IDOT Work Zone Activity Data (WZAD)

Data Summary Technical Memorandum

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1. INTRODUCTION

Work Zone Activity Data (WZAD) describes the operation aspects of a work zone deployment, including the type of work, duration, location, geometry, lane and shoulder impacts, restrictions, and detour routes. Modernizing how WZAD is collected, managed, and shared has been the subject of ongoing efforts at the national level, culminating in the recent ITE Connected Work Zone (CWZ) Standard and federal funding opportunities, such as the Strengthening Mobility and Revolutionizing Transportation (SMART) Grant. Illinois Department of Transportation (IDOT) was awarded a SMART grant in March 2023 to evaluate the state of WZAD and help improve safety through work zone data management.

The IDOT WZAD project is guided by three primary objectives: (1) develop a summary of existing work zone activity data based on stakeholder input, (2) create a statewide implementation plan that outlines a roadmap for system and process improvements, and (3) design a prototype WZAD management framework that includes a Work Zone Data Exchange (WZDx) feed and a pilot evaluation. The prototype will serve as a foundation for the implementation plan and will support future statewide scalability as additional data sources become available.

Through this summary effort, the project aims to establish a clear understanding of IDOT's work zone data sources. The purpose of this technical memorandum is to document the work zone data summary informed by stakeholder engagement and to present a snapshot of WZAD management.

2. OBJECTIVES OF STAKEHOLDER ENGAGEMENT

The stakeholder engagement and discovery phase of the IDOT WZAD project focused on understanding existing work zone data management practices to develop an "as-is" assessment of current work zone operations and data collection. The goal of this phase was to gather input on work zone data, identify gaps, and develop a data summary to guide the next steps of the WZAD project.

3. KEY TERM DEFINITIONS

The following terms provide background for understanding the systems, forms, and data processes described in this memorandum. These definitions are intended to clarify references to IDOT-specific tools and terminology related to work zone activity data collection, management, and sharing.

Term	Description
WZAD – Work Zone Activity Data	The operational aspects of a work zone deployment, such as the type of work, schedule, location, lane impacts and detour routes.
WZDx – Work Zone Data Exchange	National data specification from the Federal Highway Administration (FHWA) for sharing consistent work zone information across agencies and systems.
MOT Plan – Maintenance of Traffic Plan	A document that outlines how traffic will be safely managed during construction.
OPER 2410	An IDOT form that is used statewide to document road restriction information.
BSPE 725	An IDOT form that is used statewide for traffic control authorization requests.
BSPE 726	An IDOT form that is used to document construction traffic control inspections.
CWZ 1.0	Connected Work Zones Implementation Guide and Standard, which has replaced the WZDx specification.
ITAP – Illinois Transportation Automated Permit	Statewide system for managing oversized and overweight travel permits.
AGO – ArcGIS Online	Cloud-based mapping platform used by IDOT to store and share geospatial data such as road restrictions.

FME – Feature Manipulation Engine	A software tool that transfers and formats data between different systems.
GTIS – Gateway Traveler Information System	Data hub operated by the University of Illinois at Chicago that collects and shares road and work zone information through TravelMidwest.com.
JSON	A lightweight, human readable data exchange format.
GeoJSON	A geospatial data interchange format based on JSON, used by the WZDx.
LCS – Lane Closure System	A web-based tool used in IDOT District 1 to manage expressway lane closures.
ACTS – Arterial Construction Tracking System	A web-based tool in IDOT District 1 for managing lane closures on non-expressway roads.
WZDx Feed	Digital file or data stream formatted to the CWZ 1.0 WZDx standard, used to share work zone information in real time.
ATMS – Advanced Traffic Management System	System used to monitor and control traffic operations, including lane closures and incidents.
TMA Vehicle – Truck-Mounted Attenuator Vehicle	A safety vehicle equipped with crash-absorbing equipment and GPS tracking, used to protect road crews.
AVL – Automatic Vehicle Location	GPS-based system that tracks the location of vehicles in real time.
LRS – Linear Referencing System	Method for locating points or segments along a roadway using a route and distance measurement.
CMMS - Construction and Materials Management System	System used by IDOT for managing construction projects and materials related to transportation infrastructure.
IRIS – Illinois Roadway Information System	IDOT's database for roadway location and reference information.
HERE – Here Technologies	A commercial provider of roadway and mapping data used in IDOT's permitting systems.

