

# NORTH/WEST PASSAGE

```
start_date: "2023-04-04T02:00:00Z"  
end_date: "2023-04-04T09:00:00Z"  
start_date_accuracy: "estimated"  
end_date_accuracy: "estimated"  
event_status: "pending"  
vehicle_impact:  
location_method:  
▼ geometry:  
  type:  
  ▼ coordinates:  
    ▼ 0:  
      0:  
      1: 44.972662  
▼ bbox:  
  0: 44.9726622  
  1: -93.3411708  
  2: 44.9726622  
  3: -93.3411708
```



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Activity to Support the Work Zone Data  
Initiative – Phase 2

Project 17.6

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*Note: The images on the cover page are from the Minnesota Department of Transportation WZDx public feed and the United States Department of Transportation (USDOT) Github website.*

## 1.0 INTRODUCTION

The [North/West Passage Transportation Pooled Fund Study](#)<sup>1</sup> 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 states of Washington, Idaho, Montana, Wyoming, North Dakota, South Dakota, and Minnesota. See Figure 1.



Figure 1. North/West Passage Members

The corridors within the North/West Passage states function as major corridors for commercial and recreational travel and are predominantly rural.

The purpose of this effort was to identify gaps between North/West Passage member states work zone reporting and the data elements included in the United States Department of Transportation (USDOT) Work Zone Data Exchange (WZDx) specification. The WZDx offers a standard data exchange format for communicating work zone information, with a variety of mandatory and optional fields.

**Project Purpose**

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To identify gaps between NWP members states work zone reporting and data elements in the USDOT WZDx specification.

Overall, this effort concludes that **North/West Passage agencies are well positioned to develop and publish WZDx feeds to cover the entire corridors.** Other conclusions from this effort include:

- All North/West Passage agencies currently collect and provide extensive work zone data and information either on their agency traveler information website, as a WZDx feed, or both.
- Gaps between each agency’s existing work zone data and the WZDx version 4.2 specification are minimal and should not require extensive, additional data collection efforts.
- The minor differences that were identified between each agency’s work zone data and what is required within the WZDx version 4.2 specification have been documented separately for each agency in order for updates to be made, as desired.
- A common difference between existing agency feeds and the WZDx version 4.2 specification is the latitude/longitude locations, including the start and end of each work zone event. However, as noted herein, these values may be available in existing agency reporting systems and may not require extensive activity to publish it when developing a WZDx feed.
- Most North/West Passage agencies currently collect and provide work zone data elements beyond those that are required by the WZDx version 4.2 specification, such as commercial motor vehicle restrictions. This data could be used to provide a more robust and more useful WZDx feed.

This report provides an overview of the WZDx specification and presents the findings of a gap analysis conducted on data samples and work zone event information available on North/West Passage agency

<sup>1</sup> <https://www.nwpassage.info/>

traveler information websites to identify what is needed to conform to the WZDx version 4.2 specification. The organization of this report consists of the following sections:

- [Chapter 2.0](#): An overview of the WZDx specification,
- [Chapter 3.0](#): Current North/West Passage state work zone data practices,
- [Chapter 4.0](#): A gap analysis for each North/West Passage state that compares existing data to the WZDx version 4.2 specification, and
- [Chapter 5.0](#): Key takeaways.

## 2.0 THE WORK ZONE DATA EXCHANGE SPECIFICATION

The WZDx specification was initiated in 2018 by the USDOT), which supported WZDx development by organizing a number of working groups comprised of public- and private-sector participants. As of 2023, there were over 375 WZDx working group members from 185 unique public and private organizations. Following the release of WZDx version 4.2 in February 2023, a Connected Work Zone effort is underway to formally standardize the WZDx as part of the Connected Transportation Interoperability (CTI) family of standards.

The WZDx specification supports the consistent provision of work zone data between transportation agencies and third-parties, including traveler information providers, contractors, and work zone devices.

### 2.1 Why Are Agencies Developing WZDx Feeds

The WZDx specification supports the consistent provision of work zone data and can be applied to a variety of use cases. Nationally, standardized work zone data can facilitate the ingest of agency data by third-party traveler information providers. Additionally, consistent work zone data may also facilitate data flows from work zone devices being used by different vendors across the country into agency systems, or between transportation agencies and other parties like contractors or utilities conducting the work. It is important to emphasize:

- The WZDx IS a data specification that is being developed into a standard for easy interoperability between agencies, contractors, and third parties (e.g., traveler information providers) at a national level.
- The WZDx IS NOT a data warehouse or repository. While the USDOT maintains a [website that lists and includes links to all current and past WZDx feeds](#)<sup>2</sup> and does archive WZDx feed data, there is not a “one-stop shop” WZDx data repository or feed.

While many agencies already publish work zone information in a variety of agency traveler information websites and social media forums, the WZDx provides one more opportunity to reach third-party providers and the traveling public. Specifically, many agencies are publishing WZDx feeds with the expectation that the availability of a consistent specification for work zone event data from many agencies will encourage and facilitate the ingest of work zone data directly from the agency by third-party providers in order to provide improved and more accurate information to the traveling public via those services and applications. For instance, there is sometimes a disconnect between agencies and third-party providers that results in travelers being routed down roads that are closed or have restrictions. The data from WZDx feeds also includes data about whether location and activity has been verified in order to increase confidence in the data for possible use cases like the provision of in-vehicle warnings to drivers about work zone activity for work zone safety applications.

### 2.2 What the WZDx Includes

The WZDx specification has been developed to describe the consistent provision of work zone event data, including data that describes the when, where, and anticipated impact of planned, active, or historic work zones. Since the launch of the first version, the WZDx has evolved to include additional data elements and feeds, based on user needs, and data elements and allowable entries have been modified to facilitate use.

<sup>2</sup> <https://datahub.transportation.gov/Roadways-and-Bridges/Work-Zone-Data-Exchange-WZDx-Feed-Registry/69qe-yiui/data>

For instance, recent efforts expanded the WZDx to include data about worker presence. Additionally, the WZDx feed evolved to be organized into four separate feeds, as presented in Table 1. Specifically:

- **Work Zone Feed.** The core WZDx feed is called the work zone feed, and is the primary focus of the gap analysis described in Chapter 4.0. It describes work zone events and detours, and is generally produced by transportation agencies for use by the traveling public via third-party traveler information providers.
- **WZDx Device Feed.** The WZDx device feed was developed to facilitate the ingest of work zone device data available from the equipment manufacturers or vendors by transportation agencies and third parties.
- **Road Restriction Feed.** The road restriction feed was developed by the WZDx groups, recognizing that information about permanent restrictions regarding bridge load limits or height clearances, for example, can leverage a similar data structure as temporary restrictions described in the WZDx for work zone events.
- **Road Incident Feed.** Similarly, the road incident feed was developed by WZDx groups, recognizing that information about unplanned traffic incidents and crashes can use a similar data structure as the WZDx.

