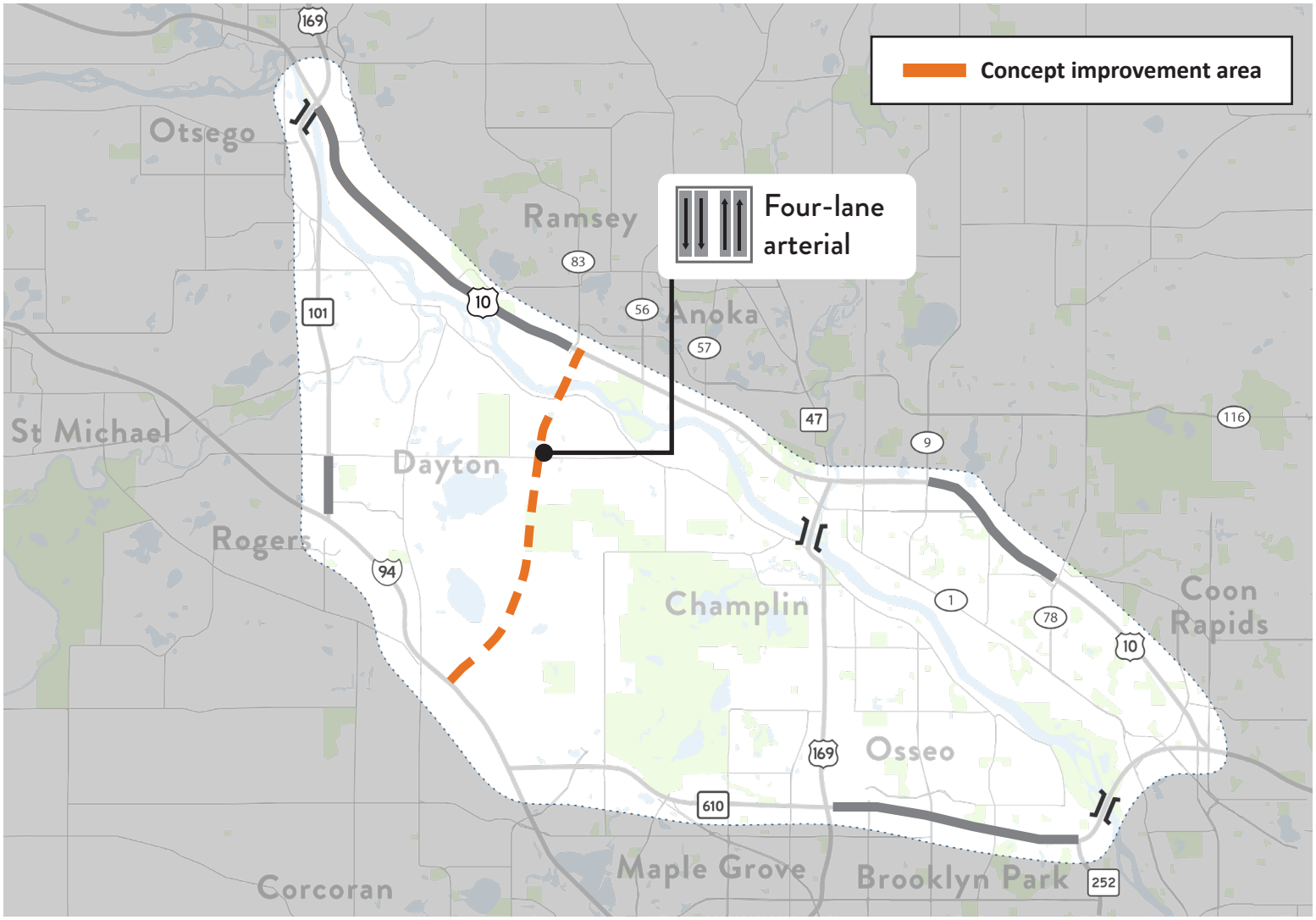


Improvement Details and Cost Range

Hwy 10	At-Grade Improvements	Elk River (US Hwy 169) to Ramsey (Armstrong Blvd)	$22-38 Million*
Hwy 10	Lane Addition	Eastbound and westbound lane add from Hanson Blvd to Round Lake Blvd	$36 Million*
Hwy 101	Flyover	Southbound Hwy 101 to eastbound I-94 flyover, including realignment of Hwy 101	$107-129 Million*
Hwy 610	Mobility Improvement	Improvement undetermined. Consider Active Traffic Management, Spot Mobility, MnPASS and Strategic Capacity	$8-35 Million*
Net Cost: $175-240 Million*		**Benefit/Cost Ratio: 1.4**	