4. STAKEHOLDER IDENTIFICATION

There are numerous stakeholders involved and invested in work zone data management efforts across Illinois. Key stakeholders that were engaged during this exercise included:

- IDOT
  - Bureau of Safety Programs and Engineering
  - Bureau of Operations
  - Bureau of Information Processing (BIP)
  - Station One Traffic Management Center
  - OSOW Permit Office
  - Districts (Traffic Operations, Construction, Utilities, Traffic Control, and Project Implementation Staff)
- Illinois State Toll Highway Authority (Illinois Tollway)
- University of Illinois at Chicago (UIC) – Gateway Traveler Information System (GTIS) and Travel Midwest (TravelMidwest.com)

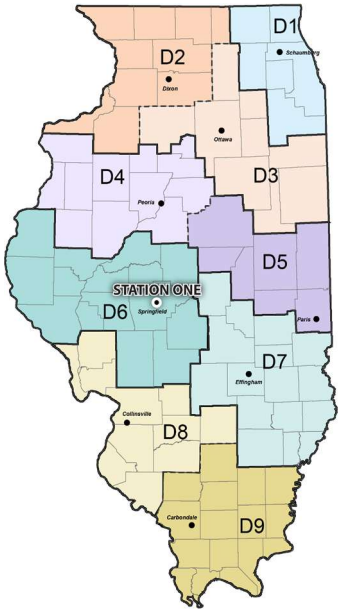


Figure 1: IDOT Districts and Headquarters

Stakeholders were identified and approved by IDOT project leadership based on their roles in creating, managing, or using work zone data. A complete list of all engaged stakeholders is provided as an attachment.

5. ENGAGEMENT APPROACH

A central component of the engagement effort was a series of interviews with IDOT bureau and district staff across operations, planning, and construction roles. Additional technical discussions addressed the traveling work zone pilot deployment, the OPER 2410 permitting form (IDOT form used statewide to document road restriction information), and the Illinois Transportation Automated Permit (ITAP) system database, which stores the OPER 2410 data. All stakeholder engagement activities were conducted virtually between May and July 2025. Interview guides, meeting summaries, and supporting materials are included as attachments.

6. FEEDBACK SUMMARY

Discussions with IDOT representatives provided valuable insights into current work zone data practices, challenges, and opportunities. The feedback gathered reflected both common themes and district-specific conditions related to how work zone activity data is collected, managed, and shared. This section outlines how work zone data is generated and describes the supporting data infrastructure and spatial referencing systems.

Work Zone Data Generation Methods

Work zone activity data is generated and collected through a variety of processes, tools, and IDOT personnel actions depending on the type, duration, and location of the work. Key data generation methods are described below.

Preconstruction Coordination

At preconstruction meetings, contractors and IDOT staff review the construction plans and discuss anticipated lane closures prior to construction start. These discussions form the basis of initial data entry, leading to the completion of OPER 2410 permitting forms.

Method	*Preconstruction Meeting*
Input Type	Maintenance of Traffic (MOT) Plan
Format	• PDF
Users	• Construction staff/contractors, operations staff
Output	• OPER 2410, BSPE725

Lane Closure Systems

In District 1, the Lane Closure System (LCS) is a web-based tool for tracking expressway closures. It includes geocoding, daily validation, and auto-generated reports. The LCS is coded for statewide use but is only used by District 1. The business rules are set up to work with District 1's lane restriction paradigm. District 1 engineers can edit the rules which are based on segments of highways, the time of day, day of week, and desired number of lanes to be closed. Other districts could add their own rules as long as they fit into the location, day of week, time of day, number of lanes schema. The geographic database of the LCS would also need to be expanded to support other districts as it is currently limited to District 1 roads.

The Arterial Construction Tracking System (ACTS) is used in District 1 for lane closures on non-expressway roads.

Method	*LCS*	*ACTS*
Input Type	• Web-based form	• Web-based form
Details	• Geocoded locations (stored and transmitted by the system, not seen by end user)	• Spatial component in development
Users	• Operations staff, construction contractor, maintenance staff	• Utilities, construction staff/contractors, operations staff
Output	• LCS Database	• ACTS Database

Manual Reporting and Logs

For maintenance activity and short-term closures, IDOT maintenance field crews may call or email operations staff, who then record the work zone activity manually. Some districts use Excel spreadsheets or paper filing systems to store this information. Longer term maintenance may trigger an OPER 2410 form submittal.

