# MINNESOTA

## Jurisdictional Realignment Project
## Final Report

November 2012

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# Executive Summary

## Objective

The overall objective for this project is to ensure that Minnesota roads are owned and operated at the right jurisdictional level. The intent is to develop and apply a methodology that can be used to evaluate current jurisdictional responsibilities for roads to identify specific segments that are not at the right level. This information will then be used as the basis from which a jurisdictional transfer process and program can be established that will remedy the misalignment. To accomplish these objectives, the project establishes a standard and consistent approach that can be used to identify segments that the different jurisdictional interests in Minnesota—the state, counties, cities, and townships—agree are "misaligned." The project then applies this approach to build a register of roads that are candidates for transfer.

It has long been recognized in Minnesota that the jurisdictional responsibilities for roadways need to be reassessed to ensure their efficient and effective management. The issue and discussion of jurisdictional alignment has been ongoing. The topic became a highly focused issue in the 1980s and has been revisited since then. Looking forward, a guiding principle in Minnesota's 50-year vision is to "strategically fix the system," which includes ensuring that roads are aligned with the proper jurisdictional owner.

The key issue with misaligned roads is that they may not provide appropriate level of service for users in terms of both their capacity and customer expectations, such as ride quality. Some issues with misaligned roads are

- Misaligned roads may not receive the priority for funding or improvements
- Misaligned roads may use the wrong source of funding, which may not contain required funds for improvements
- Misaligned roads may lead to a "broken" network of roads due to differing jurisdiction priorities (that is, the road conditions may change drastically while going from one location to another if the road jurisdiction changes along the way)

## Approach

The project has two phases:

- **Phase 1** established guiding principles, evaluated the history and prior studies, developed an approach for identifying misalignments, piloted the approach, and defined an agreed-upon process for applying the approach. The end result of the first phase is this final report.
- **Phase 2** will apply the process defined in Phase 1 to build a transfer register, which will then act as a basis for initiating transfers based on interagency agreement and available funding.

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## Prior studies

A review of prior studies indicated that the studies acknowledged misalignments in the state and agreed that it was necessary to ensure that the "right roads are at the right level" to ensure that funding was protected for the highest priority roads in the state. While multiple studies provided general guidance or methodology on how to identify misaligned segments, the factors that were presented varied from study to study—and none of the studies presented an implementation methodology or approach.

The current project focuses on preparing a consistent methodology that can be applied across the state, and Phase 2 will focus on implementing the methodology across the state to prepare a transfer register (a comprehensive list of segments that may be misaligned). This list of segments, along with potential transfer costs, risks, and other factors for consideration, will help prepare a plan for conducting segment transfers.

## Phase 1—Assigning the right roads to the right levels

This phase of the project focused on routes that are owned by the Minnesota Department of Transportation (MnDOT), counties, cities, and townships—but excludes the interstate system and the Interregional Corridor (IRC) system since its ownership is already well established.

The approach for identifying segments that may be misaligned along with examples from the implementation pilot is summarized as follows.

### *Step 1: Divide system into three tiers for analysis based on probability of misalignment*

The project team divided the system into three tiers for analysis based on the probability of misalignment by cross-referencing the route system and functional class.

The route system defines the owner of the segments, while the functional class defines the primary purpose of the road. The project team used the overarching goals of each agency to cross-reference the route system and functional class. For example, MnDOT's key goal of mobility means that routes with a functional class of principal arterial and many minor arterials and major collectors should be owned by MnDOT. Roads with a functional class of minor collectors and local roads are primarily intended to provide access to homes, businesses, and farms and should not be owned by MnDOT. The team divided the road network into three tiers that indicate the probability of misalignment based on cross-referencing the route system and functional class. The three tiers are presented in Exhibit 1 and Exhibit 2. Exhibit 1 cross-references the route system (shown in rows) and the functional class (shown in columns) to indicate the number of miles that fall within each grouping. Exhibit 2 summarizes the mileage information by tiers (shown in rows) and segment owners (shown in columns).

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## Exhibit 1. Analysis tiers and mileage chart

| Road System | Owner | Principal Arterial | | | Minor Arterial | Major Collector | Minor Collector | Local | Total | Total by Jurisdiction |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Interstate | Other Freeway/ Expressway | Other | | | | | | |
| Interstate trunk highway | FHWA | 913.9 | | | | | | | 913.9 | 913.9 |
| Trunk highway | MnDOT | | 166.2 | 4,143.3 | 5,560.7 | 1,045.6 | 17.8 | 8.8 | 10,942.4 | 10,942.4 |
| County state-aid highway | Counties | | | 80.7 | 2,863.1 | 15,048.9 | 10,027.9 | 2,563.6 | 30,584.3 | 46,600.3 |
| County road | Counties | | | | 83.0 | 513.5 | 1,433.2 | 12,296.1 | 14,325.8 | |
| Unorganized territory road | Counties | | | | | 4.2 | 4.1 | 1,681.9 | 1,690.2 | |
| Municipal state-aid street | Cities | | | 31.7 | 610.3 | 1,319.1 | | 1,421.0 | 3,382.2 | 22,198.6 |
| Municipal street | Cities | | | 0.2 | 41.1 | 350.7 | 29.5 | 18,394.9 | 18,816.5 | |
| Township road | Township | | | | 18.9 | 76.4 | 354.6 | 53,267.6 | 53,717.5 | 53,717.5 |
| Parks and other roads | Parks or private | | | | 1.0 | 63.9 | 163.2 | 4,101.0 | 4,329.0 | 4,329.0 |
| **Total** | | **914** | **166** | **4,256** | **9,178** | **18,422** | **12,030** | **93,735** | **138,702** | **138,702** |
| **Total without interstate and parks and other roads** | | | | | | | | | | **133,459** |

***Legend***

- Tier 1—High misalignment probability
- Tier 2—Medium misalignment probability
- Tier 3—Low misalignment probability
- Not applicable
- Excluded from analysis

## Exhibit 2. Analysis tiers by jurisdiction

| Tier | MnDOT | Counties | Cities | Townships | Total |
|---|---|---|---|---|---|
| Tier 1 (high misalignment probability) | 27 | 14,940 | 32 | 19 | 15,018 |
| Tier 2 (medium misalignment probability) | 6,606 | 10,032 | 651 | 431 | 17,721 |
| Tier 3 (low misalignment probability) | 4,310 | 21,628 | 21,515 | 53,268 | 100,720 |
| Excluded from analysis (not applicable) | | | | | 5,243 |
| **Total** | **10,942** | **46,600** | **22,199** | **53,717** | **138,702** |

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### *Step 2: Obtain detailed information for segments for further analysis*

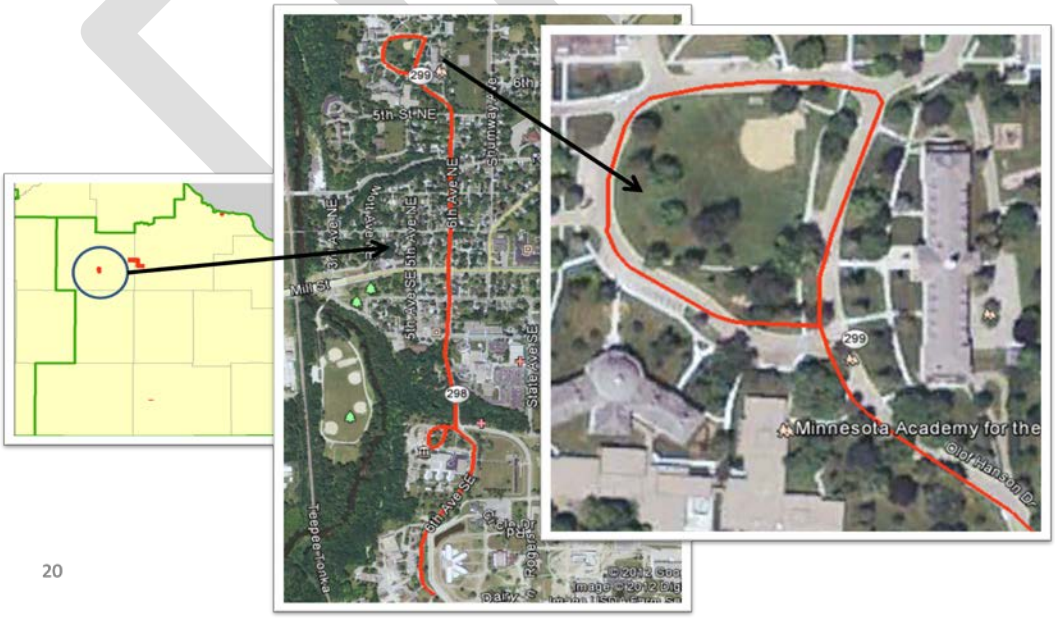
The team then obtained detailed information for each road segment to prepare a listing of all segments for analysis. This information included current owner, mile beginning and end points, functional class, and location (county and city). The team also prepared maps to present the same information visually, allowing reviewers to view both the road network and individual segments for further review and analysis. The listing of segments and maps was prepared for a subset of the road network during Phase 1. This includes Tier 1 segments that are either owned by MnDOT or functionally classified as *principal arterials* and Tier 2 segments that are owned by MnDOT.

