

**WORK ZONE  
MANAGEMENT PROGRAM**



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

# Data-Driven Work Zone Process Reviews Case Study: Illinois Department of Transportation

December 2022

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# Data-Driven Work Zone Process Reviews Case Study: Illinois Department of Transportation

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**List of Abbreviations and Acronyms**

BDE	Bureau of Design and Environment
DOT	Department of Transportation
DUI	Driving under the influence
FHWA	Federal Highway Administration
GIS	Geographic information system
IDOT	Illinois Department of Transportation
PDA	Probe Data Analytics
RITIS	Regional Integrated Transportation Information System
SWZ	Smarter work zone
TMP	Traffic management plan
USDOT	U.S. Department of Transportation
VHD	Vehicles hours of delay
VHT	Vehicle hours traveled
VMT	Vehicle miles traveled
WZ	Work zone
WZM	Work zone management
WZPR	Work zone process review

## Introduction

Federal regulations in 23 CFR Part 630 Subpart J require State highway agencies to conduct a work zone process review (WZPR) every 2 years to evaluate work zone (WZ) processes and procedures, as well as identify systematic improvements to current and future projects.<sup>1</sup> WZPRs apply to all project development and implementation phases, including planning, preliminary engineering, impact assessment, design, implementation and construction, and performance monitoring and management. States are also required to use available data, observations, and information to manage WZ impacts of individual projects, as well as to continually pursue broader improvement of WZ processes and procedures through WZ data analysis (e.g., crash and safety data, mobility data, construction metrics, and operational metrics).<sup>2</sup>

An FHWA guidance document was published in April 2015 to help State highway agencies conduct effective WZPRs. The document includes a nine-step approach States can take when performing a WZPR, as shown in figure 1.<sup>3</sup> The guidance document highlights the importance of using data and performance measures in WZPRs to make the process reviews more comprehensive, actionable, and effective.

However, many State departments of transportation (DOTs) have found it challenging to include data consistently and effectively in their WZPRs due to a lack of awareness and access to data, as well as limited resources for conducting streamlined data-driven process reviews.

A renewed focus on performance-based work zone management (WZM), new industry paradigms, and the emerging data sources from connected, autonomous, and probe vehicles present State DOTs many new opportunities to leverage data in their WZPRs. A data-driven WZPR approach can enable agencies to make WZPRs more outcome- and performance-driven, while bringing about more of a continuum mindset to WZPRs, as opposed to isolated point-in-time reviews.

### **Steps States Can Take to Conduct Effective Work Zone Process Reviews**

1. Assemble a multidisciplinary team
2. Develop a review plan
3. Conduct review
4. Analyze and interpret results
5. Develop inferences, recommendations, and lessons learned
6. Prioritize recommendations and lessons learned
7. Develop an action plan to implement the prioritized recommendations
8. Present findings
9. Initiate the action plan

**Figure 1. List. Nine-step approach for performing work zone process reviews.**

Source: Federal Highway Administration.

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<sup>1</sup>Code of Federal Regulations. 2004. 23 CFR Part 630 Subpart J. <https://www.ecfr.gov/current/title-23/part-630/subpart-J>, last accessed March 13, 2023.

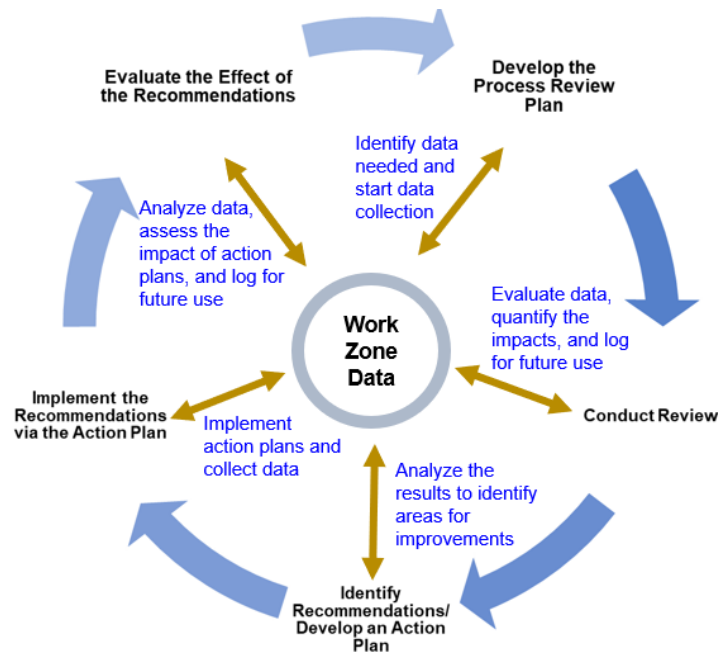
<sup>2</sup>Code of Federal Regulations. 2004. 23 CFR Part 630 Subpart J § 630.1008. <https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-630/subpart-J/section-630.1008>, last accessed March 13, 2023.

<sup>3</sup>FHWA. 2015. “Guidance for Conducting Effective Work Zone Process Reviews” (web page). <https://ops.fhwa.dot.gov/publications/fhwahop15013/index.htm>, last accessed March 13, 2023.

## Data-Driven Work Zone Process Reviews Case Study: Illinois Department of Transportation

This Illinois Department of Transportation (IDOT) case study was developed by FHWA to demonstrate a data-driven, systematic, and comprehensive approach to conducting WZPRs. It provides examples of how State DOTs can leverage existing data sources and performance assessment findings to incorporate data into steps two to five of the nine-step WZPR approach (figure 1). It does not represent FHWA guidance or an example WZPR report and is not intended to replace the WZPR report formats that State DOTs follow. As presented in figure 2, the data integration approach comprises identifying data needs for each program area, conducting data analyses, identifying trends for issues and best practices, collecting contextual information about trends identified, selecting action plans based on trends, developing metrics to assess action items, implementing continuous data collection, and analyzing the impacts of implemented action items on program outcomes.

IDOT conducted its previous WZPRs by focusing on select strategies implemented during the process review cycle. The discussions in those WZPRs were driven by qualitative observations, with limited focus on quantitative data assessments of outcomes. Although quantitative data were not included in prior WZPRs, IDOT has been routinely collecting WZ-related data as part of IDOT's internal performance management efforts. In addition, IDOT uses a third-party service, Regional Integrated Transportation Information System (RITIS)<sup>4</sup>, which collects mobility data (as well as provides transportation system performance measures). This presents a significant opportunity for IDOT to use these data resources to make its WZPRs more data driven, with the goal of using quantifiable benchmarks for performance management.



**Figure 2. Diagram. An integrated approach for data-driven work zone process reviews.**  
Source: Federal Highway Administration.

<sup>4</sup> The use of RITIS is not a Federal requirement.



## **Performance Areas Selected for the Work Zone Process Review Case Study**

The project team chose safety, mobility, and law enforcement as the three main WZ performance areas for this WZPR case study. Anonymized data from crash reports, traffic sensors, probe vehicles, WZ field reviews, and WZ project tracking were used to conduct the analyses, derive metrics and trends, and identify key issues. IDOT provided the project team with WZ exposure and safety data from 2016 to 2021 to use in the case study. The project team applied the WZ exposure data in a probe data analytics tool to collect and analyze data for the mobility performance area. For the law enforcement performance area, IDOT provided the team with data from 2017 through 2021. Law enforcement data for 2016 were not available at the time this case study was conducted. Findings from the case study for each performance area are presented in the following sections. The discussion starts with an overview of the WZ exposure data that IDOT tracks, which provides a basis for assessing performance based on the volume of WZ activity.

### **Exposure Data**

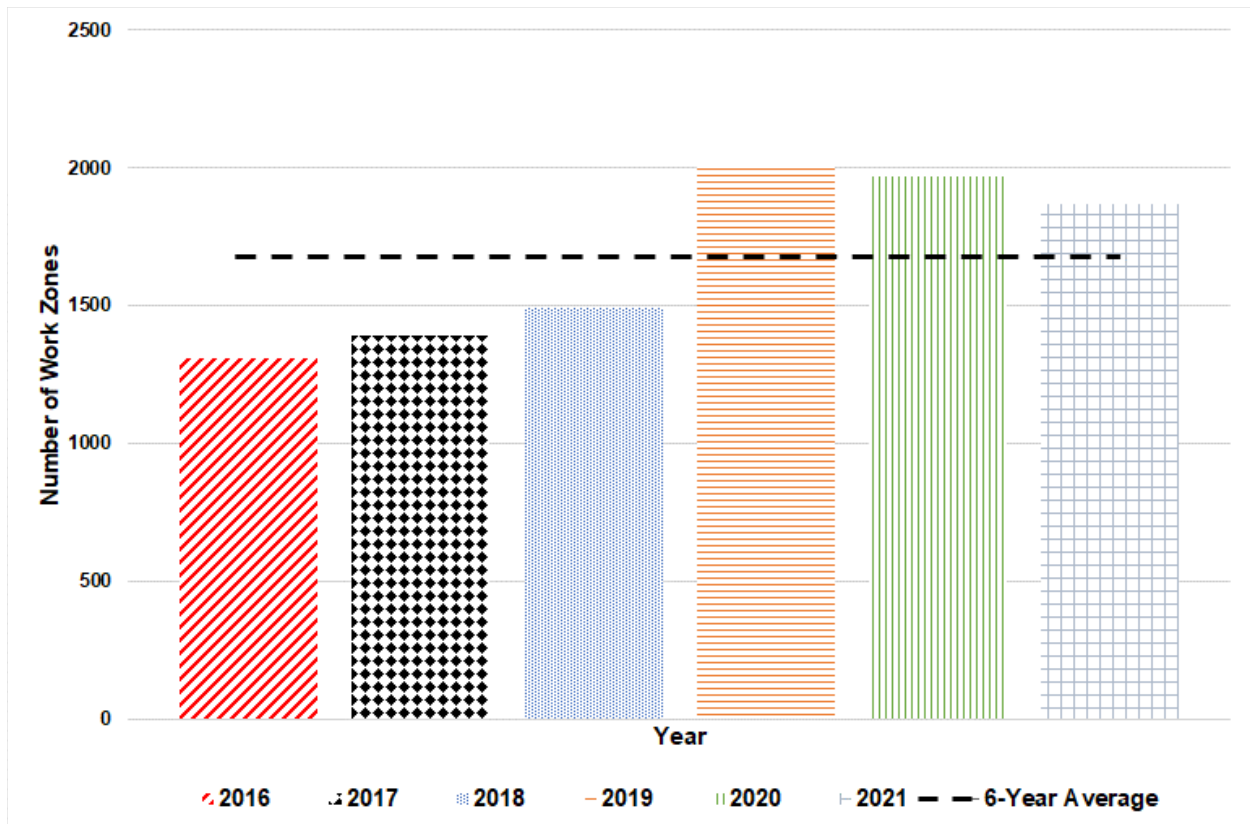
A comprehensive data-driven WZPR allows comparison of WZ performance across multiple years, as well as normalization of WZ performance by the volume of WZ activity (i.e., WZ exposure) in any given year. WZ exposure data include metrics such as the number of WZs, WZ vehicle miles traveled (VMT), mileage of construction/maintenance activity, project duration, lane closure hours, and traffic volume affected by WZs.