Permit and Notification Forms

The OPER 2410 form is the primary method for documenting lane restrictions in all districts and includes details such as location, duration, contact information, and detours. The form is used for any lane or roadway closure or restriction for construction, maintenance, or utility activities. An OPER 2410 is submitted by IDOT staff, construction contractors, or utility personnel, and is routed to various departments and systems (e.g., Illinois ArcGIS Online (AGO) database, Travel Midwest). IDOT is transitioning to a digital form that mirrors the content of the analog version, while adding functionality to pan and draw the project's extent. Additional forms such as IDOT's BSPE 725 (traffic control contact information) and BSPE 726 (construction traffic control inspection reports) also contribute relevant data. All referenced IDOT forms are included as attachments.

Method	*OPER 2410*	*BSPE 725*	*BSPE 726*
Input Type	• Paper/Pilot of Web-Based Form	• Paper Form	• Paper Form
Format	• MS Word • Digital form created with ArGIS Survey 123; accessible via public URL	• MS Word	• MS Word
Users	• Operations staff, construction staff/contractors, utilities	• Operations staff, construction staff/contractors, utilities	• Construction staff/contractors
Output	• ITAP Database	• Project File • CMMS	• Project File • CMMS

Connected Work Zone (CWZ) Technology

In areas with advanced traffic control setups, connected work zone systems generate real-time data (e.g., speeds, queues) using devices such as sensors and portable message signs, with the data accessible through contractor-managed portals. This data is not currently integrated with IDOT systems, but it is made available through the vendor, as required by IDOT construction contract special provisions.

Asset and Contract Management Systems

Some work zone activity is documented within broader systems such as the Construction and Materials Management System (CMMS), but data entry varies by district and is more focused on work zone inspections and project tracking rather than real-time lane closures.

Emergency and Incident Reporting

Closures resulting from emergencies are tracked through IDOT's incident management protocols, including reporting to Station One or communications centers, which may feed into formal databases. The OPER 2410 form may be used for emergencies/incidents since it includes an emergency classification for lane closures.

7. DATA SYSTEMS AND LINEAR REFERENCING FRAMEWORK

A range of systems support the management of work zone activity data across Illinois, from tracking lane closures and construction impacts to issuing travel permits and sharing information with the public. These systems, developed and maintained by IDOT, the Illinois Tollway, and their partners, are interconnected through a combination of manual processes, automated feeds, and shared geospatial frameworks. Together, they rely on a common linear referencing structure to ensure data consistency and integration across platforms, enabling accurate routing, coordination, and public communication. This section presents system components that were found to be integral to work zone activity data management.

Illinois Transportation Automated Permit (ITAP) ArcGIS Online (AGO)

The ITAP system manages over 270,000 permits annually, primarily for oversize and overweight vehicle travel across Illinois. ITAP auto-issues 99.4% of these permits based on user-entered route and vehicle data, using restrictions maintained in the GIS-based Obstructions and Restrictions layer to ensure safe routing. This layer includes data from multiple sources, most notably the OPER 2410 process, which feeds in manually approved construction, utility, or maintenance-related restrictions. A Feature Manipulation Engine (FME) is used to pull data from the OPER 2410 dataset into a host layer in AGO. Restrictions are coded by type (e.g., Permanent, Temporary, Obstruction, Road Construction) and by restriction category (e.g., dimension limits, height/weight restrictions, closures). The data is also published to Getting Around Illinois through an AGO service, allowing public access to real-time information on restrictions and closures. Updates to restriction data can be submitted through a separate link provided in the OPER 2410 process, allowing modifications to the data already in the database, such as start/end dates and road segments.

The Obstructions and Restrictions layer provides multiple endpoints from IDOT AGO, including Travel Midwest and Getting Around Illinois, and supports services such as temporary and permanent restrictions, vertical clearances, and public-facing road construction data.

