MassDOT Work Zone Impact Analysis Tool

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Agenda

- Motivation
- MassDOT's Work Zone Management Tools
  - Work Zone Manager
  - Lane Closure Request App
  - Impact Analysis Tool
- Impact Analysis Tool
- Impact Analysis Tool Demo

Work Zone Safety and Mobility Rule (2024)

Code of Federal Regulations Title 23, Chapter I, Subchapter G, Part 630, Subpart J

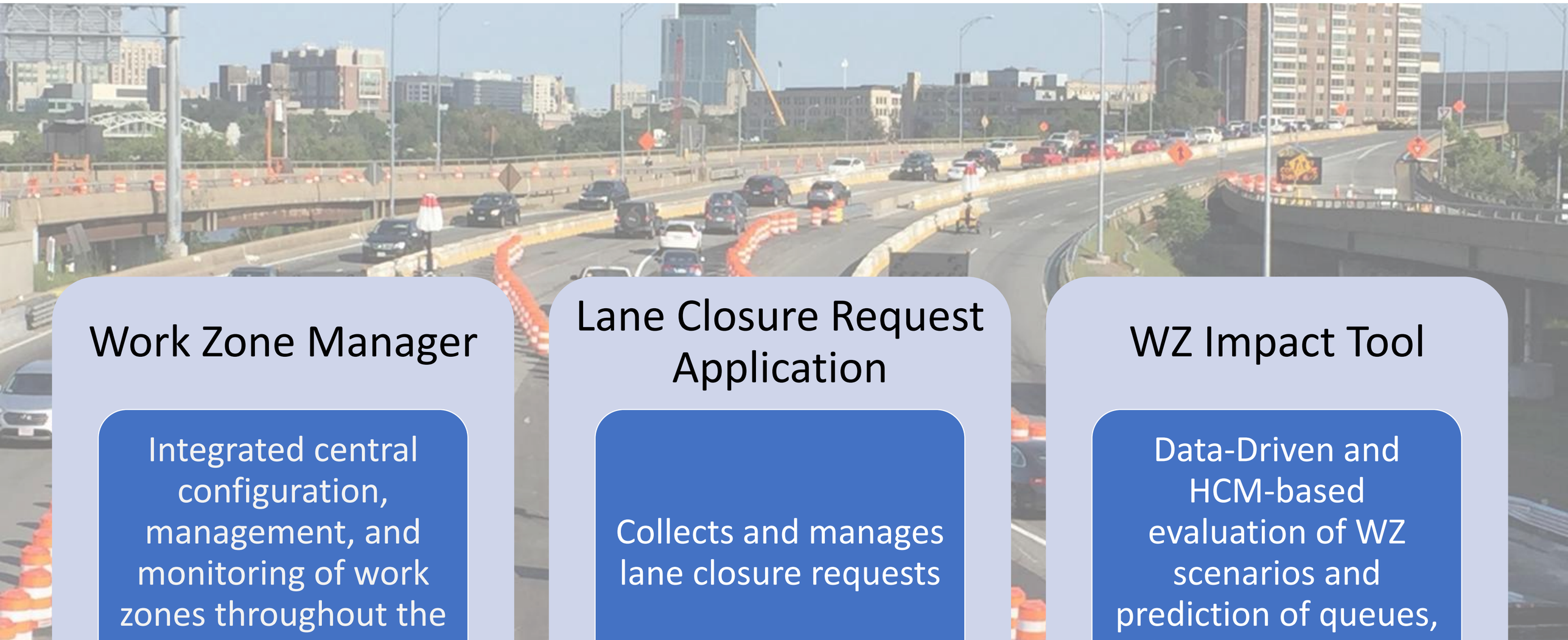
- Update published in the Federal Register (89 FR 87293) on November 1, 2024, with an effective date of December 2, 2024.
- Requires States to comply no later than December 31, 2026

- **Section 630.1006**, Work zone safety and mobility policy
  - This subpart establishes requirements for States to develop policies for the systematic consideration and management of work zone impacts on all Federal-aid highway projects. Such policy shall identify safety and mobility performance measures

- **Section 630.1008**, State-level processes and procedures
  - States shall have procedures to (1) **in the project development stage, assess likely work zone impacts** and (2) in the project implementation stage, manage work zone impacts.