#### **Exposure Data Used in Case Study**

**Sources:** Illinois DOT Work Zone Division and Bureau of Information Processing

**Metrics:** Number of WZ construction projects, length of WZ construction projects

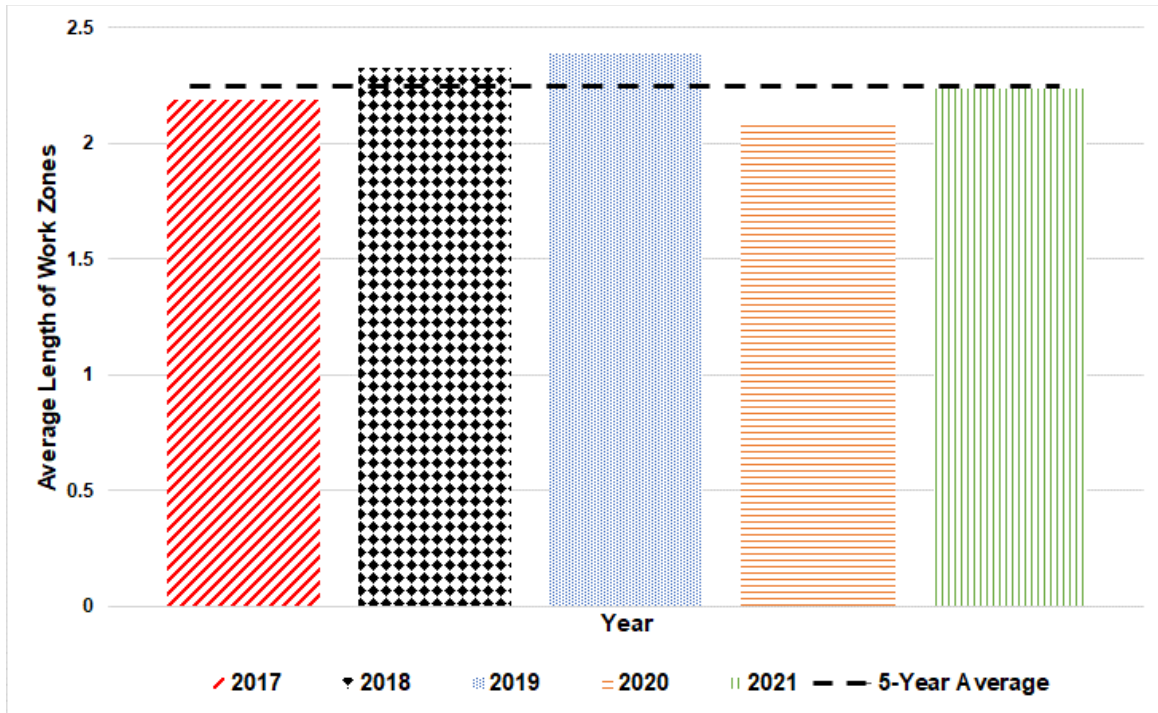
IDOT collects and archives current and historical construction WZ project information on the IDOT geographic information system (GIS) portal. IDOT follows a comprehensive process to collect WZ project data on all types of WZ activities, including road widening, bridge and waterline replacements, new road constructions, temporary maintenance, and total roadway reconstructions. On average, IDOT implemented 1,673 WZs per year from 2016 to 2021. During the years 2016, 2017, and 2018, 22, 17, and 11 percent fewer WZs were implemented in Illinois compared with the 6-year average, respectively (figure 3). Illinois implemented 20, 18, and 12 percent more WZs in 2019, 2020, and 2021, respectively. The increase in WZ activity starting in 2019 was consistent across all facility types, including interstates, U.S. routes, State routes, and other routes.



**Figure 3. Chart. Total number of work zones.**  
 Source: Illinois Department of Transportation.

### Length of Work Zones

The length of WZs provides context for the variation in the magnitude of the WZ activity performed each year. The project team analyzed WZ lengths for the years 2017 to 2021. WZ length data for 2016 were not available at the time this case study was conducted. On average, IDOT implemented 60,888 WZ miles per year from 2017 to 2021. The total lengths of WZs implemented in 2017 and 2018 were 14 and 12 percent lower than the 5-year average, respectively. Lengths of WZs implemented were 21 percent higher in 2019 and 2 percent higher in 2020 and 2021, when compared with the 5-year average. Although the total WZ length provides context about total WZ activity, it may not provide a relative comparison of WZ magnitude across the years, as the number of WZs implemented also varies. An average length per WZ provides a normalized metric for comparison across the years. After normalization, the average length of WZs in Illinois was 2.25 miles from 2017 to 2021. The average lengths of WZs across 2017 to 2021 remained close to the 5-year average, as shown in figure 4.



**Figure 4. Chart. Average length of work zones.**  
Source: Illinois Department of Transportation.

IDOT does not have a consistently implemented definition for reporting the start of a WZ when collecting the WZ length data. Currently, the reported WZ starting point varies between the start location of the lane closure taper, the start location of the first warning sign, and the start of the proposed physical improvements. Section 6C.02 of the *Manual for Uniform Traffic Control Devices* (MUTCD) defines a WZ from the start of the first warning sign until the end of the termination area. During the qualitative discussions, IDOT’s WZPR team acknowledged that IDOT needs to update its data collection for WZ lengths to report the start of a WZ from the first warning sign. IDOT’s WZPR team also mentioned that it will use updated WZ lengths in future data-driven WZPRs.<sup>5</sup> This improved data collection practice is likely to increase the average length of WZs and, thereby, the extent of safety and mobility impacts created by the WZs. For the mobility analysis, the project team considered half-mile sections upstream and downstream of WZs to account for the missing WZ lengths.

### Lane Closures

Across the years 2016 to 2021, 9 percent of WZs involved no lane closures, 51 percent of WZs involved one lane closure, 24 percent of WZs involved two lane closures, 6 percent of WZs required three or more lane closures, 10 percent of WZs required ramp closures, and 1 percent of WZs required shoulder closures. Since 2019, more than 70 percent of the increased WZ activity resulted in one or no lane closures. Overall, close to 75 percent of the WZs required two or fewer lane closures across the years 2016 to 2021.

<sup>5</sup>FHWA-IDOT conference calls February–October 2022.

**i Key Findings and Observations for Data-Driven Work Zone Process Reviews**

- IDOT tracks, digitizes, and publishes information about its WZ construction projects on its Work Zone GIS (geographic information system) portal. This detailed tracking of WZ activity data allowed the project team to conduct comprehensive performance assessments of all WZs across the State.
- Starting in 2020, IDOT considerably increased its WZ activity and took advantage of reduced traffic demand during the COVID-19 pandemic.
- From a WZPR standpoint, IDOT should consider setting up an automated data pipeline from its GIS portal to its third-party analytics, visualizations, and dashboard provider. This automated data ingestion would allow IDOT to collect and analyze traffic volume metrics such as VMT, vehicle hours traveled (VHT), delays, and queue lengths. Having these data will enable IDOT to get a complete picture of WZ exposure; to compare, contrast, and normalize WZ performance trends; and to conduct more-comprehensive WZPRs. Getting these traffic volume metrics in near real-time will enable IDOT to supplement and improve its data for real-time WZ performance monitoring.
- IDOT does not have a consistently implemented definition for reporting the start of a WZ when collecting the WZ length data. Currently, the reported WZ starting point varies between the start location of the lane closure taper, the start location of the first warning sign, and the start of the proposed physical improvements. Section 6C.02 of the MUTCD defines a WZ from the start of the first warning sign until the end of the termination area. During the qualitative discussions, IDOT’s WZPR team acknowledged that IDOT needs to update its data collection for WZ lengths to report the start of a WZ from the first warning sign. IDOT’s WZPR team also mentioned that it will use updated WZ lengths in future data-driven WZPRs. This improved data collection practice is likely to increase the average length of WZs and, thereby, the extent of safety and mobility impacts created by the WZs. For the mobility analysis, the project team considered half-mile sections upstream and downstream of WZs to account for the missing WZ lengths.

**Performance Area 1: Work Zone Safety**

**Work Zone Crashes**

IDOT’s safety policy consists of three performance goals. The first goal specifies zero worker fatalities for traffic-related WZ crashes. The second goal is to reduce the number of motorist fatalities in traffic-related WZ crashes by 10 percent each year, with the eventual goal of eliminating all of these fatalities. The third goal is to reduce the number of WZ crashes by 5 percent from each prior year.<sup>6</sup>

**Safety Data Used in Case Study**

**Source:** Illinois crash reports

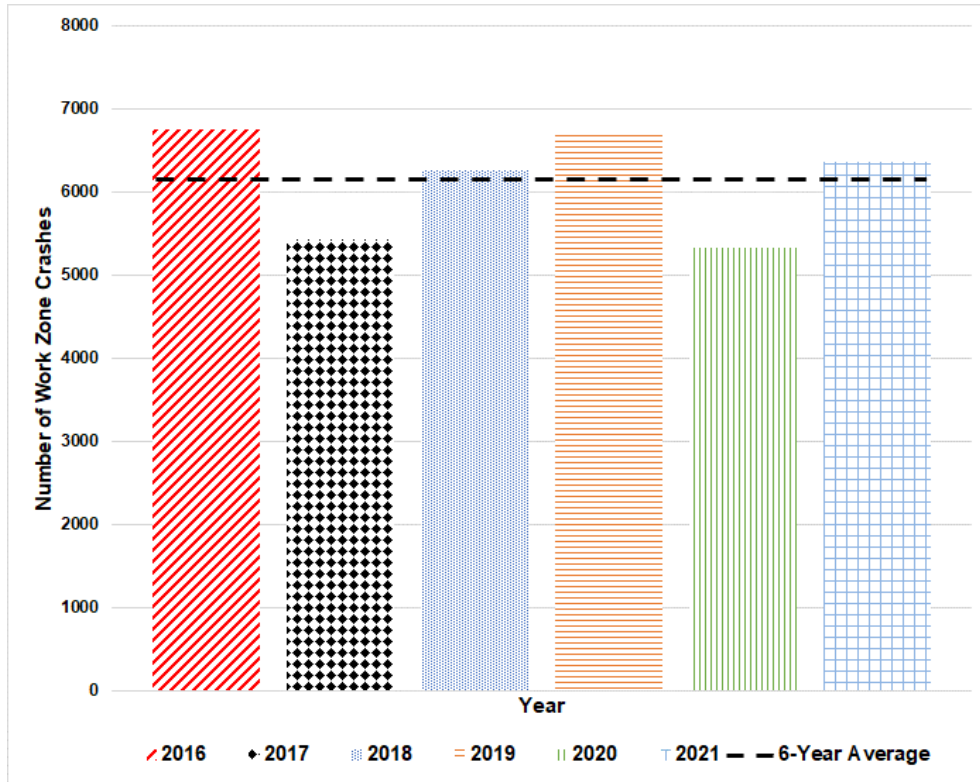
**Metrics:** Number of WZ crashes (total, fatal, injury, possible injury, and non-injury), crash type, and crash contributing factors

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<sup>6</sup>Illinois Department of Transportation Secretary Milton R. Sees memorandum to regional engineers/bureau chiefs. 2007. [https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&Handbooks/Highways/Safety-Engineering/WorkZoneSafetyandMobilityRule3-07\\_10012014.pdf](https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&Handbooks/Highways/Safety-Engineering/WorkZoneSafetyandMobilityRule3-07_10012014.pdf), last accessed March 13, 2023.

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The project team analyzed WZ-related crash data to assess the safety performance of WZs implemented in Illinois from 2016 to 2021 (figure 5). Overall, IDOT experienced 6,142 crashes per year across these years. In 2016, 2018, 2019, and 2021, IDOT experienced 9.8, 1.9, 9.3, and 3.7 percent more crashes than the 6-year average from 2016 to 2021, respectively. The numbers of WZ crashes in 2017 and 2020 were 11.6 and 13.2 percent lower than the 6-year average from 2016 to 2021, respectively.

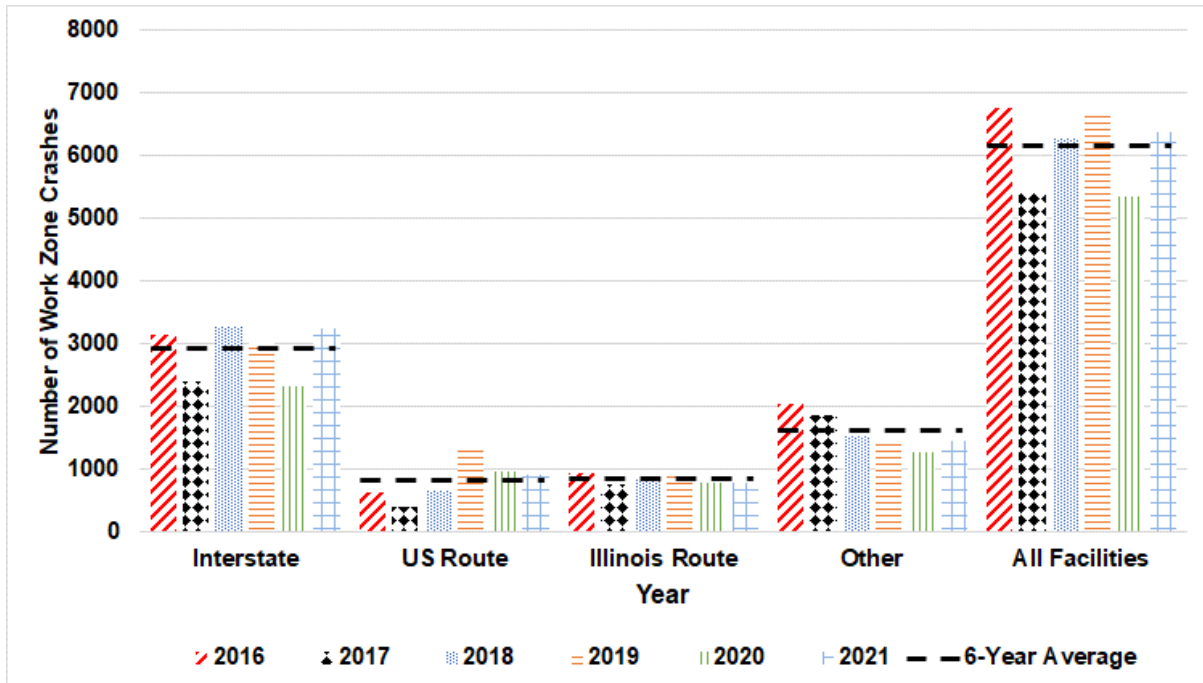


**Figure 5. Chart. Number of work zone crashes.**

Source: Illinois Department of Transportation.