Gateway Traveler Information System (GTIS)

The GTIS and its website (TravelMidwest.com) are operated by UIC in partnership with IDOT. The GTIS is the central data hub for the Travel Midwest system. GTIS collects, standardizes, and integrates work zone, incident, and Intelligent Transportation System (ITS) device data from multiple sources, including IDOT districts, the Illinois Tollway, and partner agencies, and disseminates it to the public, private-sector traveler information providers, and other transportation data systems. It supports multiple formats such as XML, GeoJSON, and WZDx, enabling interoperability across agencies and regions. IDOT and the Illinois Tollway occasionally provide real-time data updates to the GTIS control room. While these updates appear on Travel Midwest, they may not always be incorporated back into the source data.

District 1 LCS

The LCS is a web-based platform used by IDOT District 1 to manage and track lane closures on the expressway network. The system supports operational coordination by enabling contractors or IDOT personnel to submit requests for daily lane closures associated with utility, maintenance, and construction activities. Submitted closure requests undergo validation against pre-established criteria,

such as allowable hours, days of the week, and lane closure limits for specific locations. Although locations are geocoded, the system does not store complete geometry items to define the entire route of the work zone. It simply stores latitude and longitude coordinates for the start and end points without any accompanying linework. District 1 publishes its planned closure data daily to the UIC GTIS. PDF reports summarizing the closures are distributed internally and publicly. These PDF reports represent the only regularly generated summary of closure data from the LCS.

The system also handles long-term closures, which are entered by IDOT staff based on Maintenance of Traffic (MOT) plans approved by IDOT engineers. These records, largely text-based, include information on reduced speed zones and detour notices, but they do not contain detailed detour route geometry. OpenStreetMap is used for LCS, which is maintained by open-source contributors.

District 1 Arterial Construction Tracking System (ACTS)

ACTS is a web-based arterial lane closure request system for IDOT District 1. Construction or utility lane closure requests are entered, and an IDOT approval is transmitted to the contractor. The closure information is also automatically sent to appropriate IDOT staff and to Travel Midwest. Duplicate data in the District 1 LCS and the District 1 ACTS are filtered out. Both LCS and ACTS were designed to interface directly with Travel Midwest, and the data can be accessed through an existing XML data feed. IDOT is working with UIC to explore adding a spatial component to ACTS, which could enhance its tracking and mapping capabilities.

Illinois Tollway WZDx

The Illinois Tollway maintains its own WZDx feed, developed to meet FHWA standards. All work zone data originates from the Tollway's in-house LCS, which is managed internally. Field contractors are required to enter both daily and long-term lane closures into the LCS. These entries are automatically imported into the Tollway's Advanced Traffic Management System (ATMS) and uploaded daily to Travel Midwest.

The Tollway's WZDx feed is a direct output of this internal data pipeline. The same WZDx feed is transmitted to both the national WZDx repository and Travel Midwest, with each platform serving as an official endpoint. A data sharing agreement exists with Travel Midwest, which also receives Tollway incident data, dynamic message sign information, and other traffic-related inputs. Any external stakeholders not connected to Travel Midwest must subscribe to access the Tollway's WZDx public data feed.

Traveling Work Zones



IDOT's highway maintenance fleet includes vehicles equipped with Automatic Vehicle Location (AVL) systems. The vehicles are Truck-Mounted Attenuator (TMA) vehicles, and each has a tablet computer that features a "traveling work zone" action button. Drivers activate the button when commencing maintenance activity to identify their location as a work zone. The tablets are connected via the vehicle's radio system, which transmits a code and GPS coordinates to IDOT's GIS team. After the work zone has been activated, if the truck approaches 40 mph, the tablet will send a stop work zone code and continue sending the code on a 5-minute cadence, if the truck is traveling 40 mph or faster. When the truck slows down again below 40 mph, the tablet will automatically send a start work zone code and continue reporting on the 5-minute cadence. The driver will see no changes on the tablet and the work zone will continually appear as active, staying active until

the driver turns it off. The interface was intentionally designed to minimize visual distractions for the driver. The primary objective of this system is to provide real-time work zone location data. These vehicles operate year-round and switch out maintenance equipment based on seasonal needs.

Currently, the tablets only capture location data. There is potential for additional data types to be incorporated in the future. Data is transmitted via WebSocket to the ArcGIS GeoEvent Server and IDOT's AGO platform, though it is not publicly accessible at this time.