More Strategic with Allowable Lane Closures

MassDOT's Work Zone Management Tools



Work Zone Manager

Integrated central configuration, management, and monitoring of work zones throughout the state

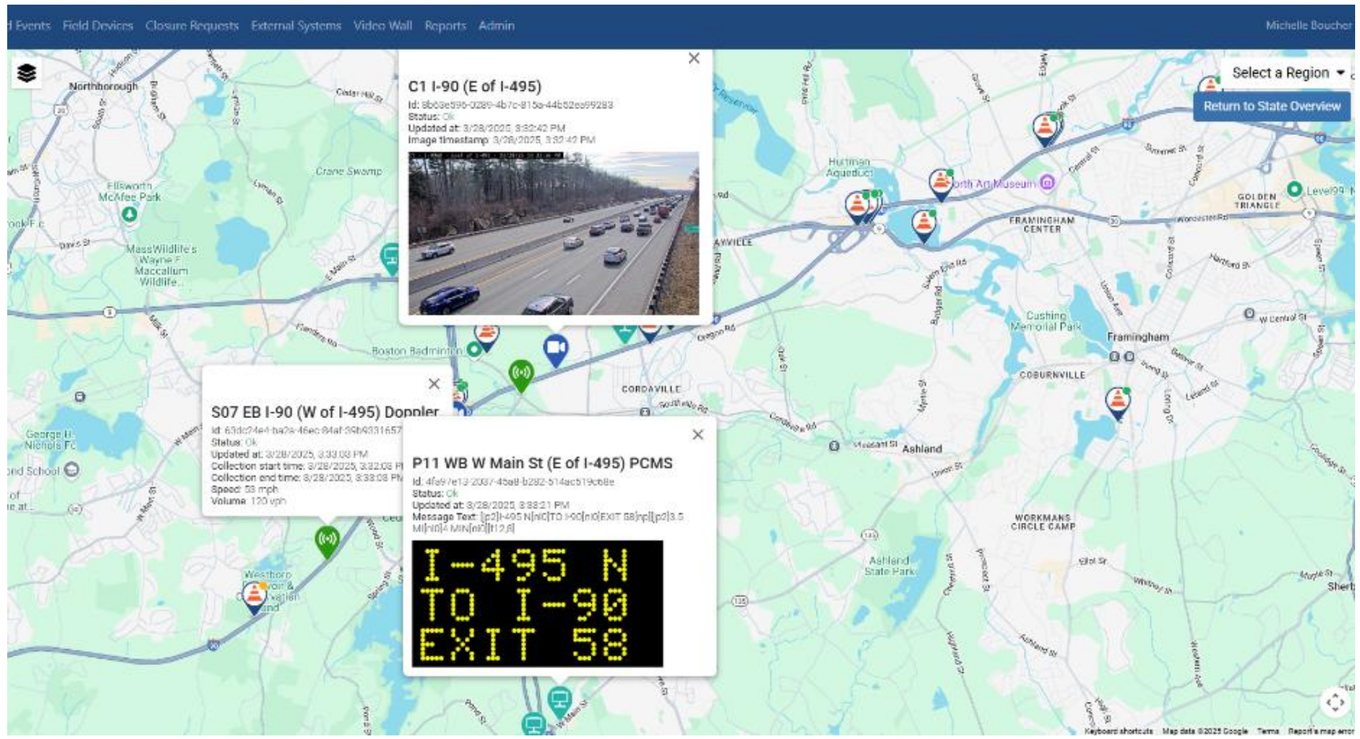
Lane Closure Request Application

Collects and manages lane closure requests

WZ Impact Tool

Data-Driven and HCM-based evaluation of WZ scenarios and prediction of queues, delays, and user costs

Work Zone Manager



ABOUT

- Web-based
- Mobile-friendly user interface

FEATURES

- Configure, manage, and monitor work zones throughout the state
- View deployed portable ITS field devices
- Report on upcoming work zones as well as historical data
- Integrate with planned event sources
- Enable creation, automated validation, and review of lane closure requests
- Combine planned events with real-time device information
- Publish a US DOT CWZ Standard feed (previously WZDx) with audited, verified information that is updated every minute

Lane Closure Request Application

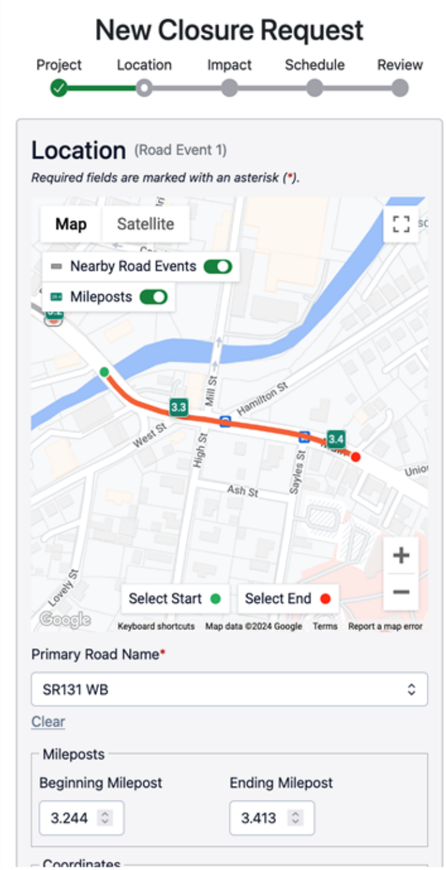
- Improve quality of planned work zone data
- Use MassDOT's road GIS data to have accurate and precise location information