Exhibit 3 presents a part of Tier 1 (MnDOT/state-owned) preliminary transfer register for District 6 that was prepared during the pilot as an example. Exhibit 4 presents the preliminary transfer register information presented on a map that was prepared during the piloting process. The extreme-left map shows the segments presented in Exhibit 3, while the two attached maps present details for MN 299 (Olaf Hansen Drive).

**Exhibit 3. Preliminary transfer register example**

| Route Number | Route System | Owner | Functional Class | County | City | Street Name | Miles | BegPt | EndPt |
|---|---|---|---|---|---|---|---|---|---|
| 818 | U.S. trunk highway | State | Local | Mower | Austin | 21st St NE | 0.047 | 12.195 | 12.242 |
| 298 | Minnesota trunk highway | State | Local | Rice | Faribault | 6th Ave SE | 0.151 | 1 | 1.151 |
| 299 | Minnesota trunk highway | State | Local | Rice | Faribault | Olaf Hansen Dr | 0.674 | 0 | 0.674 |

**Exhibit 4. Preliminary transfer register (map) example**




*Source: Google Maps ©2012 Google*

### *Step 3: Review segments with appropriate team members against established parameters*

The first part in this step involved establishing a set of consistent parameters against which all the segments can be reviewed. The project team reviewed and discussed various parameters before agreeing on a set of unambiguous parameters that were reviewed qualitatively for each segment. Some of these parameters included the following:

- Road system continuity preferences
- System spacing
- Location
- Site of national, state, or local interest
- Traffic volume
- Intermodal facilities

As a part of the piloting process, the team reviewed segments with the district representative and evaluated the segments against the parameters. The team then revised the list of parameters based on the effectiveness during the evaluation process.

### *Step 4: Prepare a revised preliminary transfer register*

This step involved revising the preliminary transfer register to remove any segments that are not deemed to be candidates for transfer and adding any segments that may be additionally identified during the process.

The pilot implementation and revisions to the segment identification approach marked the end of Phase 1 of the project.

## Phase 2—Developing a state-wide transfer register

### *Scope*

Phase 2 of the project will focus on implementing the segment identification approach presented in this final report, discussing the segments with key stakeholders from various jurisdictions, and obtaining agreement on transfer candidate segments. The end result of Phase 2 will be a state-wide transfer register that will present all segments that are candidates for transfer based on discussions with representatives from various districts, counties, cities, and local agencies (realignment teams). Phase 2 will include a broad, order-of-magnitude cost for transfers when possible, including a qualitative assessment from district/county/city engineers as to whether the road would require a full reconstruction/rehabilitation or minor repairs before a transfer. The results will also include any policy implications that may be of importance (e.g., should a road leading to a state facility be owned by MnDOT).

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### *Process*

The segment identification process during Phase 2 will include close collaboration with multiple jurisdictions. The team will prepare preliminary transfer registers for each district based on the approach identified in Phase 1 working with a district champion in each district. The district champions could be the district planning staff, district engineers, or other district staff member(s). A realignment team will be formed in each district to aid with the segment identification process and will include collaborating with district champions to identify district participants who will form the realignment teams. Realignment teams will potentially be comprised of district champion, district planning directors, MnDOT state aid engineers, select county engineers, select city engineers, and township representatives. The end result of Phase 2 will be a state-wide transfer register that will present all segments that are candidates for transfer based on discussions with realignment teams.

### *Timeline*

Phase 2 is anticipated to begin in November 2012 and end in April 2013.

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# Introduction

This document presents the results from Phase 1 of the jurisdictional realignment project. It has been long recognized in Minnesota that the jurisdictional responsibilities for roadways needs to be reassessed to ensure their efficient and effective management. The issue and discussion of jurisdictional alignment has been ongoing. The topic became a highly focused issue in the 1980s and has been revisited since then. Looking forward, a guiding principle in Minnesota's 50-year vision is to "strategically fix the system," which includes ensuring that roads are aligned with the proper jurisdictional owner.

The key issue with misaligned roads is that they may not provide appropriate level of service for users in terms of both their capacity and customer expectations, such as ride quality. Some issues with misaligned roads are:

- Misaligned roads may not receive the priority for funding or improvements
- Misaligned roads may use the wrong source of funding, which may not contain required funds for improvements
- Misaligned roads may lead to a "broken" network of roads due to differing jurisdiction priorities (that is, the road condition may change drastically while going from one location to another if the road jurisdiction changes along the way)

The Minnesota jurisdictional realignment project is aimed at ensuring that Minnesota roads are owned and operated at the right jurisdictional level. The overall project has been divided into two phases.

- **Phase 1** established guiding principles, evaluated the history and prior studies, developed an approach for identifying misalignments, piloted the approach, and defined an agreed-upon process for applying the approach. The end result of the first phase is this final report.
- **Phase 2** will apply the process defined in Phase 1 to build a transfer register, which will then act as a basis for initiating transfers based on interagency agreement and available funding.

The report is divided into the following sections:

- **Executive summary**—Presents a summary of this report
- **Introduction**—Provides an introduction to this project and the report
- **Project objectives**—Presents the key objectives for this project
- **Overall project approach**—Presents the overall approach for the project
- **Historical findings**—Presents findings from analysis of historical roadway mileage data
- **Segment analysis approach**—Details the approach to identifying segments that are transfer candidates
- **Implementation pilot**—Presents the findings from the implementation pilot
- **Next steps**—Presents the next steps in the project

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# Project Objectives

The overall objective for this project is to ensure that Minnesota roads are owned and operated at the right jurisdictional level. The intent is to develop and apply a methodology that can be used to evaluate current jurisdictional responsibilities for roads to identify specific segments that are not at the right level. This information will then be used as the basis from which a jurisdictional transfer process and program can be established with the help of a multi-jurisdictional team representing all jurisdictional interests that will remedy the misalignment.

## Guiding principles

The guiding principles of developing the project approach include the following:

- **Holistic approach**—the project focuses on all jurisdictions and in both directions of transfer (e.g., state to county and vice versa)
- **Aid in achieving 50-year goal**—the project looks at ways to "strategically fix the system"—that is, get the right roads at the right level and develop a realignment method that can be used in the future
- **Collaboration and constant feedback**—the project is transparent and collaborative among a broad project team
- **Implementable**—the project creates an approach that can be easily and consistently implemented across the state—of course, subject to financial considerations

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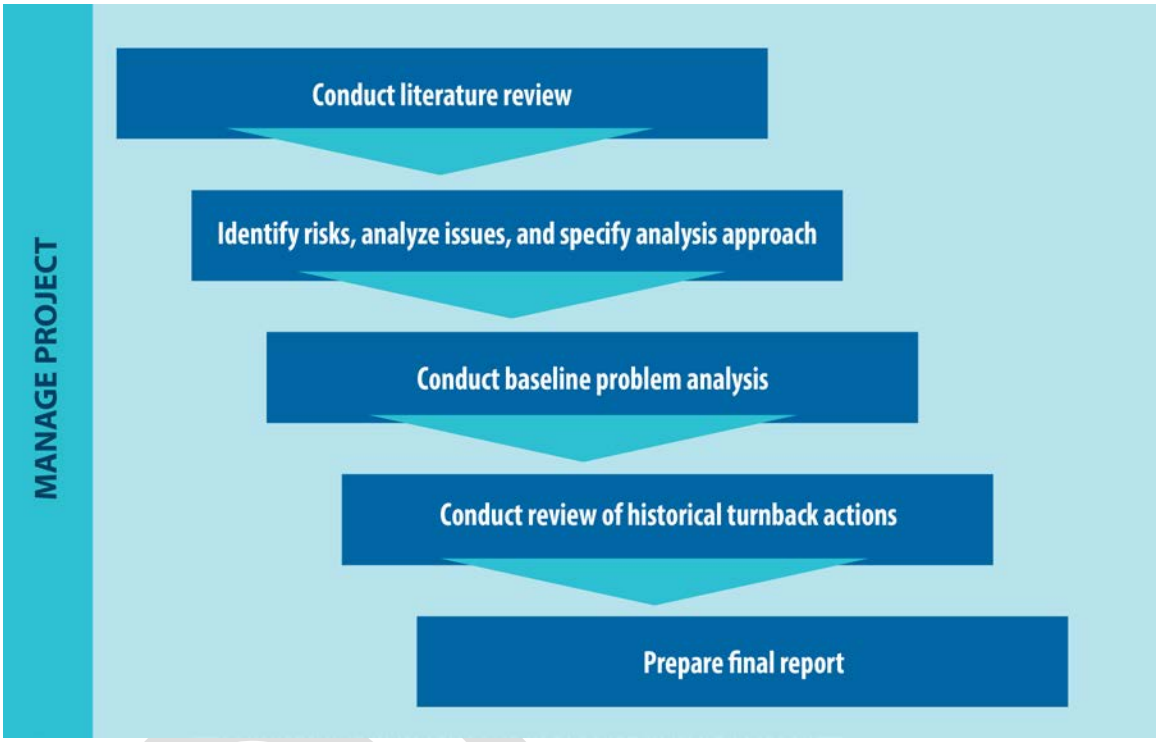
# Overall Project Approach

Exhibit 5 presents the overall project approach for Phase 1 at a high level and is followed by a short description of each task.

