

# North/West Passage Coalition

## SAFETEA-LU Section 1201 Real-Time System Management Information Program (RTSMIP) Conformance Assessment



TRAFFIC OPERATIONS &  
SAFETY LABORATORY

Peter Rafferty, PE, PTOE, AICP - ITS Program Manager

Kwame Amegashitsi - Transportation Engineer

Jason Koster - Transportation Intern

**Wisconsin Traffic Operations and Safety (TOPS) Laboratory**

**University of Wisconsin–Madison**

**Department of Civil and Environmental Engineering**

April 2013

## OVERVIEW

On November 8, 2010 the US Department of Transportation issued the final rule on Section 1201 (Rule) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This Rule lays out 23 CFR Part 511 for the establishment of a Real-Time System Management Information Program (RTSMIP) for monitoring and providing traffic and travel conditions.

The initial notice of proposed rulemaking (NPRM) appeared in the Federal Register January 14, 2009 and included a request for comments. The final rule on November 8, 2010 also atypically included a request for comments, and that document as well as the July 19, 2011 summary of responses are available separately for reference (see link in appendix). This document outlines the core components of the Rule, whether the member agencies of the North/West Passage Coalition appear to be meeting the Program requirements, and if not, preliminary recommendations for how that is to be met.

The Section 1201 (SAFETEA-LU, Subtitle B, §1201 (2005)) language includes establishment of the RTSMIP separately from data exchange formats, and these should not be confused. Section 1201 also requires up to date intelligent transportation systems (ITS) architecture and includes language on eligibility, limitation, and definitions.

The Rule authorizes the use of federal NHS, CMAQ, and STP funds for activity related to meeting the goals of the RTSMIP, including planning, deployment, operation, and maintenance. These activities may be eligible but are dependent on member agency discretion, long-range transportation plans, and other factors. If leased services, such as for engineering, communications, or data, are chosen by the implementing agencies, they are eligible for Federal participation.

The Rule makes an important distinction between information *provision* and *dissemination*, and applies only to *provision*, e.g., XML feeds, and not dissemination, e.g., 511 phone service.

### Information Provision Requirements

The RTSMIP includes four types of information:

- Construction activities, including all lane closures, excluding short-term or intermittent closures or activity that does not close a lane;
- Roadway or lane blocking incidents, including all unplanned incidents that block a lane;
- Roadway weather observations, including adverse or hazardous driving conditions and lane closures or restrictions due to environmental conditions;
- Travel time information, only on limited access roads within specified metropolitan areas.

Each of these categories of information includes requirements for information latency, accuracy, and availability. Information on construction, incidents, and road weather is to be provided on all interstates statewide and selected roads within urban or metropolitan areas, termed routes of significance (RoS). Routes of significance are to be determined by local agencies in

coordination with their FHWA division office and may be any public roadway in an applicable metropolitan area, including non-interstate limited access highways, arterial roadways, and toll or priced facilities. Travel time information is required only within the designated metropolitan areas on interstates and other limited-access roads that are part of the RoS.

The metropolitan areas included in this rule are those with a population exceeding 1 million within the Metropolitan Statistical Area (MSA) defined by the census. The January 19, 2009 NPRM specifically identified 49 metro areas. San Juan, PR has since been added, and with each decennial census, others may be added. The 2010 census information has added two more to the list - Salt Lake City, UT and Raleigh, NC - now totaling 52.



**Current Map of 52 Metropolitan Areas in RTSMIP**

The geographic area within which RoS are to be defined, however, are not necessarily the MSA boundaries, which tend to be rather coarse county-wide boundaries. The boundary definition may be either a Metropolitan Planning Organization (MPO) planning boundary, the Census-defined Urbanized Area (UZA) boundary, or potentially another designation as agreed upon by local agencies, the FHWA Office of Operations, and the local FHWA division office. In some cases, the MPO and UZA boundaries are similar, but in others they are very different (Milwaukee is a prominent example).

**Table 1. Rule Requirements Overview**

Information	Coverage		
	Interstates – Outside Metro	Interstates – Within Metro	Metro Area RoS
<b>Construction</b> – Any lane closure of duration exceeding latency requirement, not short-term or intermittent	20 minute latency from time of closure	10 minute latency from time of closure	10 minute latency from time of closure
<b>Incidents</b> – Any lane blocking incident	20 minute latency from time of verification	10 minute latency from time of verification	10 minute latency from time of verification
<b>Road Weather</b> – Hazardous conditions or lane closures/blockages due to weather	20 minute latency from observation	20 minute latency from observation	20 minute latency from observation
<b>Travel Times</b>	N/A	10 minute latency from calculation	10 minute latency from calculation *
<b>Deadline</b>	November 8, 2014	November 8, 2014	November 8, 2016

\* The travel time requirement applies only to limited-access RoS.

The implementation deadline is November 8, 2014 for all interstates – including those within metro areas – and November 8, 2016 for metro area routes of significance (RoS).

Three additional overarching requirements are included with the Rule:

- Information accuracy – the Rule states that the information shall be 85% accurate or have a maximum error rate of 15%, which refers to data accuracy, not ground truth observations, and the measurement of this may be determined between the local agency and FHWA division office;
- Information availability – the uptime requirement is 90% for information provision; and
- ITS Architecture – all regional architectures must be evaluated to determine whether real-time information is explicitly addressed, and if not, update to “address coverage, monitoring systems, data fusion and archiving, and accessibility to highway and transit information for other States and for value added information product providers.”



## Clarifying Information

The questions and answers below were developed with the North/West Passage member agencies and the FHWA Office of Operations. Draft implementation guidance from FHWA was circulated in early 2013, which further clarified a few points. These are all incorporated into this document where applicable, but several items are provided here for documentation purposes.

Q: Are maintenance or unplanned closures included in this rule?

A: Yes, the rule applies for any closure with a duration that falls within the latency time (20 min or 10 min).

Q: What lengths of travel time segments are required?

A: No detailed guidance is expected, but long segments and broad allowances are acceptable, e.g., interstate to interstate junctions may be a good rule of thumb.

Q: How does the Data Exchange Format Specification (DXFS) project and guidance relate to this?

A: It began earlier, and DXFS is not explicit to Section 1201a - they are things to work toward, they are not required, and they have no direct bearing on an agency satisfying the Rule requirement.

Q: What boundary must we use for metro areas, e.g., MSA, Urbanized Area, MPO Planning boundary?

A: While the MSA population is used to determine the metro areas, it is not necessarily the most appropriate boundary to use. Geographic coverage for major metropolitan areas under these provisions may be based on MPO boundaries, and other geographic area definitions that may be appropriate for specific major metropolitan areas may be proposed by the State and concurred by FHWA based on supporting information related to specific metropolitan areas. In Milwaukee, for example, an Adjusted Urbanized Area has been agreed to for use.

Q: Should we expect additional implementation guidelines? If so, what is the anticipated timeline and general nature of those?

A: FHWA continues to work on guidelines, with considerable feedback from state agencies. A draft was circulated in early 2013, which are guidelines and clarifications on process, not intended to be overly prescriptive.

Q: Regarding reporting road weather conditions:

- a. Does reporting point data (e.g., from RWIS/ESS) satisfy the requirement or is segment information required? If point data is sufficient, what density is required, e.g., miles between data points?

A: For ongoing provision of road weather conditions, yes, automated monitoring can be sufficient. This assumes confidence in the agency's RWIS. If road weather conditions are especially hazardous or result in a closure, human observation must be part of the process. The intent is not to change existing processes, and specifying a station density would be overly prescriptive.

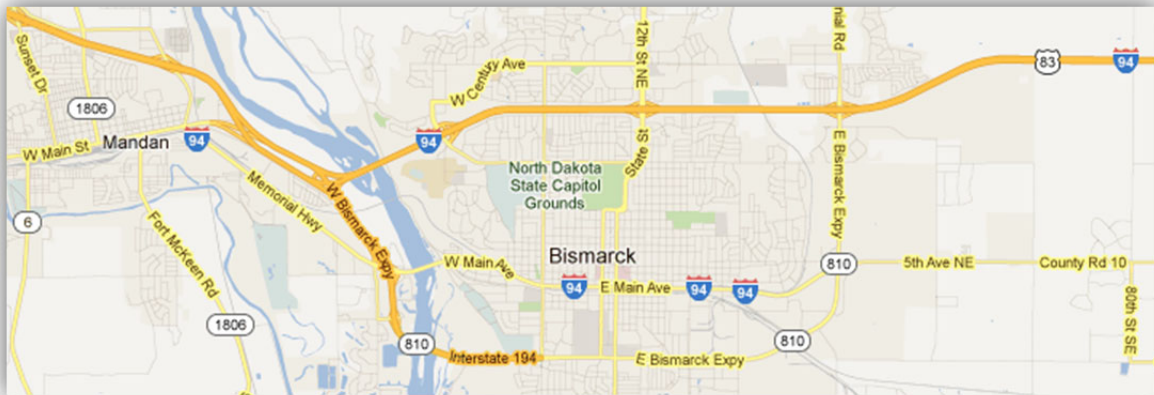
- b. Aside from the obvious, there is gray area on what constitutes "restrictive" or "hazardous," e.g., isolated snow patch in midst of lengthy rural section, light intermittent fog, etc. Will this be per agency discretion and judgment, or are there further definitions or clarifications available?

A: Yes, this is per agency discretion, with recognition that this is a gray area. It is essential to provide the most critical information, as well as restrictions such as a tire chains requirement, but in all cases the condition must be verified.

- c. Do publicly available real time camera images satisfy – or help satisfy – the requirement as a type of visual information provision?

A: No, this is not sufficient. Information must be usable as data, not solely in a human interpretable format such as an image.

Q: Are non-freeway interstate segments – such as business loops or routes – also covered under this rule? Here is an example in Bismarck, ND:



**I-94 in Bismarck, ND**

A: In general, no, that is not the intent. Forthcoming clarification should include that point, though the detail of that clarification may depend in some cases on the level of federal interstate funding received.

Q: Will there be additional clarification, suggestions, or guidance on how to measure accuracy and availability, e.g., related to sampling, spot checking, etc.?

A: The key point is that FHWA is allowing flexibility on this point, but yes, there will be some additional information in the implementation guidelines, with additional suggestions expected closer to the 2014 timeframe.

Q: Given that FHWA Division Offices will determine whether States are compliant with the Rule, what additional information may be forthcoming on criteria by which compliance will be gauged?

A: FHWA is aware of the importance of managing this, including differences between division offices. Guidance for process review will be provided to division offices. The emphasis is on regulatory quality, not on real-time monitoring for discrepancies.

## The Remainder of This Report

The following sections of this report include tables summarizing the requirements and statuses of meeting the different categories of information. Additional detail and recommendations are included for each agency and the three metro areas of 1 million or greater population. The sections are ordered from West to East.

**Table 2. NWP Agency Summary**

<b>State</b>	<b>Metro</b>	<b>Summary</b>
Washington	Seattle	Rule will be met pending a check of travel time coverage on Seattle RoS. Other coverages are good.
Idaho	n/a	Rule is met.
Montana	n/a	Rule is met.
Wyoming	n/a	Rule is met.
North Dakota	n/a	Rule will be met pending confirmation of required hours of operation and latency. Coverage is good.
South Dakota	n/a	Rule will be met pending reporting procedures for unplanned closures, all blocking incidents, and road weather conditions.
Minnesota	Minneapolis-St. Paul	Rule will be met pending a check of travel time coverage on Twin Cities RoS. Other coverages are good.
Wisconsin	Milwaukee	Rule will be met upon road weather reporting update and expansion of travel time coverage on Milwaukee RoS. Other coverages are good.

# WASHINGTON

## With the Seattle metropolitan area

### Interstate Routes

- I-5
- I-82
- I-90
- I-182 (Richland/Kennewick)
- I-205 (Vancouver)
- I-405 (Seattle)
- I-705 (Tacoma)

### **Seattle Metro Area**

The planning - or growth - area boundary is defined by the Puget Sound Regional Council (PSRC) and shown on the Seattle area map below.

The candidate non-interstate limited access road segments in the Seattle area for RoS travel time coverage are:

- SR 3
- SR 16
- SR 18 (Auburn Echo Lake Cutoff Rd)
- SR 99 (Alaskan Way, Marginal Way)
- SR 167
- SR 410
- SR 509
- SR 512
- SR 516 (Kent Des Moines Rd)
- SR 518
- SR 520
- SR 522
- SR 525
- SR 526
- SR 599
- West Seattle Bridge
- US 2 (Stevens Pass Hwy)

The Washington State Department of Transportation (WSDOT) will define the RoS network, with consideration for AADT, freight use, long range transportation plans, NHS designation, emergency or alternate routes, and other factors. This process primarily includes WSDOT, PSRC, and the FHWA Washington Division.

