NORTH/WEST PASSAGE

February 2026

Multi-State/Regional Project: Sharing Traveler Information Messages (TIMs) to a Central System

Project 19.6 – FINAL

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North/West Passage

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1. INTRODUCTION

The North/West Passage (NWP) pooled fund study program focuses on developing effective methods for sharing, coordinating, and integrating traveler information, operational activities, and emerging technologies across state and provincial borders. Membership includes the Washington State Department of Transportation (DOT), Idaho Transportation Department, Montana DOT, Wyoming DOT, North Dakota DOT, South Dakota DOT, and Minnesota DOT along the I-90 and I-94 corridors as illustrated in Figure 1-1.

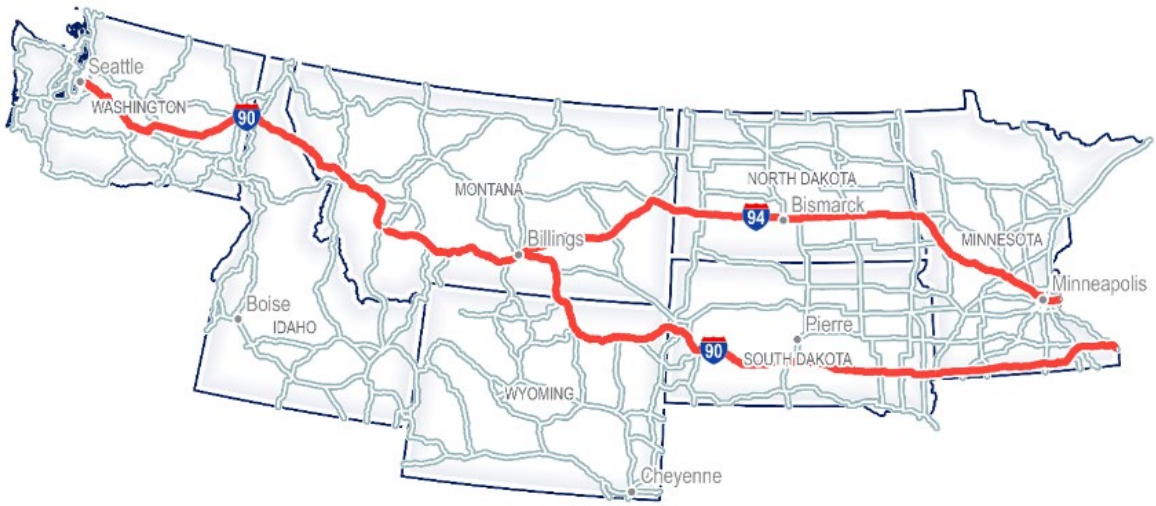

Figure 1-1: North/West Passage Member States

Traveler information is communicated to drivers in a variety of ways including:

- Dynamic message signs (DMS) that may be costly to install, maintain, and operate.
- State DOT individual traveler information systems websites and applications that vary state to state.
- Private company navigation applications that enable travelers to request origin to destination routing that is based on current travel time data sources. These applications also rely on data feeds from a variety of sources to provide travelers with information about activities along the routes.

Each NWP member state operates and maintains their own traveler information system with associated data feeds that make event and condition reports accessible through Internet data feeds. The primary consumers of the event and condition reports disseminated through these Internet data feeds are private company navigation applications. To a lesser extent, neighboring states' traveler information systems may access and utilize these data feeds as well. The NWP members have been researching the sharing of event reports through standardized messaging and event descriptions for multiple years through several previous projects, with the goal of disseminating event and condition reports as consistently as possible, using common standards that are recognized by the industry.

Project Goal

The goal of this project was to define a multi-state regional project that the NWP members could collectively pursue to advance the goals for sharing event and condition reports, both between NWP members and with private company navigation applications.