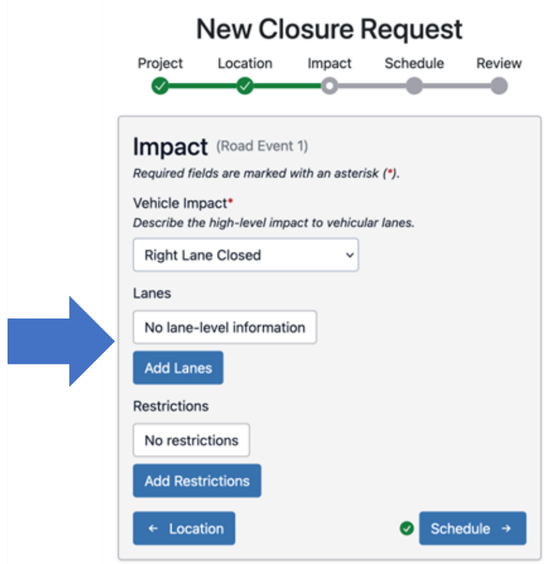
Identification of conflicts

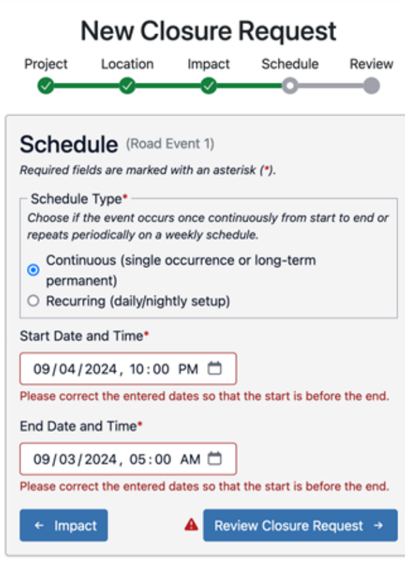
- Map layer for nearby work zone events

Configuration and automatic validation against closure restrictions

- Import data about maximum number of closed lanes for road segments
- Visual warnings and suggestions







Warning: This event violates one or more restrictions on the number of lanes that can be closed for this section of SR131 WB. Click on this notice for details.

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Work Zone Impact Analysis Tool

Work Zone Impact Analysis Tool

TOOL PURPOSE

- Create a statewide tool to streamline the freeway work zone impact assessment process
- Provide the ability to approve more temporary traffic control plans more efficiently and consistently *(i.e. Lane Closure Request App)*
- Accelerate construction project schedules (work hours)