Note that the last two feeds are listed in Table 1 as part of the Transportation Data Exchange (TDx) and that the USDOT is undertaking additional data specification efforts for other operational events, such as the Traffic Incident Management Data Exchange (TIMDx) effort that is currently underway. **For the remainder of this report, any reference to the “WZDx” refers specifically to the “Work Zone Feed.”**

Table 1. Four data feeds have been developed as part of the WZDx specification effort (Source: USDOT)

GitHub site	<a href="#">WZDx</a>	<a href="#">WZDx</a>	<a href="#">TDx</a>	<a href="#">TDx</a>
Feed	Device Feed	Work Zone Feed	Road Restriction Feed	Road Incident Feed
Features	Devices	Road Events	Road Events	Road Events
Feature types	Arrow boards, cameras, dynamic message signs, flashing beacons, hybrid signs, location markers, traffic sensors, traffic signals	Work zones and detours	Restrictions, such as bridge heights	Incidents and detours
Producer	Work zone equipment manufacturers or vendors.	Transportation Authorities like Tribal, Local, County, State, or Federal Agencies.		
Consumer	Transportation agencies. Mapping & Navigation companies and CAVs may also be interested.	Traveling public via third parties such as mapping and navigation applications and CAVs.		

The WZDx specification allows for flexibility in how much information is included. Table 2 shows the required and optional data elements for the WZDx work zone feed. It is important to note that even some required data elements allow the agency flexibility if the information is not available or verified; for example, it is acceptable for the start and end dates and positions to be listed as unverified, and location method and vehicle impacts to be “unknown.” However, the quality of an agency WZDx feed is only as good as the amount and quality of data it contains.

As such, a key question that agencies must consider when developing a WZDx feed is: how much information do you want to include to increase the value of the data you are providing? In general, if an agency is able to provide more detailed information (e.g., speed limit information or commercial motor vehicle restrictions) and ensure that the data provided is high quality and verified, then the WZDx feed is likely to be more useful and a trusted source of information by third parties and the traveling public.

The WZDx specification allows flexibility to include more or less information, however more data will generally make a feed more useful, and verifying the data will make it higher quality and trusted more.

Table 2. Required and Optional WZDx Data Elements in the Work Zone Feed

WZDx Data Name	Required in WZDx?
identifier	x
type	x
event_type	x
data_source_id	x
road_names	x
direction	x
related_road_events	
name	
description	
creation_date	
update_date	
start_date	x
end_date	x
is_start_date_verified	x*
is_end_date_verified	x*
is_start_position_verified	x*
is_end_position_verified	x*
work_zone_type	
location_method	x
vehicle_impact	x
impacted_cds_curb_zones	
lanes	
beginning_cross_street	
ending_cross_street	
beginning_milepost	
ending_milepost	
types_of_work	
worker_presence	
reduced_speed_limit_kph	
restrictions	
(geometry) type + linestring or multipoint	x
bbox	

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

### 2.3 How the WZDx Depicts Work Zone Events

The screenshots below are taken from the Minnesota DOT (MnDOT) WZDx feed and 511 traveler information website to illustrate how work zone data is presented. Note that the MnDOT WZDx feed conforms to the WZDx version 4.0 specification and includes some but not all optional WZDx data elements, such that the WZDx feed may appear slightly different for other agencies. All WZDx feeds begin with “road\_event\_feed\_info” that provides general information about the work zone event data provided, including the publisher, update frequency, update date, WZDx version, and data sources used. As shown in Figure 2, MnDOT also includes contact information. Next, each of the “features” in a WZDx feed presents data on a different work zone event. Figure 2 only shows “feature” 0 and 1, while many additional work zone events are also presented; one of these MnDOT work zone event “features” is illustrated in Figure 3. Finally, Figure 4 shows the work zone event in Figure 3 from the Minnesota WZDx feed as presented on the Minnesota DOT 511 traveler information website.

```
▼ road_event_feed_info:
  publisher: "MnDOTCastleRock"
  contact_name: "Garrett Schreiner"
  contact_email: "garrett.schreiner@state.mn.us"
  update_frequency: 60
  update_date: "2023-04-01T01:13:33.813067Z"
  version: "4.0"
  license: "https://creativecommons.org/publicdomain/zero/1.0/"
  ▼ data_sources:
    ▼ 0:
      data_source_id: "CARS"
      organization_name: "MnDOT"
      contact_name: "Garrett Schreiner"
      contact_email: "garrett.schreiner@state.mn.us"
      update_frequency: 60
      update_date: "2023-03-31T21:54:24.041131Z"
  type: "FeatureCollection"
  ▼ features:
    ▶ 0: {}
    ▼ 1:
```

Figure 2. Screenshot of the MnDOT WZDx feed “road\_event\_feed\_info”



```

▼ 1:
  id: "CARS4-29346"
  type: "Feature"
  ▼ properties:
    ▼ core_details:
      data_source_id: "CARS"
      event_type: "work-zone"
      ▼ road_names:
        0: "MN 100"
        direction: "southbound"
        description: "Entrance Ramp Blocked"
        update_date: "2023-03-30T21:39:05.297480Z"
      beginning_milepost: 7.926625860374365
      ending_milepost: 7.926625860374365
      beginning_accuracy: "estimated"
      ending_accuracy: "estimated"
      start_date: "2023-04-04T02:00:00Z"
      end_date: "2023-04-04T09:00:00Z"
      start_date_accuracy: "estimated"
      end_date_accuracy: "estimated"
      event_status: "pending"
      vehicle_impact: "unknown"
      location_method: "other"
    ▼ geometry:
      type: "MultiPoint"
      ▼ coordinates:
        ▼ 0:
          0: -93.341171
          1: 44.972662
      ▼ bbox:
        0: 44.9726622
        1: -93.3411708
        2: 44.9726622
        3: -93.3411708
  