Project Concept

The NWP members met in-person in Bismarck, North Dakota in April 2025. During this meeting, an overall concept was agreed for this corridor-wide pilot project. The concept agreed was as follows:

- NWP member states would pursue the modification of their condition reporting systems and/or traveler information systems to generate SAE standardized Traveler Information Messages (TIMs) for Interstate events (i.e., I-90 and I-94) that describe full closures to the Interstate. TIMs are an industry accepted standard for communicating traveler information reports to vehicle systems. The concept was to start with only full closures to the Interstate to minimize the number and complexities of events for which TIMs are initially created.
- NWP member states would also implement the data exchange needed to send the TIMs that are generated to the Situation Date Exchange (SDX). The SDX was originally developed as the Situational Data Warehouse (SDW) during the Wyoming DOT Connected Vehicle (CV) Pilot Project. Originally envisioned to be owned and operated by the Federal Highway Administration (FHWA), the SDX is now operated by Trihydro at no cost to public agencies wishing to share TIMs through the SDX.
- NWP project funding would support coordination efforts and information exchanges to inform NWP members (and their contractors) about the TIMs and the integration needed to share TIMs with the SDX. Modifications to the members' traveler information and/or condition reporting systems to generate and share the TIMs to the SDX would be funded by members directly to their contractors or in-house organizations as applicable.
- An alternate approach was also discussed during the April 2025 meeting that would have involved NWP members using an on-line tool to manually create road closure events for I-90 and I-94 throughout the corridor, but members agreed that implementation of an automated TIM creation was the preferred approach. Although, the manual entry of TIMs using a Trihydro on-line tool is reserved as a backup plan for any NWP states that do not implement the automated data feed.
- NWP members agreed that the long-term vision Includes expanding TIM beyond full interstate closures. Members expressed interest in expanding to also share messages describing work zones and truck parking along Interstates in the NWP states through the SDX.

Document Purpose

This document describes the background activities and decisions reached for the sharing of TIM messages to serve as the background information needed for the next step in this effort to proceed with a demonstration. The demonstration will be completed as follow on to this effort in NWP Work Plan 20 Project titled "Corridor-wide Common Data Exchange of Road Closures Demonstration" anticipated to start in early 2026.

2. BACKGROUND

The premise of this project is based on multiple previous and ongoing activities, both within the NWP member states and nearby states, summarized as follows:

Prior NWP Research into Consistent Event Dissemination

In 2008, NWP Project 3.1 "Corridor-wide Consistent Major Event Descriptions" recognized the future need for event sharing between NWP states. To prepare for this data exchange, the goal of Project 3.1 was "To achieve a level of consistency in the major event reports created by member agencies in order to allow future program projects to ultimately offer consistent corridor-wide traveler information". A key outcome of this project was a definition of a limited set of consistent phrases that describe conditions consistently to support traveler information along the corridor, with "Road Closed" being one of the phrases recognized for consistency.

Origin and Evolution of the SDX

The Wyoming DOT was one of three agencies awarded cooperative agreements from the USDOT in 2015 to implement CV applications and technologies. The architecture of the Wyoming CV Pilot deployment included development and integration with a USDOT SDW. Data housed in the SDW included connected and autonomous vehicle (CAV) messages for weather and road conditions, incident information, work zone data, and parking information. This SDW was taken over in 2019 by Trihydro and later renamed to the SDX as the USDOT was no longer hosting the platform.

Prior NWP Research into the SDX

The members of the NWP program have shared an interest in the SDX that has been used and reported on by the Wyoming DOT since the Wyoming DOT CV Pilot project. NWP has included research related to the SDX as part of four previous projects.

- SDX Phase 1 2020: Provided an overview of the services offered by the SDX and how a DOT may go about creating and distributing CV messages along roadways. The project was meant for DOTs to obtain an understanding of what the SDX is and how it operates, as well as how a DOT can leverage the SDX to communicate with CVs on their roadways. In addition, a summary was developed to understand the effort to take existing state data feeds and convert that data into TIMs, as well as what gap exists between existing state data feeds and TIM data needs.
- SDX Phase 2 2022: Conducted a gap analysis of different CAV messages sets and a high-level overview of the data needed in order for a DOT to support the generation of all these CAV message types. A level of effort on integrating the SDX with a cloud-hosted SCMS that would allow the SDX to sign and manage CV messages within the SDX system was also provided. In addition, scenarios in which the SDX worked well for message distribution vs scenarios where message delivery using 5.9 GHz direct communications is more time critical were documented.
- SDX Phase 3 2023: Helped with building out features and functionality of the SDX that would benefit all DOTs, especially NWP members that were either considering or already implementing Work Zone Data Exchange (WZDx). This included tasks associated with aggregating and housing WZDx messages from all states that were publishing WZDx feeds.
- SDX Phase 4 2024: Researched the business cases for the SDX. Wyoming DOT's CV Pilot deployment evolved their dissemination approach to largely focus on the SDX. The motivation for

this Phase 4 effort was continued interest by the NWP in learning more about SDX to understand the motivation and/or need for the use of a centralized data exchange, especially as each NWP member agency operates some form of an Application Programming Interface (API) communicating their event data to third parties. Business cases related to the SDX were created to assist members in understanding the use of a centralized data exchange.