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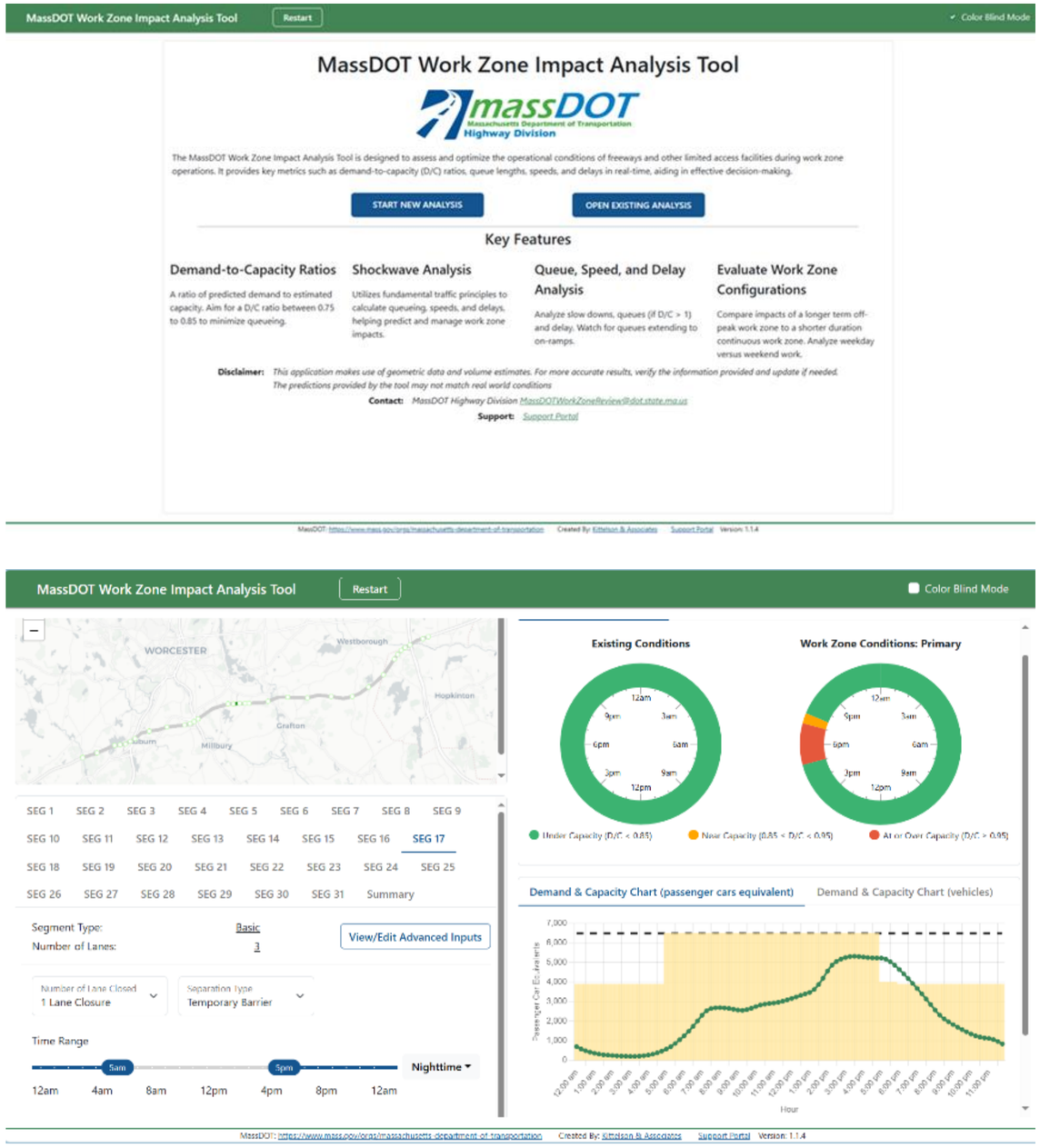
Work Zone Impact Analysis Tool

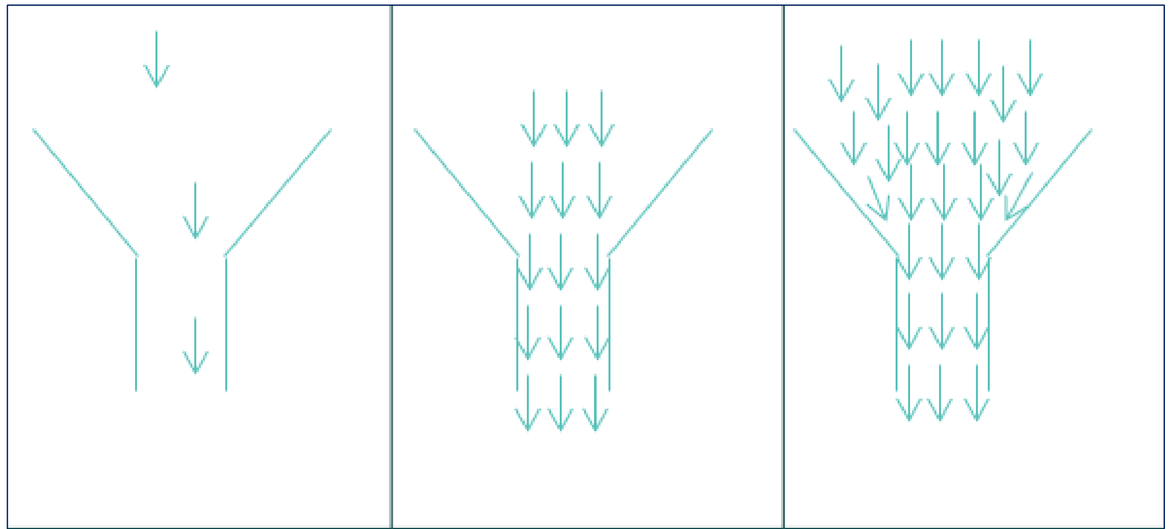
- **Integrated with WZM** (Lane Closure Request app)
- Provides a detailed traffic analysis of work zone conditions
- Built to be simple to use, while being precise
- **Minimal inputs required** – Most input data is provided as a default, which users can adjust
- **Planning level analysis** – will handle 95% of your work zones, but it is a simplified tool that may not be appropriate for complex systems
- **Web-based tool** – allows for easy access to users and rapid deployment of data updates and tool features
  ➢https://project.kittelson.com/massdot-WZ-impact/



Work Zone Impact Analysis Tool

You can answer:

- What hours can a lane be closed without causing queueing?
- How much delay is the work going to cause?
- With a particular work configuration, how far is the queue going to extend?