The Portland, Oregon area MPO growth boundary is limited to Oregon which makes Vancouver, Washington separate, although the Census Urbanized Area does cross into Washington. Assuming Portland will proceed with their preferred MPO growth boundary, metro criteria for routes in Vancouver, Washington will not apply per this Rule.

**Table 3. Washington Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide, non-Seattle interstates	Rule is met Statewide coverage with latency < 10 min	No action
Construction (10 min latency)	Seattle metro interstates and RoS	Rule is met Metro coverage with latency < 10 min	No action
Incidents (20 min latency)	Statewide, non-Seattle interstates	Rule is met Statewide coverage with latency < 10 min	No action
Incidents (10 min latency)	Seattle metro interstates and RoS	Rule is met Metro coverage with latency < 10 min	No action
Road Weather (20 min latency)	All interstates statewide and RoS	Rule is met Statewide and metro coverage with 2 min latency	No action
Travel Times (10 min latency)	Seattle metro interstates and RoS	2 min latency	RoS to be determined

The screenshot displays the Washington State Department of Transportation website. At the top, there is a navigation menu with categories: Traffic & Cameras, Projects, Business, Environment, and Maps & Data. A search bar is located on the right. Below the navigation, a breadcrumb trail reads: You are Here: Home > Traffic > Roadtemps > Ncseattle.

The main content area is titled "Washington Road Temperatures". It features a map of the Seattle area with road temperatures indicated by colored lines. A legend titled "Road Conditions" shows:

- Above 38 F (Green line)
- 33 F to 38 F (Yellow line)
- 32 F and below (Red line)

On the right side of the map, there is a weather box for "SB I-5 144th". It includes:

- Updated: Wednesday May 2, 2012 1:40 PM
- Surface Temp: 72°F, Humidity: 50%
- Air Temp: 53°F, Dew Point: 36°F
- 24hr High/Low: 54°F / 44°F, Visibility: 1 Mile
- Pressure: 30 in, Wind Speed: 2 mph
- Elevation: 347R/106m, Wind Dir: S

Below the weather box is a forecast section:

- Today:** Rain Showers (Sun and rain icon)
- Tonight:** Rain (Cloud and rain icon)
- Thursday:** Rain (Cloud and rain icon)
- Thursday night:** Rain Showers (Moon and rain icon)

On the left side of the page, there are several menu sections:

- Traffic:** Cameras, Mountain Passes, Traffic, Travel Alerts, Weather
- Traffic & Cameras:** Bellingham, Canadian Border, Centralia & Chehalis, Ferry Cameras, Hood Canal Area, Olympia, Monroe & Sultan, Mount Vernon & Stanwood, Seattle Area, Spokane, Tacoma, US 97 Border, Vancouver Area, Wenatchee
- State Travel Info:** (No items listed)

At the bottom of the map area, there are links: "Zoom Out", "[ 1 ] [ 2 ] [ 3 ]", and "Zoom In". Below the map is a "Check the Weather" section with links: "Check the Weather", "Check for Travel Alerts", and "Check the Mountain Passes".

### Washington DOT Traveler Information Web Page Example

All interstates are well covered with weather, incident, and construction information. Some information comes from the State Patrol computer aided dispatch (CAD) system and the Traffic Management Center (TMC). Washington has six regions and two TMC locations in the state. Though fairly decentralized, all traveler information is statewide. The philosophy of the TMC is to only put out information that is important to the consumers, based on importance and impacts, and severity and location are important determinants. Effort of the staff at the TMC is not an issue with how much information is distributed since it is just focused on relevance to the public for travel. This is done to prevent flooding of information to the public where they are unable to discern what is important versus ancillary. All traveler information is provided by phone, web, apps, social media, email, etc.

Construction information latency requirement is met. Construction information is reported by project engineers (construction personnel) before the construction projects begin. Construction information has a coordinator who provides updated information weekly. If there is any real-time aspect that is needed for construction information then it is through the TMC. All the construction information is put into the ROADS reporting system. The ROADS reporting system feeds the web, 511 phone, media alerts, push emails, etc. The information is publicly available and is currently updated every ten minutes.

Incident information requirements are met. Incident information is a product of information received from Washington State Patrol, other police coordination, and WDOT crew on the roads and is updated as incidents happen or as conditions change. All the incident information is put into ROADS reporting system. The information is publicly available and is currently updated every ten minutes.

Road weather information requirements are met. Road weather information is provided from a large network of RWIS stations operated by WSDOT and is integrated with weather service forecast information for forecast data of the roads. The information is publicly available and is currently updated every two minutes. The Seattle map below shows road weather information only for limited access roads.

Travel time information requirements may not be met. Travel times are provided on a network of DMS and dedicated travel time signs on major state routes in the greater Seattle area. There is also a web-based real-time travel time information site for all key commute routes within the Seattle area. Travel time information is a product of speed and occupancy data collected by a network of sensors. All the interstates in the Seattle area are covered with travel times though not every mile may be covered. Travel times are reported on the heavy commuter routes but coverage according to the rule is still uncertain. This information is typically refreshed every two minutes. The Seattle map below shows travel time information for all covered roads in the area.

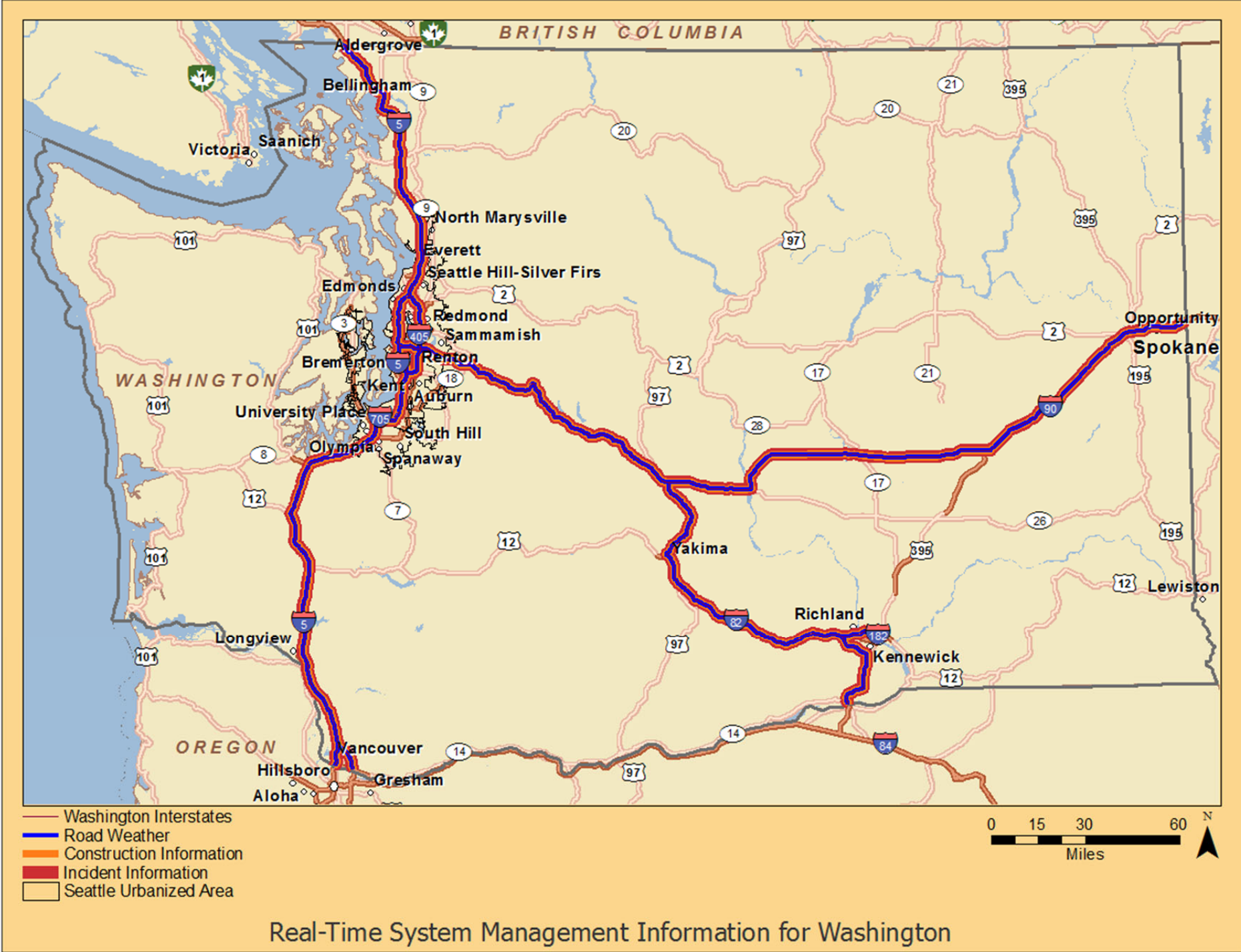
## **Other Requirements**

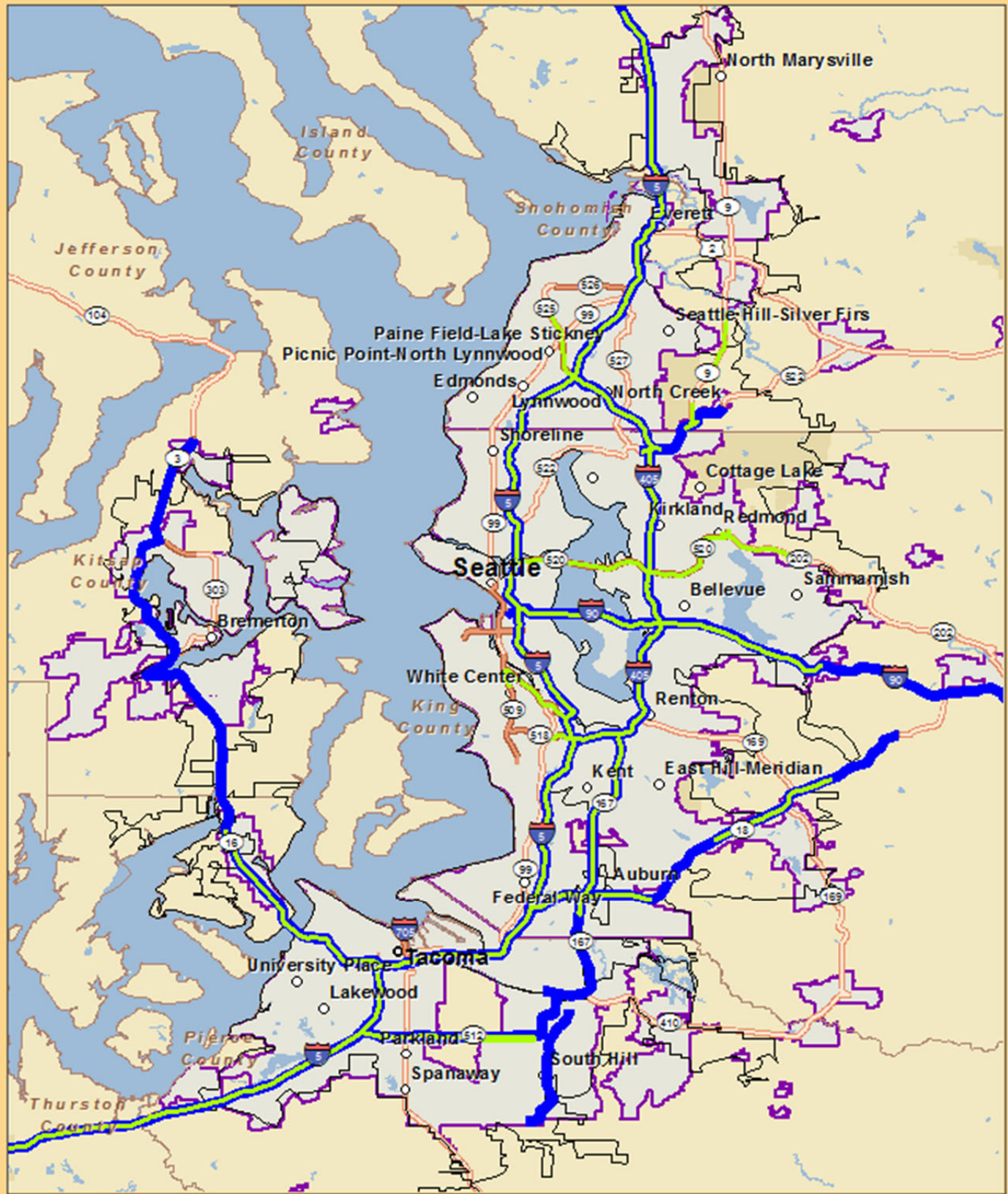
Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. WSDOT information exceeds this threshold.