*Total project cost estimate in 2030 dollars

Concept 3 – New River Crossing (Arterial)



Improvement Details and Cost Range

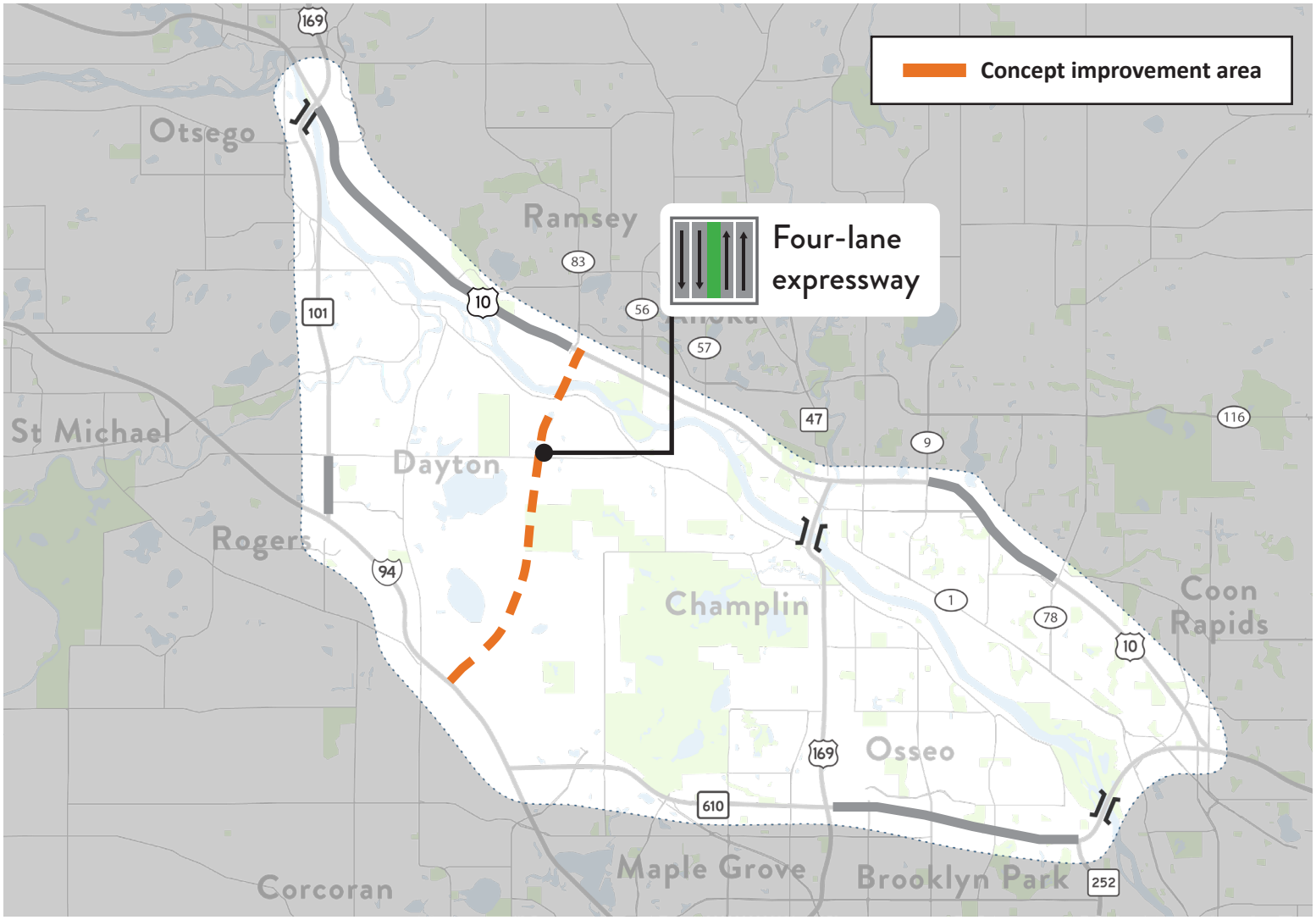
New River Crossing	New river crossing designed as a four-lane arterial roadway between I-94 and Hwy 10.	$170-250 Million*