**Exhibit 5. Overall project (Phase 1) approach**




## Manage project

This task included conducting ongoing project management, providing regular status updates, and conducting project team meetings to discuss project progress and direction.

## Conduct literature review

This task consisted of conducting literature review of completed studies that address realignment-related issues.

## Identify risks, analyze issues, and specify analysis approach

This task included understanding available data for both historical review and preparing an analysis approach. The outcome of this task was a draft analysis approach.

## Conduct baseline problem analysis

This task formed the majority of the project and involved implementing the draft analysis approach. This included collecting core network data and conducting a pilot of the analysis approach.

## Conduct review of historical turnback actions

This task was conducted in parallel to developing a draft analysis approach and included reviewing historical data. Since actual transfer (turnback) data was not available, the project team reviewed project data (highway performance monitoring system [HPMS]) that MnDOT reports to FHWA on an annual basis.

## Prepare final report

This task consisted of compiling all information in the form of this final report and a Phase 2 project plan.

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# Historical Findings

This section presents a summary of literature review conducted by the project team and a summary of mileage growth and jurisdictional ownership over time.

## Literature review—key themes

One of the first tasks of this project was to conduct a detailed literature review of key studies related to jurisdictional alignment within the state of Minnesota. The prior studies focused on a variety of jurisdictional realignment issues, including funding considerations, legislation changes, and general obstacles to realignment. Following are the seven studies reviewed:

- Citizens League Report (1983)
- Highway Study Commission Report (1984)
- Highway Jurisdiction Task Force (1984)
- Minnesota Legislative Changes (1985)
- Minnesota Highway Jurisdiction Study (1988)
- Minnesota Experience with Jurisdiction Studies (1989)
- Turnback Task Force Report (1998)

A detailed literature review summary was presented to the project team at the end of this task to assist the project team in understanding each study and its application to this project. The summary provides specific details, findings, and recommendations. This report section presents the key themes from prior studies:

- **Inconsistent prior methodology for assessing and implement transfers**—A key theme emerging from the studies was that the methodology adopted for assessing and implementing transfers was inconsistent, leading to difficulties in making much progress.
- **Deemed necessary to protect funds for highest priority roads**—Almost every study agreed that it was necessary to have the "right roads at the right level" to ensure that funding was protected for the highest priority roads in the state.
- **Overall funding shortfall critical to aiding/preventing transfers**—Almost every study mentioned funding shortfalls and how critical they are to aiding/preventing transfers.
- **Concerns over future funding uncertainties**—Many studies referred to future funding uncertainties. This situation has worsened since those studies were conducted.
- **Dedicated funding for transfers**—The concept of dedicated funding for transfers was discussed in some of the earliest studies.
- **Plan for the future**—The studies agreed that any methodology should take future conditions, priorities, and goals into consideration.

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## Trends in historical ownership

This section presents the trends in historical ownership of roadways among various jurisdictions. The key trends, as indicated by the data in this section, are as follows:

- A majority of the roads are owned by townships and counties, while a majority of the traffic is carried by the Interstate trunk highway and trunk highway systems owned by FHWA and MnDOT.
- Roadway mileage within the state has grown consistently over the years for all jurisdictions.
- The mileage ownership ratios (e.g., percentage of mileage owned by MnDOT vs. cities) have remained consistent for the most part, which indicates that there has not been a wide-scale reassessment of jurisdictional responsibilities over the years.

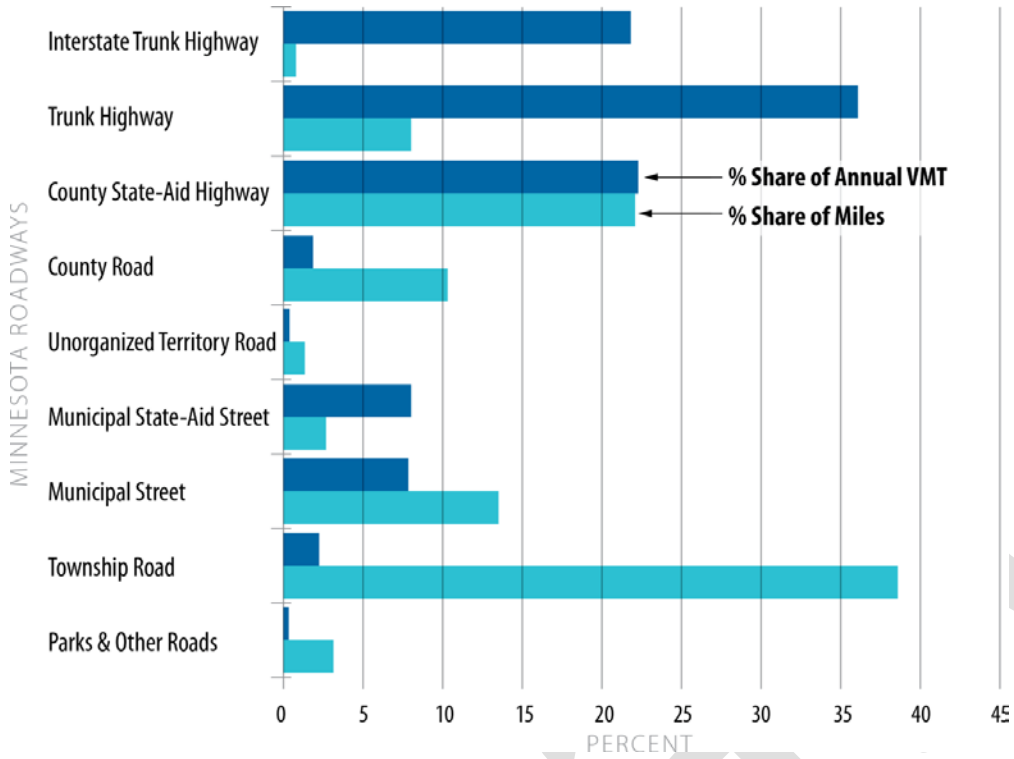
Exhibit 6 and Exhibit 7 show the share of Minnesota roads among jurisdictions based on MnDOT Transportation Data and Analysis data.[1] Townships own the largest percentage of roads in Minnesota at about 39 percent, with counties (both county-owned and state-aided) constituting about 34 percent combined. When considering jurisdictional alignment, the primary concern is deciding what the "share of miles" among jurisdictions should be—and which jurisdictions should own which roads from a performance and financial perspective.

**Exhibit 6. Minnesota roadways—vehicle miles of travel share and mile share**

| Route System | Owner | 2010 Annual VMT (billions) | Share of Annual VMT (%) | 2012 Centerline Miles | Share of Miles (%) |
|---|---|---|---|---|---|
| Interstate trunk highway | FHWA | 12.36 | 21.8 | 914 | 0.7 |
| Trunk highway | MnDOT | 20.54 | 36.2 | 10,942 | 7.9 |
| County state-aid highway | Counties | 12.69 | 22.4 | 30,584 | 22.1 |
| County road | Counties | 1.01 | 1.8 | 14,326 | 10.3 |
| Unorganized territory road | Counties | 0.02 | 0.0 | 1,690 | 1.2 |
| Municipal state-aid street | Cities | 4.55 | 8.0 | 3,382 | 2.4 |
| Municipal street | Cities | 4.36 | 7.7 | 18,816 | 13.6 |
| Township road | Townships | 1.17 | 2.1 | 53,717 | 38.7 |
| Parks and other roads | Parks or private | 0.05 | 0.1 | 4,329 | 3.1 |
| **Total** | | **56.76** | | **138,702** | |

[1] http://www.dot.state.mn.us/roadway/data/reports/vmt.html

**Exhibit 7: Minnesota roadways (graph)—vehicle miles of travel share and mile share**




MnDOT supplied data from its HPMS, which provided road ownership in miles over the past 28 years. The reporting method has changed over the years, and quality checks have led to updates in data collection methodology—which has resulted in some data anomalies. However, the historical data provides a good overview of the system changes and should be reviewed as a whole without focusing on the actual number of miles shown or the mileage changes between years.

Exhibit 8 shows the total mileage for Minnesota from 1983 to 2011. Total mileage has been increasing at a rate of about 342 miles per year and, currently, the highway system consists of about 139,000 miles. That represents an increase of about 7 percent from 1983 miles. It is believed that the drops in mileage resulted from changes to the data collection methodology or roadway classification/definitions. The total mileage, subdivided by jurisdiction, is displayed in Exhibit 9.

As seen in Exhibit 9, the growth in jurisdiction ownership is fairly constant between jurisdictions. The biggest change resulted from a definition change in the late 1990s, which led to a “swap” in miles from “other” (includes toll roads, roads not identified by administrative authority, and federal parks, forests, and reservations that are not a part of the state and local highway systems) to “municipal” jurisdiction. Exhibit 10 presents the distribution of ownership in years 1983 and 2012.

As evident in Exhibit 10, the municipal mileage share increased from 1983 to 2011, but most of the increase resulted from a swap between “municipal” and “other” miles. The “state” and “county” mileage shares have decreased slightly over the years, mainly due to jurisdictional transfers.