Information availability. The uptime requirement is 90% for information provision. Washington TMC is a 24/7 operation with negligible system down time.

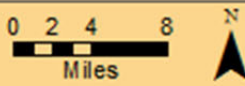
ITS Architecture. WSDOT ITS architecture includes all system components involved in providing the information per the Rule.







- Travel Time Information
- Road Weather
- Limited Access Roads
- Urbanized Areas
- Urban Growth Area



### Real-Time System Management Information for Seattle Metro Area

Note: Construction and incident information is available on all limited-access routes.

# IDAHO

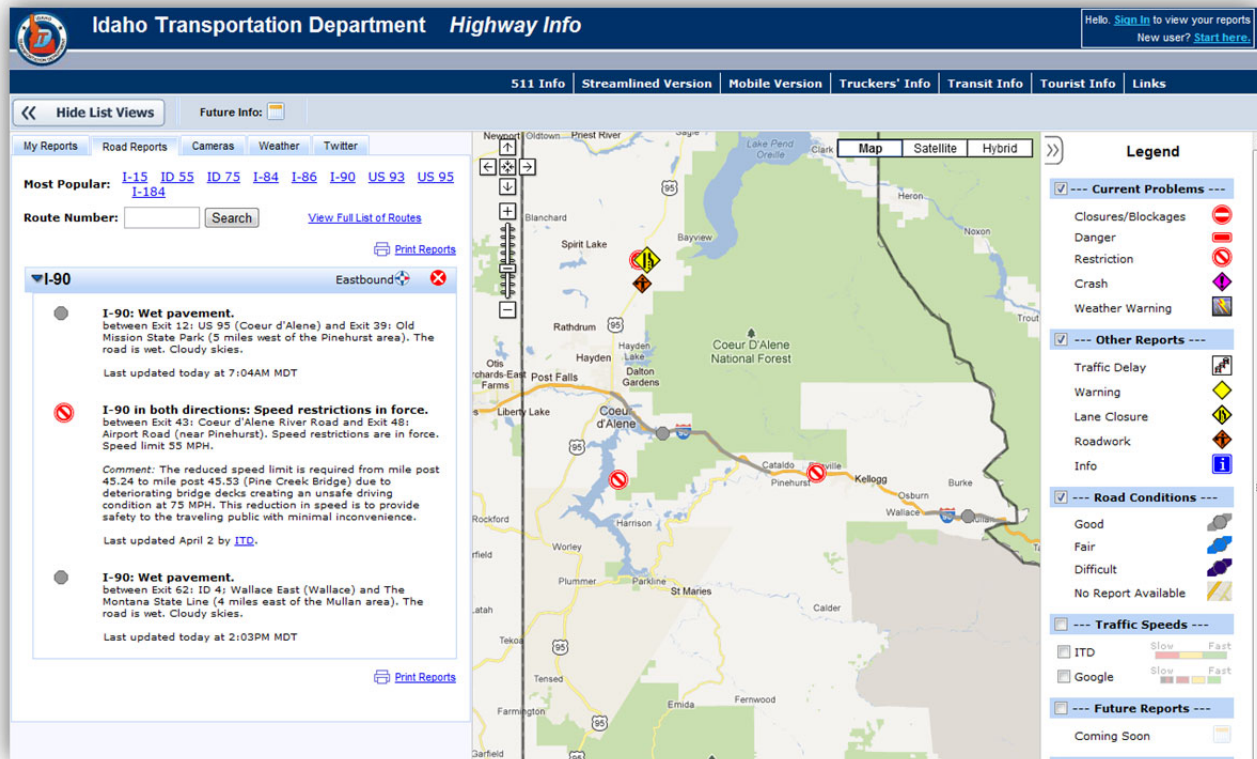
## Interstate Routes

- I-15
- I-84
- I-86
- I-90
- I-184 (Boise)

**Table 4. Idaho Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction <i>(20 min latency)</i>	Statewide interstates	Rule is met Statewide coverage with latency < 10 min	No action
Incidents <i>(20 min latency)</i>	Statewide interstates	Rule is met Statewide coverage with latency < 10 min	No action
Road Weather <i>(20 min latency)</i>	Statewide interstates	Rule is met Statewide coverage with latency < 10 min	No action





**Idaho Transportation Department Traveler Information Web Page Example**

Idaho utilizes a traveler information service which provides real time data that is available to the public. The 511 service is furnished by the Castle Rock Condition Acquisition and Reporting System (CARS). During 2012, Idaho is selecting a new vendor to provide a full suite of control for communications, video, and other system components.

Construction information requirements are met. Construction information is primarily reported by the six district offices throughout Idaho for all interstates and other roads. This information is put into the system in advance of the construction event, and any changes to the construction information are readily updated. The information is publicly available and is currently updated every 10 minutes.

Incident information requirements are met. Incident information is handled by state police and the statewide communication center located in Meridian, Idaho. There is a foreman in charge of each section of the state and will radio in information to the state communications center. This center is staffed with statewide dispatch 24/7 and also provides information to the governor's office and the FHWA. There are currently incidents that do not make it into the real time information system as they are not reported, though the police may be involved. This may be remedied with a new CAD system which would provide a filter and export to the communication center. The information is publicly available and is currently updated every 10 minutes.

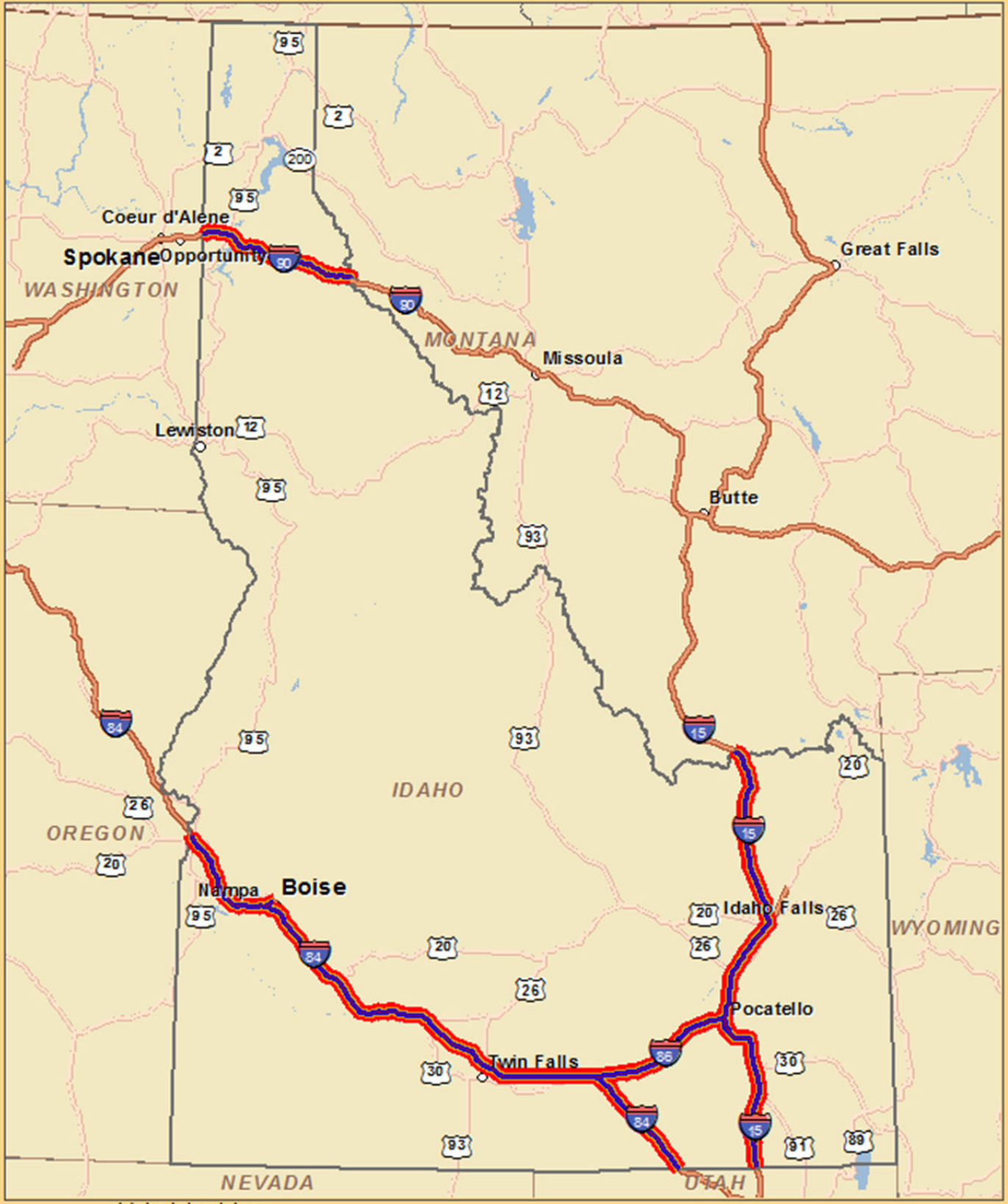
Road weather information requirements are met. Road weather information is provided by fixed segment for the entire state road network and is managed by the statewide communications center in Meridian, Idaho. There are currently RWIS cameras on the 511 site with a table available for road weather information. This coverage is for the entire state route network including the interstate highways. The information is publicly available and is currently updated every 10 minutes.

### **Other Requirements**

Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. The accuracy of the information meets the requirement.

Information availability. The uptime requirement is 90% for information provision, which is currently exceeded. There is a 24/7 operations center which provides information and support to the data and it has an assumed uptime of 99% which meets the Rule requirement.

ITS Architecture. The statewide architecture currently meets the requirements of the Program. The Idaho ITS architecture was updated in 2011 which include all the systems involved in meeting the Rule.



- Idaho Interstates
- Road Weather
- Construction Information
- Incident Information



### Real-Time System Management Information for Idaho

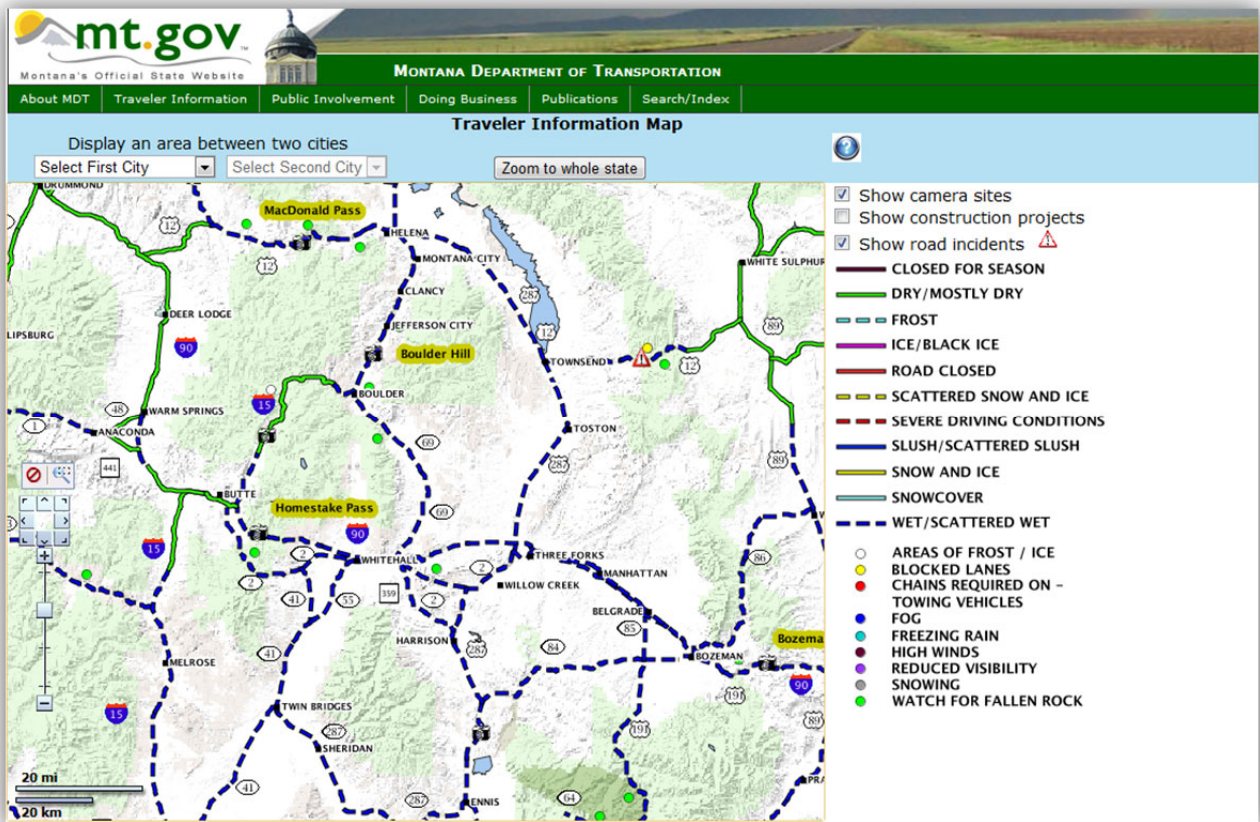
# MONTANA

## Interstate Routes

- I-15
- I-90
- I-94

**Table 5. Montana Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide interstates	Rule is met Statewide coverage with latency 5-15 min	No action
Incidents (20 min latency)	Statewide interstates	Rule is met Statewide coverage with latency 5-15 min	No action
Road Weather (20 min latency)	Statewide interstates	Rule is met Statewide coverage with latency 5-15 min	No action



**Montana DOT Traveler Information Web Page Example**

Reports provided to Helena and into an Oracle database go straight to the 511 website, phone service, and out via email. The map application was built and is maintained in-house while the phone service is hosted by Meridian. The database has three different forms, one for construction, one for incidents, and one for road weather information, and the map is automatically updated as the information enters the system. There are updates approximately once every 15 minutes for the 511 phone service on the FTP site through excel files.