Under-Capacity	At Capacity	Over-Capacity
$d/c < 1.0$	$d/c = 1$	$d/c > 1.0$

Work Zone Impact Analysis Tool

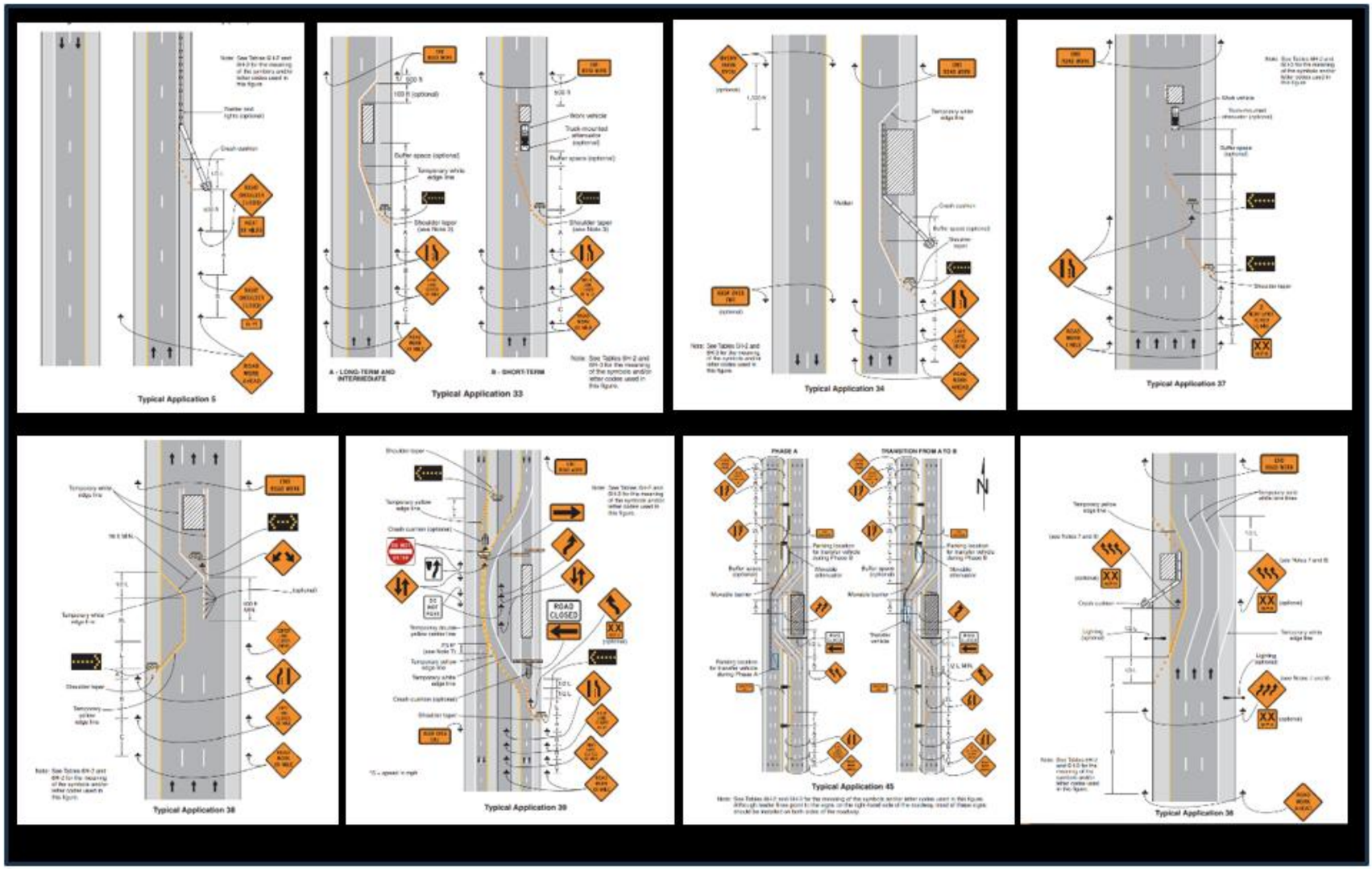
Work Zone Capacity Values

Work Zone Type	WZ Duration	Barrier Type	Left Side		Right Side	
			Urban	Rural (pcphpln)	Urban	Rural (pcphpln)
Shoulder Closure (2 lanes)	Short Term	Cones or drums	1,900	1,750	1,850	1,700
		Hard Barrier	2,050	1,850	2,050	1,850
	Long Term	Cones or drums	2,000	1,850	1,950	1,800
		Hard Barrier	2,100	1,950	2,100	1,900
Shoulder Closure (3 lanes)	Short Term	Cones or drums	1,950	1,750	1,900	1,700
		Hard Barrier	2,100	1,900	2,050	1,850
	Long Term	Cones or drums	2,050	1,850	2,000	1,800
		Hard Barrier	2,150	1,950	2,100	1,900
Shoulder Closure (4 lanes)	Short Term	Cones or drums	1,950	1,750	1,900	1,750
		Hard Barrier	2,100	1,900	2,050	1,900
	Long Term	Cones or drums	2,050	1,850	2,000	1,850
		Hard Barrier	2,150	1,950	2,100	1,950
Shoulder Closure (5 lanes)	Short Term	Cones or drums	1,950	1,750	1,900	1,750
		Hard Barrier	2,100	1,950	2,050	1,900
	Long Term	Cones or drums	2,050	1,850	2,000	1,850
		Hard Barrier	2,150	1,950	2,150	1,950
Lane Closure (2 to 1)	Short Term	Cones or drums	1,650	1,500	1,650	1,450
		Hard Barrier	1,800	1,650	1,800	1,600