SDX Role in Current Information Sharing Projects

Background information regarding other related efforts that are either planning for or already sharing TIMs using the SDX are described below for additional context to this project.

Utah, Wyoming, Colorado – Connecting the West Project. In 2024, FHWA awarded three Vehicle to Everything (V2X) Accelerator Grants. One of these V2X Accelerator Grants was awarded to a three-state project team (referred to as the Connecting the West (CTW) Project) that consists of Utah DOT, Wyoming DOT, and Colorado DOT. While the primary emphasis of the grant award and infrastructure deployment for the CTW Project was on V2X Direct communications using 5.9 GHz communications, the CTW Project is modifying systems in Utah and Colorado to share TIM and event messages with the SDX to accomplish information sharing between the states as well as with private sector navigation systems.

I-80 Corridor. States along the I-80 Corridor have been conducting a trial of entering TIMs through the manual entry tool to facilitate consistent event report sharing between states along the corridor as well as the sharing of events to private sector navigation systems.

3. PROJECT APPROACH

This section describes the approach the NWP members followed to move towards the project goal for sharing event and condition reports, both between NWP members and with private company navigation applications.

Following the in-person NWP member discussion in April 2025 and general agreement to the project approach by the NWP members, a series of virtual meetings were conducted between June 2025 and January 2026, summarized as follows:

Virtual Meeting Series #1: Introduction to TIMs and the SDX

- Building upon the decision during the April 2025 meeting to pursue TIM sharing through the SDX, an initial set of meetings were organized to introduce TIMs and the SDX to other staff in NWP member agencies as well as the traveler information contractor or DOT staff responsible for the condition reporting system and/or traveler information system.
- These meetings conducted between June – August 2025 included Trihydro that presented detailed information about the TIMs as well as the interface to the SDX.
- Background materials on TIMs and the SDX as well as on-line links to resources were circulated following each meeting.
- The decision reached within each meeting was that each NWP state would work with their contractors or internal staff to receive cost estimates and time estimates for implementing the creation of TIMs and sharing of TIMs through the SDX.

Virtual Meeting #2: Group Webinar to Answer Specific Questions About the SDX

- Following the initial meetings, there were additional questions initiated by Washington State DOT that other members were interested in as well. These were questions about the financial approach to the SDX operations and whether messages sent to the SDX were re-sold to others that were answered during a webinar in November 2025. With the center-to-center model of the SDX, data is periodically pulled every 5 minutes. This does not cost data consumers or data producers anything to access the system. However, if for example an OEM would pull data for every single one of their vehicles there would be a network cost. The SDX is not a revenue model, although there is overall maintenance for the SDX that has been funded by the Wyoming DOT.

Virtual Meeting Series #3: Follow-up Meetings with Each State

- A second set of webinars were conducted with each NWP member state in January 2026. The intent of these follow-up meetings was to receive an update from the state DOT on their progress and any decisions reached, as well as to answer any additional questions to move forward with creating TIMs for road closures.

4. CORRIDOR-WIDE COMMON DATA EXCHANGE OF ROAD CLOSURES DEMONSTRATION: PROJECT DESCRIPTION

The technical, financial, and business aspects of a Corridor-wide Common Data Exchange of Road Closures Demonstration project are described in this section.

Technical Aspects

The technical aspects of the Corridor-wide Common Data Exchange of Road Closures Demonstration project are summarized as follows:

- **Exchange of TIM Messages.** Road closures along Interstate highways in the NWP states will be described using SAE J2735 TIMs.
- **Sharing TIMs to the SDX.** Once TIMs are generated, updated, or expired, the message (or message update) will be shared to the SDX.
- **Optional Security Credentials.** The TIMs shared to the SDX may include security credentials identifying the state DOT that created the event as the authority and establishing credibility of the message.
- **No Additional Changes to State DOT Systems.** NWP member states are not being asked to modify their systems in other ways. Individual traveler information systems will continue to operate and the only addition is the sharing of data with the SDX. States may wish to consume TIMs shared by neighboring NWP states through the SDX exchange.