The project team also analyzed WZ crashes by facility type (figure 6). Compared with the 6-year average from 2016 to 2021, WZ crashes on interstates increased in 2016, 2018, and 2021, remained on par in 2019, and decreased in 2017 and 2020. U.S. routes experienced fewer WZ crashes until 2018 and higher WZ crashes from 2019 to 2021, compared with the 6-year average from 2016 to 2021. Illinois routes experienced higher WZ crashes in 2016 and remained on par from 2017 to 2021, when compared with the 6-year average from 2016 to 2021. The variation in the number of crashes across the years may be attributable to the changes in travel demand experienced in the IDOT WZs.

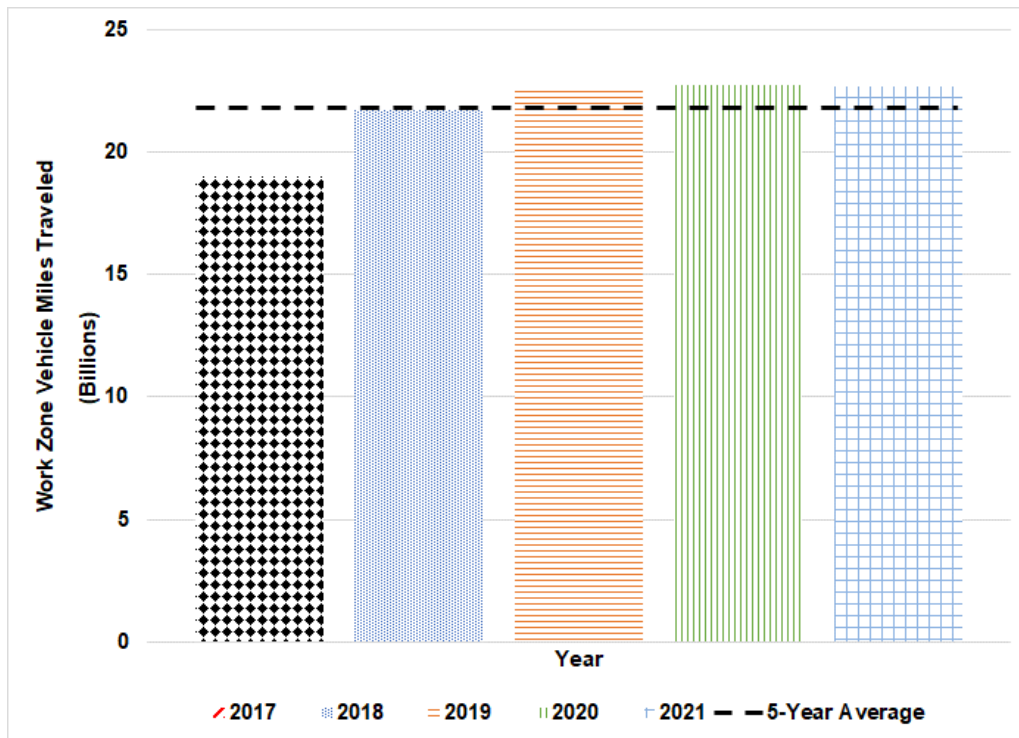




**Figure 6. Chart. Number of work zone crashes by facility type.**  
Source: Illinois Department of Transportation.

### Vehicle Miles Traveled

On average, IDOT WZs experienced 21.7 billion VMT per year across the years 2017 to 2021. Compared with the 5-year average from 2017 to 2021, WZ VMT was 12 percent lower in 2017, remained on par in 2018, increased by 4 percent in 2019 and 2021, and increased 5 percent in 2020 (figure 7). Although 2020 experienced lower overall VMT because of the COVID-19 pandemic, the increase in 2020 WZ VMT is likely a result of increased WZ activity in 2020. A further assessment of these WZ VMT in relation to the annual WZ activity is provided in the Vehicle Miles Traveled per Work Zone section.



**Figure 7. Chart. Work zone vehicle miles traveled.**

Source: Illinois Department of Transportation.

Note that the project team did not analyze 2016 WZ VMT data due to a lack of exposure data availability at the time of the mobility analysis. As a result, all normalized metrics were calculated for the years 2017 to 2021.

### Work Zone Crashes per Vehicle Miles Traveled

The project team analyzed WZ crashes per 100 million VMT. This normalization provides a comparable metric across the years by considering WZ activity. Findings indicated that Illinois WZs experienced an average of 28 crashes per every 100 million VMT for the years 2017 to 2021. Crash rates marginally increased in 2017, 2018, and 2019, decreased by 15 percent (5 crashes fewer per 100 million VMT) in 2020, and remained on par in 2021 compared with the 5-year average from 2017 to 2021 (figure 8). The project team concluded that the reduction in crash rate in 2020 might have been a result of reduced travel demand per WZ during the COVID-19 pandemic (figure 12).

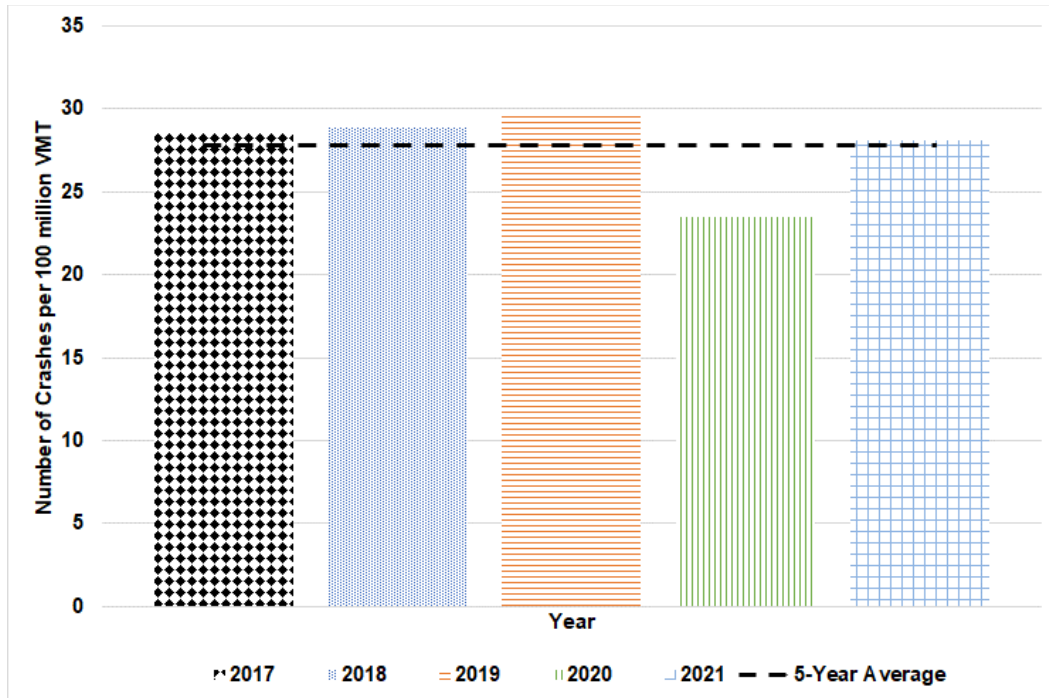


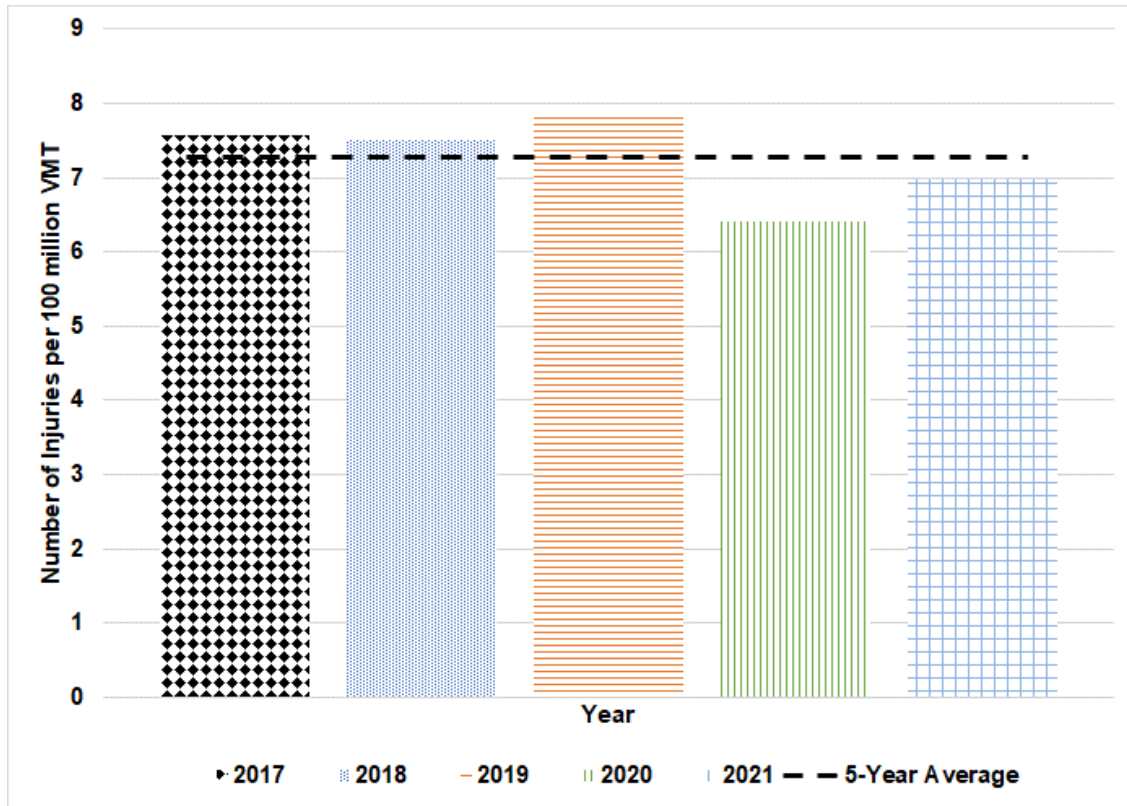
Figure 8. Chart. Number of work zone crashes per 100 million vehicle miles traveled.

Source: Illinois Department of Transportation.

### Work Zone Injuries and Fatalities

The project team analyzed the number of injuries and fatalities resulting from the WZ crashes to understand the severity of crashes across the years. On average, Illinois WZs experienced 1,575 injuries per year across the years 2017 to 2021. Compared with the 5-year average, the variations in WZ injuries were similar to the variations in WZ crashes (i.e., fewer injuries in 2017 and 2020, and higher injuries in 2018, 2019, and 2021). After normalizing, the rate of WZ injuries per 100 million VMT was marginally higher in 2017, 2018, and 2019, and lower in 2020 and 2021, when compared with the 5-year average from 2017 to 2021 of seven injuries per 100 million VMT (figure 9).

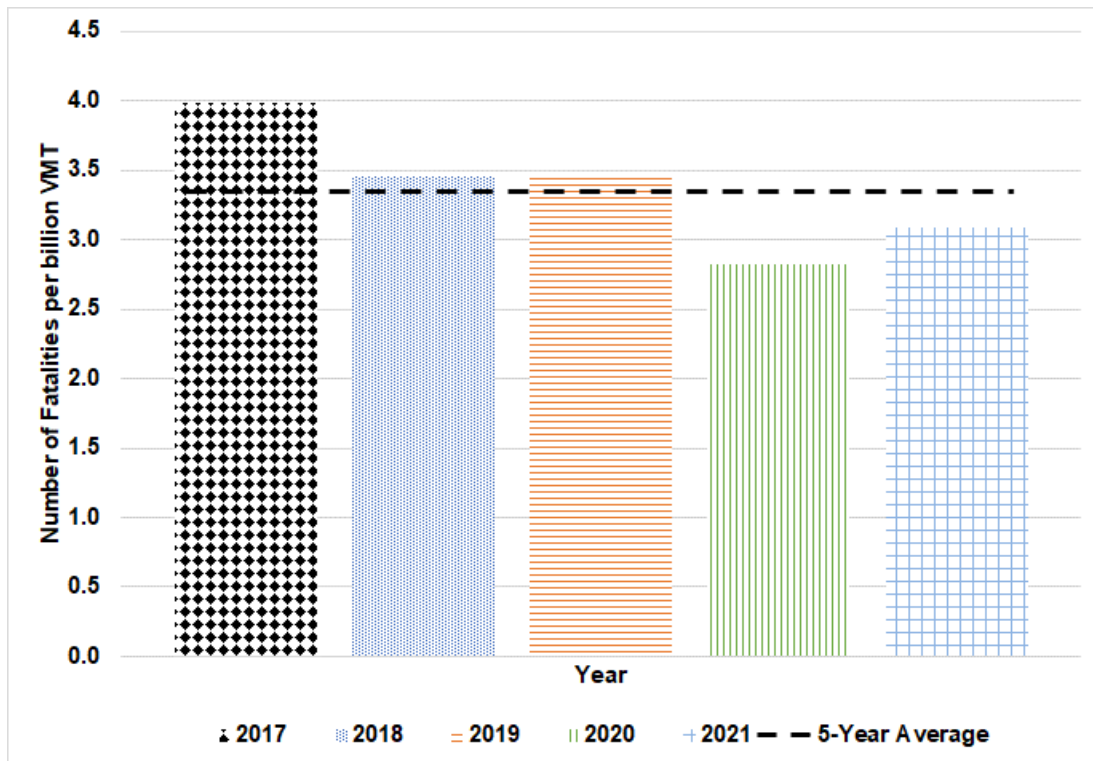




**Figure 9. Chart. Number of work zone injuries per 100 million VMT.**

Source: Illinois Department of Transportation.

