REVISION HISTORY

This document will be periodically updated by the Iowa Department of Transportation (DOT). The following table provides the date and a brief description of each revision to track revision history.

REVISION NUMBER	DATE OF REVISION	DESCRIPTION OF REVISION
1.0	June 2018	Initial Version
2.0	September 2020	Updated Action Recommendations
3.0	July 2022	Updated Action Recommendations

ACTION RECOMMENDATIONS

Many of the Action Recommendations from the Work Zone Management Service Layer Plan have been completed or revised as progress has been made. This update incorporates revisions to ongoing actions and adds new actions resulting from work zone mobility and safety efforts.

The following action recommendations are being proposed to achieve the Work Zone Management Service Layer's (WZMSL) objectives outlined in the previous sections. Action recommendations are presented in order of priority.

1. Systems and Technology

   Iowa Work Zone Data Hub * Ongoing/Updated

   Iowa has incredible amounts of data used for work zone applications that is located in many different places and in different formats. The Iowa Data Hub is intended to aggregate and summarize this information to create datasets used by Department staff and others for meaningful, and useful applications such as future project planning. The data includes, but is not limited to work zone data, crash data, LCPT, hourly volumes, AADT, annual cultural events, weather history, etc. Beyond linking data, Iowa DOT wants to turn data into useful information. Development will include processes to systematically relate data and expand process for reporting critical WZM performance measures.

   The Data Hub is being developed in cooperation with the FHWA Work Zone Data Initiative (WZDI). Current efforts are for four use Cases:

   1. Work Zone Mobility Performance Analysis
   2. Agency Project Initiation and Planning Temporary Traffic Control (TTC) Coordination
   3. Work Zone Safety Performance Analysis
   4. Disseminate to Third Part Data Provider as part of the Work Zone Data Exchange (WZDx)

Action:	Continue to collaborate with FHWA WZDI and develop applications for Iowa DOT users.
Lead:	Traffic and Safety Bureau
Support:	Traffic Operations Bureau, IT, TMC, GIS
Maintenance:	
Accomplishments:	Work zone data is being archived based on the available 511 data feed and integrated/enhanced with smart arrow board data if within the proximity of the work zone. For the archived work zones above, performance measures using sensor, probe and crash data are calculated on a daily basis if the information is available for the given location Iowa DOT received a grant to develop a WZDx feed as part of the ATMS system
Duration:	5 years– Initial development focused only on a few use cases and will be continued to be expanded for other use cases as well as integrating with the lane closure system.

Develop and Integrate Connected Devices *New*

Continue to develop and integrate data from temporary traffic control devices and other equipment into the Work Zone Data Hub. The first device in this effort the Smart Arrow Board provides real-time lane closure information that can be provided to driver information systems and used for work zone operation analysis.

Action:	Continue to work with industry to develop and deploy devices such as connected temporary traffic signals and other devices. This includes collaborating with development of the Work Zone Data hub and WZDx efforts. This includes purchase and deployment of smart work zone devices for maintenance operations. Informing local agencies and private companies that deploy devices on the Iowa highway system is important to full deployment of these devices.
Lead:	Traffic and Safety Bureau
Support:	Design Bureau. Construction and Materials Bureau, Traffic Operations Bureau, Maintenance Bureau, TMC
Maintenance:	
Accomplishments:	Smart Arrow Board deployment on Iowa DOT projects. Development of Connected Temporary Traffic Signal protocols meeting requirements of WZDx and implementing plan to deploy them on Iowa DOT projects.
Duration:	5 years

2. Performance Measures

Identify Work Zone Performance Measures * Ongoing/Updated

The Iowa DOT has developed Transportation Systems Management and Operations (TSMO) performance measures to aid in managing the transportation system. These overarching performance measures are being used to determine outcome-based performance measures for work zone management that align with TSMO performance measures of Crashes, Non-Recurring Delay, Roadway Clearance Time and Winter Operations Time-to-Normal (most likely not a work zone management item). Currently InTrans tracks, average queue length, maximum queue length, average duration of traffic queuing events, total vehicles, number of traffic slowdowns, average delay and maximum delay.

Action:	Present work zone performance measures to the Work Zone Council. The Work Zone Crash Team will link the new crash database by InTrans to TCP projects and establish thresholds to identify work zones that warrant additional attention.
Lead:	Traffic and Safety Bureau
Support:	Traffic Operations Bureau, Construction and Materials Bureau
Maintenance:	Revised every three years
Accomplishments:	A performance measure goal of 4-Minute of delay for work zones was established in 2020. This standard continues to be monitored.
Duration:	12 months

Customer Satisfaction *New

The TSMO plan provides for Iowa DOT to be Customer Focused by being committed to consistently providing high quality service for external and internal customers. The DOT promotes a positive customer focus by understanding customer needs and empowering staff to be responsive. Customer needs in work zones are currently not being tracked making it impossible for work zone staff to respond to these needs to improve customer satisfaction.