```

Figure 3. Screenshot of a work zone event in the MnDOT WZDx feed

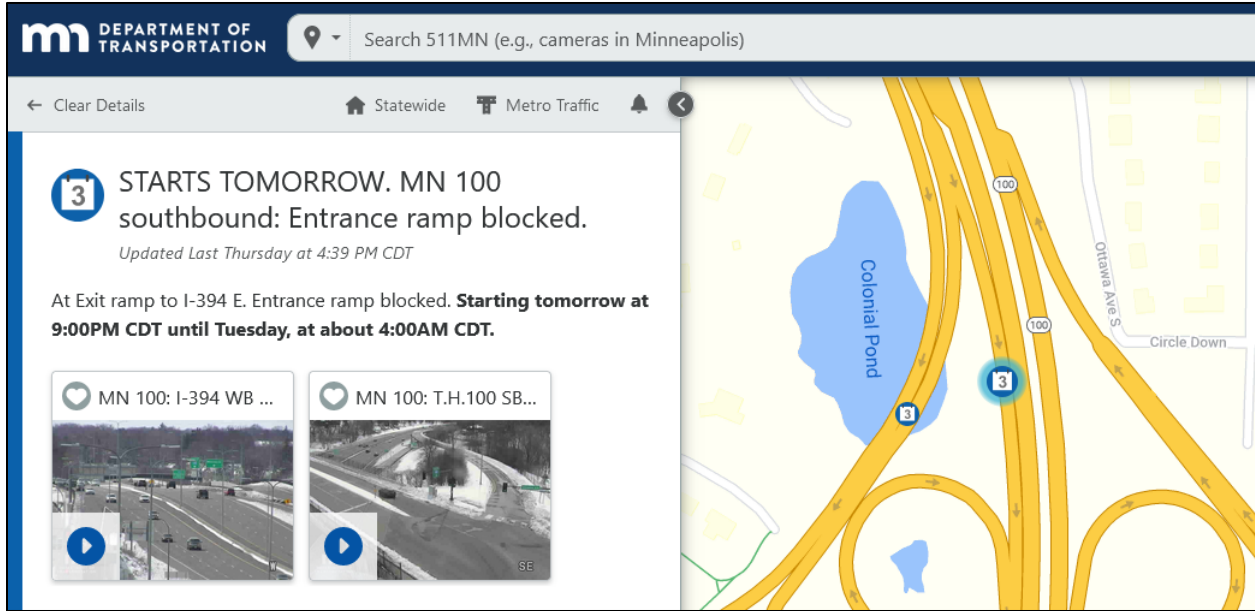


Figure 4. Screenshot of a MnDOT work zone event from the 511 traveler information website

## 2.4 WZDx Resources

The [USDOT WZDx Github site](#) is an invaluable resource for agencies interested in developing and publishing a WZDx feed. It includes examples of WZDx feeds and resources for agencies interested in developing and publishing a WZDx feed. Specific pages that are available and may be of interest to North/West Passage members include:

- [WZDx Specification Content](#)<sup>3</sup>, specifically for the road event feature, describes in detail each WZDx data element in the work zone feed, allowable entries as applicable, whether or not the data element is required, and is organized based on the the structure of the feed (i.e., within the road event feature, click the “workzoneroadevent” link to see the data elements contained within, and then “core\_details” to see the data elements nested therein).
- [WZDx Specification Release Notes](#)<sup>4</sup> describes the changes made between each version update, and may be a helpful resource for agencies wishing to upgrade their WZDx feed to the latest version.
- [WZDx Feed Registry](#)<sup>5</sup> includes links to all active and former WZDx feeds that are available from transportation agencies.

<sup>3</sup> <https://github.com/usdot-jpo-ode/wzdx/blob/main/spec-content/objects/RoadEventFeature.md>

<sup>4</sup> <https://github.com/usdot-jpo-ode/wzdx/blob/main/RELEASES.md>

<sup>5</sup> <https://datahub.transportation.gov/Roadways-and-Bridges/Work-Zone-Data-Exchange-WZDx-Feed-Registry/69qe-yiui/data>

### 3.0 NORTH/WEST PASSAGE CURRENT WORK ZONE DATA PRACTICES

This effort examined the current work zone data practices of each North/West Passage state. Each agency was requested to provide a data sample to support the gap analysis, which is presented in the next chapter. Additionally, the work zone information provided on North/West Passage agency 511 and traveler information websites was examined for those states that are not currently developing or publishing a WZDx feed. To summarize current North/West Passage state efforts:

All North/West Passage members provide extensive work zone data and information via their agency traveler information websites.

- MnDOT publishes a WZDx version 4.0 feed.
- North Dakota DOT (NDDOT) is conducting work to develop a WZDx version 4.0 feed.
- South Dakota DOT (SDDOT) publishes work zone information on the agency 511 traveler information website (see Figure 5).
- Wyoming DOT (WYDOT) is currently working with TriHydro on upgrades to their Situational Data Exchange (SDx) that will support a WZDx feed (see Figure 7).
- Montana Department of Transportation (MDT) publishes work zone information on the agency 511 traveler information website (see Figure 6).
- Idaho Transportation Department (ITD) publishes work zone information on the agency traveler information website (see Figure 8).
- Washington State DOT (WSDOT): has developed and is finalizing a WZDx version 4.1 feed.

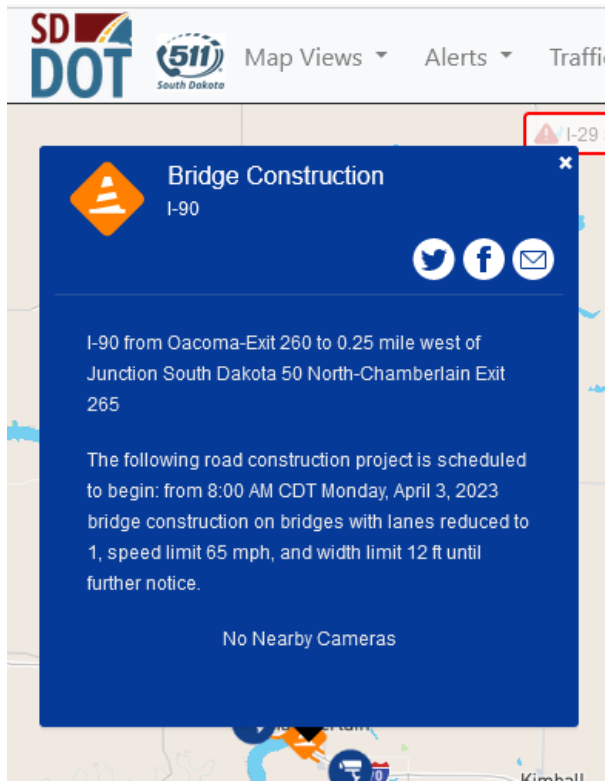


Figure 5. Example of work zone event information on the SDDOT 511 traveler information website