	Long Term	Cones or drums	1,750	1,600	1,750	1,550
		Hard Barrier	1,850	1,700	1,850	1,650
Lane Closure (3 to 1)	Short Term	Cones or drums	1,500	1,300	1,850	1,650
		Hard Barrier	1,650	1,450	2,000	1,800
	Long Term	Cones or drums	1,600	1,400	1,950	1,750
		Hard Barrier	1,700	1,550	2,050	1,850
Lane Closure (4 to 1)	Short Term	Cones or drums	1,350	1,150	1,300	1,100
		Hard Barrier	1,500	1,300	1,450	1,250
	Long Term	Cones or drums	1,450	1,250	1,400	1,200
		Hard Barrier	1,550	1,350	1,500	1,350
Lane Closure (5 to 1)	Short Term	Cones or drums	1,200	1,000	1,150	950
		Hard Barrier	1,350	1,150	1,300	1,100
	Long Term	Cones or drums	1,300	1,100	1,250	1,050
		Hard Barrier	1,400	1,200	1,350	1,150

Work Zone Impact Analysis Tool

Work Zone Configurations:

- **Shoulder Closure**
  - Right-side
  - Left-side
  - Both sides
- **Lane Closure**
  - One lane closed
  - Two lanes closed
  - Three or more lanes closed
  - Short Term vs. Long Term
  - Soft vs. Hard Barrier
- **Median Crossover**
  - Single-lane crossover
  - Two-lane crossover
- **Lane Shift**
  - All lanes open
  - With lane closure



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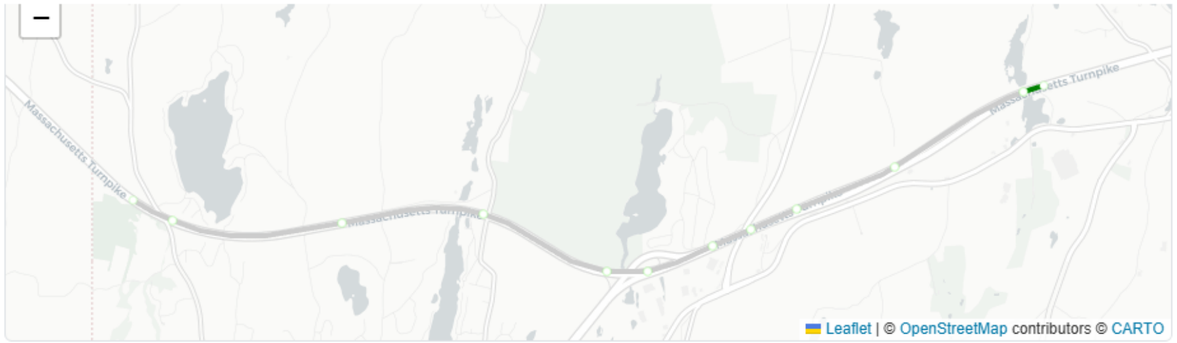
Work Zone Impact Analysis Tool Interface