Action:	Identify external and internal work zone customers. Establish customer needs in work zones by working with these customers to understand their specific needs related to construction and maintenance work zones. Communicate these needs to the WZMTO Committee to develop effective response to address the identified needs. Establish a tracking mechanism to access the success of these efforts.
Lead:	Strategic Communications
Support:	Traffic Operations Bureau, Traffic and Safety Bureau, Construction and Materials Bureau
Maintenance:	Revised every three years
Duration:	12 months

Investigate Relationship Between Work Zone Speed Density and Work Zone Crashes *NEW

Use of machine learning to identify slow and stopped conditions has resulted in establishing speed density curves that provide four clusters of information, normal, minor delay/recovery, slow traffic and stopped traffic. This system is currently used to provide real-time alerts to TMC and project managers while reducing the number of false alerts experienced with the previous system that relied on a fixed 45 mph threshold. While critical to assessing mobility in a work zone no quantifiable linkage to traffic safety has been established. This action item is to determine if there is a statistically valid linkage between these speed density curves and number, type, and severity of traffic crashes. If a relationship can be established, this real time and historic data could be used to determine safety risk based on observed speed in work zones.

Action:	Investigate if a relationship between crashes and speed density data exists. If so, quantify the relationship to provide a statistically valid risk assessment. If a relationship is discovered, develop processes and procedures to report this information to inform management of risks, project managers of issues on specific projects, and provide data driven identification of projects that indicate a need for further review by the process review team.
Lead:	Traffic Operations Bureau
Support:	Traffic and Safety Bureau, Construction and Materials Bureau, Design Bureau
Maintenance:	Review every three years
Duration:	12 months

Identify Work Zone Production and Efficiency Outcome Measures * New *

Identify work zone production and efficiency outcome measures that aligns with agency work zone safety and mobility policies and goals.

Action:	Establish outcome measures using existing contract management data such as number of temporary traffic control change orders, amendments to contracts for temporary traffic control, number of amendments to add mitigations or enhancements, etc. Provide this information to the Work Zone Process Review team for incorporation into report and recommendations.
Lead:	Construction and Materials Bureau
Support:	Design Bureau, Traffic Operations Bureau Traffic and Safety Bureau
Maintenance:	Revised every year
Duration:	12 months

3. Culture

Promote Work Zone Innovation * New *

Members of the Work Zone Council organization support innovations to improve work zone safety and mobility for both construction and maintenance operations. A key element of this effort is to ensure statewide implementation of successful innovations by promoting them department wide.

Action:	Collect results of recent and ongoing innovative WZM efforts throughout the agency and distribute to core WZM staff to raise awareness and encourage further innovation.
Lead:	Traffic Operations Bureau
Support:	Design Bureau, Construction and Materials Bureau, Maintenance Bureau, Traffic and Safety Bureau, and Strategic Communications.
Maintenance:	Promote at all Work Zone Council Meetings
Duration:	Five Years

4. Collaboration

Work Zone Design Stakeholders * Ongoing/Updated

The work zone CMF workshop identified the need to establish a list of stakeholders to contact during work zone design and Transportation Management Plan (TMP) development including developing a process to engage stakeholders and include traveler and customer satisfaction measures.

Action:	Work with ADEs and designated personnel to document the standard process that can be used statewide to expand existing TMP development process to include specific steps for obtaining and considering other stakeholder needs and include in the TCP Checklist. Include TIM Route assessment in TCP checklist update.
Lead:	Design Bureau
Support:	Construction and Materials Bureau, Traffic and Safety Bureau, and TSMO Engineers
Maintenance:	Include in process review
Accomplishments:	Language was included in the Design Manual update to include use of the TCP checklist for every project to be completed during the concept phase of design.
Duration:	One year

Work Zone Management External Stakeholders * New

The work zone Information Sharing Workshop reestablished the need to work with external stakeholders to improve work zone management by collaborating to generate and implement creative solutions to mitigate work zone safety and mobility challenges.

Action:	Involve construction industry in WZM by replacing the Roadway Industry Safety Committee (RISC) that assisted in identifying and solving WZM issues by: • Identifying Iowa DOT personnel that serve on industry committees and providing them with WZM information to share with the industry. • Engaging the safety groups and individuals in the industry such as the AGC Safety Director, APAI, etc.
Lead:	Construction and Materials Bureau
Support:	Design Bureau, Traffic and Safety Bureau, and Traffic Operations Bureau
Maintenance:	
Duration:	One year

Work Zone Management Law Enforcement Stakeholders * New

The work zone CMF Workshop reestablished the need to work with law enforcement to improve work zone management by collaborating to generate and implement creative solutions to mitigate work zone safety and mobility challenges.

Action:	Periodically review processes for considering WZM needs for law enforcement, funding levels, and implementation procedures. Involve internal MVE, State Patrol and Local law enforcement agencies in this effort to identify and solve work zone safety issues. Incorporate decision points regarding MVE needs and use WZM within the TMP development and implementation process. Support and Collaborate with the MVE initiative to establish full time Work Zone Officers.
Lead:	Construction and Materials Bureau
Support:	Design Bureau, Traffic and Safety Bureau, and Traffic Operations Bureau
Maintenance:	Include in process review
Duration:	One year

5. Business Process

Improve Plan Development Process and Collaboration Tools * Ongoing

This program action item will assist in creating a process for communication and collaboration between design and field staff by updating the process from an ad-hoc process to a more formal review using available technology to streamline the process.