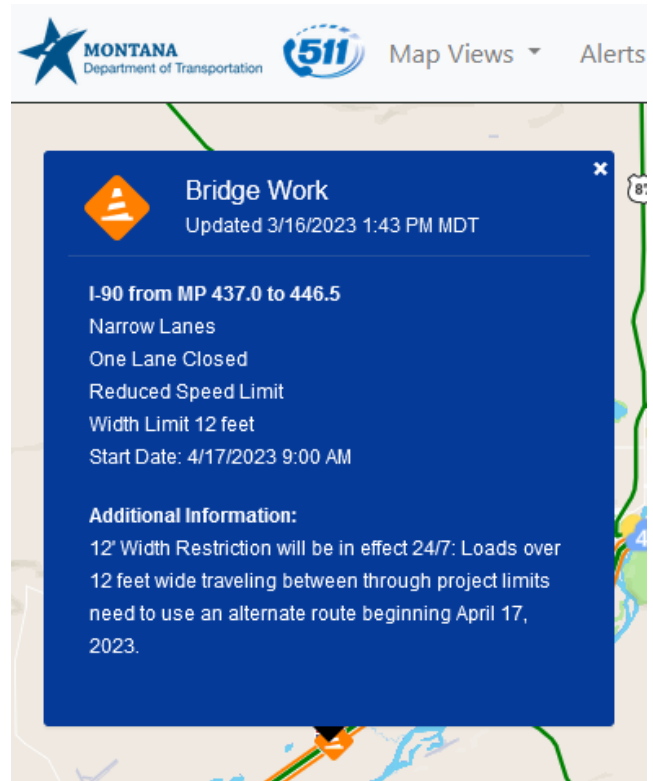


Figure 6. Example of work zone event information on the MDT 511 traveler information website

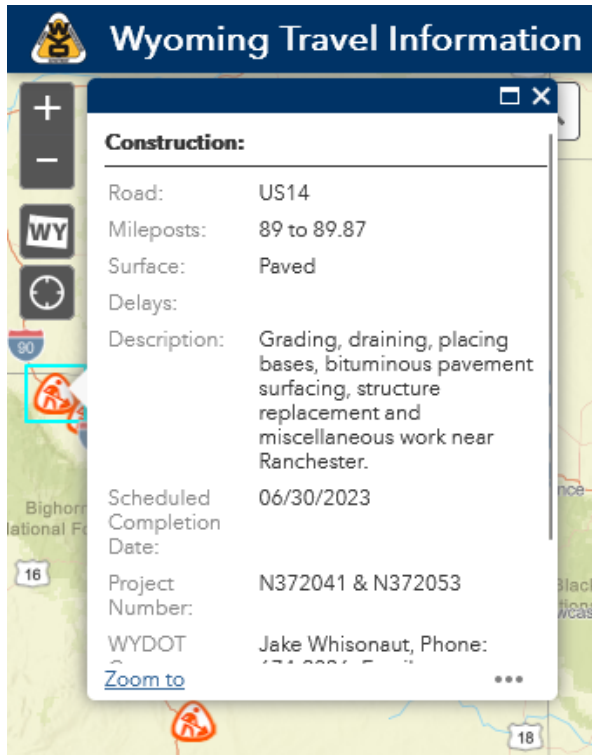


Figure 7. Example of work zone event information on the WYDOT traveler information website

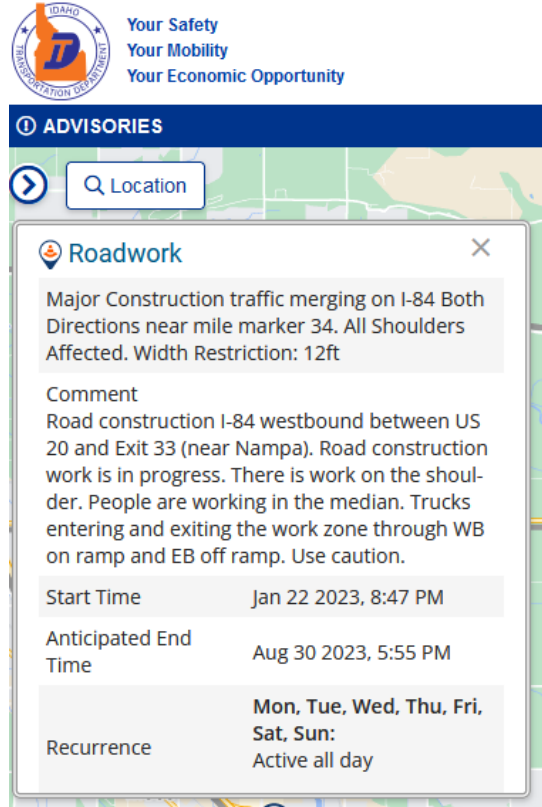


Figure 8. Example of work zone event information on the ITD traveler information website

## 4.0 GAP ANALYSIS

A primary objective of this effort was to summarize the gaps between existing state work zone data reports and the required WZDx data elements, while also documenting links from existing data to the optional WZDx data elements. This section presents a summary table for each North/West Passage agency that lists:

- The WZDx data name and indicates in **bold** whether it is a required WZDx data element;
- The name of the corresponding state agency work zone data element, as available;
- An example of the data value from the agency-provided data sample for this effort or the agency traveler information website; and
- Any applicable notes regarding the gap analysis findings, with color coding to indicate:
  - **Green**: if the data is generally available and no major change is needed.
  - **Yellow**: if minor changes are needed for the data to conform to the WZDx version 4.2 specification.
  - **Red**: if the data was not present in the sample and could constitute a major change to provide the data for the WZDx version 4.2 specification.
  - **White**: if the data is not present for an optional data element and no change is needed.

### 4.1 Minnesota Department of Transportation

MnDOT received a USDOT WZDx demonstration grant that was used to develop a WZDx version 4.0 feed. This analysis used a sample of data available through MnDOT’s publicly available WZDx API feed. As noted in Table 3 below, only minor discrepancies exist between MnDOT’s WZDx version 4.0 feed and the WZDx version 4.2 specification; it should be noted that it is possible additional changes in allowable data values may also exist between the version 4.0 and version 4.2 specifications.

Table 3. Gap Analysis between the WZDx version 4.2 specification and the WZDx version 4.0 data feed available from MnDOT

WZDx Version 4.2 Data Name (in bold, if required)	Minnesota DOT (WZDx v4.0)		
	Data Name	Value	Notes
<b>identifier</b>	id	"CARS4-29344"	No change needed
<b>type</b>	type	"Feature"	No change needed
<b>event_type</b>	event_type	"work-zone"	No change needed
<b>data_source_id</b>	data_source_id	"CARS"	No change needed
<b>road_names</b>	road_names	"I-94"	No change needed
<b>direction</b>	direction	"westbound"	No change needed
related_road_events	-	-	n/a
name	-	-	n/a
description	description	"Entrance Ramp Blocked"	No change needed
creation_date	-	-	n/a
update_date	update_date	"2023-03-24T05:48:16.209252Z"	No change needed
<b>start_date</b>	start_date	"2023-03-29T02:00:00Z"	No change needed
<b>end_date</b>	end_date	"2023-03-29T08:00:00Z"	No change needed