MassDOT Work Zone Impact Analysis Tool | Restart | Color Blind Mode



SEG 1 | SEG 2 | SEG 3 | SEG 4 | SEG 5 | SEG 6 | SEG 7 | SEG 8 | SEG 9 | SEG 10 | SEG 11

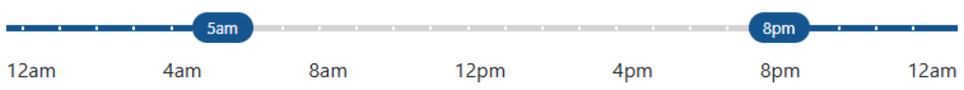
Summary

Segment Type: Basic
Number of Lanes: 3

View/Edit Advanced Inputs

Number of Lane Closed: Shoulder Closure
Separation Type: Temporary Barrier

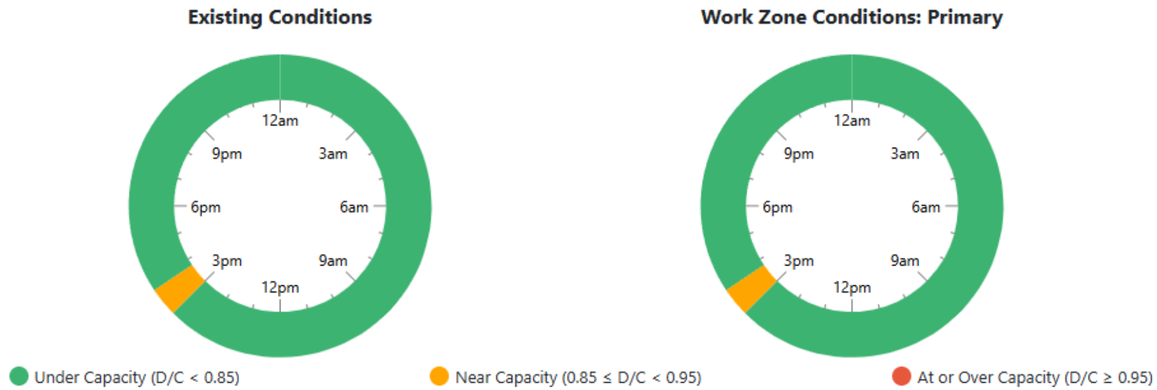
Time Range



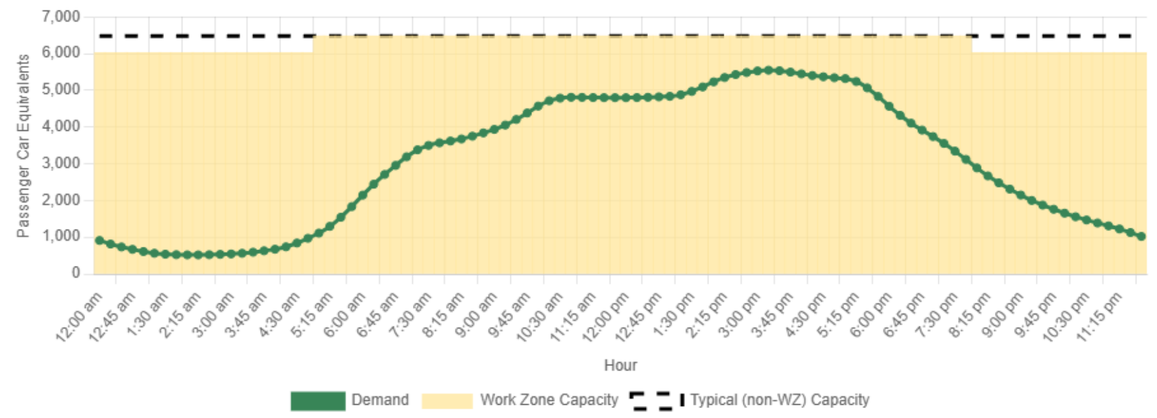
Nighttime

+ Alternative Config (Optional)