Illinois WZs experienced 30, 17, 34, 37, and 24 fatalities in 2017, 2018, 2019, 2020, and 2021, respectively. Normalizing with VMT indicated that Illinois WZs experienced an average of four fatalities per billion VMT. In comparison with the 5-year average from 2017 to 2021, WZs implemented in 2017, 2018, and 2019 experienced 19, 3, and 4 percent higher fatality rates, respectively, and WZs in 2020 and 2021 experienced 15 and 8 percent lower fatality rates, respectively (figure 10). These reduced fatality rates could also correspond to reduced WZ traveler exposure during peak hours. An analysis of hourly VMT across the years 2017 to 2021 indicated that the peak-hour VMT reduced in 2020 and was slowly getting back to normal demand in 2021 when compared with the pre-COVID-19 pandemic years of 2017 to 2019.



**Figure 10. Chart. Number of work zone fatalities per billion VMT.**  
Source: Illinois Department of Transportation.

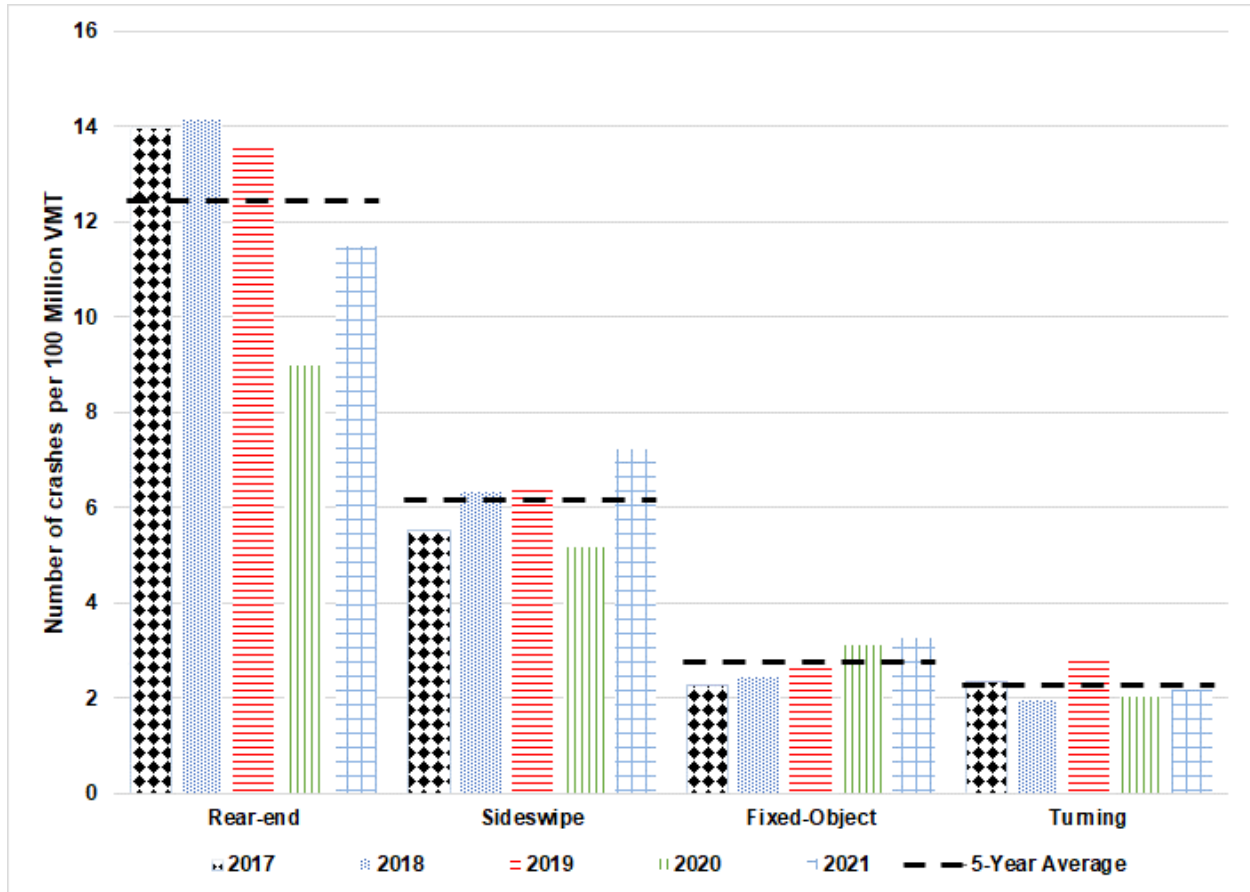
### Crash Type

Findings from an analysis of the crash types indicated that rear-end crashes, sideswipe crashes, fixed-object crashes, and turning crashes make up 85 percent of the overall crashes across the years. Rear-end crashes were higher in 2017, 2018, and 2019 but decreased in 2020 and 2021 compared with the 5-year average of 2,779 from 2017 to 2021. In contrast, fixed-object crashes remained lower than the 5-year average (611 crashes) from 2017 to 2019 and increased in 2020 and 2021. IDOT defines fixed-object crashes as motor vehicle collisions with fixed objects when no other vehicle or object has been struck. Per this definition, a fixed-object crash always occurs off the pavement (roadway) unless the vehicle has struck the underside of an overpass, a curb, an overhead sign, an overhead traffic control device, or a railway crossing gate. IDOT defines a fixed object as an object that is intentionally constructed or placed at a particular location, usually off or adjacent to the roadway. In close to 65 percent of fixed-object crashes, the event prior to striking the fixed object was the driver’s vehicle running off the roadway. In the remaining 35 percent of the cases, fixed-object crashes occurred when the subject vehicle ran into one of the roadway objects listed above. Sideswipe crashes decreased in 2017 and 2020, remained on par in 2018 and 2019, and increased in 2021 compared with the 5-year average of 1,337 crashes. The number of turning crashes remained marginally close to the 5-year average of 508 crashes across all years from 2017 to 2021.

The project team normalized each crash type by WZ VMT to get a common frame of reference across the years. The performance variations in normalized crash rates were similar to total

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crashes for all crash types (figure 11). During qualitative discussions with the project team, the IDOT WZ team mentioned that they will investigate the decrease in rear-end crashes and the increases in fixed-object and sideswipe crashes in their upcoming WZPR to identify any best practices, areas of improvements, and mitigation strategies in managing the safety performance of WZs.<sup>7</sup>



**Figure 11. Chart. Number of work zones by crash type.**

Source: Illinois Department of Transportation.

Finally, the project team assessed the surface and lighting conditions during the crashes. Findings from the surface conditions analysis indicated that 80 percent of crashes occurred in dry surface conditions, 12 percent occurred in wet conditions, and the remaining 8 percent of crashes occurred in snow, ice, or dirt conditions. The lighting conditions analysis indicated that 70 percent of crashes occurred in daylight conditions, 20 percent of crashes occurred in dark conditions with lighting, 6 percent crashes occurred in dark conditions, and the remaining 4 percent of crashes occurred in dusk, dawn, or unknown light conditions. Even though only 6 percent of overall crashes occurred in dark conditions, these crashes contributed to 25 percent of the total fatalities. In contrast, dark conditions with lighting resulted in 13 percent of total fatalities despite experiencing higher crashes than the dark conditions. This finding suggests that

<sup>7</sup>FHWA-IDOT conference calls February–October 2022.

lighting might have been one of the contributing factors for achieving fewer fatalities per crashes in dark conditions.

**i Key Findings and Observations for Data-Driven Work Zone Process Reviews**

- The project team analyzed WZ-related crash data to assess the safety performance of WZs implemented in Illinois from 2016 to 2021.
- Compared with the 6-year average of 6,142 crashes per year, IDOT experienced more crashes in 2016, 2018, 2019, and 2021, and fewer crashes in 2017 and 2020. The project team performed a normalized comparison of crash rates across the years by using WZ VMT. Findings indicated that Illinois WZs experienced an average of 28 crashes per every 100 million VMT traveled for years 2017 to 2021. Crash rates marginally increased in 2017, 2018, and 2019, decreased by 15 percent (5 crashes fewer per 100 million VMT) in 2020, and remained on par in 2021 compared with the 5-year average from 2017 to 2021.
- The project team analyzed the normalized injury and fatality rates resulting from the WZ crashes to understand the severity of crashes across the years 2017 to 2021. Findings indicated that the injury and fatality rates were higher from 2017 to 2019 and decreased in 2020 and 2021, when compared with the 5-year average from 2017 to 2021.
- Crash type analysis indicated that rear-end, sideswipe, fixed-object, and turning crashes make up 85 percent of the total WZ crashes. A year wise comparison of these crash types indicated a decrease in rear-end crashes and an increase in fixed-object crashes for the years 2020 and 2021, as well as an increase in sideswipe crashes in 2021. In its next WZPR assessment, the IDOT WZPR team plans to thoroughly analyze the key factors contributing to the rear-end, sideswipe, fixed-object, and turning WZ crashes and identify any best practices, areas of improvements, and mitigation strategies in managing the safety performance of WZs.
- The IDOT WZ team’s well-established processes to collect and publish WZ activity data allowed the project team to gather additional exposure data such as WZ VMT and WZ VHT. These exposure data enabled the project team to analyze the safety performance data with a common frame of reference across years and incorporate those findings into the WZPR case study.

**Performance Area 2: Work Zone Mobility**

The mobility data presented in this case study are from WZ projects implemented in 2017, 2018, 2019, 2020, and 2021. As previously mentioned, the construction projects tracked by IDOT include road widening, bridge and utility projects, new road constructions, temporary maintenance, and total roadway reconstructions.

IDOT uses maximum delay per traveler as a key measure to assess the mobility impact of WZs on travelers. IDOT’s mobility policy consists of two performance goals. The first goal specifies that WZ

**Mobility Data Used in Case Study**

**Sources:** RITIS PDA Suite and IDOT

**Analysis:** Bottleneck ranking and user delay

**Metrics:** Vehicle miles traveled per WZ, vehicle hours of delay

impacts are unacceptable if they result in more than 5 minutes of delay per vehicle per mile of project length, with a maximum of 30 minutes above the normal recurring traffic delay. The second goal specifies that queues caused by WZs should be no more than 1.5 miles beyond preexisting queues.<sup>8</sup>

Based on the WZ project information available from IDOT, the project team conducted a comprehensive mobility analysis using the RITIS Probe Data Analytics (PDA) Suite.<sup>9</sup> Given that many State DOTs have access to the RITIS PDA Suite, the project team used this tool to demonstrate the application of available resources for mobility-based WZ performance analysis. The project team conducted two types of analyses—bottleneck and delay. The bottleneck analysis focused on identifying the number of WZ traffic events and the WZ segments with the highest bottleneck and queuing impact resulting from WZ traffic events. The delay analysis combined probe speed data with volume data to estimate the overall mobility impact experienced by drivers resulting from congestion at WZs. The facility types selected for the mobility analysis were interstates, U.S. routes, Illinois routes, and other local routes.

Note: During the preliminary discussions about mobility analysis, the IDOT WZPR team mentioned that WZs in Cook and DuPage counties (i.e., the Chicago area) may show high VMTs, VHTs, and delays, as they experience higher traffic demand. The IDOT WZPR team also expressed that it is important to look at the mobility performance with and without Cook and DuPage counties. The project team conducted the mobility analysis with and without Cook and DuPage counties to gather the impact of these counties on the program-level WZ mobility performance.