<b>is_start_date_verified*</b>	start_date_accuracy	"estimated"	start_date_accuracy is expected to be phased out in future WZDx versions
<b>is_end_date_verified*</b>	end_date_accuracy	"estimated"	end_date_accuracy is expected to be phased out in future WZDx versions
<b>is_start_position_verified*</b>	beginning_accuracy	"estimated"	beginning_accuracy is expected to be phased out in future WZDx versions
<b>is_end_position_verified*</b>	ending_accuracy	"estimated"	ending_accuracy is expected to be phased out in future WZDx versions
work_zone_type	-	-	n/a
<b>location_method</b>	location_method	"other"	No change needed
<b>vehicle_impact</b>	vehicle_impact	"unknown"	No change needed
impacted_cds_curb_zones	-	-	n/a
lanes	-	-	n/a
beginning_cross_street	-	-	n/a
ending_cross_street	-	-	n/a
beginning_milepost	beginning_milepost	231.748775653747	No change needed
ending_milepost	ending_milepost	231.748775653747	No change needed
types_of_work	-	-	n/a
worker_presence	-	-	n/a
reduced_speed_limit_kph	-	-	n/a
restrictions	-	-	n/a
<b>(geometry) type + linestring or multipoint</b>	(geometry) type + linestring or multipoint	"Multipoint", coordinates: 0: "-93.286915", 1: "44.979049"	No change needed
bbox	bbox	0: "44.979048797", 1: "-93.286915013", 2: "44.979048797", 3: "-93.286915013"	No change needed
-	event_status	"pending"	Deprecated in version 4.2

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

Data source: [https://mn.carsprogram.org/carsapi\\_v1/api/wzdx](https://mn.carsprogram.org/carsapi_v1/api/wzdx)

#### 4.2 North Dakota Department of Transportation

NDDOT is developing a WZDx version 4.0 feed. Although not yet publicly available at the time of this project, a sample of the WZDx version 4.0 feed was provided by NDDOT. As noted in Table 4 below, only minor discrepancies exist between North Dakota DOT’s WZDx version 4.0 feed and the WZDx version 4.2 specification; it should be noted that it is possible additional changes in allowable data values may also exist between the version 4.0 and version 4.2 specifications.

Table 4. Gap Analysis between the WZDx version 4.2 specification and the WZDx version 4.0 data sample provided by NDDOT

WZDx Version 4.2 Data Name (in bold, if required)	North Dakota DOT (WZDx v4.0)		
	Data Name	Value	Notes
<b>identifier</b>	id	"CN-21855"	No change needed
<b>type</b>	type	"Feature"	No change needed
<b>event_type</b>	event_type	"work-zone"	No change needed
<b>data_source_id</b>	data_source_id	"NDDOT-WZDX"	No change needed
<b>road_names</b>	road_names	"29N"	No change needed
<b>direction</b>	direction	"Northbound"	No change needed
related_road_events	related_road_events	-	n/a
name	name	-	n/a
description	description	"Head to head traffic is active. Speed reduced to 65 MPH. Northbound traffic will be restricted to 20'. Southbound traffic will be restricted to 14.5'. Southbound traffic will enter head to head at mile 101 at the crossover. Southbound traffic will continue south for 13 miles and exit head to head at the crossover located at mile 88. Traffic is delineated with signs, barriers, barrels, and tubes."	No change needed
creation_date	creation_date	"2022-04-19T05:00:00+00:00"	No change needed
update_date	update_date	"2022-09-13T11:51:42+00:00"	No change needed
<b>start_date</b>	start_date	"2022-04-19T00:00:00-05:00"	No change needed
<b>end_date</b>	end_date	"2023-01-09T00:00:00-06:00"	No change needed
<b>is_start_date_verified*</b>	is_start_date_verified	"false"	NDDOT also includes "start_date_accuracy" ("verified")
<b>is_end_date_verified*</b>	is_end_date_verified	"false"	NDDOT also includes "end_date_accuracy" ("verified")

is_start_position_verified*	is_start_position_verified	"false"	NDDOT also includes "beginning_accuracy" ("estimated")
is_end_position_verified*	is_end_position_verified	"false"	NDDOT also includes "ending_accuracy" ("estimated")
work_zone_type	work_zone_type	-	n/a
location_method	location_method	"unknown"	No change needed
vehicle_impact	vehicle_impact	"some-lanes-closed"	No change needed
impacted_cds_curb_zones	impacted_cds_curb_zones	-	n/a
lanes	lanes	"[]"	n/a
beginning_cross_street	beginning_cross_street	-	n/a
ending_cross_street	ending_cross_street	-	n/a
beginning_milepost	beginning_milepost	"88.27"	No change needed
ending_milepost	ending_milepost	"101.527"	No change needed
types_of_work	types_of_work	type_name: "maintenance"	No change needed
worker_presence	worker_presence	are_workers_present: "true"	No change needed
reduced_speed_limit_kph	reduced_speed_limit_kph	-	n/a
restrictions	restrictions	0: "reduced-width", "18", "feet"; 1: "reduced-height", "16.5", "feet"; 2: "reduced-length", "0", "feet"; 3: "gross-weight-limit", "0", "pounds"; 4: "axle-load-limit", "0", "pounds"	No change needed
(geometry) type + linestring or multipoint	(geometry) type + linestring or multipoint	"Linestring", coordinates: 0: 0: "-10796439.4183", 1: "5972474.0078", ...176 points	No change needed
bbox	bbox	0: "-10803801.7776", 1: "5972474.0078", 2: "-10796439.4183", 3: "6002548.9597"	Note that bbox appears twice - once within geometry, and once outside of it.
-	event_status	"active"	Deprecated in version 4.2

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

Data source: information received from Brandon Backman, [blbackman@nd.gov](mailto:blbackman@nd.gov)



### 4.3 South Dakota Department of Transportation

SDDOT publishes work zone information as a layer on the agency’s 511 webpage. As noted in Table 5 below, only minor discrepancies exist between data already available at the SDDOT and the WZDx version 4.2 specification. Further, additional data elements are available from SDDOT that could be used to populate optional WZDx version 4.2 specification data elements in order to provide better information, such as restrictions for commercial motor vehicles.