Plan Review * Ongoing

A working group to develop a Bluebeam based plan review procedure has been formed. They are planning a pilot program to establish the final statewide procedure.

Action:	Form a plan review development team and conduct a pilot demonstration to establish a detailed process for plan review
Lead:	Construction and Materials Bureau
Support:	Bureaus of Design, Bridges and Structures, Traffic and Safety
Maintenance:	Quarterly project updates and incorporation into training
Accomplishments:	Bluebeam licenses have been purchased and are being utilized by several bureaus for as-built creation. Documentation on interoperability between different platforms (Adobe/Bluebeam) was created.
Duration:	5 years

Improve Processes to Identify Significant Projects *Ongoing/Updated

Developed and implemented a procedure for the Mitigation Team to begin reviewing projects two years out, advise designers of requirements, and audit this process to ensure additional projects are included in the process. A list will be sent to FHWA on June 1 each year and updated on September 1.

Action:	Document in the Design Manual and collaborate with Project Management Bureau to include in new Master Works process. Add a process to track projects that add mitigations mid-season to determine process improvements and include these mitigations in the design process. The goal is to get more people to use the TCP checklist by properly linking the checklist to processes and focus on including it with the Bridge Design Manual processes.
Lead:	Traffic and Safety Bureau
Support:	Bureaus of Design, Construction and Materials and Project Management
Maintenance:	
Accomplishments	Revision of PPM 500.18 to clarify definition of significant projects. Updates to the TCP checklist include a flow chart diagram to assist in identifying projects as significant (or TCP).
Duration:	1 year

Develop and Implement Improved Process Review * Ongoing

There are many performance indicators used to assess temporary traffic controls on projects. Create a scalable and sustainable process that integrates with DOT systems that are managed by Iowa DOT that integrates work zone key performance indications into a dashboard enabling DOT staff to quickly determine work zone traffic control performance and track this performance over time.

Action:	Develop Key Performance Indicator Dashboards for process review team field review findings.
Lead:	Design Bureau

Support:	Bureaus of Construction and Materials, Traffic and Safety, Motor Vehicle Enforcement, Local Systems, and FHWA
Maintenance:	Include results in process review
Accomplishments:	GIS tool created to assist with Iowa's Data Driven Process Reviews
Duration:	One year

Improve Processes to Implement Data Driven Decisions *New

Develop or improve policies, standards, specifications, guidelines and standard operating procedures that will facilitate implementing mitigations and improvements based on data collected and used for work zone management.

Action:	Include discussion of issues that indicate the need to revise policies, standards, guidelines and procedures in the Work Zone Council network of committees, teams, and task forces. Focus actions from these meetings toward continued improvement. Review processes and procedures on a periodic basis.
Lead:	Traffic and Safety Bureau – make this a design job to lead on WZTraffic Safety Committee
Support:	Bureaus of Design, Construction and Materials and Traffic Operations
Maintenance:	
Duration:	5 years

6. Organization and Work Force

Support Continued Effort to Integrate TCP Efforts* Ongoing\Updated

This action item is currently in progress. The TCP program deals directly with Iowa work zones so having the TCP program housed under the TSMO WMZSL umbrella is appropriate. This action recommendation is a continuation of the TCP program as it transitions to an internal process for the DOT as 'a way of doing business' for Iowa work zones.

Action:	Move the TCP group towards a support role of training, plan review, and system monitoring and assisting the DOT transitioning into an in-house TCP program. Develop and distribute list of critical WZM knowledge and skills throughout the agency and encourage/require training and capability-building efforts to develop the knowledge and skills. Identify organizational units within agency where critical WZM knowledge and skills are required. Regularly assess compiled lessons learned and determine which should be incorporated as best practices into agency standards, manuals, guidance, etc.
Lead:	Traffic Operations Bureau
Support:	Bureaus of Traffic and Safety, Design, Construction and Materials, Bridges and Structures
Maintenance:	
Accomplishments:	The TCP checklist was updated to include plan turn in mitigations, concept mitigations, and project enhancements (traffic ops, IWZ, TIM) to assist internal staff by providing additional guidance to improve work zones.
Duration:	3 years

Work Zone Management Training Program* Ongoing

Develop a work zone management training program to provide information and new developments in management of mobility and safety in work zones. This includes both construction and maintenance operations

Action:	Include this as part of the annual work zone training program. Evaluate online Basics of Work Zone Traffic Control. Formalize employee training program for work zones. Develop training program on WZM offered by and supported by DOT.
Lead:	Design Bureau
Support:	Bureaus of Traffic and Safety, Construction and Materials, Bridges and Structures, Maintenance
Maintenance:	Annual updates
Accomplishments:	Additional trainings such as flagger, maintenance, and train the trainer have been created or updated.
Duration:	On going