A1: Four-lane arterial roadway typical section

Net Cost: $170-250 Million* | **Benefit/Cost Ratio: 1.1**

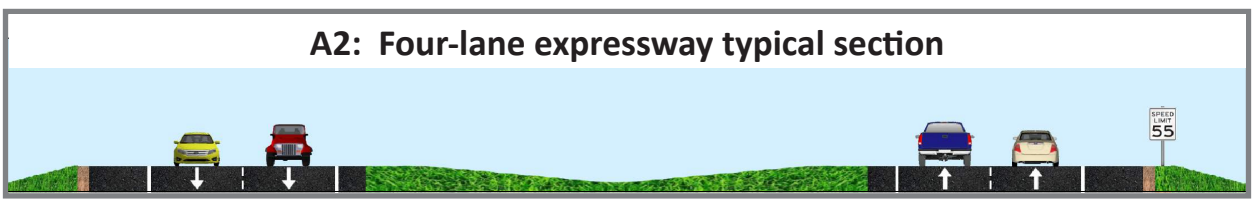
**Total project cost estimate in 2030 dollars*

Concept 4 – New River Crossing (Expressway)



Improvement Details and Cost Range

New River Crossing	New river crossing designed as a four-lane expressway between I-94 and Hwy 10.	$190-250 Million*