**Exhibit 8. Growth of road miles in Minnesota**

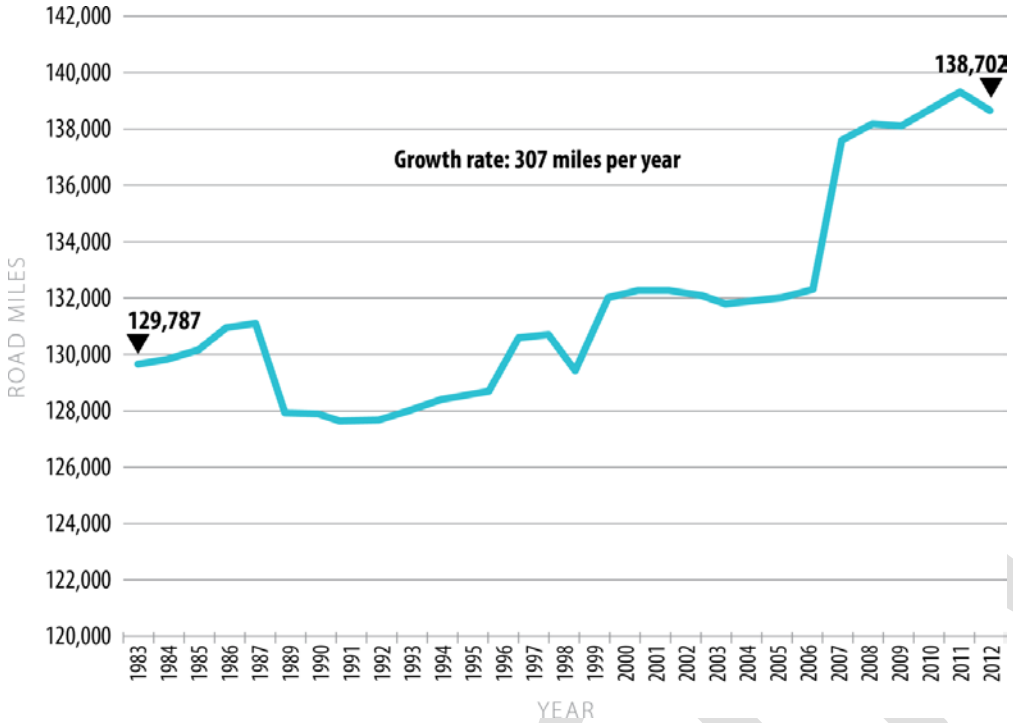



**Exhibit 9. Road miles in Minnesota by jurisdiction, 1983 through 2012**

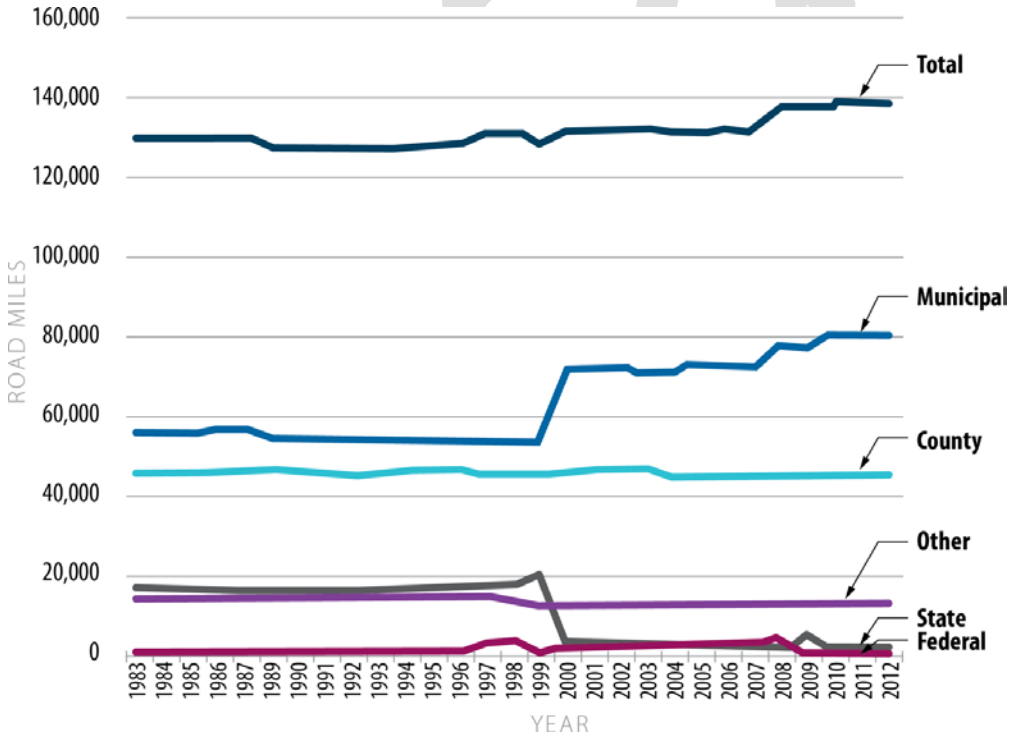
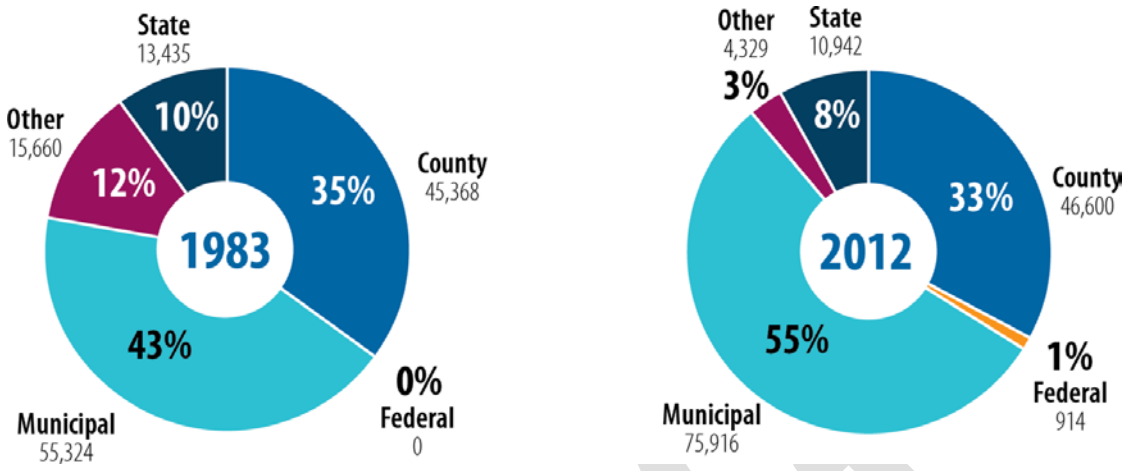


**Exhibit 10. Road miles in Minnesota by jurisdiction, 1983 and 2012**

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# Segment Analysis Approach

This section presents the segment analysis approach that was developed to identify segments that may be misaligned and are, therefore, candidates for transfer from one jurisdiction to another. The project team first divided the system into three tiers for analysis based on the probability of misalignment by cross-referencing the route system and functional class.

The route system defines the owner of the segments, while the functional class defines the primary purpose of the road. The project team used the overarching goals of each agency to cross-reference the route system and functional class. For example, MnDOT's key goal of mobility means that routes with a functional class of principal arterial and many minor arterials and major collectors should be owned by MnDOT. Roads with a functional class of minor collectors and local roads are primarily intended to provide access to homes, businesses, and farms—and should not be owned by MnDOT.

This section presents the following three subsections:

- **Legal/regulatory restrictions** that affect jurisdictional transfers
- **Definitions** of various route systems/classifications and functional classifications
- **Segment identification approach**, including roadway exclusions, approach, and analysis framework

## Legal/regulatory restrictions

There are certain Minnesota statutes and legal requirements that affect jurisdictional ownership of Minnesota roads. While these requirements have been in place for many years and may be outdated, changing these requirements is a complex process.

Following are the basic legal/regulatory restrictions related to the roadway network:

- The state highway system is limited to 12,200 miles
- The county state-aid highway system is 30,000 miles
- The municipal state-aid street system is 2,500 miles

There are 70 constitutional routes across the state that connect key locations across the state. By state law:

- A state route must exist to maintain these connections
- A state route may be designated on any roadway that meets the constitutional route definition

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## Definitions

This section presents the definitions for route systems and functional classifications which aid the segment analysis and identification process. The route system definitions presented below are derived from Minnesota statutes and clarified through feedback from the project's multi-jurisdictional team, while the functional classification definitions are obtained from FHWA functional classification guidelines.[2]

### *Route system definitions*

The route system definitions below provide information presented in the statutes and as well as more detailed information/definition as agreed upon by the project's multi-jurisdictional team.

#### State roads (also known as "trunk highways")

**Statute 160.02, Subd. 29**—*"Trunk highways" includes all roads established or to be established under the provisions of article 14, section 2 of the Constitution of the State of Minnesota.*

State roads provide the primary backbone of Minnesota's transportation network. These roads are critical to providing mobility across the state for people and goods, as well as ensuring economic development and growth. The trunk highway system in Minnesota includes about 10,942 centerline miles.