Construction information requirements are met. Construction information is reported statewide on all interstates and other roads, per the ten division offices, by construction project engineers. The engineers supply weekly reports to the headquarters in Helena and it is entered into an Oracle database. Headquarters in Helena are staffed 24/7 in the winter season and are on call 24/7 for the remainder of the year. The information is publicly available and is updated within 5-15 minutes.

Incident information requirements are met. Incidents are reported by the field staff upon verification. Highway patrol and others are able to call in incidents but they are verified by the field staff before they are officially reported. The report details include detours, location, nature, and impact of the incident. The information is publicly available and is updated within 5-15 minutes.



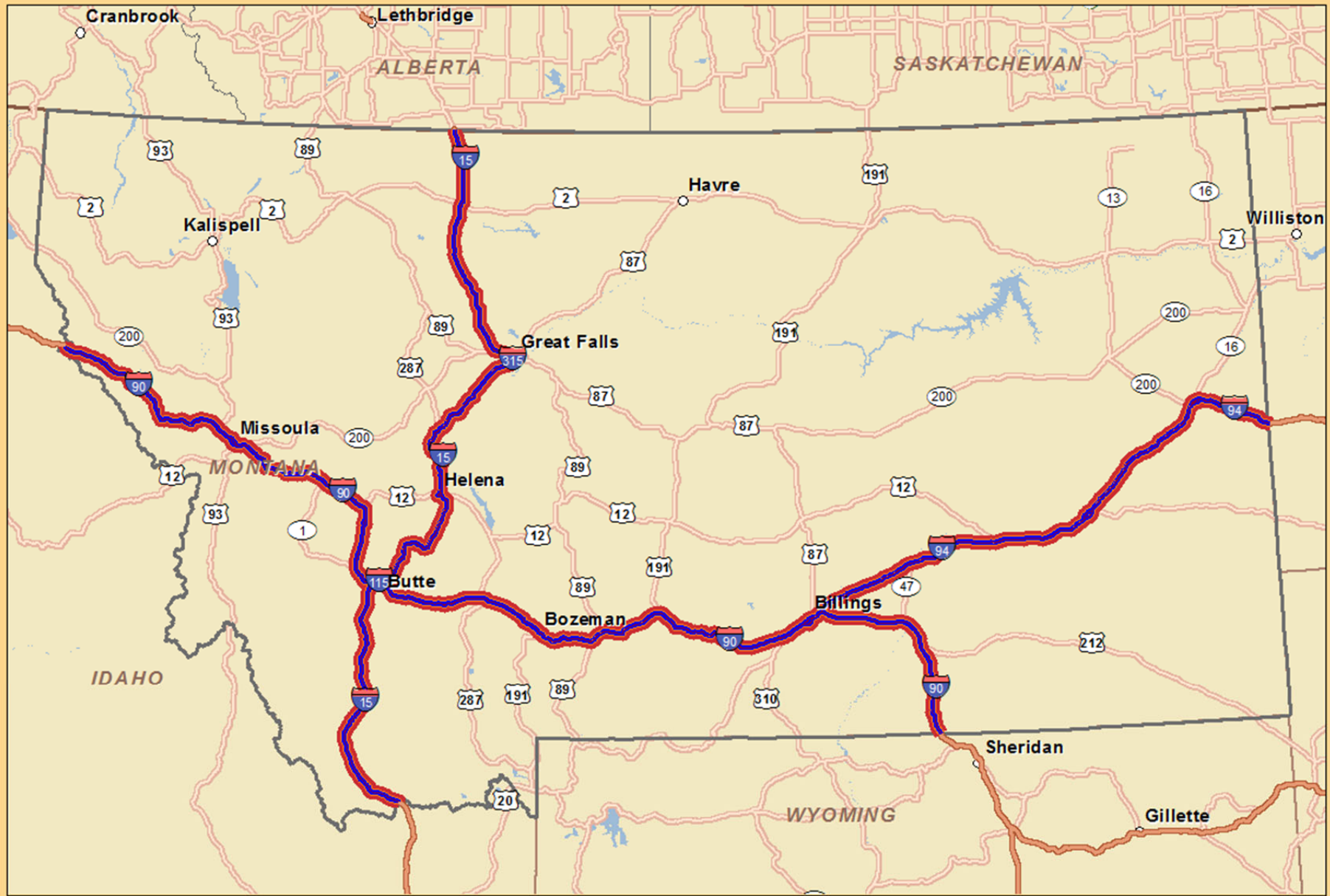
Road weather information requirements are met. Road weather is reported by the field staff upon observation on all state roads. The road weather information is segmented on the map in segments between one and twenty miles. This coverage is for the entire state route network including the interstate highways. The information is publicly available and is updated within 5-15 minutes.

### **Other Requirements**

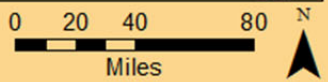
Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. Montana DOT information exceeds this threshold and there is no indication for concern.

Information availability. The uptime requirement is 90% for information provision. Information availability exceeds this threshold.

ITS Architecture. Montana ITS Architecture was updated in 2007 with many of the systems used in daily operations, and it includes all those involved in information provision per the Rule.



- Montana Interstates
- Road Weather
- Construction Information
- Incident Information



### Real-Time System Management Information for Montana

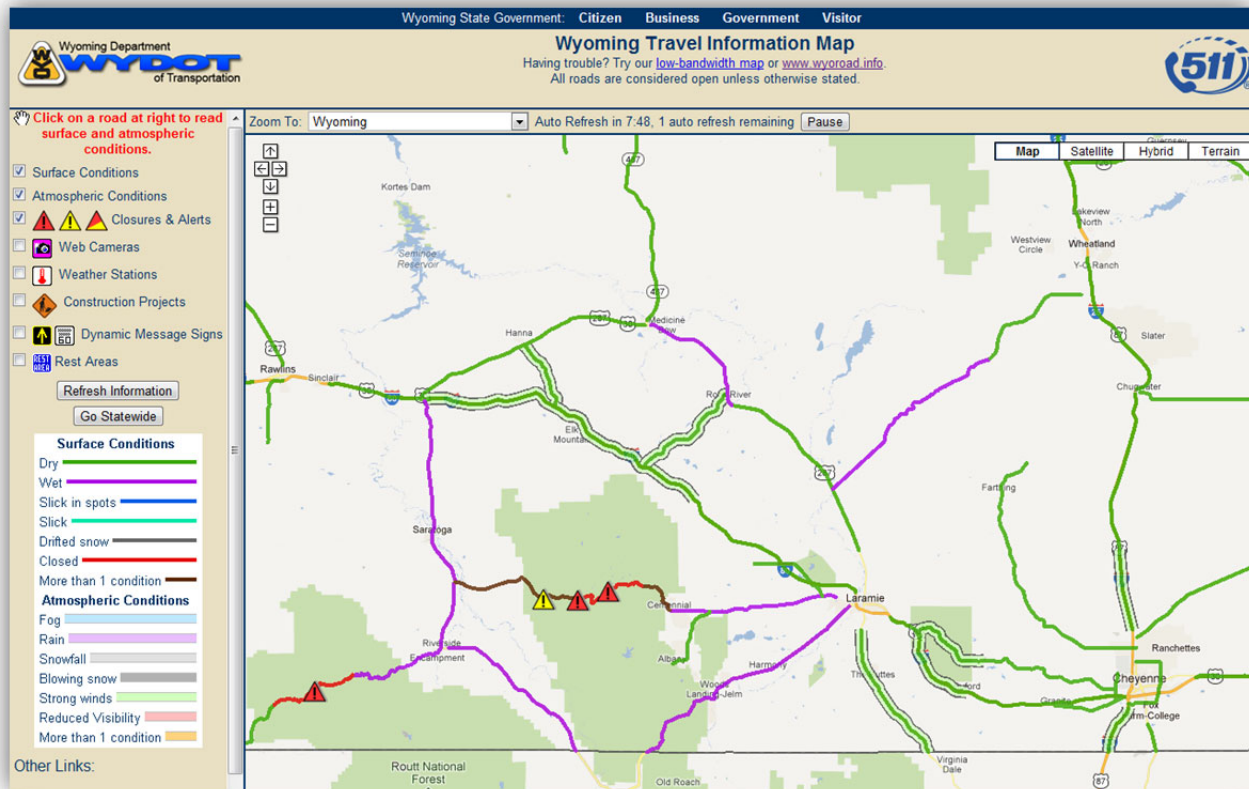
# WYOMING

## Interstate Routes

- I-25
- I-80
- I-90
- I-180 (Cheyenne)

**Table 6. Wyoming Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide interstates	Rule is met Statewide coverage with latency 1-5 min	No action
Incidents (20 min latency)	Statewide interstates	Rule is met Statewide coverage with latency 1-5 min	No action
Road Weather (20 min latency)	Statewide interstates	Rule is met Statewide coverage with latency 1-5 min	No action



**Wyoming DOT Traveler Information Web Page Example**

The means of communication to the public include an online map, text messages, email, and telephone information. The site [map.wyoroad.info](http://map.wyoroad.info) is a public information website with real time information. The telephone information takes up to five minutes to update since it is relayed through Meridian systems who update the phone information. There is also currently a test webpage with real time information in a tabular format which is expected to be released in the near future. This page will list construction information, incident information, and road weather information on separate table. This allows for an easier printout version of the information for quick and easy viewing of route and information.

The real time management system uses a redundant system to prevent down time. The system has not been down for the eight years it has been running. If one system were to fail then there would be a 2 minute lapse where the other system would pick up the feed. Meridian provides the 511 information via the phone. Meridian interfaces with two redundant locations for information to make sure the information they have is accurate and up to date.

Construction information requirements are met. Construction information is statewide and is input into the system with project details by field engineers. The three real time information components are surface conditions, expected delay, and any closures in the project area. The construction information comes from the field engineer of the construction project. After April 2012, construction information will be reported to the Wyoming Traffic Management Center

(TMC) in Cheyenne. The TMC will provide the data for the construction information to the Wyoming 511 site which is an internal process. There is a statewide radio network in place for communication of construction information. It takes just minutes from reporting an update or change to construction information to having it publicly available.

Incident information requirements are met. The incident information follows a similar process as the construction information such that the TMC inputs all the information. Information sources include DOT field staff, local agencies, police, and public state government trained employees. The highway patrol is part of the Wyoming Department of Transportation which allows the incident information to be entered quickly through coordination efforts. The program to train participants is the Enhanced Citizen-Assisted Reporting (ECAR) program. The time between reporting an update or change to incident information and getting it out to the public is generally about one minute.