Net Cost: $190-270 Million*	**Benefit/Cost Ratio: 1.3**

**Total project cost estimate in 2030 dollars*

2040 Daily Travel Patterns with New River Crossing

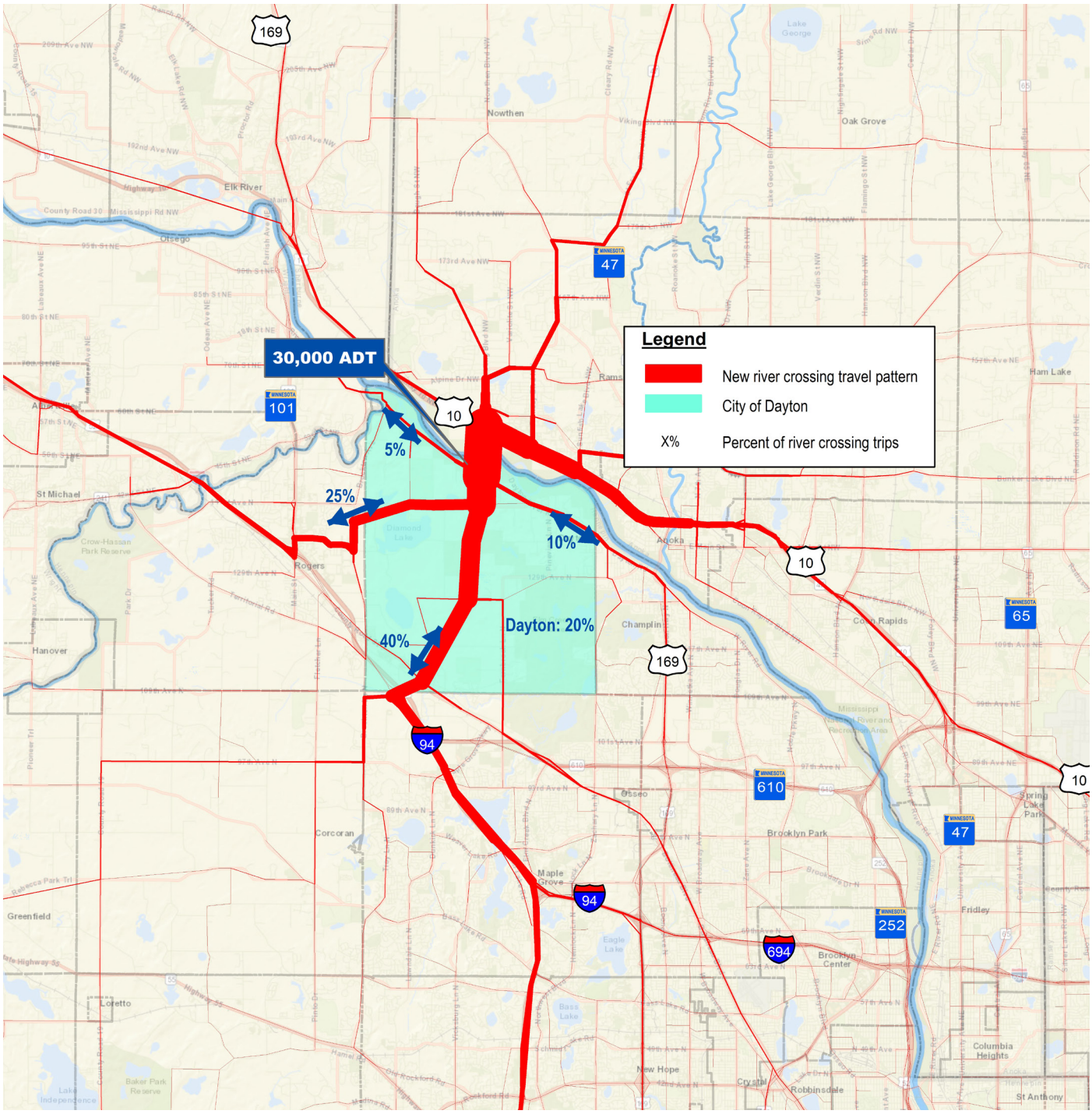


Image uses line thickness to illustrate 2040 travel patterns at the Hwy 610, Hwy 169 and Hwy 101 river crossings in the Northwest Twin Cities Metro area after construction of a new river crossing.

Impacts of the COVID-19 Pandemic

The timeframe during which this analysis was conducted coincided with the COVID-19 pandemic health crisis. During this time, lower traffic volumes were observed due to social gathering restrictions, school and business closures and increased telecommuting. These changes in travel impacted the performance of highways in the study area compared to the pre-COVID traffic data collected for this feasibility analysis. For example, many highways had lower peak period volumes, resulting in congestion that was substantially decreased or eliminated.

A sensitivity analysis was undertaken to compare the traffic conditions during the pandemic versus pre-COVID conditions. This showed that several of the bottlenecks identified in the traffic analysis had been reduced or were eliminated. Other locations, however, continued to experience congestion during the pandemic, most commonly on highway corridors with traffic signals such as Highways 10, 101 and 169.

The future travel demand on highways in the study area will require ongoing monitoring to understand traffic conditions as the COVID-19 pandemic subsides.

Decision makers should monitor these trends in the coming years and weigh the uncertainties of travel behaviors and demand when making investments on highway improvements.

Next steps

This feasibility analysis revealed the following important findings:

- The four concepts evaluated in this analysis all produced a benefit-cost ratio that is technically feasible.
- Additional analysis is needed (particularly with safety) that was not a part of this analysis that should be included in the next phase of analysis, if one were to occur.
- The question of jurisdiction for a new river crossing is not addressed in this analysis.

This analysis concludes with laying out a process stakeholders could use if there is interest in moving forward with improvements.

The following are necessary elements for advancing projects:

- Identify a champion for leadership (no recommendation at this time)
- Adopt a vision to determine improvements that align with local goals
- Establish a prioritization plan for implementing projects in the vision
- Facilitate public involvement to incorporate additional voices

Advancement of mobility improvements in this area will require additional study, environmental review process and funding for implementation.