Linear Referencing System

IDOT uses Illinois Roadway Information System (IRIS) key route and stationing as their primary Linear Referencing System (LRS) for planning purposes. IDOT is in the process of migrating this information to an Environmental Systems Research Institute (Esri) Roads and Highways Server, exposing the data via an application programming interface (API) and creating a custom web application for event editing. This data will not include any information pertaining to active work zones or permitting. ITAP currently uses Here Technologies (HERE) data to manage permit requests.

The data in ITAP and Travel Midwest are not currently linked to IRIS. The Texas Transportation Institute (TTI) at Texas A&M University is actively working with IDOT to conflate HERE and the IRIS/Esri LRS.

Connected Work Zones

Many work zones throughout Illinois utilize ITS-connected devices. Although IDOT district staff can access work zone data through the device vendor's portal, this information is not currently used to verify work zone timing and location in the field.

8. WORK ZONE ACTIVITY DATA FLOW

Through extensive interviews and technical discussions with IDOT bureau and district staff, the Illinois Tollway, and partner agencies, the project team developed a picture of how work zone activity data moves from the field to various internal and public-facing systems. Stakeholders described the processes, tools, and handoffs involved in creating, managing, and sharing lane closure and related activity data, revealing both common statewide practices and district-specific variations. This engagement helped map the current "as-is" data flow, from initial entry through permitting systems and databases to traveler information platforms, and identified issues, gaps, and opportunities for improvement.