Table 5. Gap Analysis between the WZDx version 4.2 specification and the data sample provided by SDDOT

WZDx Version 4.2 Data Name (in bold, if required)	South Dakota Department of Transportation		
	Data Name	Value	Notes
<b>identifier</b>	-	-	Created by the agency
<b>type</b>	-	-	"Feature" inserted by agency
<b>event_type</b>	-	-	"work-zone" inserted by agency
<b>data_source_id</b>	-	-	Inserted by the agency
<b>road_names</b>	RouteName	"I-90"	No change needed
<b>direction</b>	Direction	-	Not listed when both directions are affected
<b>related_road_events</b>	-	-	n/a
<b>name</b>	Description	"Bridge Construction"	This information could appear in "types of work" below
<b>description</b>	Description	"Bridge Construction on bridges with lanes reduced to 1, speed limit 65 mph, and width limit 12 ft until further notice"	No change needed
<b>creation_date</b>	-	-	n/a
<b>update_date</b>	-	-	n/a
<b>start_date</b>	Start Date	"8:00 AM CDT Monday, April 3, 2023"	Convert to UTC time
<b>end_date</b>	End Date	-	Information not always listed (i.e., "until further notice"); transition underway from this to good-faith end date estimates
<b>is_start_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_start_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>work_zone_type</b>	-	-	n/a
<b>location_method</b>	-	-	Acceptable for agency to indicate "unknown"

<b>vehicle_impact</b>	Travel Restrictions; Lanes Reduced To	"lanes reduced to 1"	Provided data can be translated to WZDx
impacted_cds_curb_zones	-	-	n/a
lanes	-	-	n/a
beginning_cross_street	MRM Begin (?);Start Landmark (?)	"Oacoma-Exit 260"	Optional data that may meet WZDx
ending_cross_street	MRM End (?); End Landmark (?)	"0.25 mile west of Junction South Dakota 50 North-Cahmberlain Exit 265"	Optional data that may meet WZDx
beginning_milepost	MRM Begin (?);Start Landmark (?)		Information available to meet WZDx
ending_milepost	MRM End (?); End Landmark (?)		Information available to meet WZDx
types_of_work	Description	"Bridge Construction"	No change needed
worker_presence	-	-	n/a
reduced_speed_limit_kph	Speed Limit (mph)	"Speed limit 65 mph"	Can convert to kph
restrictions	Commercial Vehicle Restrictions: Height Limit (ft), Width Limit (ft), Gross Weight Limit (lbs), Axle Weight Limit (lbs), Length Limit (ft)	"width limit 12 ft"	No change needed
<b>(geometry) type + linestring or multipoint</b>			Latitude and longitude of start/end points are available, plus for intermediate points for longer segments
bbox	-	-	n/a

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx  
 Data source: <http://www.sd511.org>

#### 4.4 Wyoming Department of Transportation

WYDOT publishes work zone information as a layer on the agency’s 511 webpage. As noted in Table 6 below, some discrepancies exist between data already available at WYDOT via their traveler information website and the WZDx version 4.2 specification. However, it is likely that more information is available at WYDOT that is not available via their traveler information website that could be used to populate a WZDx feed. Additionally, WYDOT is working to develop a WZDx data feed as part of the Situational Data Exchange (SDx) effort.

Table 6. Gap Analysis between the WZDx version 4.2 specification and data available on WYDOT’s traveler information website

WZDx Version 4.2 Data Name (in bold, if required)	Wyoming Department of Transportation		
	Data Name	Value	Notes
<b>identifier</b>	Project Number	"N372041"	Created by the agency
<b>type</b>	-	-	"Feature" inserted by agency
<b>event_type</b>	-	-	"work-zone" inserted by agency
<b>data_source_id</b>	-	-	Inserted by the agency
<b>road_names</b>	Road	"US 14"	No change needed

<b>direction</b>	-	-	Information likely available
related_road_events	-	-	n/a
name	-	-	n/a
description	Description	"Grading, draining, placing bases, bituminous pavement surfacing, structure replacement and miscellaneous work near Ranchoester."	No change needed
creation_date	-	-	n/a
update_date	-	-	n/a
<b>start_date</b>	-	-	Information likely available
<b>end_date</b>	Scheduled Completion Date	"06/30/2023"	Convert to UTC time
<b>is_start_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_start_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
work_zone_type	-	-	n/a – may be available to indicate if work zone is mobile or a static location
<b>location_method</b>	-	-	Acceptable for agency to indicate "unknown"
<b>vehicle_impact</b>	-	-	Information about lane reductions and etc. may be available
impacted_cds_curb_zones	-	-	n/a
lanes	-	-	n/a
beginning_cross_street	-	-	n/a
ending_cross_street	-	-	n/a
beginning_milepost	Mileposts	"89 to 89.87"	Single WYDOT data element includes multiple WZDx data elements
ending_milepost	Mileposts	"89 to 89.87"	Single WYDOT data element includes multiple WZDx data elements
types_of_work	Description	-	"description" above would be an alternative space for this information
worker_presence	-	-	n/a
reduced_speed_limit_kph_restrictions	-	-	n/a
<b>(geometry) type + linestring or multipoint</b>			Latitude and longitude of start/end points is a required element. This appears to be missing from current data set
bbox	-	-	n/a

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

Data source: <https://map.wyroad.info/wtimap/index.html>

#### 4.5 Montana Department of Transportation

MDT publishes work zone information as a layer on the agency’s 511 webpage. As noted in Table 7 below, only minor discrepancies exist between data already available at MDT and the WZDx version 4.2 specification. Further, many additional data elements are available from MDT that could be used to populate optional WZDx version 4.2 specification data elements in order to provide better information, such as restrictions for commercial motor vehicles.

Table 7. Gap Analysis between the WZDx version 4.2 specification and the data sample provided by MDT

WZDx Version 4.2 Data Name (in bold, if required)	Montana Department of Transportation		
	Data Name	Value	Notes
<b>identifier</b>	-	-	Created by the agency
<b>type</b>	-	-	"Feature" inserted by agency
<b>event_type</b>	-	-	"work-zone" inserted by agency
<b>data_source_id</b>	-	-	Inserted by the agency
<b>road_names</b>	Location	"I-94"	Single MDT data element includes multiple WZDx data elements
<b>direction</b>	Location	"EB"	Single MDT data element includes multiple WZDx data elements
related_road_events	-	-	n/a
name	Work Type	"Road Side Work", "Bridge Work"	"type_of_work" below would be an alternate place for this information
description	Additional Information	"R/W Fencing. Vehicles parked near roadway at times."	No change needed
creation_date	-	-	n/a - may be available internally, if desired
update_date	Updated	"1/5/2023 2:08 PM MST"	No change needed
<b>start_date</b>	Start Date	"4/17/2023 9:00 AM"	No change needed
<b>end_date</b>	End Date	"5/2/2023 8:31 AM"	No change needed
<b>is_start_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_start_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
work_zone_type	Description	-	Optional, but sometimes available to indicate if work zone is mobile or a static location
<b>location_method</b>	-	-	Acceptable for agency to indicate "unknown"
<b>vehicle_impact</b>	Travel Restrictions	"Alternating One Lane Traffic... Periodic Lane Closures with Flagger"	Information is here but may need to be adjusted to conform to accepted WZDx options
impacted_cds_curb_zones	-	-	n/a
lanes	-	-	n/a

beginning_cross_street	Description	"This work will take place on Russell Street between Dakota Street and Mount Avenue"	Sometimes included in "additional information" and could be extracted for WZDx data elements
ending_cross_street	Description	"This work will take place on Russell Street between Dakota Street and Mount Avenue"	Sometimes included in "additional information" and could be extracted for WZDx data elements
beginning_milepost	Location	"From MP 128.0 to 152.0"	Single MDT data element includes multiple WZDx data elements
ending_milepost	Location	"From MP 128.0 to 152.0"	Single MDT data element includes multiple WZDx data elements
types_of_work	Work Type	-	"name" above would be an alternative space for this information
worker_presence	-	-	n/a
reduced_speed_limit_kph	-	-	n/a
restrictions	Commercial Vehicle Restrictions	Width Limit 12 feet	No change needed
<b>(geometry) type + linestring or multipoint</b>	-	-	Latitude and longitude of start/end points is a required element. This appears to be missing from current data set, but MDT's linear referencing system may allow calculation of this if/when MDT begins publishing a WZDx feed
bbox	-	-	n/a