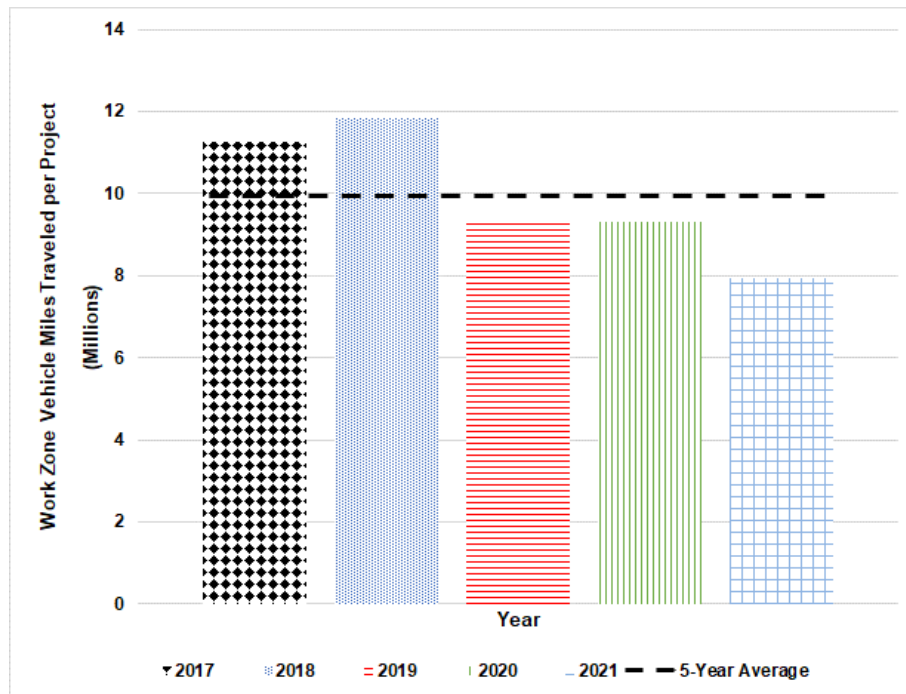
### Vehicle Miles Traveled per Work Zone

This metric presents the VMT for all vehicles traversing through the WZ segments. RITIS calculates the VMT of a segment by multiplying the hourly volume of the segment by its length. Overall, IDOT WZs experienced 19.0, 21.7, 22.6, 22.7, and 22.6 billion VMT in 2017, 2018, 2019, 2020, and 2021, respectively. An average of 21.7 billion VMT per year was experienced by IDOT across the years from 2017 to 2021. To account for the variability of WZ activity across the years, the project team normalized the WZ VMT by the number of WZ projects implemented by IDOT each year. Across all facilities, the WZ VMT per project were 11.3, 11.8, 9.3, 9.3, and 7.9 million in 2017, 2018, 2019, 2020, and 2021, respectively (figure 12). The WZ VMT rates were 14 and 19 percent higher in 2017 and 2018, respectively, 6 percent lower in 2019 and 2020, and 20 percent lower in 2021 compared with the 5-year average of 9.9 million WZ VMT per project from 2017 to 2021.

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<sup>8</sup>Illinois Department of Transportation Secretary Milton R. Sees memorandum to regional engineers/bureau chiefs. 2007. [https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Safety-Engineering/WorkZoneSafetyandMobilityRule3-07\\_10012014.pdf](https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Safety-Engineering/WorkZoneSafetyandMobilityRule3-07_10012014.pdf), last accessed March 13, 2023.

<sup>9</sup>Probe Data Analytics Suite. n.d. “RITIS” (web page). <https://pda.ritis.org/suite/>, last accessed March 13, 2023.

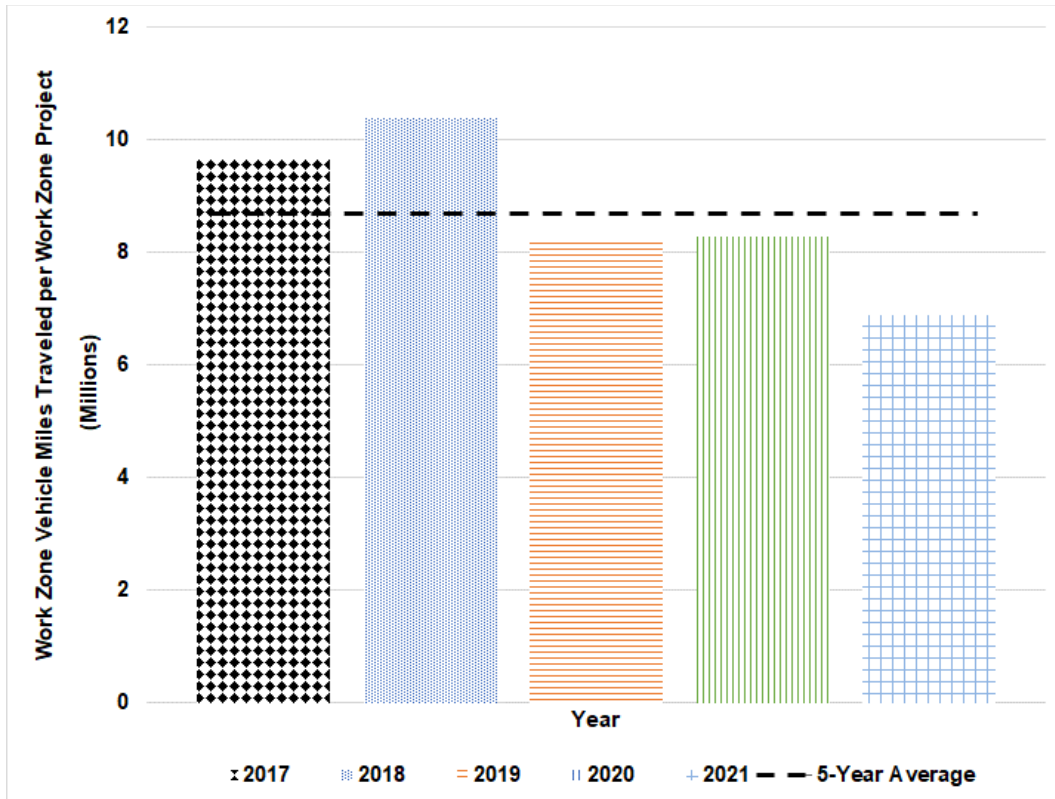


**Figure 12. Chart. Number of work zone vehicle miles traveled per project.**  
 Source: Illinois Department of Transportation.

*Vehicle Miles Traveled Without Cook and DuPage Counties*

Excluding Cook and DuPage counties, IDOT WZs experienced an average of 14 billion VMT, which was 34 percent less than the statewide VMT. This indicates that Cook and DuPage counties on average contribute to about one third of the total WZ traffic demand. After normalizing, the average WZ VMT rate reduced to 8.67 million VMT per project across the years (figure 13). Compared with the 5-year average from 2017 to 2021, the variations in WZ VMT rates were similar to the statewide values (i.e., WZ VMTs were higher in 2017 and 2018 and lower in 2019, 2020, and 2021).



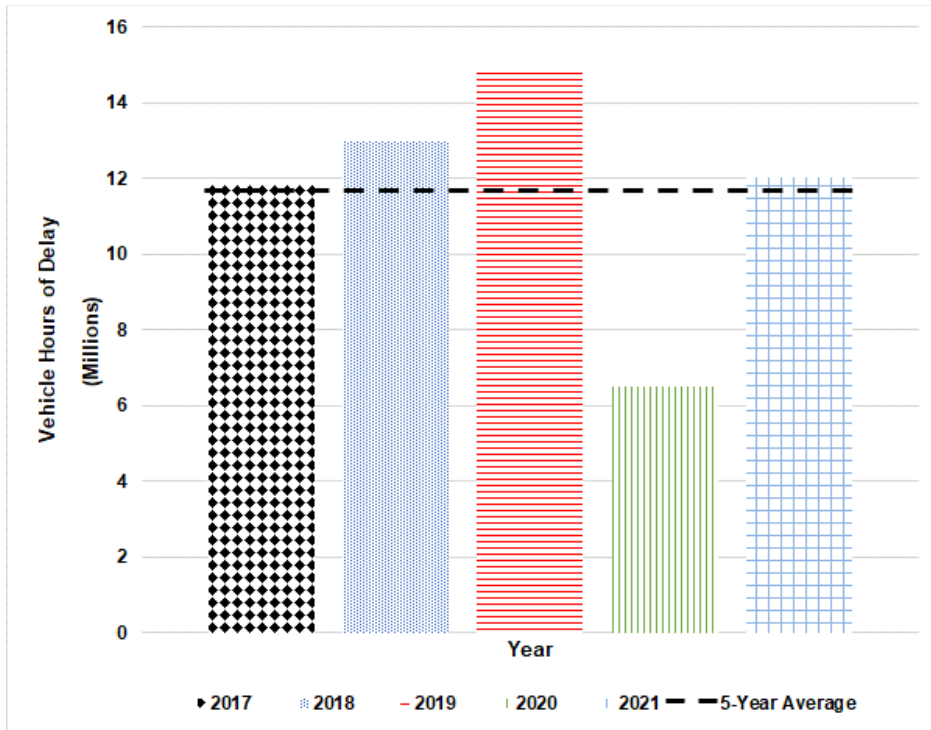


**Figure 13. Chart. Number of work zone vehicle miles traveled per project (without Cook and DuPage counties).**

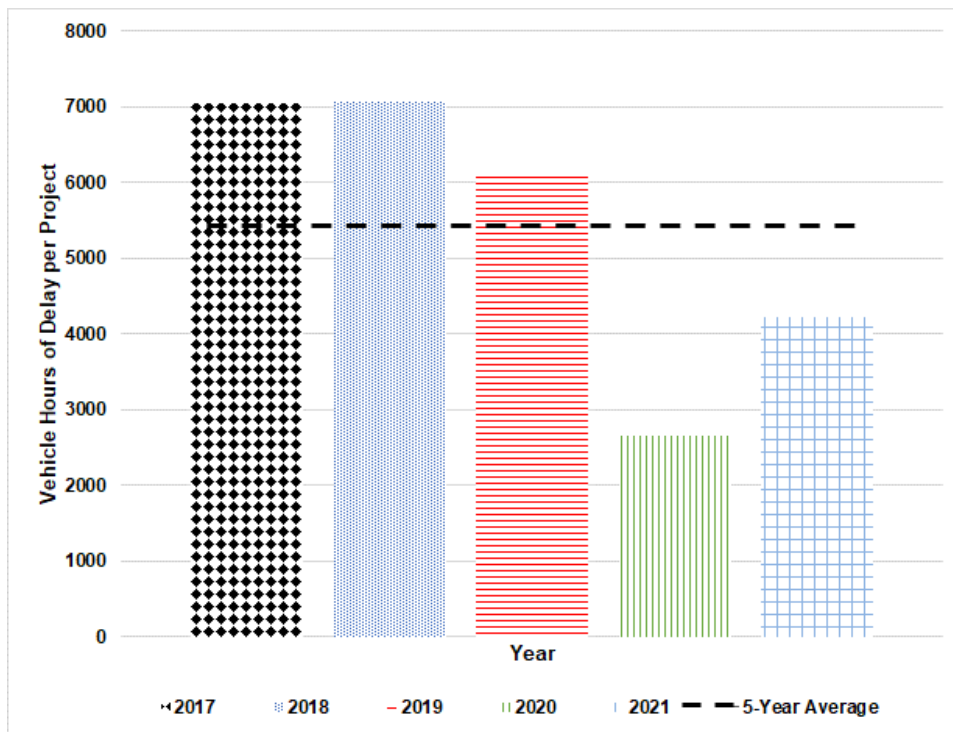
Source: Illinois Department of Transportation.

### Vehicle Hours of Delay

This metric presents an estimate of the total delay experienced by travelers traversing through IDOT WZs. RITIS calculates the vehicle hours of delay (VHD) by totaling all delays experienced by vehicles traversing the WZ segments in a selected timeframe. Across all facility types, travelers experienced 11.9, 13.0, 14.9, 6.5, and 12.1 million VHD in 2017, 2018, 2019, 2020, and 2021, respectively, in IDOT WZs (figure 14). To get a common frame of reference across the years from 2017 to 2021, the project team normalized the delay with the number of WZs. After normalizing, IDOT experienced 7,041, 7,073, 6,106, 2,664, and 4,219 VHD per WZ project in 2017, 2018, 2019, 2020, and 2021, respectively (figure 15). Compared with the 5-year average from 2017 to 2021, VHD per project was 30 percent higher in 2017 and 2018, 13 percent higher in 2019, and 50 and 22 percent lower in 2020 and 2021, respectively.