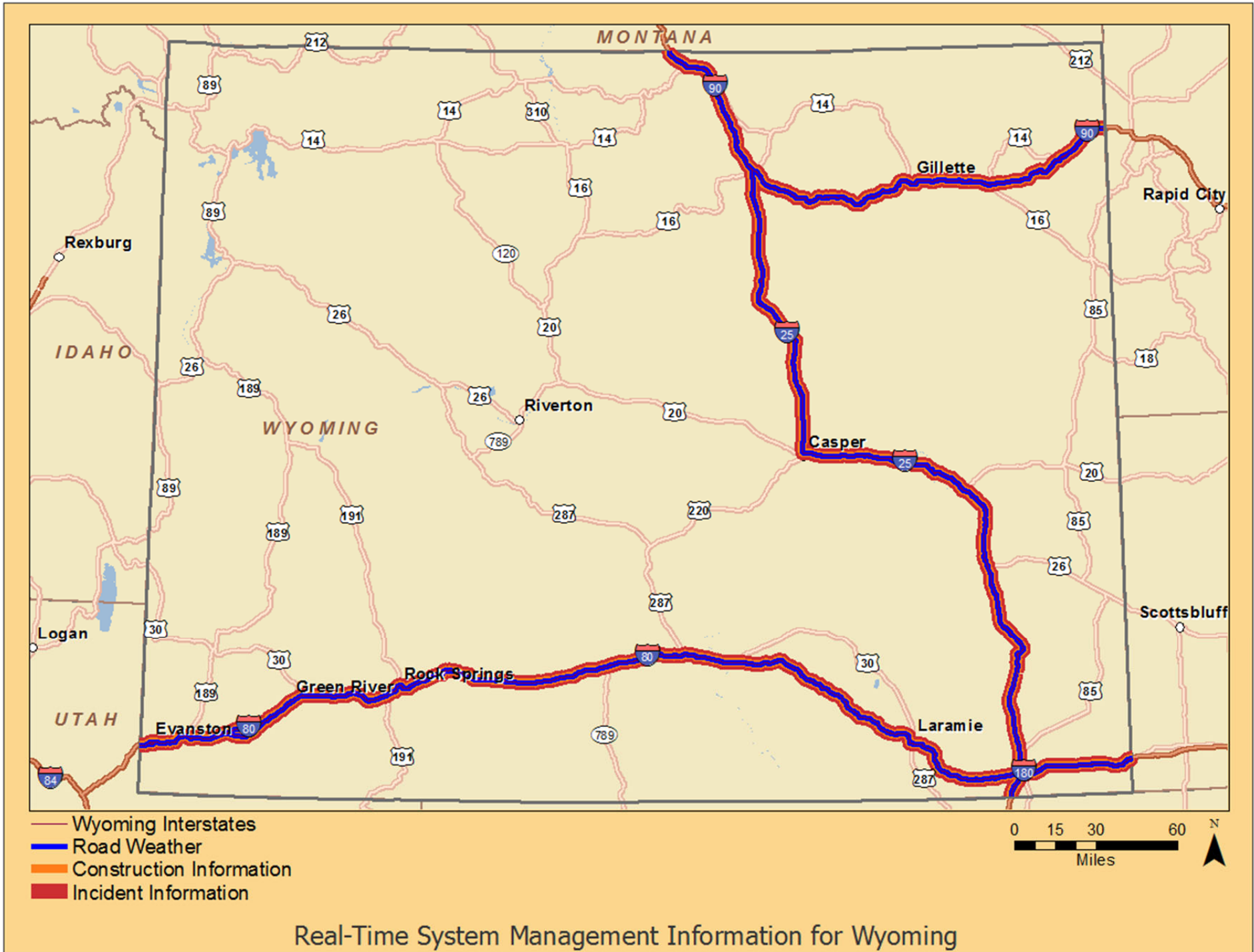
Road weather information requirements are met. Road weather information is reported for fixed segments statewide in the same manner as incident information through reports by DOT field staff, local agencies, police, and public state government trained employees. The online map information can be modified if necessary for an event. This information is also made public in just minutes.

## **Other Requirements**

Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. The information is mainly provided through observation and then directly entered into the system. Information accuracy exceeds this threshold.

Information availability. The uptime requirement is 90% for information provision. The uptime of the system has been 100% as the system has not yet been down in its eight years of operation, meeting the Rule requirement

ITS Architecture. The architecture for Wyoming's systems received a major update four years ago and is updated periodically with new information. The current version of the architecture includes all system components involved in real time information provision and meets the requirements of the Rule.



Real-Time System Management Information for Wyoming

# NORTH DAKOTA

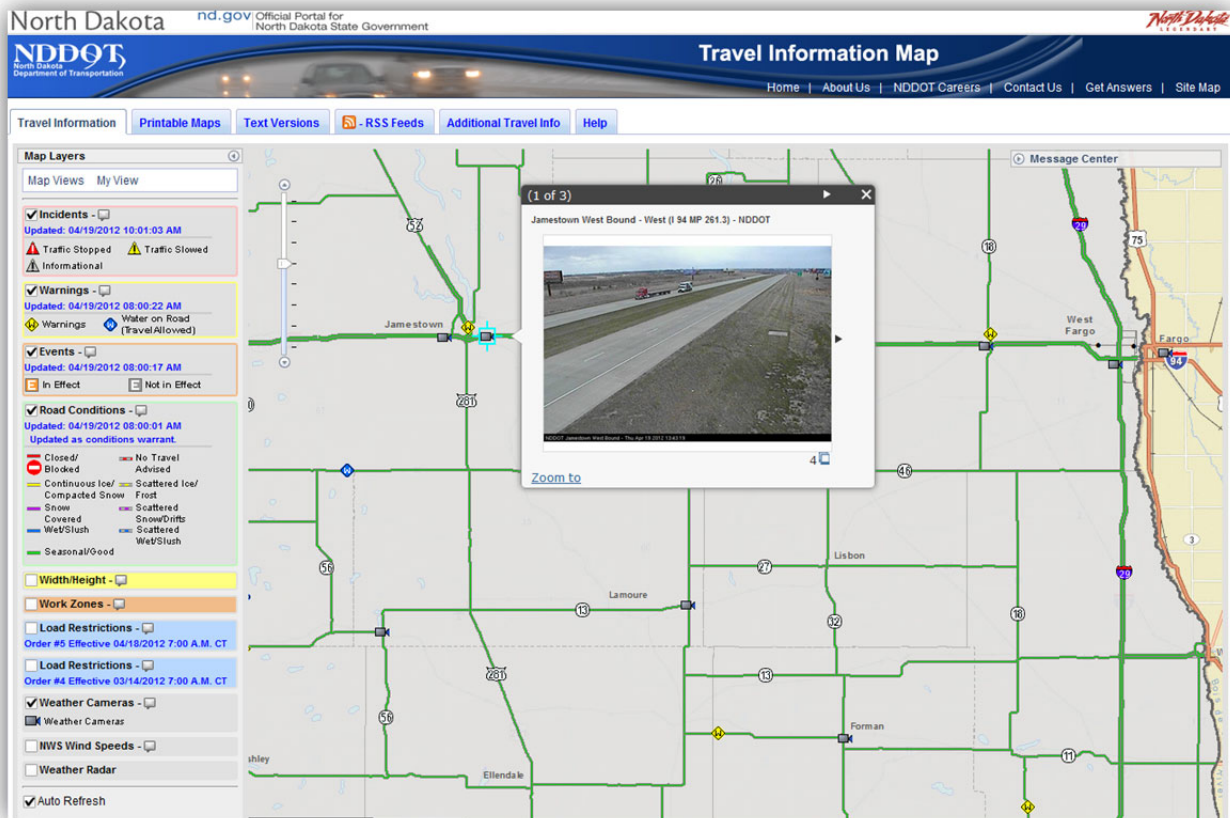
## Interstate Routes

- I-29
- I-94
- I-194 (Bismarck)

**Table 7. North Dakota Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide interstates	Rule is met	No action
Incidents (20 min latency)	Statewide interstates	Coverage is statewide, but latency up to 60 min after office hours, and not 24/7	Consider extending operator interface to partner agencies
Road Weather (20 min latency)	Statewide interstates	Coverage is statewide, but latency up to 60 min after office hours, and not 24/7	Consider extending operator interface to partner agencies





**North Dakota DOT Traveler Information Web Page Example**

There is no 24/7 traffic operations center and the current office operates from 5:00 am - 9:30 pm in the winter months, October to May. Maintenance staff generally updates the traveler information, and if a significant event occurs outside of normal business hours, the staff can make updates remotely. The map application was built and is maintained in-house while the phone service is hosted by Meridian. Meridian pulls a CSV file from the website every five minutes for any posted updates. Updates are made by field reports into a voicemail which are manually checked by the staff. The technical systems are in place, but have high latency after office hours.

Suggestions for possible improvements to information turnaround and 24/7 operations include extending the operator interface to partner agencies, including the Department of Emergency Services state radio, 911 PSAPs, Highway Patrol, and fusion center staff.

Construction information latency requirement is met. Construction information is statewide and is reported by the field engineer as the project progresses. The data automatically updates when the engineer enters in information. Width restriction and closures are posted prior to the event. The information is publicly available.



Incident information latency requirement. Incident information conditions are also covered on all the interstates. During office hours latency is met. These conditions can be reported by the highway patrol through media blasts which may be a fax or an email to a media outlet or a maintenance center. Only extended incidents are reported to the maintenance center to be put on the traveler information map and 511. The information is publicly available. The technical systems are in place, but have high latency after office hours.

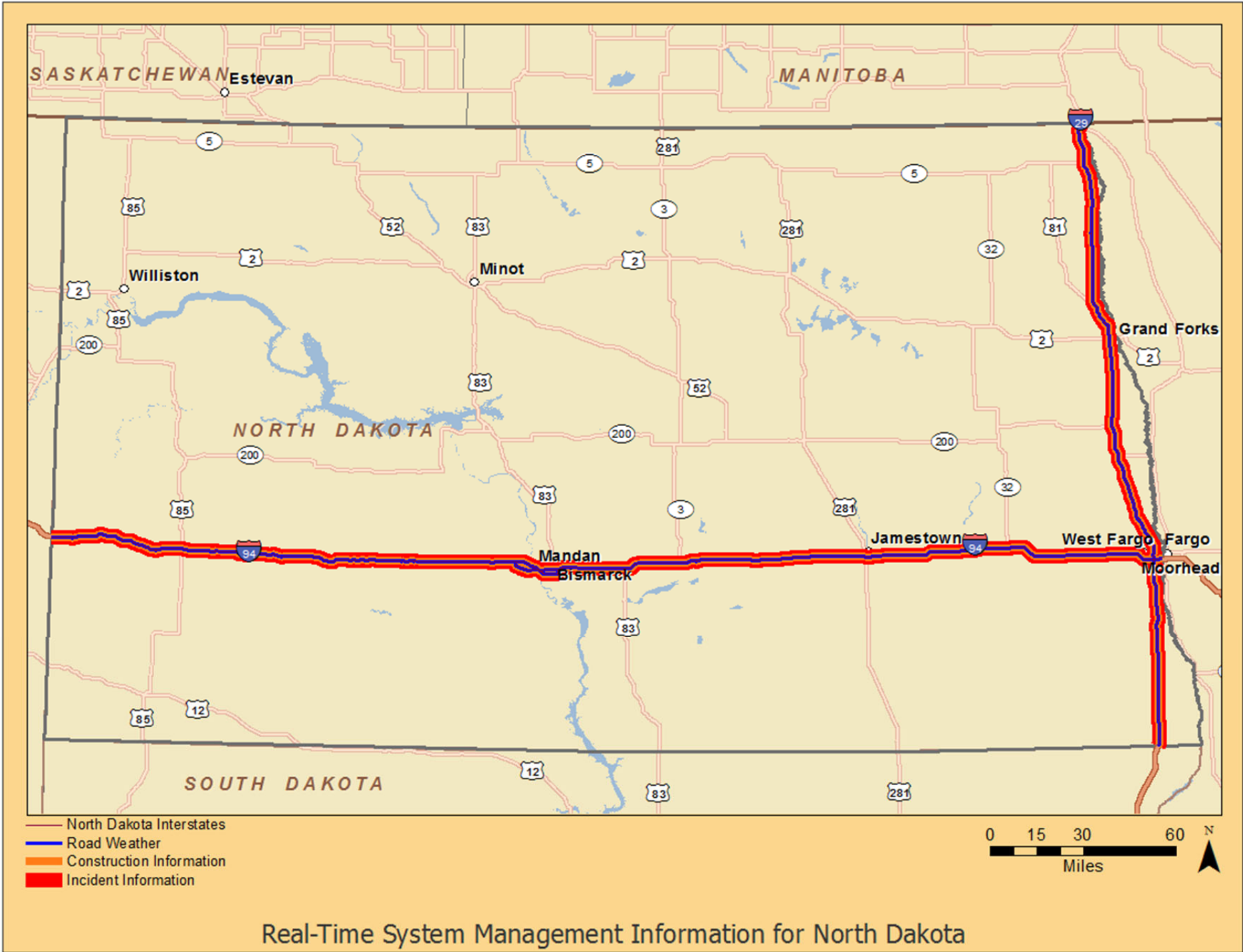
Road weather information latency requirement. Road weather information is covered for all the interstates and is confirmed and reported by field staff. During winter office hours, field staff report road conditions to central office maintenance staff to be posted on the traveler information map and 511. There are RWIS stations throughout the state which makes information available to the public along with visual information from cameras mounted throughout the state. The video feed from the cameras is the most real time information available in North Dakota and can be used to manually spot check an area of roadway. The road weather information is publicly available. The technical systems are in place, but have high latency after office hours.

### **Other Requirements**

Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. The information accuracy exceeds this threshold.