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

Data source: information received from Curtis Buckley, [cbuckley@mt.gov](mailto:cbuckley@mt.gov); additional data available at: <http://www.511mt.net>

#### 4.6 Idaho Transportation Department

ITD publishes work zone information as a layer on the agency's 511 webpage. As noted in Table 8 below, only minor discrepancies exist between data already available at ITD and the WZDx version 4.2 specification. Further, many additional data elements are available from ITD that could be used to populate optional WZDx version 4.2 specification data elements in order to provide better information, such as restrictions for commercial motor vehicles.

Table 8. Gap analysis between the WZDx version 4.2 specification and the data sample provided by ITD

WZDx Version 4.2 Data Name (in bold, if required)	Idaho Transportation Department		
	Data Name	Value	Notes
<b>identifier</b>	WORK_ZONE_ID (or WORK_ZONE_SEQUENCE_NO)	"CN-21855"	No change needed, except possibly to create IDs specific to the event direction
<b>type</b>	-	-	"Feature" inserted by agency
<b>event_type</b>	-	-	"work-zone" inserted by agency
<b>data_source_id</b>	-	-	Inserted by the agency
<b>road_names</b>	HIGHWAY	"29"	No change needed
<b>direction</b>	DIRECTION	"S"	No change needed
related_road_events	[related_road_event]	[event for Route 29, northbound]	ITD creates separate entries for each direction; however the IDs for these events are the same
name	WORK_PROJECT_TYPE_DESC	"Reconstruction Work"	No change needed
description	MAP_COMMENTS	"Head to head traffic is active. Speed reduced to 65 MPH. Northbound traffic will be restricted to 20'. Southbound traffic will be restricted to 14.5'. Southbound traffic will enter head to head at mile 101 at the crossover. Southbound traffic will continue south for 13 miles and exit head to head at the crossover located at mile 88. Traffic is delineated with signs, barriers, barrels, and tubes."	The 511 site appears to have a short description, followed by something labelled "comment" - this "MAP_COMMENTS" is maybe too verbose / redundant with other WZDx data elements; The short description may be preferred
creation_date	-	-	n/a - may be available internally, if desired
update_date	LAST_UPDATE_TIME	"9/13/2022 6:51:42 AM"	Convert to UTC time
<b>start_date</b>	START_DATE	"4/19/2022 12:00:00 AM"	Convert to UTC time
<b>end_date</b>	END_DATE	"11/9/2022 12:00:00 AM"	Convert to UTC time
<b>is_start_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_date_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_start_position_verified*</b>	-	-	Acceptable for agency to indicate "false"
<b>is_end_position_verified*</b>	-	-	Acceptable for agency to indicate "false"

work_zone_type	-	-	n/a – may be available to indicate if work zone is mobile or a static location
location_method	-	-	Acceptable for agency to indicate “unknown”
vehicle_impact	LANE_REDUCTION	"reduced to one lane"	Information is here but may need to be adjusted to conform to accepted WZDx options
impacted_cds_curb_zones	-	-	n/a
lanes	-	-	n/a
beginning_cross_street	PROJECT_LOCATION	"I-29,HUNTER SEP TO NEAR BLANCHARD-SB"	Information is here but would need to be adjusted for WZDx
ending_cross_street	PROJECT_LOCATION	"I-29,HUNTER SEP TO NEAR BLANCHARD-SB"	Information is here but would need to be adjusted for WZDx
beginning_milepost	-	-	BEGIN_REFERENCE_POINT may be a milepost?
ending_milepost	-	-	END_REFERENCE_POINT may be a milepost?
types_of_work	-	-	WORK_PROJECT_TYPE_DESC is comparable to this value in the WZDx, but would need to be adjusted for WZDx specific terms: "maintenance", "minor-road-defect-repair", "roadside-work", "overhead-work", "below-road-work", "barrier-work", "surface-work", "painting", etc.
worker_presence	-	-	n/a
reduced_speed_limit_kph	-	-	n/a
restrictions	HEIGHT_RESTRICTION; WIDTH_RESTRICTION; LENGTH_RESTRICTION; GVWL_RESTRICTION: AWL_RESTRICTION	"16.5", "14.5", "0", "0", "0"	No change needed
<b>(geometry) type + linestring or multipoint</b>	Geometry [as a linestring]	"47.185848 - 96.986484 47.185852 - 96.986487 ...[50 points].... 47.369193 - 97.052666"	No change needed
bbox	-	-	n/a

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

Data source: information received from Steve Spoor, [Steve.Spoor@itd.idaho.gov](mailto:Steve.Spoor@itd.idaho.gov); additional data available at: [511.idaho.gov](http://511.idaho.gov)

#### 4.7 Washington State Department of Transportation

WSDOT received a USDOT WZDx demonstration grant that is being used to develop a WZDx version 4.1 feed. Although not yet publicly available at the time of this project, a sample of the WZDx version 4.1 feed was provided by WSDOT. As noted in Table 9 below, only minor discrepancies exist between WSDOT’s WZDx version 4.1 feed and the WZDx version 4.2 specification; it should be noted that it is possible additional changes in allowable data values may also exist between the version 4.1 and version 4.2 specifications.