***System primary goal***—Statewide mobility (high speed)

#### County roads

**Statute 160.02, Subd. 17**—*"County highways" includes those roads which have heretofore been or which hereafter may be established, constructed, or improved under authority of the several county boards, including all roads lying within the county or on the line between counties established by judicial proceedings, except those roads established, constructed, or improved by the counties that have been maintained by the towns for a period of at least one year prior to July 1, 1957. All roads heretofore designated prior to July 1, 1957 as county-aid highways shall be county highways until abandoned or changed in accordance with law.*

County roads link different cities and townships within a county. A road within an unorganized township, by default, is a county road. County roads provide mobility within the county and may have different (lower) speed limits than on state roads.

#### County state-aid highways (CSAH)

**Statute 160.02, Subd. 18**—*"County state-aid highways" includes all roads established in accordance with law as county state-aid highways.*

#### Municipal state-aid streets (MSAS)

**Statute 160.02, Subd. 21**—*"Municipal state-aid streets" includes all streets within the cities having a population of 5,000 or more, established in accordance with law as municipal state-aid streets.*

[2] http://www.fhwa.dot.gov/planning/processes/statewide/related/functional_classification/fc02.cfm#ad

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### City roads

City roads primarily serve residents of a particular city. They are designed to provide access to homes and commercial establishments and provide intra-city mobility. City roads primarily consist of local streets with multiple access points. These local streets tie to collectors with less access points. City roads act as the first and last leg of connectivity for most trips. City roads may include roads with high AADT—for example, a road that leads to a major shopping location (e.g., Mall of America). Typically, a road with the primary use of "passing-by" a city, including trucks, is not owned by cities.

### Township roads

**Statute 160.02, Subd. 28**—*"Town roads" includes those roads and cartways which have heretofore been or which hereafter may be established, constructed, or improved under the authority of the several town boards, roads established, constructed, or improved by counties that have been maintained by the towns for a period of at least one year prior to July 1, 1957.*

**Minnesota Administrative Rules (8820.0100), Subp. 17b**—*"Town road" means a road that is maintained by a town or any other local unit of government acting as a town and open to the traveling public a minimum of eight months of the year as certified by the county highway engineer.*

Township roads primarily serve residents of the town and transport people to and from cities, larger roads, or other township roads. These roads also provide connectivity to farm lands as well as recreational areas (e.g., summer cabins). Township roads act as the first and last leg of connectivity for most trips.

## *Functional classification definitions*

This section presents functional classification definitions derived from FHWA functional classification guidelines. Although the FHWA guidelines include separate definitions for urban and rural classifications, they have been merged here for consistency.

### Principal arterial system

#### *Urban principal arterial system*

In every urban environment there exists a system of streets and highways which can be identified as unusually significant to the area in which it lies in terms of the nature and composition of travel it serves. In smaller urban areas (under 50,000), these facilities may be very limited in number and extent and their importance may be primarily derived from the service provided to travel passing through the area. In larger urban areas, their importance also derives from service to rural-oriented traffic but equally, or even more, important from service for major movements within these urbanized areas.

This system of streets and highways is the urban principal arterial system and should serve the major centers of activity of a metropolitan area, the highest traffic volume corridors, and the longest trip desires and should carry a high proportion of the total urban area travel on a minimum of mileage. The system should be integrated, both internally and between major rural connections.

The principal arterial system should carry the major portion of trips entering and leaving the urban area, as well as the majority of through movements desiring to bypass the central city. In addition, significant intra-area travel, such as between central business districts and outlying residential areas between

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major inner city communities, or between major suburban centers should be served by this system. Frequently the principal arterial system will carry important intra-urban as well as intercity bus routes. Finally, this system in small urban and urbanized areas should provide continuity for all rural arterials which intercept the urban boundary.

Because of the nature of the travel served by the principal arterial system, almost all fully and partially controlled access facilities will be part of this functional system. However, this system is not restricted to controlled access routes. In order to preserve the identification of controlled access facilities, the principal arterial system is stratified as follows:

- Interstate
- Other freeways and expressways
- Other principal arterials (with no control of access)

The spacing of urban principal arterials will be closely related to the trip-end density characteristics of particular portions of the urban areas. While no firm spacing rule can be established which will apply in all—or even most—circumstances, the spacing of principal arterials (in larger urban areas) may vary from less than 1 mile in the highly developed central business areas to 5 miles or more in the sparsely developed urban fringes.

For principal arterials, the concept of service to abutting land should be subordinate to the provision of travel service to major traffic movements. It should be noted that only facilities within the "other principal arterial" system are capable of providing any direct access to adjacent land, and such service should be purely incidental to the primary functional responsibility of this system.

#### *Rural principal arterial system*

The rural principal arterial system consists of a connected rural network of continuous routes having the following characteristics:

- Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel
- Serve all, or virtually all, urban areas of 50,000 and over population and a large majority of those with population of 25,000 and over
- Provide an integrated network without stub connections except where unusual geographic or traffic flow conditions dictate otherwise (e.g., international boundary connections and connections to coastal cities)

In the more densely populated states, this system of highways may not include all heavily traveled routes which are multi-lane facilities. It is likely, however, that in the majority of states, the principal arterial system will include all existing rural freeways.

The principal arterial system is stratified into the following two subsystems:

- **Interstate System**—The Interstate System consists of all presently designated routes of the Interstate System.
- **Other principal arterials**—This system consists of all non-Interstate principal arterials.

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## Minor arterial road/street system

### *Urban minor arterial street system*

The minor arterial street system should interconnect with and augment the urban principal arterial system and provide service to trips of moderate length at a somewhat lower level of travel mobility than principal arterials. This system also distributes travel to geographic areas smaller than those identified with the higher system.

The minor arterial street system includes all arterials not classified as principal, contains facilities that place more emphasis on land access than the higher system, and offers a lower level of traffic mobility. Such facilities may carry local bus routes and provide intra-community continuity but ideally should not penetrate identifiable neighborhoods. This system should include urban connections to rural collector roads where such connections have not been classified as urban principal arterials.

The spacing of minor arterial streets may vary from 1/8 to 1/2 mile in the central business district to 2 to 3 miles in the suburban fringes but should normally be no more than 1 mile in fully developed areas.

### *Rural minor arterial road system*

The rural minor arterial road system should, in conjunction with the principal arterial system, form a rural network having the following characteristics:

- Link cities and larger towns (and other traffic generators, such as major resort areas, that are capable of attracting travel over similarly long distances) and form an integrated network providing interstate and inter-county service.
- Be spaced at such intervals, consistent with population density, so that all developed areas of the state are within a reasonable distance of an arterial highway.
- Provide (because of the two characteristics defined above) service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems. Minor arterials, therefore, constitute routes whose design should be expected to provide for relatively high overall travel speeds, with minimum interference to through movement.

## Collector road/street system

### *Urban collector street system*

The collector street system provides both land access service and traffic circulation within residential, commercial, and industrial areas. It differs from the arterial system in that facilities on the collector system may penetrate residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination. Conversely, the collector street also collects traffic from local streets in residential neighborhoods and channels it into the arterial system. In the central business district, and in other areas of like development and traffic density, the collector system may include the street grid which forms a logical entity for traffic circulation.

### *Rural collector road system*

The rural collector routes generally serve travel of primarily intra-county rather than statewide importance and constitute those routes on which (regardless of traffic volume) predominant travel distances are shorter than on arterial routes. Consequently, more moderate speeds may be typical on average.

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In order to define more clearly the characteristics of rural collectors, this system should be sub-classified according to the following criteria:

- **Major collector roads**—These routes should (1) provide service to any county seat not on an arterial route, to the larger towns not directly served by the higher systems, and to other traffic generators of equivalent intra-county importance, such as consolidated schools, shipping points, county parks, important mining and agricultural areas, etc. ; (2) link these places with nearby larger towns or cities or with routes of higher classification; and (3) serve the more important intra-county travel corridors.
- **Minor collector roads**—These routes should (1) be spaced at intervals, consistent with population density, to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road; (2) provide service to the remaining smaller communities; and (3) link the locally important traffic generators with their rural hinterland.

### Local road/street system

#### *Urban local street system*

The urban local street system comprises all facilities not on one of the higher systems. It serves primarily to provide direct access to abutting land and access to the higher order systems. It offers the lowest level of mobility and usually contains no bus routes. Service to through traffic movement usually is deliberately discouraged.

#### *Rural local road system*

The rural local road system should have the following characteristics: (1) serve primarily to provide access to adjacent land and (2) provide service to travel over relatively short distances as compared to collectors or other higher systems. Local roads will constitute the rural mileage not classified as part of the principal arterial, minor arterial, or collector systems.

## Segment identification approach

This section presents the approach to identify candidates for jurisdictional transfers. The analysis is based on a set of metrics, or properties of road segments and the current owner. The next section (Pilot Implementation) presents detailed information on how the approach was applied in District 4 and District 6.