**Figure 14. Chart. Vehicle hours of delay.**  
Source: Illinois Department of Transportation.



**Figure 15. Chart. Vehicle hours of delay per project.**  
Source: Illinois Department of Transportation.



During qualitative discussions with the project team, the IDOT WZPR team indicated that the reduced travel demand in the COVID-19 pandemic conditions might have contributed to the delay reduction in 2020 and 2021.<sup>10</sup> The project team analyzed the annual delay per VMT to get a normalized comparison of delays based on relative WZ exposure to the travelers.<sup>11</sup> Findings indicated that travelers in IDOT WZs experienced an average of 117 seconds of delay per each VMT in WZs across the years from 2017 to 2021. In comparison to the 5-year average from 2017 to 2021, travelers experienced 16, 11, and 22 percent higher delays in 2017, 2018, and 2019, respectively, and 47 and 1 percent lower delays in 2020 and 2021, respectively. These findings support IDOT's observation that reduced travel demand in 2020 and 2021 likely lessened the delay impact of WZs during those time periods. Even though the delay per VMT metric provides a normalized view of delay performance across the years from 2017 to 2021, it does not provide insights into the amount of delay experienced by travelers or per trip. Ideally, the VHD would be normalized by exposure metrics such as WZ volume or trips to get a comparable metric across the years such as delay per vehicle or delay per trip. However, traffic volume data was not available to conduct this normalization.

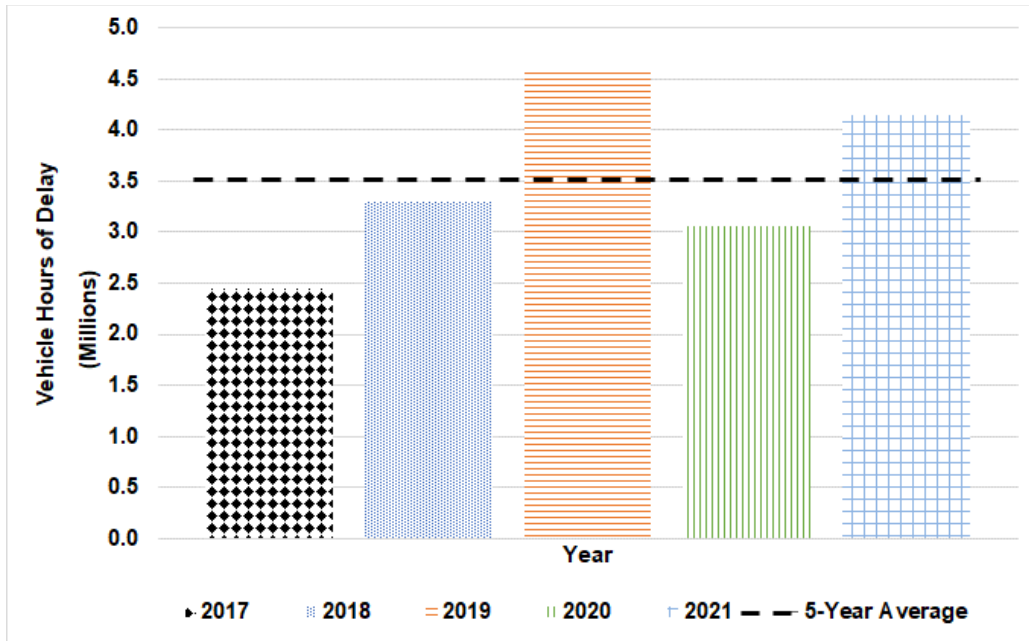
### *Delay Without Cook and DuPage Counties*

Without Cook and DuPage Counties, the annual average VHD experienced by travelers in IDOT WZs was 3.5 million hours, which makes up 30 percent of statewide average delay of 11.7 million hours across the years 2017 to 2021 (figure 16). These findings indicate that the WZs in Cook and DuPage counties attracted one third of statewide traffic demand and contributed to 70 percent of delays experienced by travelers statewide. The project team also performed a normalized delay per project comparison with and without Cook and DuPage counties to assess the mobility impact of these counties across the years. Findings indicated that the amount of delay experienced in Cook and DuPage counties was 15 percent or more during the pre-COVID-19 pandemic period (i.e., 2017, 2018, and 2019) when compared with 2020 and 2021 (figure 17). Finally, the project team analyzed the delay per VMT to assess the magnitude of delay reduction. The average delay per VMT across the years 2017 to 2021 was 54 seconds, which was 53 percent less than the statewide delay per VMT when Cook and DuPage counties were included.

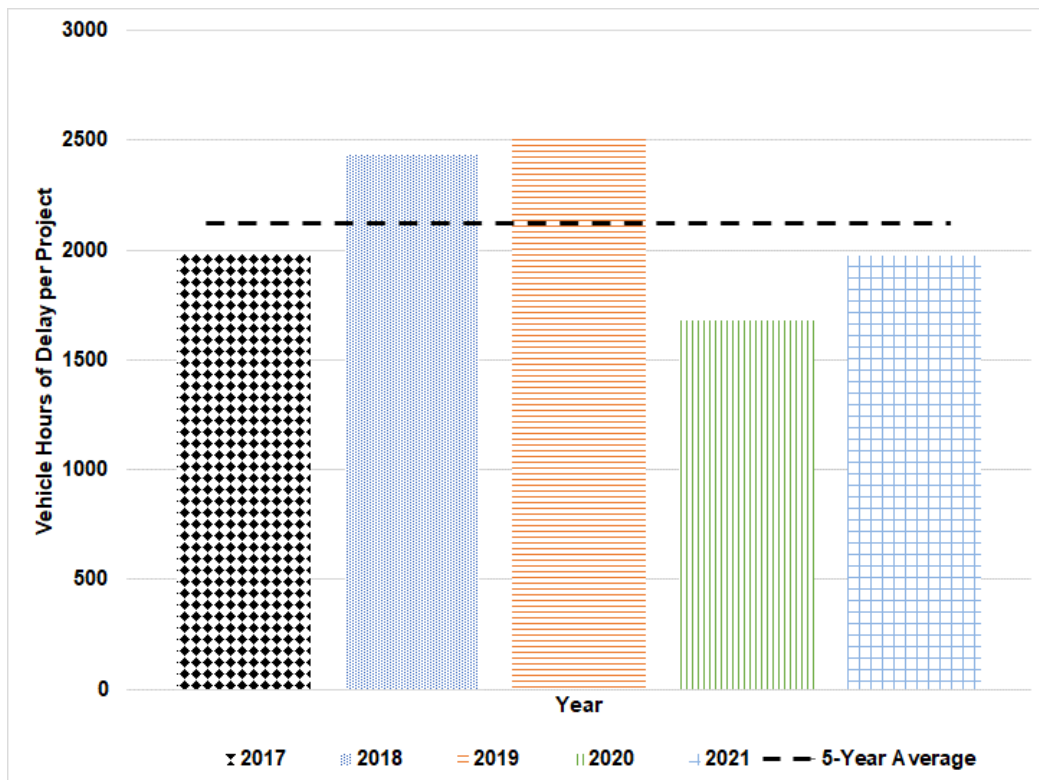
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<sup>10</sup>FHWA-IDOT conference calls February–October 2022.

<sup>11</sup>FHWA. n.d. "Guide for Highway Capacity and Operations Analysis of Active Transportation and Demand Management Strategies" (web page). <https://ops.fhwa.dot.gov/publications/fhwahop13042/appe.htm>, last accessed March 13, 2023.



**Figure 16. Chart. Vehicle hours of delay without Cook and DuPage counties.**  
Source: Illinois Department of Transportation.



**Figure 17. Chart. Vehicle hours of delay per project without Cook and DuPage counties.**  
Source: Illinois Department of Transportation.

The overall improved mobility trends in 2020 and 2021 (including reduced delay per WZ and delay per VMT) can be attributed to the reduced traffic demand (i.e., decrease in VMT per project) on the Illinois roadway facilities. Especially, the reduced demand during peak hours due to remote work during the COVID-19 pandemic had a significant impact on the delay experienced by travelers. Continuing to perform mobility analyses will provide IDOT with an improved comparison of WZ mobility performance pre-COVID-19 pandemic (2017, 2018, and 2019) and post-COVID-19 pandemic (2022 and 2023).

In addition to delay analysis, the project team conducted a bottleneck analysis to identify the WZ segments with recurring and nonrecurring events resulting in queues and bottlenecks. Because the WZ segments in Cook and DuPage counties attract more recurring congestion due to their urban and metropolitan settings, the project team conducted the bottleneck analysis with and without Cook and DuPage counties. Preliminary findings indicated that most of the WZ segments with highest bottlenecks outside Cook and DuPage counties were on Illinois routes (e.g., IL-4, IL-16, IL-127, IL-157, and IL-159) and U.S. routes (e.g., US 6, US 24, US 30, and US 47). The IDOT WZPR team indicated that they will be using the bottleneck analysis findings in their upcoming WZPR to identify WZ segments with queues exceeding 1.5 miles or more when compared with the normal queuing conditions of those segments. The Illinois WZPR team plans to use a combination of number of traffic congestion events, daily duration of bottlenecks, and maximum queue length to determine the underperformed WZ segments. Furthermore, IDOT plans to review the traffic management exceptions (if any) provided to the underperformed WZ segments, identify possible updates to the exception requirements, and implement more-stringent exemption policies to minimize future WZ bottlenecks.

**i Key Findings and Observations for Data-Driven Work Zone Process Reviews**

IDOT uses two mobility goals as key measures to assess the mobility impact of WZs on travelers. The first mobility goal specifies that WZ impacts are unacceptable if they result in more than 5 minutes of delay per vehicle per mile of project length, with a maximum of 30 minutes above the normal recurring traffic delay. The second mobility goal specifies that queues caused by WZs should be no more than 1.5 miles beyond preexisting queues.

Based on the WZ project information available from IDOT, the project team conducted a comprehensive mobility analysis for all WZs across 2017 to 2021 using the RITIS PDA Suite, which uses third-party probe vehicle speed and travel time data. The mobility metrics analyzed for this study using delay analysis included WZ VMT and VHD. Similarly, the project team used a bottleneck analysis to rank WZ segments with the highest bottleneck or queuing duration and queue lengths. Combining these mobility performance metrics, IDOT can draw a comprehensive picture of the WZ segments with recurring queues and the associated delay impact on the IDOT WZs. This information can provide insights on the project, as well as program-level mobility focus areas, key issues, and actions for WZPRs.

During qualitative discussions, IDOT's WZPR team mentioned that Cook and DuPage counties experience a considerable amount of congestion. The project team conducted the mobility analysis with and without Cook and DuPage counties to gather the impact of these counties on the program-level WZ mobility performance.

Across the years 2017 to 2021, IDOT WZs experienced an average of 21.7 billion VMT. The project team normalized the VMT per WZ project to get a common frame of reference across the years. The WZ VMT rates were 14 and 19 percent higher in 2017 and 2018, respectively, 6 percent lower in 2019 and 2020, and 20 percent lower in 2021 compared with the 5-year average of 9.9 million WZ VMT per project:

IDOT WZs without Cook and DuPage counties experienced an average of 14 billion VMT, which is 33 percent less than the statewide VMT. These numbers indicate that Cook and DuPage counties attracted one third of WZ traffic demand across the State. Variations in per-year VMT remained similar to statewide VMT.

Similarly, IDOT WZ experienced an average of 11.7 million hours of delay across 2017 to 2021. Without Cook and DuPage counties, the total delay decreased to 3.5 million hours, which is a 70-percent reduction. Compared with the 5-year average, VHD per project was 30 percent higher in 2017 and 2018, 13 percent higher in 2019, and 50 and 22 percent lower in 2020 and 2021, respectively:

The improved mobility performance in 2020 and 2021 is likely due to the reduced travel demand induced by the COVID-19 pandemic conditions. Ideally, VHD would be normalized by exposure metrics such as WZ volume or trips to get a comparable metric across the years such as delay per vehicle or delay per trip. The project team did not have access to the traffic volume data to perform this normalization. The RITIS PDA Suite does not currently make the traffic volume or trip data accessible through its mobility (delay and bottleneck) analyses, which would enable IDOT to normalize by WZ VHD.

Performance Area 3: Law Enforcement

IDOT implements law enforcement as one of the key mechanisms to improve traffic safety in certain WZs. Law enforcement is very effective in reducing speeding, speed variability, and undesirable driving behaviors such as tailgating and unsafe lane changes, which improves both traffic and worker safety. Ideally, IDOT would use law enforcement in all projects with high traffic demand and safety risks; however, staffing issues and the high volume of projects in some districts limit the number of projects that can be enforced with law enforcement. IDOT deploys most of its law enforcement in interstate WZs and in a limited capacity in U.S. and Illinois route WZs.

