

WSDOT's NextGen Work Zone Database and iCone Pilot

From Planning the Work to Working the Plan with Real-time Communications

INFRASTRUCTURE & SYSTEMS SUBCOMMITTEE MEETING

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Agenda

- Why is Work Zone Data Important?
- Where Did WSDOT Start?
- WSDOT's Work Zone Data System Today
 - Work Zone Database Overview and Summary
- Alignment with National Initiatives
 - FHWA Goals
 - Work Zone Data Initiative (WZDI) and Partner Engagement
- Putting Work Zone Data to Work
 - Building on Existing Systems and Workflow
 - WSDOT Pilot Project: iCone Roadside Units (RSU)
 - Plan for Smart Work Zone Applications Specifications
 Development
- Next Steps



Why is Work Zone Data Important?

Safety:

- Work zones are designed for safety, but they represent one of the riskiest roadway scenarios when normal conditions are, by necessity, replaced with temporary and continually changing conditions.
- All the typical factors in roadway crashes can be present in addition to highly vulnerable maintenance, construction, & utility workers and support staff.

Solution: WSDOT's *Work Zone Database* (WZDB)

- Provide for planning and coordination of work zone impacts
- Accurately communicate and disseminate work zone information for everyone's benefit



Intersecting Factors:

- Distracted Driving
- Real-time Connectivity
- Increased Automation



Where Did WSDOT Start?

Problem:

- Conflicts between construction and maintenance operations
- Missing reliable public information

Solution: WSDOT's original Work Zone Database (WZDB) –

- 1st Generation developed in early 2000s
- Provided a way to plan and coordinate work zone impacts in advance

Results:

- Conflict avoidance through better coordination using the WZDB
- Opportunities to combine multiple work zone activities and reduce driver impacts – better and more available public information





WSDOT's Work Zone Data System Today

Statewide application and deployment

Use of the WZDB grew to be recognized as essential statewide

- 2017 Multiple major project impacts around the state
- Interest from several WSDOT regions (Several Already Engaged)
- Need to communicate better around jurisdictional boundaries that the public doesn't see

NextGen WZDB

Redevelopment to a newer database technology so that data can be used across other existing and future platforms

- NextGen WZDB re-development began in late 2017
- Basic forms and reports complete July 2019
- Initial Implementation in Fall 2019
- Dynamic Mapping/Visualization tool available Spring 2020





NextGen WZDB Overview

- Work Zone List View:
- Clickable Column Headers
- Filtering Elements
- Captures All Impacts on State highways:
 - Construction
 - Maintenance
 - Utilities
 - Special Events, Etc.
 - Temporary Work Zone
 Commercial Vehicle
 Restrictions

Work Zone Database Navigation - Reports - Settings - Administration -

Work Zone List

Create New

Tedle Hew											
Region	County	State R	oute		Start	Date	End Da	te			
All	All	▼ All			▼ 11/3	0/2019			\langle	Filter	
Show 100 ▼ entries											
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Agate Pass Bridge - Bridge Painting		Contract	Active	3 05	Both Directions	6.82 - 7.05	Agate Pass Bridge	009409	11/21/2019	11/30/2019	View Edit Duplicate
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CenturyLink - Fiber Installation		Utilities	Active	101	Both Directions	193.3 - 193.9	Forks		12/2/2019	12/20/2019	View Edit Duplicate
Chehalis River Bridge Structural Rehabilitat	tion & Painting	Contract	Active	107	Both Directions	6.74 - 7.16	Chehalis River Bridge	009360	4/6/2019	9/30/2020	View Edit Duplicate
Drill Crew Traffic Control		Maintenance	Active	101	Both Directions	237.5 - 238.5	Indian Creek		12/2/2019	12/2/2019	View Edit Duplicate
E. of Elgin Clifton Rd To SR16 - Remove Fish Barriers, Paving, ADA & Bridge		Contract	Active	• 302	Both Directions	10 - 11	Minter Cr.	009446	12/2/2019	12/7/2019	View Edit Duplicate
Guardrail repair		Maintenance	Active	512	Westbound	8.37	94th.		12/5/2019	12/6/2019	View Edit Duplicate
JBLM		Contract	Active	005	Both Directions	119 - 124	JBLM	9133	11/18/2019	10/30/2020	View Edit Duplicate
N of SR 107 Stabilize Slope		Contract	Active	101	Both Directions	78.81 - 79.08	Cosi Hill Slide	009430	11/18/2019	3/8/2020	View Edit Duplicate
Sign installation		Maintenance	Pending	0 410	Eastbound	20.56			12/3/2019	12/3/2019	View Edit Duplicate
Signals		Maintenance	Active	161	Northbound	24.2 - 24.45			12/3/2019	12/3/2019	View Edit Duplicate
Spiketon Creek Bridge - Temporary Bridge		Contract	Active	162	Both Directions	19.58 - 19.75		C9438	12/2/2019	12/3/2019	View Edit Duplicate
SR 410 / Traffic Ave Interchange Improvements		Contract	Active	410	Westbound	9.16 - 9.48		TA6499	12/2/2019	12/6/2019	View Edit Duplicate

NextGen WZDB Overview continued

User Experience – Easy

Fill Form:

- Project Description
- Contractor Contacts
- Internal WSDOT "Crew Manager" App Integration (Also SQL)
- Order of Priority for Emergency Callouts (TMCs)

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NextGen WZDB Overview continued

User Experience – Easy Fill Form - Continued:

- **Description of Traffic** \bullet Impacts
- Type of Traffic Control
- **Commercial Vehicle** • **Restrictions for Temporary Oversize**