Information availability. The uptime requirement is 90% for information provision. While system uptime exceeds this threshold, staff availability limits information provision in off hours.

ITS Architecture. The current architecture includes all system components involved in real time information provision and meets the requirements of the Rule.



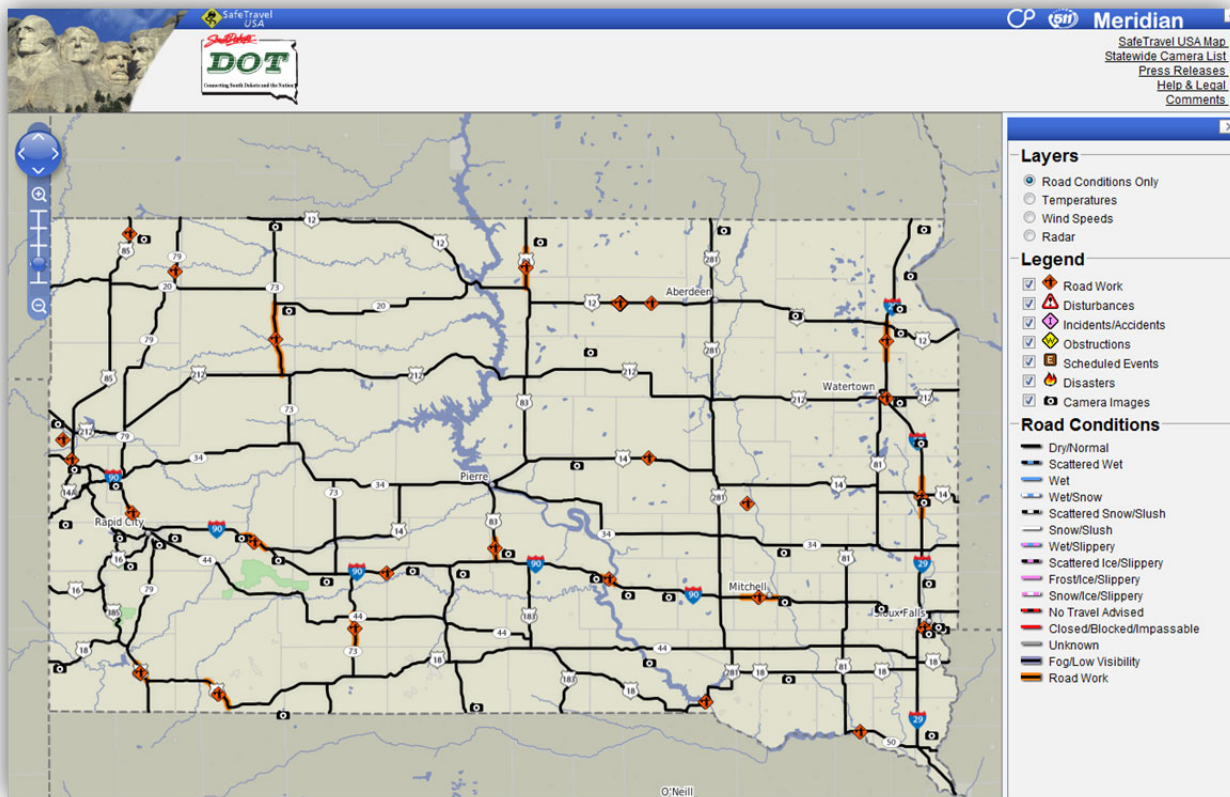
# SOUTH DAKOTA

## Interstate Routes

- I-29
- I-90
- I-190 (Rapid City)
- I-229 (Sioux Falls)

**Table 8. South Dakota Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide interstates	Rule is met Coverage is statewide, latency is 5 min	No action
Incidents (20 min latency)	Statewide interstates	SD DOT does not report all incidents	Work with Highway Patrol on interface or reporting for interstate incidents
Road Weather (20 min latency)	Statewide interstates	Good coverage and latency, but not 24/7 reporting	Explore staffing, agency partners, and automated solutions



**South Dakota DOT Traveler Information Web Page Example**

All information is put into their Integrated Roadway Information System (IRIS) software, from Meridian Environmental Technology. Meridian also provides the interface for the 511. Information is provided by web (Safe Travel USA), 511 phone service, an Android mobile phone application, Clear Path 511 subscription email and text alerts, and other mechanisms. There is currently no traffic operations center for South Dakota but there is a project working toward the planning and creation of one for 24/7 operations.

Construction information requirements are met. Construction information is statewide on all interstates and state roads, and is reported by the field office engineers before the construction starts and as construction progresses. All construction information is presented and not just closures. The system updates information within five minutes during the refresh cycles.

Incident information requirements. Incident information is supplied by Highway Patrol units for major events but not all incidents are communicated to SD DOT. SD DOT does not always have physical presence at incidents for verification. SD DOT personnel currently enter incident information communicated to the 12 field offices throughout the state into IRIS. System latency is also five minutes.

One possible solution is training Highway Patrol dispatch officers or state radio dispatch in Pierre to use IRIS, focusing on interstates, and especially for nighttime incidents since the SD

DOT staff runs on typical business hours. In time, another improvement may entail a data link from the Highway Patrol CAD to operations staff or directly into IRIS.

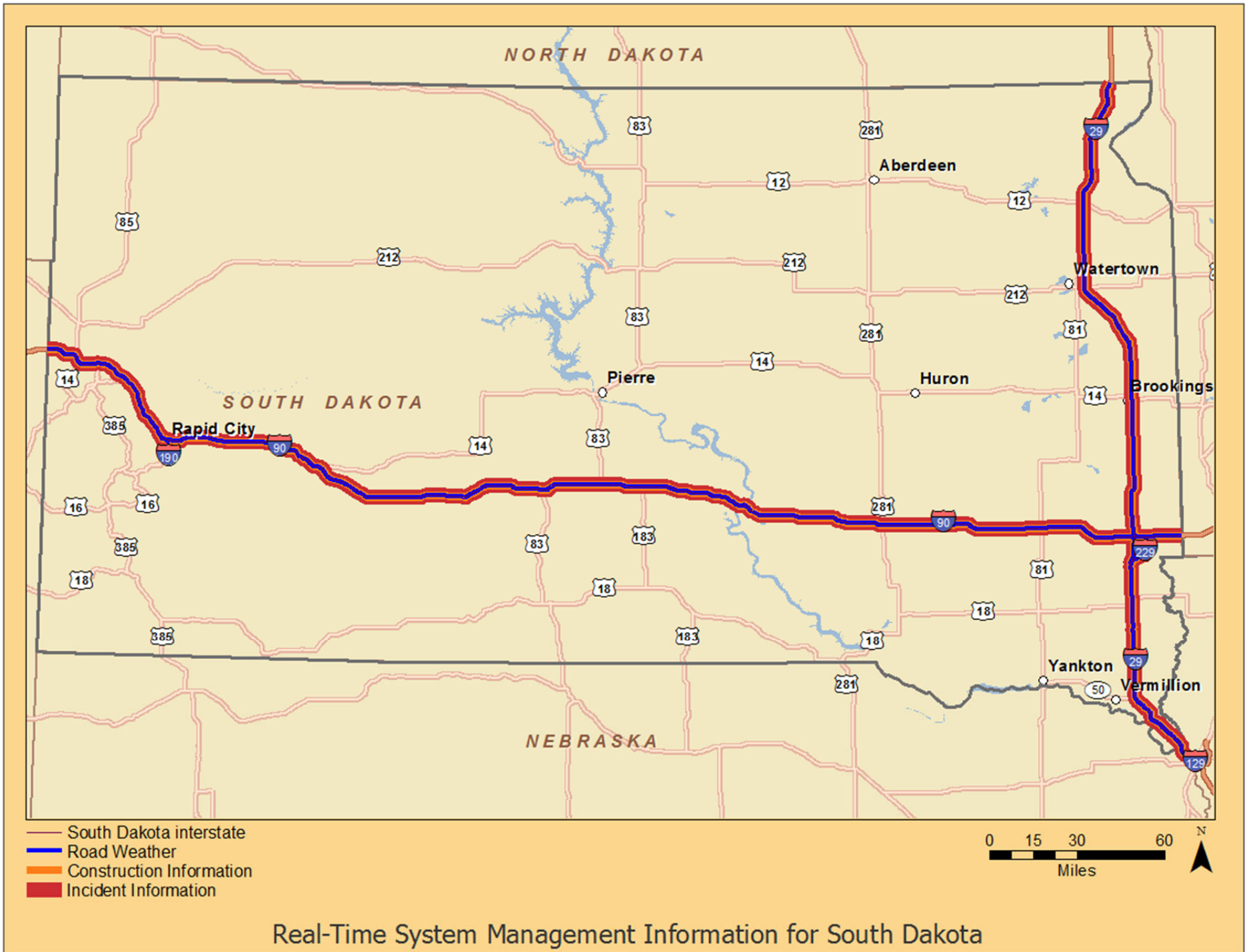
Road weather information coverage requirement. Road weather information is covered for all the interstates and is done by the maintenance personnel in the field. Winter reports are done at a minimum of three times per day, while summer has no required time schedule for road weather conditions. South Dakota relies on snow plow drivers, field personnel, maintenance supervisors, and cameras for the road weather information. The sole gap is that the updates are not currently 24/7, e.g., a nighttime freezing rain condition may not be reported until 4 am. While this may be addressed in time with a 24/7 operations center or partnership with other agencies as suggested for incidents, automated solutions will continue to be explored. This relates to the question of whether a combination of weather and RWIS/ESS reports may help satisfy the Rule requirement.

### **Other Requirements**

Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. The information accuracy exceeds this threshold.

Information availability. The uptime requirement is 90% for information provision. SD DOT system uptime is essentially 100% and exceeds this threshold, but reporting times are not generally 24/7.

ITS Architecture. A regional ITS architecture for South Dakota was completed in 2009, with updates occurring since then. The current architecture includes all system components involved in real time information provision and meets the requirements of the Rule.



Real-Time System Management Information for South Dakota

# MINNESOTA

## With the Minneapolis-St. Paul (Twin Cities) metropolitan area

### Interstate Routes

- I-35
- I-90
- I-494 (Twin Cities)
- I-394 (Twin Cities)
- I-535 (Duluth)
- I-694 (Twin Cities)

### **Twin Cities Metro Area**

The Twin Cities metro area is defined by the seven-county regional planning area. The Metropolitan Council is the regional planning agency for this area, made up of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties and including all or part of 182 cities and townships, with a total population of approximately three million persons.

The candidate non-interstate limited access road segments for RoS travel time coverage are:

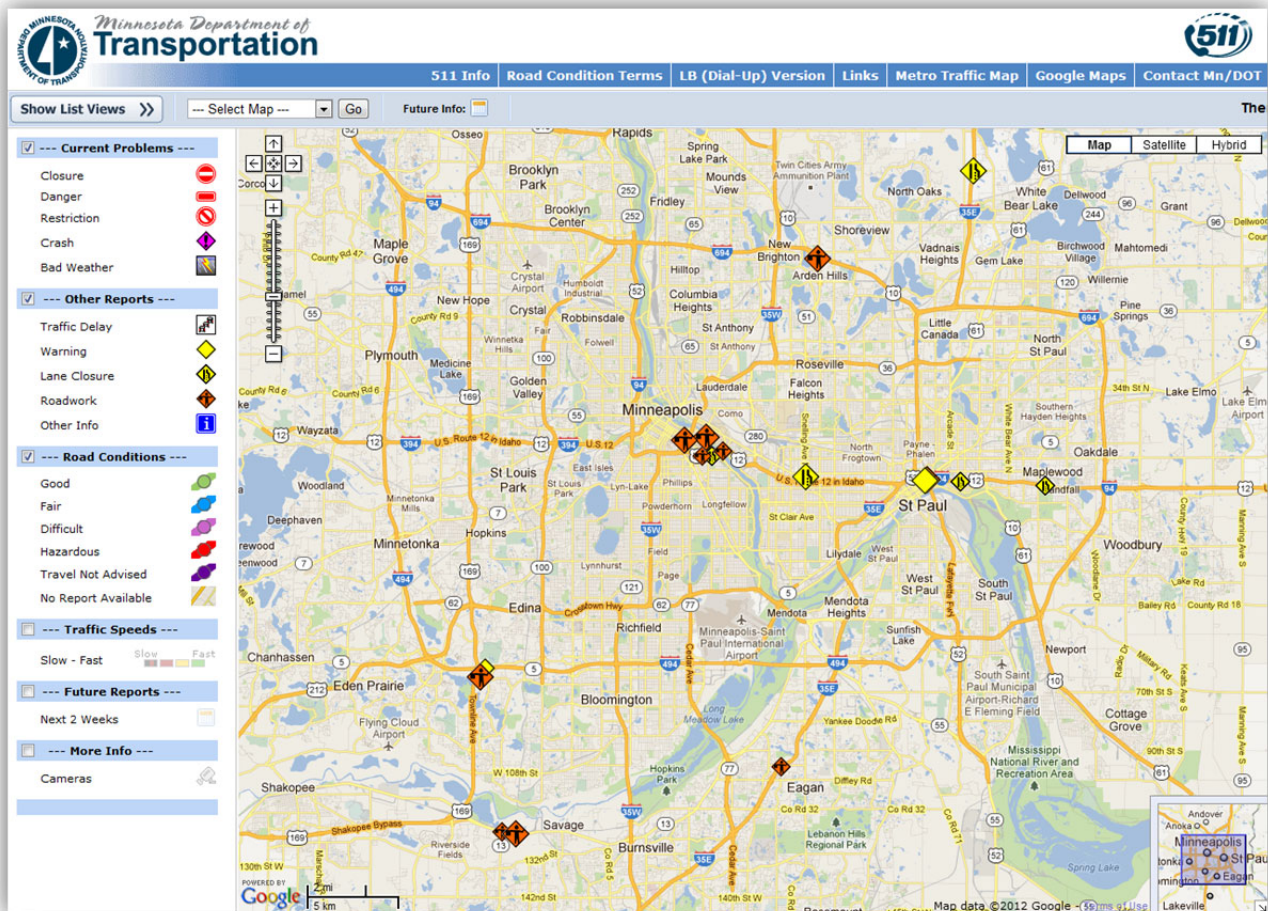
- US 10
- US 52
- US 61
- US 169
- US 212
- Hwy 5
- Hwy 36
- Hwy 55
- Hwy 62
- Hwy 77 (Cedar Ave)
- Hwy 100
- Hwy 610