### *Exclusions*

The following roads will be excluded from the analysis since their ownership is well-established. Any special roads that may be identified as candidates for transfer (by any involved parties) will be treated on a case-by-case basis:

- Interstate routes
- Interregional Corridor (IRC) network, which includes key transportation corridors in Minnesota
- “Special roads”
- National park roads
- National forest development roads
- Indian reservation roads

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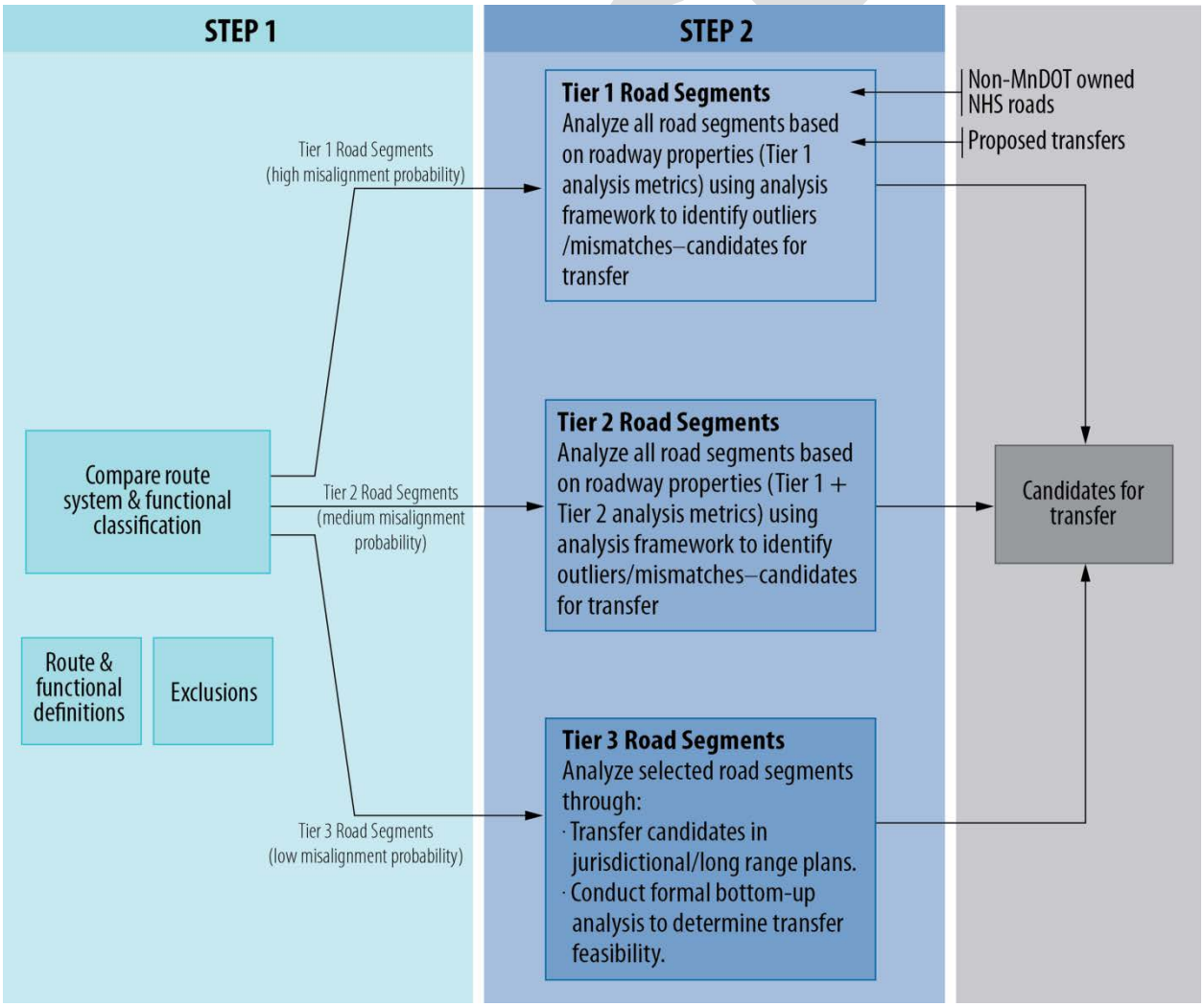
- State forest roads
- State park roads
- Military roads
- National monument roads
- National wildlife refuge roads
- State game reserve roads
- Metropolitan Airports Commission (MAC) Minneapolis-St. Paul International Airport

Exhibit 11 presents the high-level approach for identifying candidate segments for transfer.

**Exhibit 11. High-level segment analysis approach**



### *Step 1: Divide system into three tiers for analysis based on probability of misalignment*

The project team divided the system into three tiers for analysis based on the probability of misalignment by cross-referencing the route system and functional class.

The route system defines the owner of the segments, while the functional class defines the primary purpose of the road. The project team used the overarching goals of each agency to cross-reference the route system and functional class. For example, MnDOT's key goal of mobility means that routes with a functional class of principal arterial and many minor arterials and major collectors should be owned by MnDOT. Roads with a functional class of minor collectors and local roads are primarily intended to provide access to homes, businesses, and farms—and should not be owned by MnDOT. The team divided the road network into three tiers that indicate the probability of misalignment based on cross-referencing the route system and functional class.

These tiers are presented in Exhibit 12 in the form of a mileage chart that cross-references the route system (shown in rows) and the functional class (shown in columns) to indicate the number of miles that fall within each grouping. Exhibit 13 summarizes the mileage information by tiers (shown in rows) and segment owners (shown in columns). In addition to the routes identified in the exhibit, other routes that are included in the tiers are as follows:

#### Tier 1

- Routes that a jurisdiction may have proposed to take ownership from another jurisdiction
- Routes that are on the National Highway System (NHS) and are owned by jurisdictions other than MnDOT

#### Tier 2

- None

#### Tier 3

- Interregional Corridor network that is owned by MnDOT and has different functional classifications.

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## Exhibit 12. Analysis tiers and mileage chart

| Road System | Owner | Principal Arterial | | | Minor Arterial | Major Collector | Minor Collector | Local | Total | Total by Jurisdiction |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Interstate | Other Freeway/ Expressway | Other | | | | | | |
| Interstate trunk highway | FHWA | 913.9 | | | | | | | 913.9 | 913.9 |
| Trunk highway | MnDOT | | 166.2 | 4,143.3 | 5,560.7 | 1,045.6 | 17.8 | 8.8 | 10,942.4 | 10,942.4 |
| County state-aid highway | Counties | | | 80.7 | 2,863.1 | 15,048.9 | 10,027.9 | 2,563.6 | 30,584.3 | 46,600.3 |
| County road | Counties | | | | 83.0 | 513.5 | 1,433.2 | 12,296.1 | 14,325.8 | |
| Unorganized territory road | Counties | | | | | 4.2 | 4.1 | 1,681.9 | 1,690.2 | |
| Municipal state-aid street | Cities | | | 31.7 | 610.3 | 1,319.1 | | 1,421.0 | 3,382.2 | 22,198.6 |
| Municipal street | Cities | | | 0.2 | 41.1 | 350.7 | 29.5 | 18,394.9 | 18,816.5 | |
| Township road | Township | | | | 18.9 | 76.4 | 354.6 | 53,267.6 | 53,717.5 | 53,717.5 |
| Parks and other roads | Parks or private | | | | 1.0 | 63.9 | 163.2 | 4,101.0 | 4,329.0 | 4,329.0 |
| **Total** | | **914** | **166** | **4,256** | **9,178** | **18,422** | **12,030** | **93,735** | **138,702** | **138,702** |
| **Total without interstate and parks and other roads** | | | | | | | | | | **133,459** |

Legend

- Tier 1—High misalignment probability
- Tier 2—Medium misalignment probability
- Tier 3—Low misalignment probability
- Not applicable
- Excluded from analysis

## Exhibit 13. Analysis tiers by jurisdiction

| Tier | MnDOT | Counties | Cities | Townships | Total |
|---|---|---|---|---|---|
| Tier 1 (high misalignment probability) | 27 | 14,940 | 32 | 19 | 15,018 |
| Tier 2 (medium misalignment probability) | 6,606 | 10,032 | 651 | 431 | 17,721 |
| Tier 3 (low misalignment probability) | 4,310 | 21,628 | 21,515 | 53,268 | 100,720 |
| Excluded from analysis (not applicable) | | | | | 5,243 |
| **Total** | **10,942** | **46,600** | **22,199** | **53,717** | **138,702** |

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### *Step 2: Obtain detailed information for segments for further analysis*

The team then obtained detailed information for each road segment to prepare a listing of all segments for analysis. This information included current owner, mile beginning and end points, functional class, and location (county and city). The team also prepared maps to present the same information visually, allowing reviewers to view both the road network and individual segments for further review and analysis.

The listing of segments and maps was prepared for a subset of the road network during Phase 1. This included Tier 1 segments that are either owned by MnDOT or functionally classified as principal arterials and Tier 2 segments that are owned by MnDOT.