<p><b><u>Work Zone Field Inspection</u></b> <b><u>Data Used in Case Study</u></b></p> <p><b><u>Source:</u></b> IDOT</p> <p><b><u>Metrics:</u></b> Number of patrols per interstate WZs, number of enforcement hours per interstate WZs, number of citations, types of citations, crashes per interstate WZs</p>
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IDOT regularly collects and archives law enforcement data. These data include the number of patrols, number of enforcement hours, number of citations and warnings, and types of citations and warnings.

On average, IDOT implemented 7,092 patrols and 54,600 hours of enforcement per year in its WZs across the years 2017 to 2021. Compared with the 5-year average, 3, 10, and 13 percent higher patrols were deployed in 2017, 2018, and 2020, respectively, and 18 and 8 percent fewer patrols were deployed in 2019 and 2021, respectively (figure 18). Similar variations were observed in the hours of enforcement deployed across the years (figure 19). Because the project team did not have access to the exact locations of law enforcement deployment, a precise normalization was not achievable. During qualitative discussions with the project team, IDOT expressed that normalizing the law enforcement data with interstate WZ activity might give a relative estimate of enforcement per WZ. IDOT’s reasoning is that the enforcement deployed in the U.S. and Illinois routes might counterbalance the interstate WZs without enforcement deployments.<sup>12</sup>

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<sup>12</sup>FHWA-IDOT conference calls February–October 2022.

# Data-Driven Work Zone Process Reviews Case Study: Illinois Department of Transportation

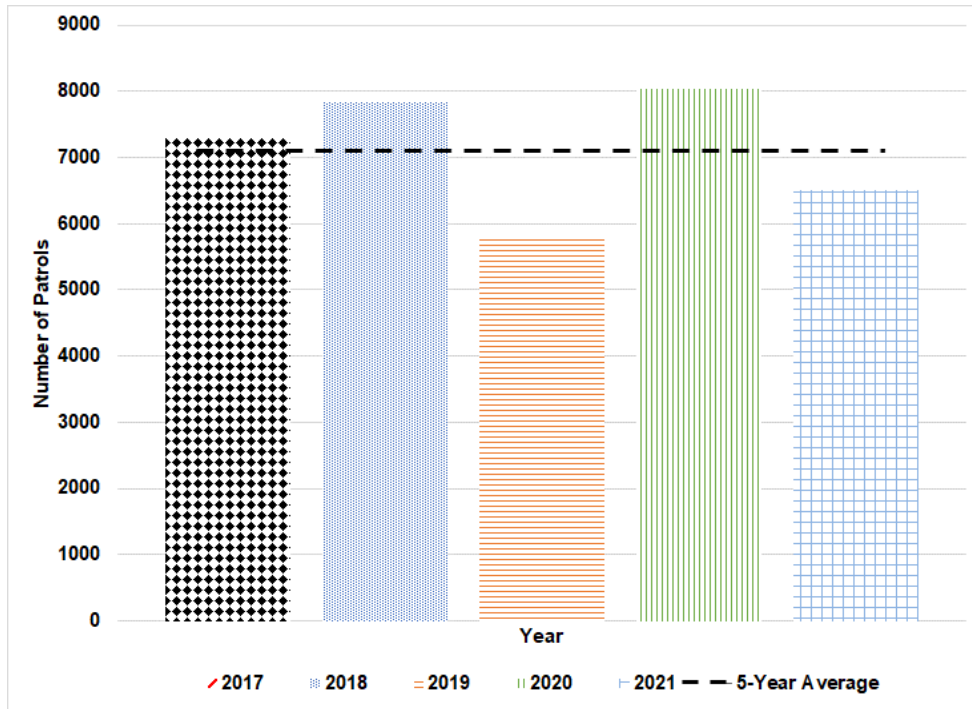


Figure 18. Chart. Number of patrols in Illinois work zones.  
Source: Illinois Department of Transportation.

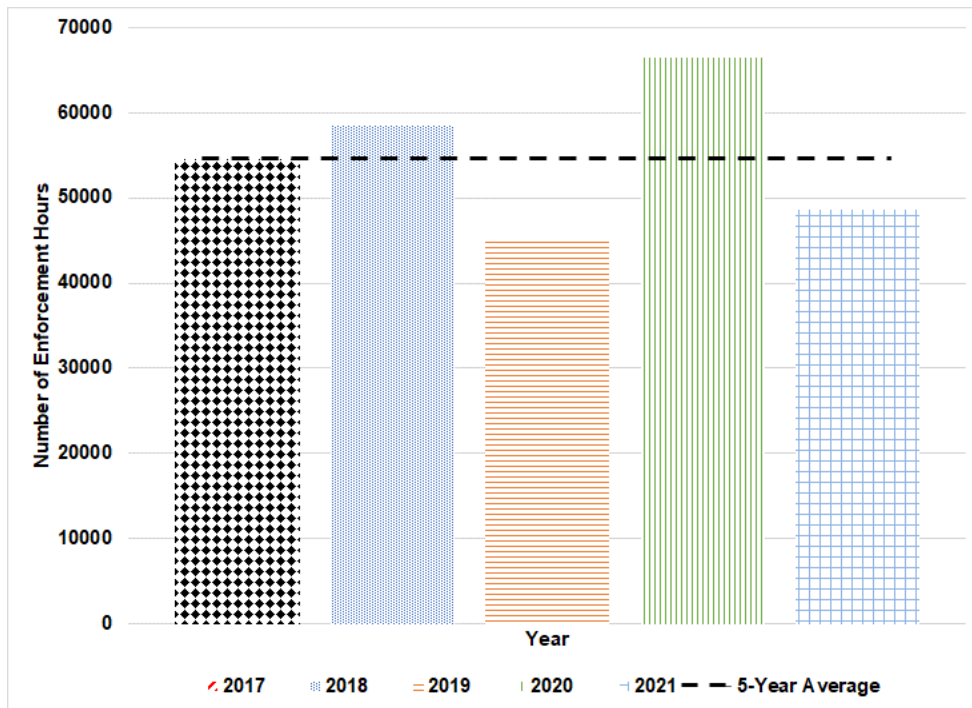
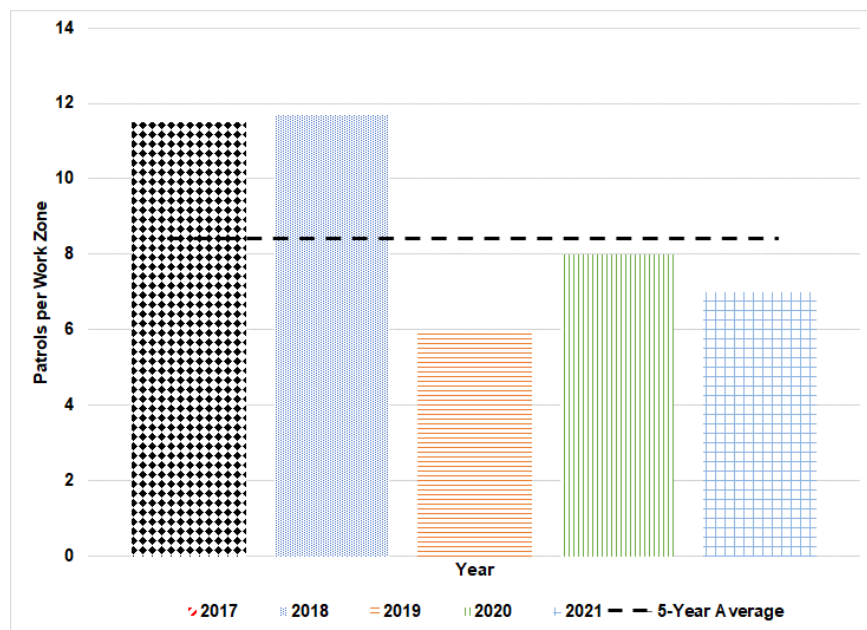


Figure 19. Chart. Number of enforcement hours in Illinois work zones.  
Source: Illinois Department of Transportation.

## Data-Driven Work Zone Process Reviews Case Study: Illinois Department of Transportation

The project team normalized the enforcement data with WZ exposure data on interstates. Findings indicated that Illinois deployed an average of 8.5 patrols per interstate WZ across the years 2017 to 2021. Compared with the 5-year average from 2017 to 2021, 36 and 40 percent more patrols per interstate WZ were deployed in 2017 and 2018, respectively, and 30, 5, and 16 percent fewer patrols were deployed in 2019, 2020, and 2021, respectively (figure 20). Similarly, an analysis of enforcement hours per interstate WZ indicated 33, 35, and 2 percent more deployments in 2017, 2018, and 2020, respectively, and 29 and 19 percent fewer deployments in 2019 and 2021, respectively, than the 5-year average from 2017 to 2021 of 65 hours (figure 21). For all years except 2020, the variations in patrols and enforcement hours were similar. In 2020, despite fewer patrols deployed per WZ, longer enforcement hours were implemented. The Illinois WZPR team mentioned that WZs with higher traffic demand and crash likelihood might require longer enforcement hours, which might have led to more enforcement hours despite fewer patrols in 2020.<sup>13</sup> The Illinois WZPR team recommends that the locations and number of enforcement deployments in each WZ be tracked to get a precise understanding of the magnitude and distribution of enforcement deployments.

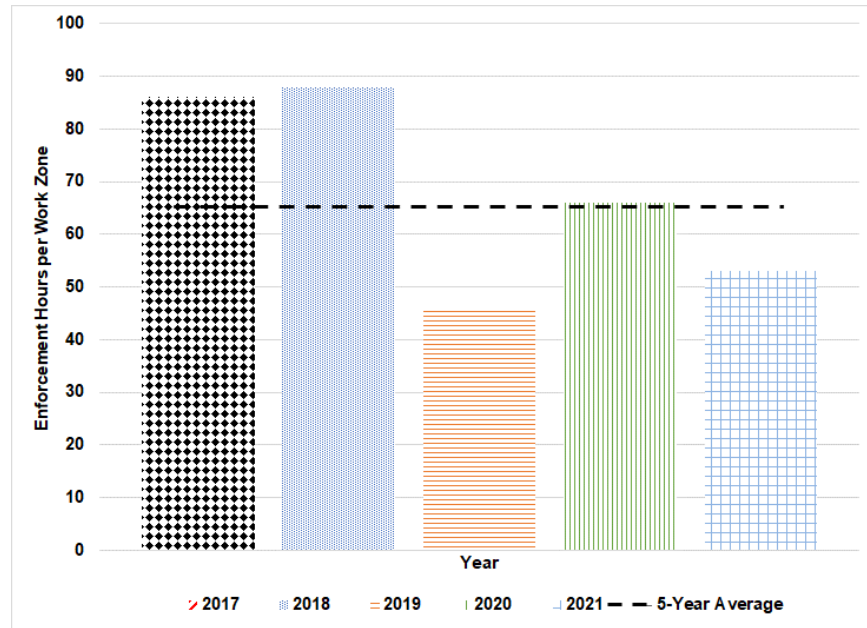


**Figure 20. Chart. Number of patrols per interstate work zone.**

Source: Illinois Department of Transportation.

<sup>13</sup>FHWA-IDOT conference calls February–October 2022.





**Figure 21. Chart. Number of enforcement hours per interstate work zone.**  
Source: Illinois Department of Transportation.

The project team also analyzed the types of citations issued across the years from 2017 to 2021. Speeding (36 percent), seatbelt (8 percent), and distracted-driving citations (13 percent) comprise more than 57 percent of the total citations. The numbers of speeding citations were 8, 1, and 26 percent lower in 2017, 2018, and 2021, respectively, and 12 and 22 percent higher in 2019 and 2020, respectively. Seatbelt and distracted-driving citations issued in 2017 and 2018 were more than twice the citations issued in the years 2019, 2020, and 2021. IDOT mentioned that the revised citation policy for seatbelt and distracted-driving citations in WZs likely led to this reduction. Drug and alcohol and driving under the influence (DUI) citations remained lower than 5-year averages from 2017 to 2021 of 133 and 201 in 2017, 2018, and 2019 but increased in 2020 and 2021. IDOT mentioned that the legalization of recreational cannabis in 2020 might have contributed to these increased citations.<sup>14</sup> Further, comparing the citation locations and WZ crash locations might provide insights into the impact of citations on crash variations, regions with recurring citations, and crash locations with limited citations.