MnDOT will define the RoS network, with consideration for AADT, freight use, long range transportation plans, NHS designation, emergency or alternate routes, and other factors. This process primarily includes MnDOT, the Metropolitan Council, and the FHWA Minnesota Division.

**Table 9. Minnesota Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide, non-Twin Cities interstates	Rule is met Statewide coverage with latency < 15 min	No action
Construction (10 min latency)	Twin Cities metro interstates and RoS	Rule is met Metro coverage with latency < 15 min	No action
Incidents (20 min latency)	Statewide, non-Twin Cities interstates	Rule is met Statewide coverage with latency < 10 min	No action
Incidents (10 min latency)	Twin Cities metro interstates and RoS	Rule is met Metro coverage with latency < 10 min	No action
Road Weather (20 min latency)	All interstates statewide and RoS	Rule is met Statewide coverage with latency < 10 min	No action
Travel Times (10 min latency)	Twin Cities metro interstates and RoS	Rule may not be met depending on RoS coverage, one minute latency	Determine RoS network and check travel time coverage against it





**Minnesota DOT Traveler Information Web Page Example**

Minnesota currently uses the Castle Rock Condition Acquisition and Reporting System (CARS) to report their real time information which goes out to web, phone services, and an xml data feed. The Twin Cities Regional Traffic Management Center (RTMC) provides the metro area information to the 511 system. Phone and web updates occur within two minutes.

Construction information requirements are met. Construction information is reported by project engineers and construction personnel to the Traffic Operations and Communications Centers (TOCC) statewide (including the Twin Cities metro and RTMC) before the construction projects begin and as any updates occur. The information is publicly available via XML feed and is currently updated every 10 minutes. Total latency is estimated at 5-15 minutes.

Incident information requirements are met. State Patrol dispatch manages incident information and unexpected construction events statewide (and metro) and has a latency of 5-10 minutes from verification. The incident information uses a semi-automated process to bring the information into the 511 CARS interface. The information is publicly available via XML feed to private providers and is currently updated every 10 minutes.

Road weather information requirements are met. RWIS sensors along with dispatch report road weather information, which is then input manually by dispatch with a required update at least every 4 hours. If new conditions are expected or observed, the system is updated at that time. Maintenance and TMC staff loads the road weather data. The information is publicly available and is currently updated every 10 minutes.

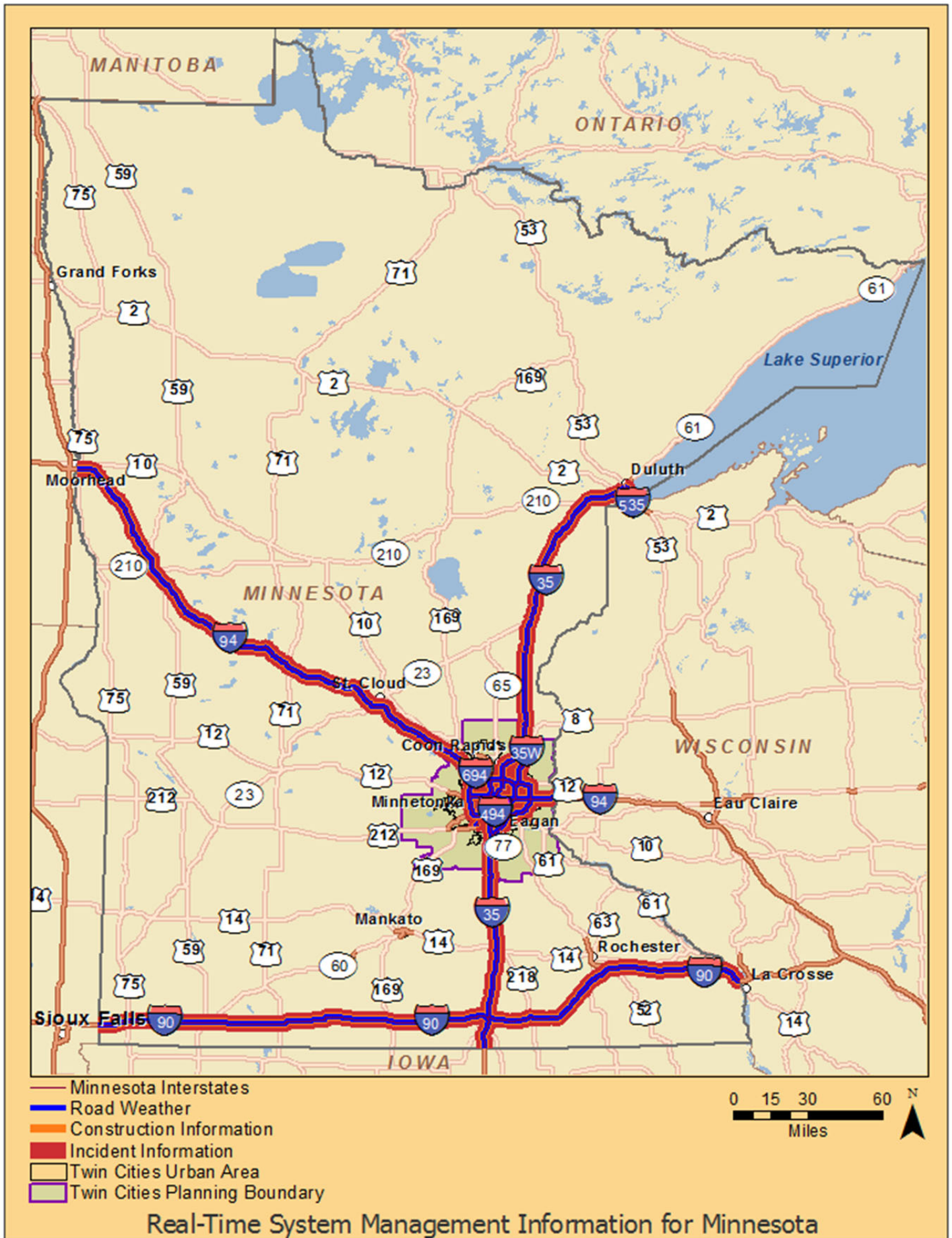
Travel time information coverage requirement may not be met. Most required areas are covered for travel times with the exception of a few minor gaps on limited (controlled) access highways. Travel times are calculated from loop detectors and information is reported every 30 seconds, smoothed to two minutes. Travel times are processed through MnDOT's IRIS software, which is their Advanced Traffic Management System. Metro traffic travel time information is available on MN 511 web map, phone, via XML, and other mechanisms.

### **Other Requirements**

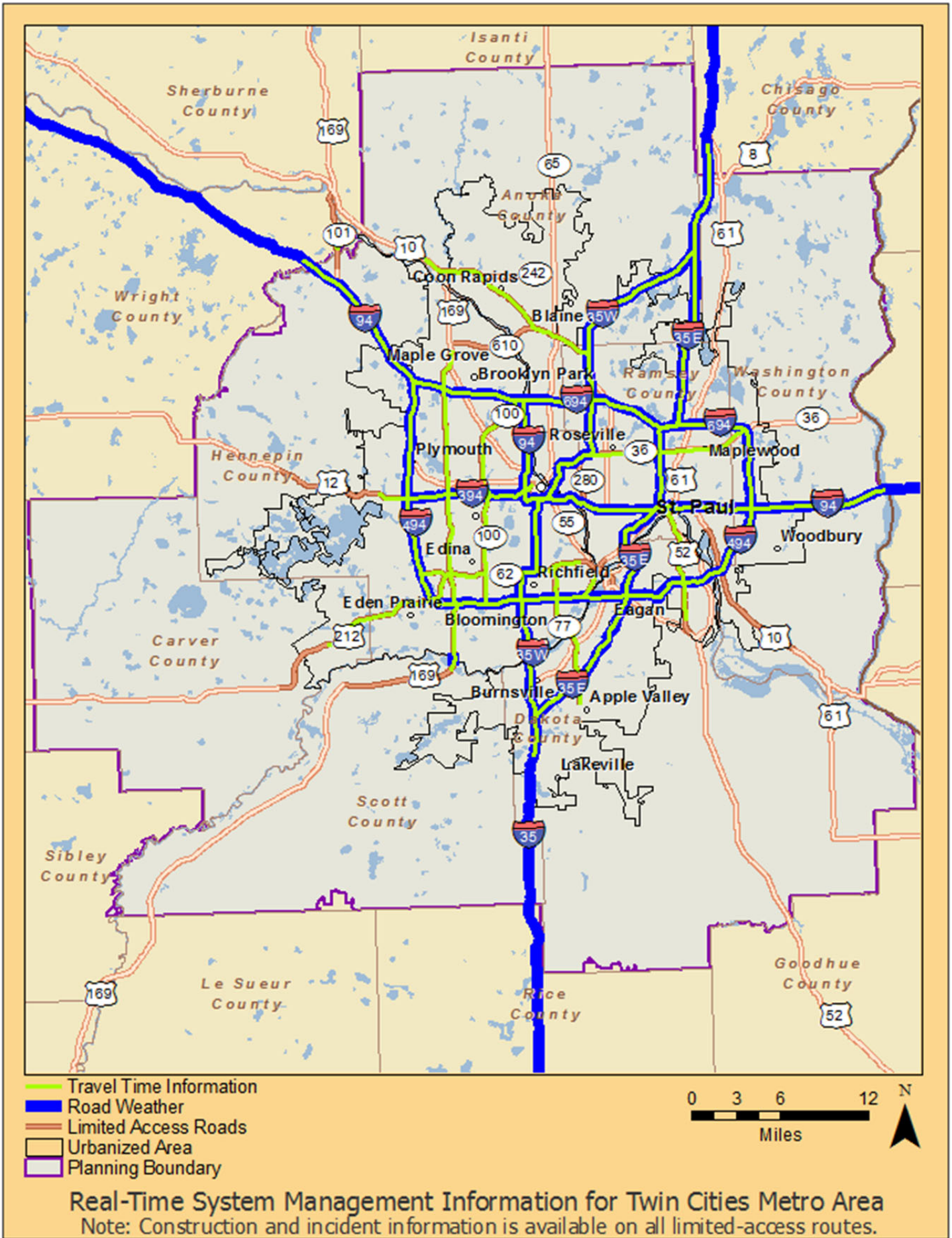
Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. MnDOT information accuracy exceeds this threshold.

Information availability. The uptime requirement is 90% for information provision. Availability of the information exceeds this with the 24/7 operations and negligible system down time.

ITS Architecture. The Minnesota ITS Architecture was updated in 2009 with all current systems for real time information meeting Rule requirements.