Table 9. Gap Analysis between the WZDx version 4.2 specification and the WZDx version 4.1 data sample provided by WSDOT

WZDx Version 4.2 Data Name (in bold, if required)	WSDOT (WZDx v4.1)		
	Data Name	Value	Notes
<b>identifier</b>	identifier	"11460-S"	No change needed
<b>type</b>	type	"Feature"	No change needed
<b>event_type</b>	event_type	"work-zone"	No change needed
<b>data_source_id</b>	data_source_id	"WSDOT-WZDB"	No change needed
<b>road_names</b>	road_names	"099"	No change needed
<b>direction</b>	direction	"southbound"	No change needed
related_road_events	-	-	n/a
name	-	-	n/a
description	description	"Contract Contract Single Lane"	No change needed
creation_date	creation_date	"0001-01-01T00:00:00+00:00"	No change needed
update_date	update_date	"0001-01-01T00:00:00+00:00"	No change needed
<b>start_date</b>	start_date	"2022-07-18T00:00:00+00:00"	No change needed
<b>end_date</b>	end_date	"2023-12-29T00:00:00+00:00"	No change needed
<b>is_start_date_verified*</b>	is_start_date_verified	"true"	"start_date_accuracy" is also included
<b>is_end_date_verified*</b>	is_end_date_verified	"true"	"end_date_accuracy" is also included
<b>is_start_position_verified*</b>	is_start_position_verified	"false"	"beginning_accuracy" is also included
<b>is_end_position_verified*</b>	is_end_position_verified	"false"	"ending_accuracy" is also included
work_zone_type	-	-	n/a
<b>location_method</b>	location_method	"unknown"	No change needed
<b>vehicle_impact</b>	vehicle_impact	"unknown"	No change needed
impacted_cds_curb_zones	-	-	n/a
lanes	lanes	"[""]"	No change needed
beginning_cross_street	-	-	n/a
ending_cross_street	-	-	n/a
beginning_milepost	beginning_milepost	"0"	No change needed
ending_milepost	ending_milepost	"0"	No change needed
types_of_work	types_of_work	"[""]"	No change needed
worker_presence	worker_presence	are_workers_present: "false"; definition: "[""]"	No change needed
reduced_speed_limit_kph	-	-	n/a



restrictions	restrictions	"[]"	No change needed
<b>(geometry) type + linestring or multipoint</b>	(geometry) type + linestring or multipoint	"Linestring", coordinates: 0: 0: "-122.295004", 1: "47.497827"; 1: 0: "- 122.295184", 1: "47.497919"; ... 46: 0: "- 122.3252", 1: "47.527004"	No change needed
bbox	bbox	0: "-122.295004", 1: "47.497827", 2: "- 122.3252", 3: "47.527004"	No change needed
-	event_status	"pending"	Deprecated in WZDx v4.2

\* This is a required data element unless an associated "accuracy" value is provided that has been deprecated in version 4.2 of the WZDx

Data source: <https://wsdotwzdx.azurewebsites.net/api/v4/wzdxfeed>

## 5.0 KEY TAKEAWAYS

This project presented an opportunity for the North/West Passage members to examine their existing work zone data practices and how work zone event information is presented in order to better understand what may be needed to develop and publish a WZDx feed. Some key takeaways from this effort include:

- All North/West Passage agencies currently collect and provide extensive work zone data and information either on their agency traveler information website, as a WZDx feed, or both.
- Gaps between each agency’s existing work zone data and the WZDx version 4.2 specification are minimal and should not require extensive, additional data collection efforts.
- The minor differences that were identified between each agency’s work zone data and what is required within the WZDx version 4.2 specification have been documented separately for each agency in order for updates to be made, as desired.
- A common difference between existing agency feeds and the WZDx version 4.2 specification is the latitude/longitude locations, including the start and end of each work zone event. However, as noted herein, these values may be available in existing agency reporting systems and may not require extensive activity to publish it when developing a WZDx feed.
- Most North/West Passage agencies currently collect and provide work zone data elements beyond those that are required by the WZDx version 4.2 specification, such as commercial motor vehicle restrictions. This data could be used to provide a more robust and more useful WZDx feed.
- As a whole, North/West Passage agencies are well positioned to develop and publish WZDx feeds to cover the entire corridor.

The WZDx provides an opportunity for North/West Passage agencies to join a growing number of agencies, shown in Figure 9, offering consistent work zone data to third-party providers and the public.

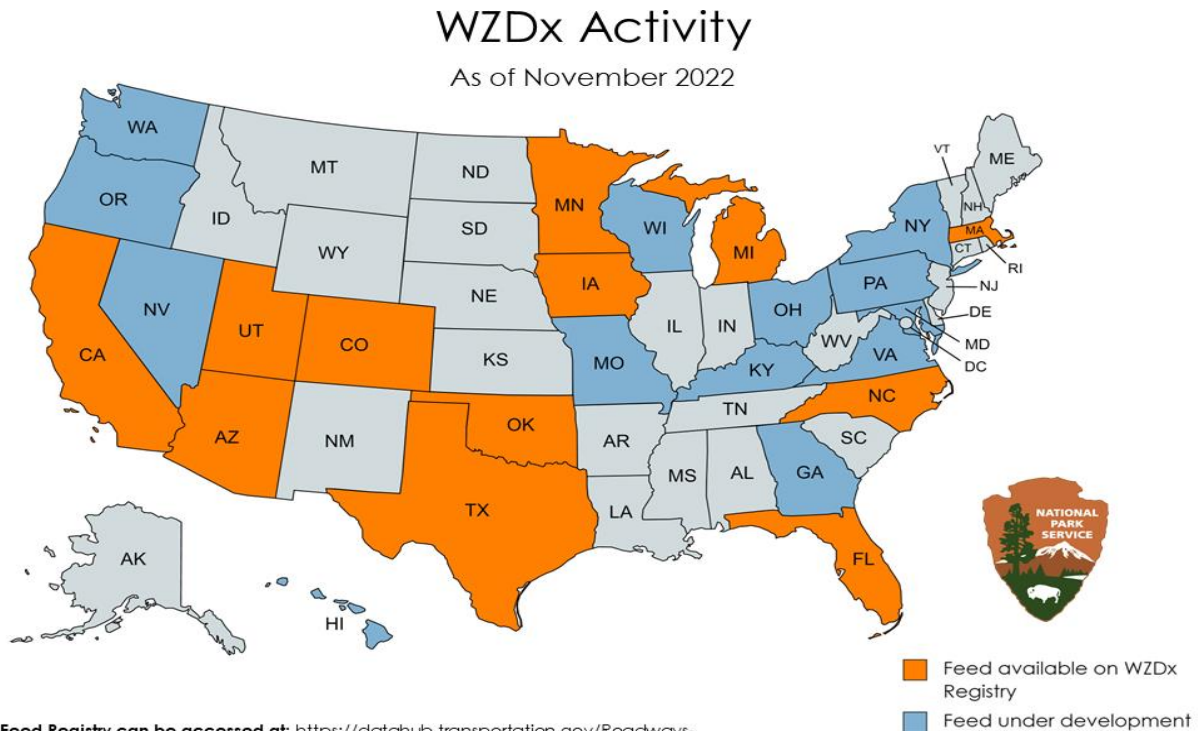


Figure 9. WZDx feeds available or being developed nationwide as of November 2022 (Source: USDOT ITS Joint Program Office)