Through this project, each NWP member is aiming to modify their local systems to generate TIMs that describe interstate closures. As a backup plan, if any NWP state decides not to create and share TIMs, a manual tool could be used to create the TIMs for Interstate road closures, but this may result in a financial contribution by the member states.

NWP SDX Phase 4 project completed by NWP in 2024 documented benefits and challenges with TIMs sharing through the SDX.

- *Benefits*
  - *TIMs follow a strict standard to ensure consistency as transportation agencies develop these messages.*
  - *The use of valid regions for each TIM removes any uncertainty about the location of the event.*
  - *Assigning security credentials to TIMs identifies the source and establishes trust in the message.*
- *Challenges*
  - *TIMs are more complex to create than generating messages using XML or related structures for data.*
  - *Proper management of TIMs requires the issuance of updated TIMs if/when the location or timing of the alert changes for third parties to confidently use the information contained in the TIMs.*
  - *DOTs might not have the mechanisms in place with Security Credential Management Systems (SCMS) providers that are required to apply security credentials to TIMs.*
  - *While beneficial, the SDX introduces an extra "layer" between the agency generating the messages and the end consumer. This additional layer could be susceptible to outages or require future funding to operate.*

Financial Aspects of the Project

To accomplish creation of TIMs for road closures, each NWP member state is aiming to modify their traveler information system to generate TIMs and send them to a centralized system (e.g., SDX). Those member states that utilize a traveler information consultant will work through their current contracting mechanisms to add TIMs creation as an additional effort. For those states that operate and maintain their traveler information system internally they will work to create TIMs. There is a cost to creating TIMs that each NWP state will pursue internal funding to accomplish. There is not funding anticipated from NWP for each state to create TIMs for road closures.

Through discussion with Trihydro there is no cost for NWP members to send TIMs to the SDX. However, due to the secure and standardized nature of TIMs, a separate effort may be needed with Trihyrdro to support integration with the SDX and technical support to ensure each NWP member states TIMs are consistent and uniform. If support from Trihydro is desired, Trihydro will be asked to submit a scope of work and budget for approval by the NWP members.

Business Aspects of the Project

As NWP member states move forward with this project and agree to send road closure messages, a key initial step will be to create a project document with the goal of agreement by all NWP members and by Trihydro describing each DOT's role and Trihydro's role in delivering TIMs. Following are aspects to clarify and document.

- Document what the minimum agreed period of time that Trihydro agrees to operate the SDX to share road closure TIMs received from NWP members at no cost.

- Clarify that providing TIMs to the SDX does not preclude NWP members from sharing TIMs with others.
- Identify the timeline of the agreement that NWP members will send TIMs to the SDX (e.g., renew in 5 years).
- Document the outreach process used for Trihydro to share TIMs with third parties. Provide and update to NWP members on those subscribing to the TIMs.
- Document Trihydro's responsibilities and rights to use the TIMs.
- Document any detail for expanding to other TIMs (e.g., road work, truck parking).

The details will be documented through a project deliverable describing the roles for use in member state establishing funding internally to create TIMs. There are also more formal agreements to consider, as Wyoming DOT has an established Memorandum of Understanding (MOU) with Trihydro.

5. SUMMARY AND NEXT STEPS

The purpose of this document was to document and define a multi-state regional project that the NWP members could collectively pursue to advance the goals for sharing event and condition reports, both between NWP members and with private company navigation applications. The overall agreed to concept was for each NWP member state to share TIMs to the SDX for interstate full road closures. This project ends with providing the technical, financial, and business aspects of creating and sharing TIMs to the SDX. The information from this effort and all previous related NWP SDX projects will be used towards implementation in NWP's Project 20 titled "Corridor-wide Common Data Exchange of Road Closures Demonstration" anticipated to early 2026.

However, it is understood that the following key outstanding questions need to be resolved before moving forward with implementation.

- Are all NWP states committed to the project?
- Does each committed NWP state have a contracted agreement in place to implement the addition of TIM creation and sharing to the SDX (if needed - or would development be internal)?
- What is the timeline for the WP 20 project?