### *Step 3: Review segments with appropriate team members against established parameters*

The first part in this step involved establishing a set of consistent parameters against which all the segments can be reviewed. The project team reviewed and discussed various parameters before agreeing upon a set of unambiguous parameters that are reviewed qualitatively for each segment. The parameters included the following:

- Road system continuity preferences
- System spacing
- Roadway speed limit
- Location
- Minimum length of segment/road
- High volume truck traffic
- Site of national, state, or local interest
- Road restrictions
- Traffic volume
- Intermodal facilities

Specifically, traffic volume information (in the form of Average Annual Daily Traffic [AADT]) was found to be particularly helpful to further segregate Tier 2 segments. Further, for Tier 2, the team agreed on some additional factors:

- Identifying new alternative routes that have altered, or may alter, traffic patterns significantly (e.g., a new highway that bypasses a city would result in an old state road to become a city road)
- Reviewing and identifying potential efficiency gains through transfer (feedback from jurisdictions/long range plans)—funding, access, agency controls, community values (excluding maintenance)
- Reviewing design standards for consistency with current functional class/jurisdiction standards
- Identifying other considerations based on location, geography, etc.

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### *Step 4: Prepare a revised preliminary transfer register*

This step involves revising the preliminary transfer register to remove any segments that are not deemed to be candidates for transfer and adding any segments that may be additionally identified during the process.

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# Implementation Pilot

To test the segment identification approach, an implementation pilot was conducted in two districts—District 4 (Detroit Lakes) and District 6 (Rochester). The pilots focused on three segment types: Tier 1 (state-owned), Tier 1 (principal arterials), and Tier 2 (state-owned). This allowed the team to test the approach for various functional classifications, owners, and tiers, while keeping the scope manageable, and develop a detailed implementation approach for Phase 2 of the project. The information below uses information from both districts to present the implementation step-by-step.

- Prepare district-specific mileage charts and maps
- Prepare district-specific preliminary transfer register
- Review preliminary transfer register with district representatives
- Discuss approach feasibility and lessons learned and adjust segment identification approach for clarity

## Prepare district-specific mileage charts and maps

The first step of the implementation approach was to prepare district-specific mileage charts (listing of all segments) and maps. The charts and maps were prepared for the district, and then separately for Tier 1 (state-owned), Tier 1 (principal arterials), and Tier 2 (state-owned). Exhibit 14 and Exhibit 15 show the mileage chart and mileage summary by Tier for District 4.

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## Exhibit 14. District 4 mileage chart

| Road System | Owner | Interstate | Principal Arterial | | Minor Arterial | Major Collector | Minor Collector | Local | Total | Total by Jurisdiction |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Other Freeway/ Expressway | Other | | | | | | |
| Interstate trunk highway | FHWA | 115.209 | | | | | | | | |
| Trunk highway | MnDOT | | | 489.28 | 799.877 | 192.176 | 0.68 | | 1,482.012 | 1482.012 |
| County state-aid highway | Counties | | | | 44.46 | 2,042.87 | 1,507.52 | 644.67 | 4,239.517 | 6,327.18 |
| County road | Counties | | | | | 20.564 | 191.55 | 1,875.55 | 2,087.666 | |
| Unorganized territory road | Counties | | | | | | | | 0 | |
| Municipal state-aid street | Cities | | | 3.995 | 34.547 | 47.05 | | 38.23 | 123.825 | 1,053.05 |
| Municipal street | Cities | | | | 1.732 | 15.108 | 0.42 | 911.97 | 929.228 | |
| Township road | Township | | | | 3.995 | 19.196 | 35.156 | 9,102.67 | 9,160.979 | 9,160.98 |
| Parks and other roads | Parks or private | | | | | 0.91 | 1.79 | 163.7 | 166.466 | 166.47 |
| **Total** | | **115.209** | **0** | **493.274** | **884.569** | **2,337.868** | **1,737.116** | **12,736.866** | **18,304.902** | **18,304.90** |
| **Total without interstate and parks and other roads** | | | | | | | | | | |

Legend

- Tier 1—High misalignment probability
- Tier 2—Medium misalignment probability
- Tier 3—Low misalignment probability
- Not applicable
- Excluded from analysis

## Exhibit 15. District 4 mileage by tier

| Tier | Miles |
|---|---|
| Tier 1 (state-owned) | 0.68 |
| Tier 2 (principal arterials) | 4.00 |
| Tier 3 (state-owned) | 992.05 |
| **Total** | **996.73** |

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## Prepare district-specific preliminary transfer register

This step included preparing a district-specific preliminary transfer register by each tier. Exhibit 16 presents Tier 1 (state-owned) preliminary transfer register for District 6.

**Exhibit 16. Preliminary transfer register**

| Route Number | Route System | Owner | Functional Class | County | City | Street Name | Miles | BegPt | EndPt |
|---|---|---|---|---|---|---|---|---|---|
| 818 | U.S. Trunk Highway | State | Local | Mower | Austin | 21st St NE | 0.047 | 12.195 | 12.242 |
| 246 | Minnesota Trunk Highway | State | Minor Collector | Rice, Goodhue | Nerstrand | 170th St E to 420th St | 6.991 | 11.23 | 18.221 |
| 292 | Minnesota Trunk Highway | State | Local | Goodhue | Red Wing | Highway 292 | 0.314 | 0.5 | 0.814 |
| 298 | Minnesota Trunk Highway | State | Local | Rice | Faribault | 6th Ave NE | 0.759 | 0 | 0.759 |
| 298 | Minnesota Trunk Highway | State | Local | Rice | Faribault | 6th Ave SE | 0.151 | 1 | 1.151 |
| 299 | Minnesota Trunk Highway | State | Local | Rice | Faribault | Olaf Hansen Dr | 0.674 | 0 | 0.674 |

Exhibit 17 presents the preliminary transfer register information presented on a map. The extreme-left map shows the segments presented in Exhibit 16 while the two attached maps present details for MN 299 (Olaf Hansen Dr).

The Tier 2 (state-owned) miles for both Districts 4 and 6 were much higher than in the other two categories (around 900 miles each). As a result, it was important to add certain filters to review segments and segregate them for further analysis. The team realized that traffic volume information in the form of AADT was the most effective filter after a few iterations and discussions with district representatives.

Exhibit 18 and Exhibit 19 present the Tier 2 (state-owned) map for District 6 without and with color coding for AADT variations across segments.

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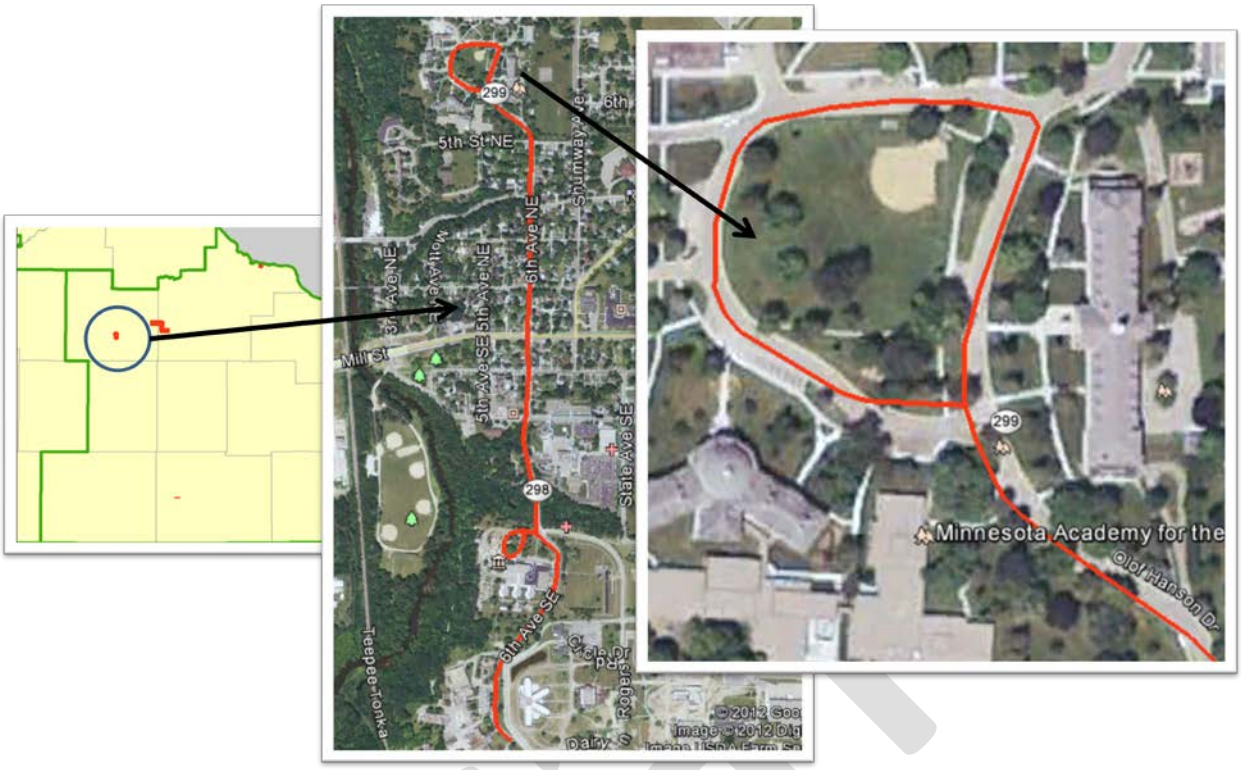
**Exhibit 17: Preliminary transfer register (map)**