	Traffic Impacts				
	State Route	Direction	Start Milepost	End Milepost	Common Name
	101 Туре	Both Directions Priority	78.810 Weather Permitting	79.080	Cosi Hill Slide
	Shoulder Start Date	Contract End Date	No Start Hour	End Hour	Work Days
	11/18/2019 Description of Work	3/8/2020	7:00 AM	08:00 PM	Sun Mon Tue Wed Thr Fri Sat
	No on-site work is anticipated between 11/ Description of Traffic Control Required	18/2019 and 3/8/2020.			
	Two lanes (one in each direction) are open Comments	to the traveling public. Shoulders are narrow as a result of Jers	sey Barrier on the downhill side of the roadway.		
	This input is primarily to provide contact in	formation in case the slide mobilizes, causing damage to the ter	mporary 2-lane HMA roadway.		
\subseteq	Commercial Vehicle Restrictions				
	None Specified				

Loads

© 2019 - Work Zone Database

Duplicate

Edit



WSDOT's WZDB Overview Summary

Planning Level Data Input:

- What is the Work?
- When is it Scheduled?
- Are there Temporary Commercial
 Vehicle Restrictions?
- Who is responsible?
 - ✓ Construction
 - ✓ Maintenance
 - ✓ Utilities
 - ✓ Special Events, etc.
- How Can the TMC Contact Them?
 - ✓ Avoid Conflicts
 - Combine Multiple Work Zone Activities?
- Deployment Underway
 - ✓ 4 of 6 WSDOT Regions to Date



Agency Alignment with FHWA Goals

U.S. Department of Transportation

WSDOT



Work Zone Data Initiative (WZDI) and Partner Engagement

Leverage existing partnerships:

- WSDOT is working collectively with the North/West
 Passage (NWP) Pooled Fund on a new Work Zone Data
 Exchange (WZDx) feed to benefit all seven states involved
- Applied for a joint grant with existing NWP/agency resources

Future:

 Both Planned Work Activities and Incident messaging are sent to National WZDx-compliant Feed for Big Data and CAT ingestion

Expected Benefits

- Provide a multi-state opportunity to become WZDxcompliant (Build on this approach!)
- Potential Reduction of Secondary Crashes and increased awareness of Worker Presence in active work zones is one of the primary focuses



FHWA National Work Zone Data Exchange (WZDx) Specifications Concept



Putting Work Zone Information to Work

- Build on existing WSDOT applications and workflow: Build automated connectivity into the system so that existing and future data sources can ingest the planning level information into real-time use (and eventually historical data collected)
- 2. Use existing off-the-shelf products: Test and integrate devices through low-risk pilot projects with available technology
- 3. Learn and develop specifications: Take existing lessons learned and institutionalize proven products and practices into daily activities and promote widespread use and adoption of smarter work zone technologies.





Building on Existing Systems and Workflow

Concept: Build automated connectivity into the system so that existing and future data sources can ingest the planning level information into real-time use (and eventually historical data collected)

Opportunity:

NextGen WZDB Planning Data to Real-time Info

Today: Push anticipated work zone impacts (one week ahead minimum) into public-facing systems (mostly manually input):

- Weekly construction report
- Temporary oversize load restrictions for WSDOT's Commercial Vehicle Services division customers
- Combine real-time Roadside Unit (RSU) data with Planned Traffic Impacts as they come online.
- Automate All of this!
- Add ability to mine historical data to improve management of future planned traffic impacts





WSDOT Pilot: Transmit Work Zone Data through Roadside Units (RSUs) to WAZE



Connected Arrow Board Kit:

Two Each for Olympic and Southwest Region Dedicated Work Zone Crews





"iPin" (Marks End of Work Zone)



Courtesy: iCone Products/Waze App



Smart Work Zone Applications

NoTraffic Queues: Free-flow conditions



FREEWAY (2 LANES): SMART WORK ZONE SYSTEM FOR SINGLE RIGHT LANE CLOSURE (QUEUES UP TO 6 MILES)



Smart Work Zone Applications continued



FREEWAY (2 LANES): SMART WORK ZONE SYSTEM FOR SINGLE RIGHT LANE CLOSURE (QUEUES UP TO 6 MILES)



Smart Work Zone Applications continued

Traffic Queues: Up to 6 Miles



FREEWAY (2 LANES): SMART WORK ZONE SYSTEM FOR SINGLE RIGHT LANE CLOSURE (QUEUES UP TO 6 MILES) NOT TO SCALE

Future Planning: WSDOT is Developing Smart Work Zone Specifications for: Automated travel times, alternate routes/detours (including local agency arterials!), and *Worker Presence* through personal smart devices (Personal protective device (PPE) technology such as smart vests, glasses, artificial intelligence tech applications, etc.



Next Steps

- **Ongoing:** Develop the NextGen WZDB data for use in Traffic Management Center (TMC) Apps and beyond
- Automate notifications to TMC that work has commenced (via fixed RSU's)
- Future Goal: Add local agency arterial impacts and inputs to the system to provide holistic CAT Data for All Users





Walkers Landing

iCone® 0xd000cc GroupID: 145

Location Time: 2019-12-03 10:12:00

Battery: 11.119 V Switch: Double Arrow,Down

Data Time: 2019-12-03 10:27:00

Get Historical Report

Details

Lakebay

Kellys Korner

Camp Murray

Mock City

Satellite

McCleary (8)

(102)

Capitol State Forest

Map



Thank you!

Questions?

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