# WISCONSIN

## With the Milwaukee metropolitan area

Interstate routes in Wisconsin:

- I-39
- I-43
- I-90
- I-94
- I-535 (Superior)
- I-794 (Milwaukee)
- I-894 (Milwaukee)

### Milwaukee Metro Area

The use of a MSA boundary is not appropriate for Milwaukee, which is the four counties of Washington, Ozaukee, Waukesha, and Milwaukee. These four counties include outlying rural segments. The assumption that using the MPO Planning boundary creates a more sensible (different, smaller) area is usually good, but not in Milwaukee's case. The MPO Planning boundary in Milwaukee includes those four counties above plus three additional counties, adding additional rural segments. The Census Urbanized Area (UA) boundary is used as a starting point for Milwaukee, with adjustments as agreed upon between WisDOT, FHWA, and the Southeast Wisconsin RPC (SEWRPC). As shown on the map below, this is the Adjusted Urbanized Area boundary.

The candidate limited access road segments for RoS travel time coverage are:

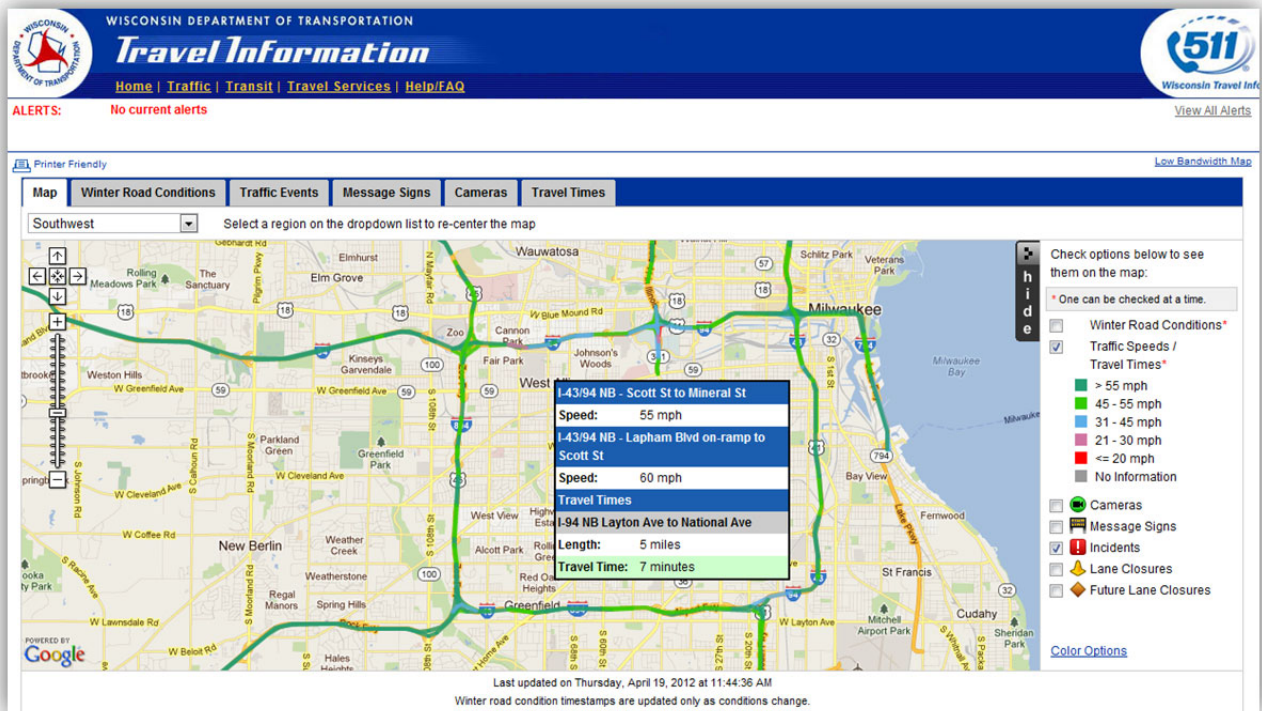
- US 41 between I-94 and W Lisbon Ave
- US 41/45 concurrent section between Holy Hill Rd and W Mill Rd
- US 45 between I-94 and US 41
- WIS 16 between WIS 67 (Oconomowoc) and I-94
- WIS 119 (Airport Spur)
- WIS 145 between N 68th St and US 41/45
- WIS 794 between E Layton Ave and I-794

WisDOT will define the RoS network, with consideration for AADT, OSOW priority network, Connections 2030 Corridors, NHS designation, emergency or alternate routes, and other factors. This process includes the WisDOT Bureau of Traffic Operations, WisDOT Southeast Region, and FHWA, in collaboration with local agencies such as cities, counties, and SEWRPC. The TOPS Lab will assist with facilitation, recommendations, and mapping. As the RoS network is identified, the Traffic Operations Infrastructure Plan (TOIP) will be updated to reflect the need for additional deployment of detection on the remaining segments.

**Table 10. Wisconsin Rule Requirements Summary**

Information	Coverage	Status	Recommendation
Construction (20 min latency)	Statewide, non-Milwaukee interstates	Rule is met Statewide coverage, information updated as needed, XML refreshes every 10 minutes	No action
Construction (10 min latency)	Milwaukee metro interstates and RoS	Rule is met Metro coverage, information updated as needed, XML refreshes every 10 minutes	No action
Incidents (20 min latency)	Statewide, non-Milwaukee interstates	Rule is met Information flows through STOC; XML and 511 system are updated every minute	No action
Incidents (10 min latency)	Milwaukee metro interstates and RoS	Rule is met Information flows through STOC; XML and 511 system are updated every minute	No action
Road Weather (20 min latency)	All interstates statewide and RoS	Coverage lacks I-535, I-794, and possible RoS; latency is good; other environmental hazards are reportable through LCS	Add I-535, I-794, and RoS to winter road condition reporting
Travel Times (10 min latency)	Milwaukee metro interstates and RoS	Portions of interstates within area not covered; need to define Routes of Significance network	Define Routes of Significance network; install detection or contract for travel time data





**Wisconsin DOT Traveler Information Web Page Example**

Construction information requirements are met. Construction information is currently administered through the statewide Wisconsin Lane Closure System (WisLCS). This is a real-time database with a web interface for those involved in construction or closure activity to input and modify current and planned activity. The information is publicly available via a XML feed that is currently updated every 10 minutes. The 511 web and phone service, as well as other third-party information providers disseminate the content of this XML.

Incident information requirements are met. Incident data statewide originates primarily from the Wisconsin State Patrol and Milwaukee County Sheriff. Filtered data flows to the STOC where it is subsequently made publicly available via a XML feed that is updated every minute and used in a similar fashion to construction information.

Road weather information coverage requirement. Road weather information is provided primarily from Wisconsin State Patrol (WSP) field observations. In 2008 a new interface was developed as part of the 511 system so that once confirmed observations were communicated to the dispatch centers, an operator updates the condition and that information is reflected in the publicly available 511 web and phone systems within approximately one minute.

All interstates are currently covered with the exception of I-535, which is a segment less than one mile long in Superior that includes the Blatnik Bridge to Duluth, and I-794 in downtown Milwaukee. Within the Milwaukee metro area, all other interstates are already covered, as well as most of the potential RoS network.

In coordination with WSP the two interstate segments and other designated RoS should be added to winter road condition reporting as part of a future enhancement. In the case of I-535, an agreement may be possible with Minnesota, and for I-794, which is patrolled by Milwaukee County Sheriff and not WSP, it may be possible to obtain timely condition information from Milwaukee County either to the WSP Waukesha post or the STOC for reporting. In late 2012 WisDOT is contracting for a new traveler information and 511 system, and it is expected that this coverage will be addressed during that development.

Travel time information coverage requirement. Travel time information is made available via the same XML feed that contains incident information. The end to end latency is approximately three minutes, well within the Rule requirement. Coverage throughout the Milwaukee area is lacking, however. Refer to the map to see what segments currently have speed and/or travel time information provided via the 511 website. Some segments not highlighted do have speed detection in place, but are not shown on 511. Once the RoS network is defined, solutions to this may include additional loop, video, or microwave detection, BlueTooth travel time detection, or other third-party information provider. It is important to note that the Rule has no specific requirements for travel time segment lengths.

## **Other Requirements**

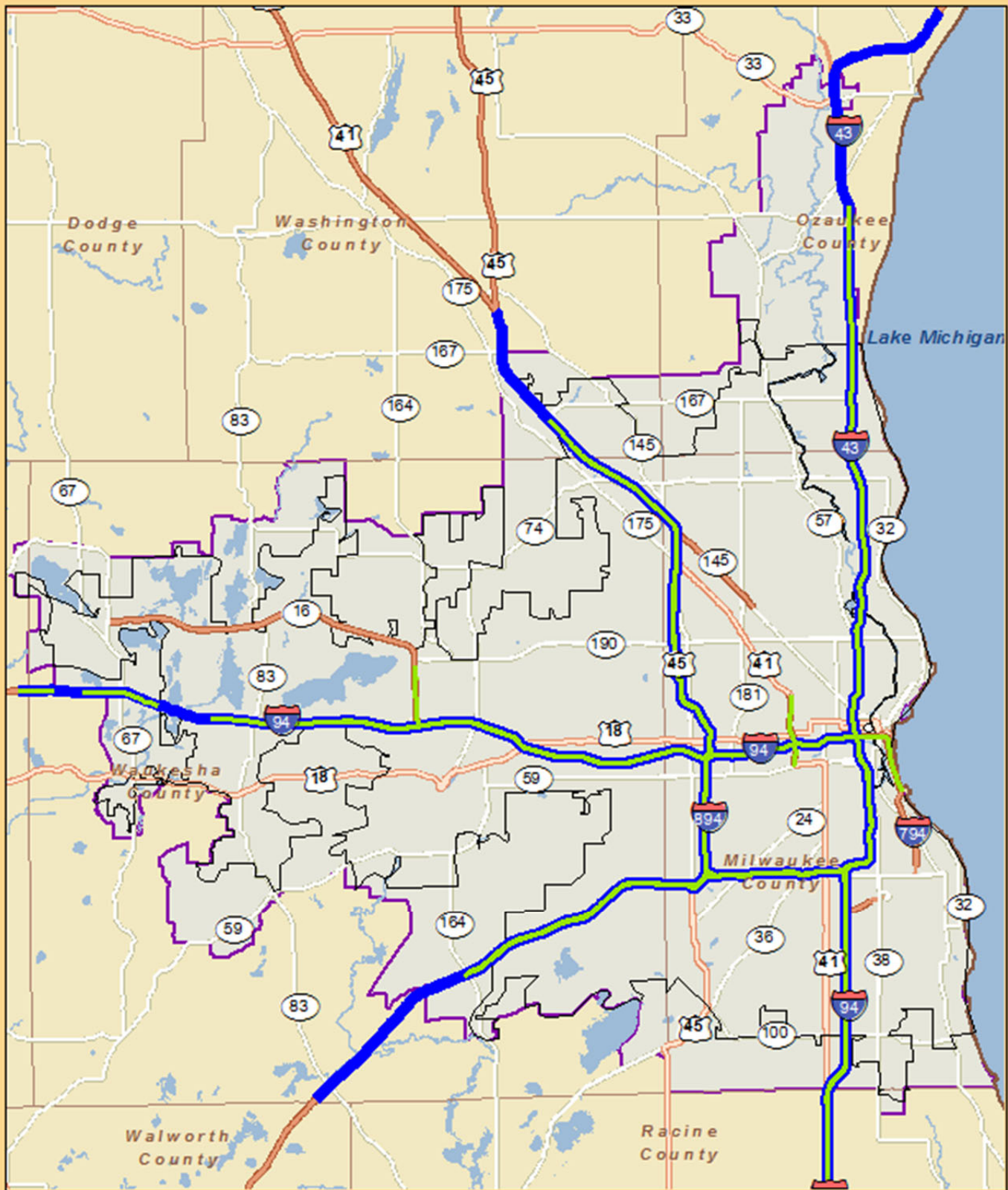
Information accuracy. The Rule states that the information shall be 85% accurate or have a maximum error rate of 15%. Wisconsin data exceeds this threshold, and this can be verified with spot checking.

Information availability. The uptime requirement is 90% for information provision, which is currently exceeded. For example, the 511 system currently has an uptime exceeding 99% with only very occasional issues or planned maintenance outages.

ITS Architecture. The statewide architecture currently meets the requirements of the Program. The 511 system, the WisTransPortal systems, and other related STOC systems are represented within the statewide architecture.







- Travel Time Information
- Road Weather
- Limited Access Roads
- Urbanized Area
- Adjusted Urbanized Area



**Real-Time System Management Information for Milwaukee Metro Area**  
 Note: Construction and incident information is available on all limited-access routes.

## **APPENDIX**

Contact information and several related resources are available at <http://www.topslab.wisc.edu/its/1201/> , including the following:

- This report
- The text of Section 1201
- Federal Register, Notice of Proposed Rulemaking (01/14/09)
- Federal Register, Final Rule (1/8/10)
- Federal Register, Summary of Responses ( 07/19/11)
- Link to the Current Code of Federal Regulations, Title 23, Section 511