*Source: Google Maps ©2012 Google*

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**Exhibit 18. District 6 Tier 2 (state-owned) map (without AADT variations)**

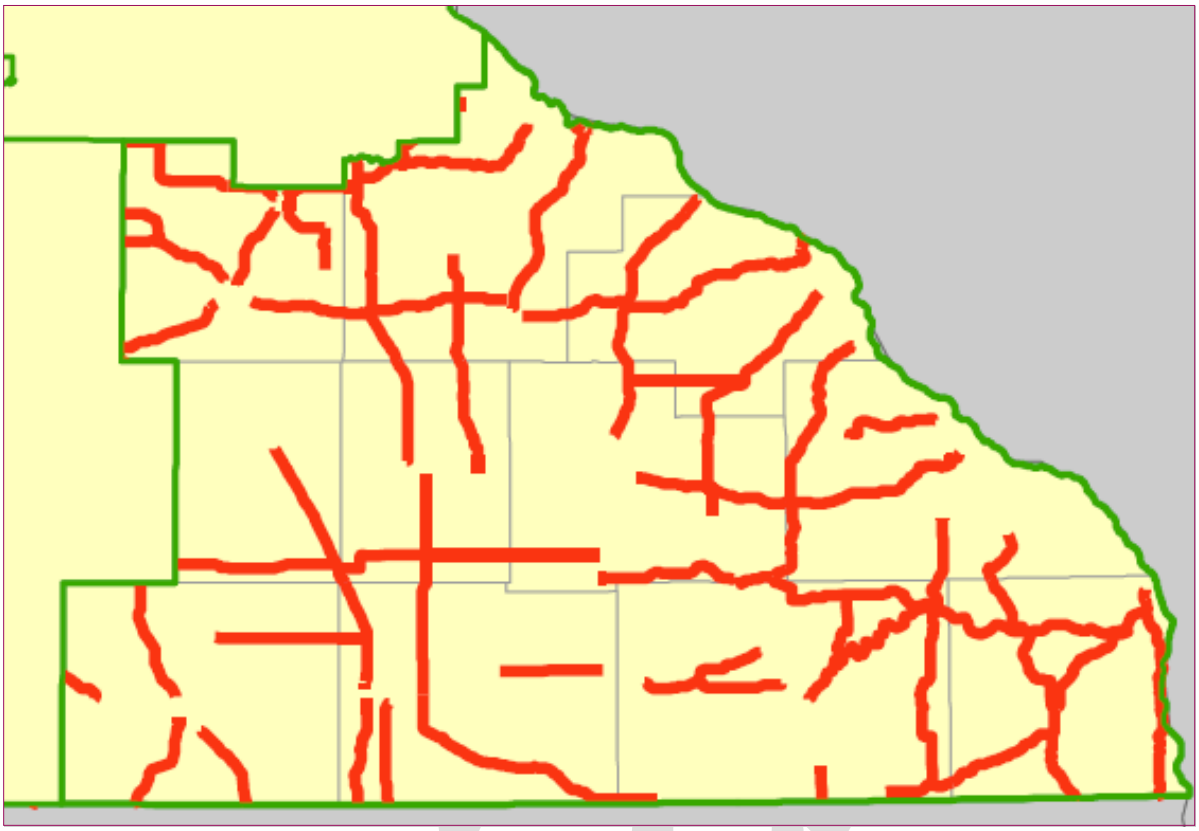
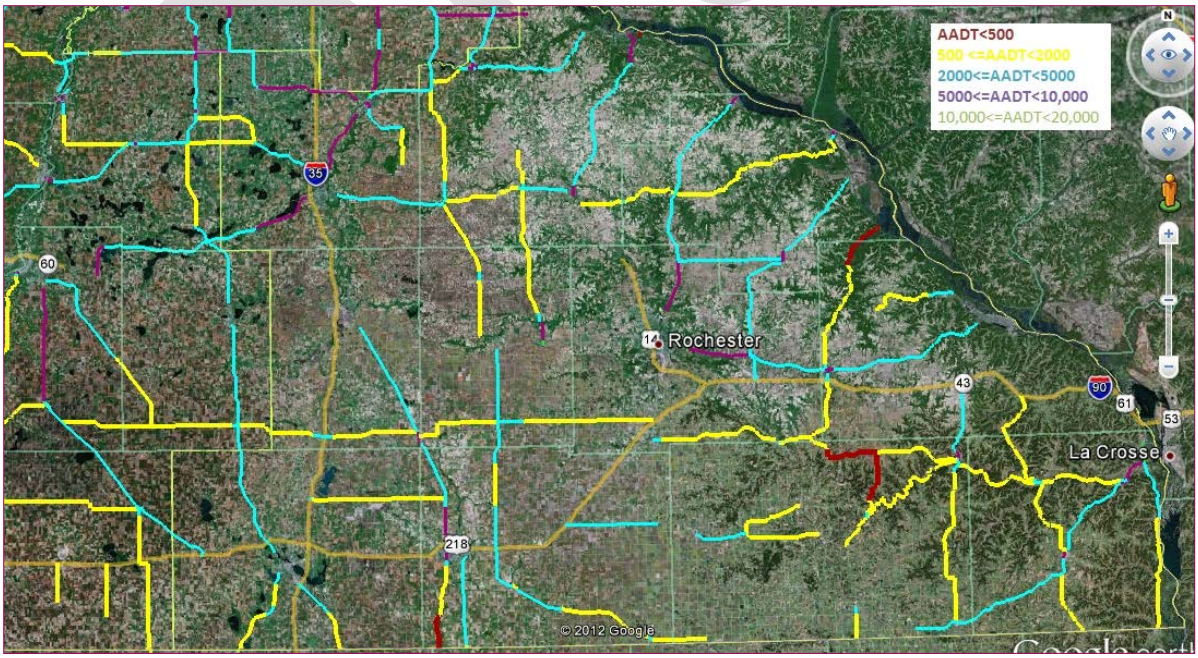


**Exhibit 19. District 6 Tier 2 (state-owned) map (with AADT variations)**




*Source: Google Maps ©2012 Google*

## Review preliminary transfer register with district representatives

The project team met with district representatives from Districts 4 and 6 to discuss the preliminary transfer register using a combination of the transfer register tables and maps. The maps allowed the team to review the segments visually, reviewing segment location, system spacing, and segment continuity and identifying any alternative routes. The team reviewed various segments to assess their probability as candidates for transfer using a range of factors mentioned under Step 3 of the segment identification approach and repeated here:

- Road system continuity preferences
- System spacing
- Roadway speed limit
- Location
- Minimum length of segment/road
- High volume truck traffic
- Site of national, state, or local interest
- Road restrictions
- Traffic volume
- Intermodal facilities

The AADT color coding allowed the team to first focus the analysis on segments with low AADT and then move to other segments. The teams were able to turn various information on and off on the maps during the analysis/review to understand and analyze the system as a whole and not just in tiers. This information included showing other roads, points of national/state/local interest, intermodal facilities and other tier roads.

## Discuss approach feasibility and lessons learned

The team discussed the strengths and weaknesses of the approach with district representatives and MnDOT project management staff to determine any adjustments required to the approach. Initial discussions revealed that while the approach worked very well for Tier 1 segments, analysis of Tier 2 segments required the use of filters. It was agreed after discussions and trials that the AADT filter provided the most value. Furthermore, it became apparent that the local knowledge of district representatives and other engineers/representatives will be critical to the success of the project, as the analysis approach is designed to be qualitative to account for various route/traffic differences within the state. Based on the lessons learned, the identification approach was adjusted and clarified—and the adjustments have been incorporated in this section of the report.

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# Next Steps—Phase 2

The overall project has been divided into two phases. This report marks the end of Phase 1 of the project and the beginning of Phase 2.

## Scope

Phase 2 of the project will focus on implementing the segment identification approach presented in this final report, discussing the segments with key stakeholders from various jurisdictions, and obtaining agreement on transfer candidate segments. The end result of Phase 2 will be a statewide transfer register that will present all segments that are candidates for transfer based on discussions with representatives from various districts, counties, cities, and local agencies (realignment teams). Phase 2 will include a broad, order-of-magnitude cost for transfers when possible, including a qualitative assessment from district/county/city engineers as to whether the road would require a full reconstruction/rehabilitation or minor repairs before a transfer. The results will also include any policy implications that may be of importance (e.g., should a road leading to a state facility be owned by MnDOT).

## Process

The segment identification process during Phase 2 will include close collaboration with multiple jurisdictions. The team will prepare preliminary transfer registers for each district based on the approach identified in Phase 1 working with a district champion in each district. The district champions could be the district planning staff, district engineers, or other district staff member(s). A realignment team will be formed in each district to aid with the segment identification process and will include collaborating with district champions to identify district participants that will form the realignment teams. Realignment teams will potentially be comprised of district champion, district planning directors, MnDOT state aid engineers, select county engineers, select city engineers, and township representatives. The end result of Phase 2 will be a state-wide transfer register that will present all segments that are candidates for transfer based on discussions with realignment teams.

## Timeline

Phase 2 is anticipated to begin in November 2012 and end in April 2013.

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