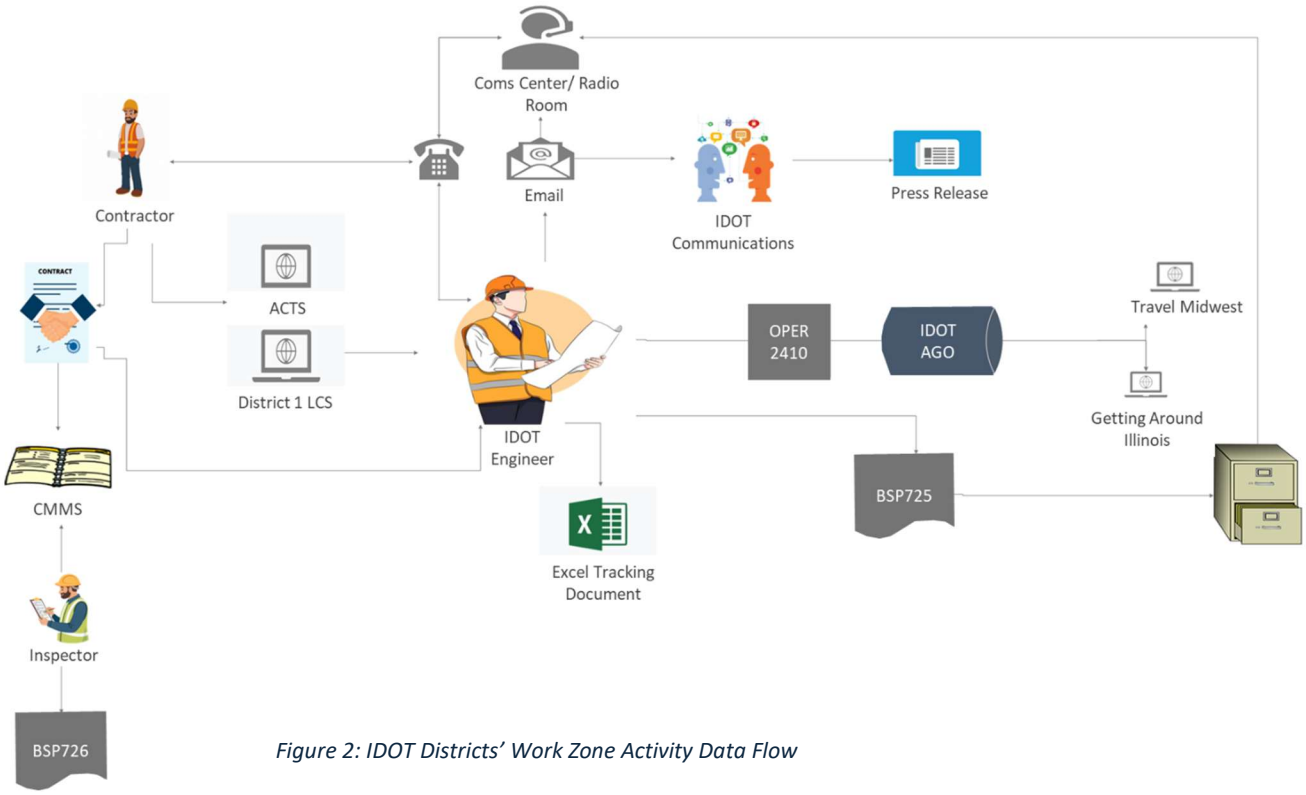


Figure 2: IDOT Districts' Work Zone Activity Data Flow

Recurring Issues and Concerns with Work Zone Data

Across all IDOT districts, stakeholders identified several recurring challenges that impact the consistency, accuracy, and accessibility of work zone activity data. These issues reflected limitations in current systems, variations in district-level practices, and gaps in data collection, tracking, and communication.

Data Entry and Redundancy

Multiple districts reported that OPER 2410 and related forms (BSPE 725/726) require repetitive manual entry. This can result in duplicate records for construction, maintenance, or other permitting actions.

Lack of Real-Time Updates

Current systems do not consistently reflect day-to-day changes in lane closures or detours. Field staff maintain the most accurate knowledge, but updates are not digitized or shared broadly in real time.

Inconsistent Use of Connected Work Zones

CWZ deployments vary widely with some districts using them only for high-ADT projects or emergencies. Access is granted, however, through vendor portals.

Detour Tracking and Mapping Gaps

Detour routes are often noted informally on forms or press releases, but they are not spatially tracked in a centralized database, which limits situational awareness for both internal teams and the public.

System Complexity and Staff Workload

Stakeholders voiced concerns about adding new systems or requirements that could increase the burden on engineering and field staff who are already managing reporting and daily inspections.

Common Ground and Key Differences

While each district operates within its own context, stakeholder feedback revealed several shared priorities, as well as distinct differences in how work zone activity data is managed. The table below highlights areas of consensus and alignment, as well as points of divergence that reflect variation in practices and available resources.

Areas of Consensus	Areas of Divergence
• Recognition that existing manual processes are burdensome and contribute to data gaps. • Agreement on the need for improved real-time work zone data sharing and centralization across districts. • Broad support for leveraging technology (CWZ, GPS-enabled fleet) if it reduces, not adds to, staff workload. • Shared understanding that public traveler information systems need consistent, accurate inputs to build trust and utility.	• Adoption of CWZ across the districts varies in deployment frequency and comfort with data integration. • While most agree system improvements are needed, concerns persist about implementation costs and added workload for field engineers, particularly in districts with fewer staff.

9. POTENTIAL ROADMAP IMPROVEMENTS

Feedback from stakeholder engagement, combined with analysis of current practices, points to several opportunities for strengthening IDOT's work zone data processes. These potential improvements focus on enhancing data consistency, streamlining workflows, expanding digital tools, and supporting more timely and accessible information sharing. The following ideas are intended to inform the development of a practical, scalable roadmap for statewide implementation.

- *Centralized Digital Platform*
  A unified system for lane closure data would enable real-time access while reducing reliance on paper forms and individual staff knowledge. While centralization does not depend on perfect data, it sets the stage for ongoing quality improvements that enhance harmonization and provisioning efficiency.
- *Integration of CWZ Data*
  Integrating CWZ data would enable automated field verification of work zone activity and facilitate the collection and sharing of traffic speed, queue, and incident data from contractor-deployed devices, thus reducing the need for manual reporting. It would enhance the currently limited work zone performance management by providing real-time work zone conditions.
- *Spatial Tracking Enhancements*
  Improved mapping and geocoding for detours and lane closures would increase operational visibility and support more effective public information dissemination.

DATA SUMMARY TECHNICAL MEMORANDUM ATTACHMENTS

1: Stakeholder List – available in the ROSA P archive upon completion of project.
2: District Interview Questions - available in the ROSA P archive upon completion of project.
3: Stakeholder Meeting Minutes - available in the ROSA P archive upon completion of project.
4: OPER 2410 Form - available in the ROSA P archive upon completion of project.
5: BSPE 725 Form - available in the ROSA P archive upon completion of project.
6: BSPE 726 Form - available in the ROSA P archive upon completion of project.