Finally, the project team compared these enforcement findings with interstate crash rates in corresponding years. On average, interstate WZs experienced 3.5 crashes per WZ across the years 2017 to 2021, which is 14 percent lower than the average crash rate for noninterstate WZs (i.e., 4 crashes per WZ). Across all years except 2018, interstate crashes were lower than noninterstate crashes. The project team concluded that there might be a possible correlation between the deployment of law enforcement and crash variations. Ideally, mapping the law enforcement locations with crash locations will give detailed insights such as crashes in WZs in which law enforcement was deployed, high-crash WZs with and without law enforcement, and severity of crashes with and without law enforcement. A similar analysis could be drawn between WZ congestion/queuing/bottleneck locations with law enforcement to understand the

<sup>14</sup>FHWA-IDOT conference calls February–October 2022.



impact of law enforcement on WZs' mobility performance (i.e., the effectiveness of law enforcement in reducing speeding, and speed variability through traffic calming). The project team could not perform this analysis due to lack of law enforcement location data at the time of analysis.

### **i Key Findings and Observations for Data-Driven Work Zone Process Reviews**

- IDOT implements law enforcement as one of the key mechanisms to improve traffic safety in certain WZs.
- IDOT collects and digitizes the WZ enforcement deployments and citations data. These data allow IDOT to gauge the amount of enforcement resources invested in improving IDOT's WZ performance, as well as evaluate the efficiency and effectiveness of law enforcement practices and processes from time to time.
- Overall, IDOT implemented 7,092 patrols and 54,600 hours of enforcement per year in its WZs across the years 2017 to 2021. Based on IDOT's qualitative feedback, the project team normalized the enforcement data with interstate WZ data to get a comparable metric across the years. Normalized findings indicated that IDOT implements an average of 8.5 patrols and 65 hours per WZ. Compared with the 5-year average from 2017 to 2021, more patrols per WZ were deployed in 2017 and 2018, and fewer patrols per WZ were deployed in 2019, 2020, and 2021. Similar variations were observed for enforcement hours per WZ for all years except 2020, when more enforcement hours were implemented despite fewer patrols:
  - To get a precise understanding of the magnitude and distribution of enforcement deployments, IDOT should consider tracking the locations and number of enforcement deployments in each WZ.
- Speeding, seatbelt, and distracted-driving citations comprise more than 57 percent of total citations issued by law enforcement officers. Compared with the 5-year average from 2017 to 2021, speeding violations spiked in 2019 and 2020 but remained below in 2017, 2018, and 2021. Seatbelt and distracted-driving citations were high in 2017 and 2018 but decreased starting in 2019, potentially due to a change in enforcement policy for these violations. Drug, alcohol, and DUI violations remained low until 2019 but increased in 2020 and 2021. Legalization of cannabis in Illinois in 2020 might have contributed to the rise in drug, alcohol, and DUI citations.
- Comparison of crash rates per interstate WZs with enforcement per interstate WZs indicated that the interstate WZ crashes rates remained lower than the noninterstate crash rates by 13 percent across all years by 2020:
  - IDOT should consider mapping the law enforcement locations with crash locations to capture detailed insights such as crashes in WZs in which law enforcement was deployed, high-crash WZs with and without law enforcement, and severity of crashes with and without law enforcement.

## **Application of Case Study Results to Future Work Zone Process Reviews**

Results of the quantitative analyses conducted for the three performance areas provide IDOT with a basis to make decisions on how to focus efforts for future WZPRs. IDOT's WZPR team will use the case study results, supplemented by qualitative data and additional quantitative data sources, to implement a data-driven approach for conducting program-level WZPRs, as well as other follow-up activities.

### **Follow-Up Work Zone Process Review Activities**

IDOT will leverage the findings from this case study to conduct follow-up WZPR activities, including:

- Identifying undesirable and desirable trends in each performance area, as well as projects, issues, and improvements contributing to the trends.
- Conducting WZ committee and district meetings to collect contextual information (e.g., root cause identification, correlating factors, and issue identification) behind the trends identified from the data in each performance area.
- Identifying common issues observed at both State and district levels.
- Selecting and prioritizing issues to address during the next WZPR cycle.
- Identifying action items to address the prioritized issues.
- Selecting metrics for assessing the impact of the implemented action items.
- Establishing processes for collecting data required to calculate the metrics selected.

These activities are not an extensive or exhaustive list nor are required under any FHWA regulation. IDOT will tailor and conduct the activities to suit its WZPR goals and objectives.

## Lessons Learned

Lessons learned from the IDOT case study include:

- **State DOTs have access to data resources for different performance areas through their intra-agency data collection efforts.** A comprehensive data inventory of all data resources can enable State DOTs to select their internal performance measures for various WZ strategies and performance assessments based on available data sources.
- **Combining quantitative data trends with qualitative contextual information may lead to better root cause identification.** Neither quantitative trends nor qualitative contextual information alone depicts a complete picture of WZ issues; synthesizing them enables stronger and more-pointed identification of root causes and potential solutions to issues.
- **Developing quantifiable metrics can enable continuous performance tracking of WZ processes and procedures.** Developing and implementing metrics for different WZM outcome areas may enable States to quantify the impact of identified issues through qualitative data assessments. Depending on the level of impact, States can prioritize the most-pressing issues. Further, these metrics may also help States to assess the effectiveness of implemented action items in resolving issues.
- **Data analytics and visualization tools can be leveraged to establish a continuously evolving WZ mobility assessment.** Such tools offer data and visualization applications that can be used to perform a wide variety of mobility assessments within and outside the realms of WZ performance. After the initial process of geolocating WZ projects, these tools can be leveraged to perform comparisons for varying spatial and temporal boundaries. These features can also help States learn about short-term and long-term impacts of different WZ strategies through historical comparisons.
- **IDOT's detailed data collection and publication of WZ projects (e.g., geolocations of WZ projects, project timeframes, lengths, and project types) enabled the project team to more accurately select the project boundaries in the analytics and visualization tool and assign analysis parameters.** Setting up a data transfer pipeline with reliable third-party analytics and visualization providers may minimize the personnel resource needs to ingest WZ information to the tools and enable more-robust tracking of WZ performance on a near-real-time, hourly, daily, weekly, or monthly cadence.
- **Updating WZ boundaries reporting process to include advance warning area may enable IDOT to get a true measurement of WZ lengths and associated safety and mobility impacts.** IDOT does not have a consistently implemented definition for reporting the start of a WZ when collecting the WZ length data. Currently, the start of WZ reporting by IDOT WZ personnel varies between the start location of the lane closure taper, the start location of the first warning sign, and the start of the proposed physical improvements. Section 6C.02 of the *MUTCD* defines a WZ from the start of the first warning sign until the end of the termination area. During the qualitative discussions, IDOT's WZPR team acknowledged that IDOT needs to update its data collection for WZ lengths to report the start of a WZ from the first warning sign. IDOT's WZPR team also mentioned that it will use updated WZ lengths in future data-driven WZPRs. This

improved data collection practice is likely to increase the average length of WZs and, thereby, the extent of safety and mobility impacts created by the WZs.

- **Law enforcement data provide valuable insights into the amount of enforcement resources invested in improving IDOT's WZ performance, as well as evaluating the efficiency and effectiveness of law enforcement practices and processes from time to time.** IDOT's implementation of law enforcement as a traffic-calming mechanism demonstrates its continuous efforts to manage the safety performance of its WZs. In addition, collecting and digitizing these data enabled the project team to assess the variance in law enforcement in comparison to WZ activity across the years, as well as the high-level impact on safety performance. IDOT should consider expanding its law enforcement data collection to include locations and time stamps of enforcement, citations, and warnings. Mapping these locations with crashes and congestion events can provide key insights into the effectiveness of enforcement in managing safety and mobility performance.
- **IDOT's detailed tracking of safety data allowed the project team to access the detailed safety performance variations, severities, types, and contributing factors.** In addition to the existing best practices for data collection, IDOT (and other State DOTs) can benefit from:
  - Adding standardized entry fields for classifying speeding-related crashes and WZ-worker crashes.
  - Digitizing safety and mobility strategies implemented and locations of implementation.
  - Correlating WZ traffic message channel segments with crash locations.
- **Updating WZ safety goals to compare normalized metrics may account for the variability in WZ activity implemented in each year.** IDOT's current safety goals focus on reducing the total WZ crashes and fatalities compared with previous years. However, these goals do not take the amount of WZ activity into account. Updating the safety goals to compare normalized metrics (e.g., crashes or fatalities per WZ or crashes per WZ VMT) can enable IDOT to establish comparable thresholds across the years.

## Appendix A: Case Study Team and Follow-Up Activities

### Work Zone Process Review Case Study Review Team

The State DOTs should include representatives from various WZM areas in their WZPR teams (figure 22)<sup>3</sup>. The IDOT WZPR team comprises members from IDOT’s Bureau of Safety Programs and Engineering, Bureau of Construction, Bureau of Design and Environment (BDE), and FHWA Division Office, and project engineers from IDOT districts. Together, this multidisciplinary team enables comprehensive decisionmaking for WZPRs by covering all aspects of WSM.

### Follow-Up From the 2019 Work Zone Process Review

During its 2019 WZPR, IDOT identified action items to:

- **Action Item No. 1:** Clarify language in the BDE manual and other documentation to better align with desired practice by including common practices and changes that occur once projects are constructed and by providing a traffic management plan (TMP) development checklist:
  - **Status:** Incremental BDE manual revisions are under way. However, revisions to policies that are dependent on ongoing research studies will limit the immediate changes to be implemented. IDOT created and implemented a TMP development checklist.
- **Action Item No. 2:** Develop and offer a TMP training course specific to WZ designers and field personnel to discuss guidance in the BDE manual about development, implementation, and need for a feedback loop:
  - **Status:** TMP training course materials do exist. IDOT intends to offer courses starting in 2023–2024 as additional staff are added. Staffing and COVID-19 pandemic restrictions have impeded improvements in formal classes. Feedback loop is generally handled through multiple annual or semiannual department meetings involving Traffic Control supervisors, Project Implementation engineers, Bureau of Construction personnel, and industry stakeholders on the Work Zone Safety Committee. Additionally, IDOT requires safety and mobility

#### Division/Office Representatives Can Include on Work Zone Process Review Team

Planning  
Occupational (Worker) Safety  
Construction Administration  
Roadway/Project Design  
Materials  
Traffic Operations/Management  
Traffic Safety  
Permitting  
Maintenance  
District Staff (Resident, Areas, and District Engineers)  
Training/Workforce Development  
Public Information Office  
Design Consultants  
FHWA Division Office

**Figure 22. List. Division/Office Representatives Can Include on Work Zone Process Review Team.**

Source: Federal Highway Administration.

postconstruction reporting for projects with exceptions to compliance from policy goals.

- **Action Item No. 3:** Use traffic management center data to report congestion and incidents:
  - **Status:** IDOT is developing a request for proposal for IDOT’s next-generation Advanced Transportation Management System, which may have capabilities to address this action item but also incorporate third-party services as well. IDOT is identifying opportunities to improve WZ activity data quality in preparation for future capabilities.
- **Action Item No. 4:** Modify IDOT guidelines and policies to reflect most recent WZM practices:
  - **Status:** WZM guideline and policy revisions are under way. IDOT selected some elements for inputs via a task force. Additional elements are tied to ongoing research projects that are expected to be completed in 2023. IDOT updated highway standards and specifications based on the needs identified.
- **Action Item No. 5:** Update and enhance existing online IDOT WZ resources:
  - **Status:** Website content revisions are under way and will be updated as more WZ efforts have been completed.
- **Action Item No. 6:** Develop specifications and guidelines for smarter work zone (SWZ) technologies and enforce application by contractors:
  - **Status:** Illinois research study R27-246 will provide a SWZ tool with draft specifications and guidelines. IDOT will consider enforcement in various stages dependent on adoption of new policy and completion of statewide training.
- **Action Item No. 7:** Require an SWZ manager for each project employing SWZ technologies:
  - **Status:** IDOT is reevaluating this action item in light of identification of other best practices for project delivery and quality control.
- **Action Item No. 8:** Establish a task force that brings together all relevant parties, with the goal of establishing quantifiable performance measures:
  - **Status:** IDOT holds biannual meetings with the WZ safety committee, including members from multiple agencies, industry groups, and other stakeholders that provide input and support for the identification and deployment of safety campaigns and countermeasures. The committee also provides input on the selection of performance measures and analysis tools. IDOT has been working with FHWA and Battelle to transition its WZPR toward a data-driven effort to further improve the use of data for identification and prioritization of needs.
- **Action Item No. 9:** Develop a structured tool to collect specific mobility and safety data:
  - **Status:** IDOT’s Bureau of Safety Programs and Engineering is working on developing a tool for the analysis of fatal- and serious-injury WZ data to identify areas of overrepresentation and to identify of trends. The goal is for this tool to be combined with or used in conjunction with the mobility dashboard being created by the research project to give IDOT an idea of the correlation between mobility impacts and safety in WZs.

For more information on FHWA's Work Zone Management Program, please visit:  
<https://ops.fhwa.dot.gov/wz> and  
<https://www.workzonesafety.org/swz>

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