Apply To All Segments



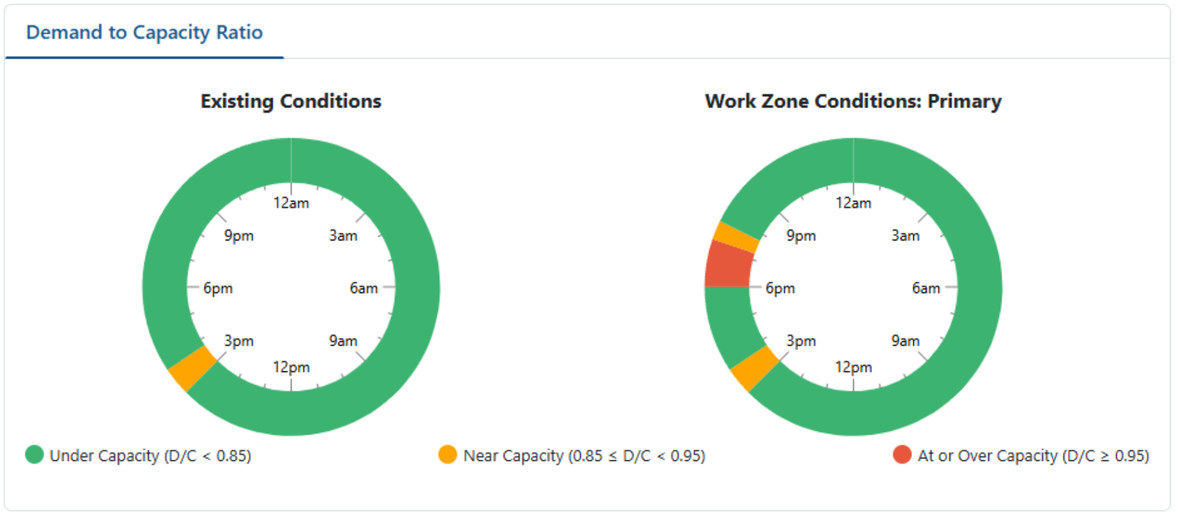
Demand & Capacity Chart (passenger cars equivalent) | Demand & Capacity Chart (vehicles)

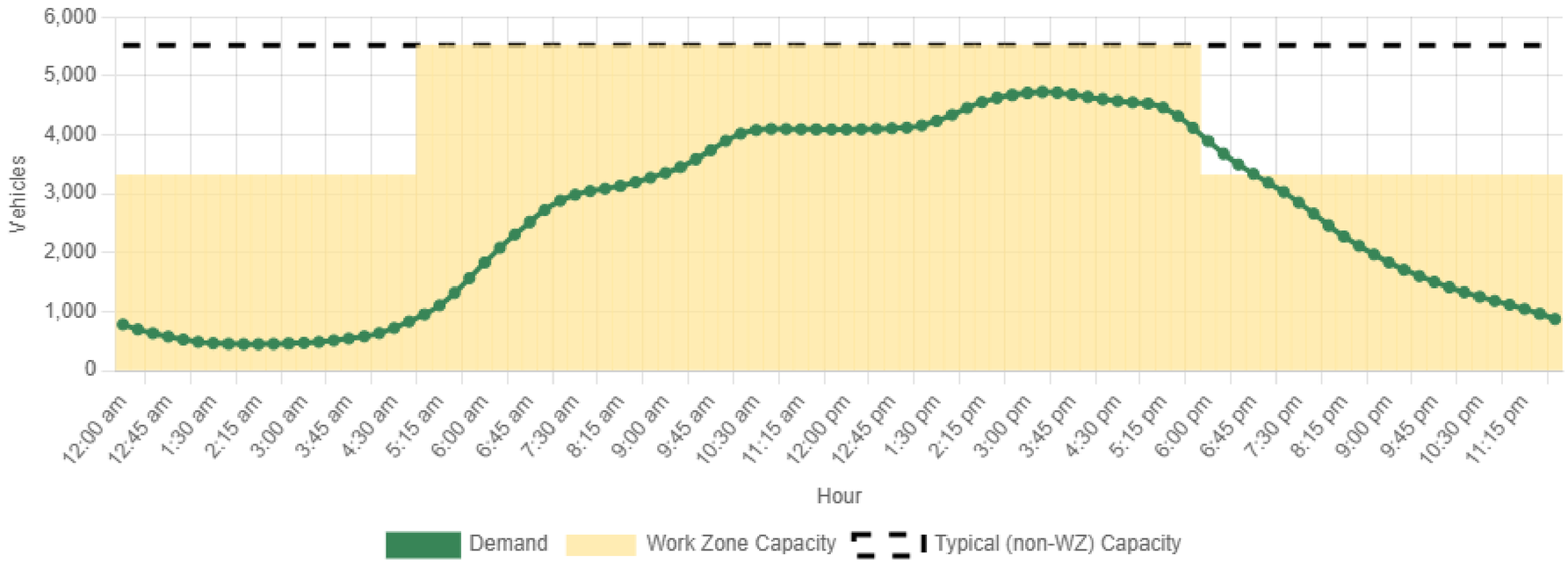


BACK | Generate Report | Export Analysis

MassDOT: https://www.mass.gov/orgs/massachusetts-department-of-transportation Created By: Kittelson & Associates Support Portal Version: 1.1.4

24-Hour Performance Measure Details





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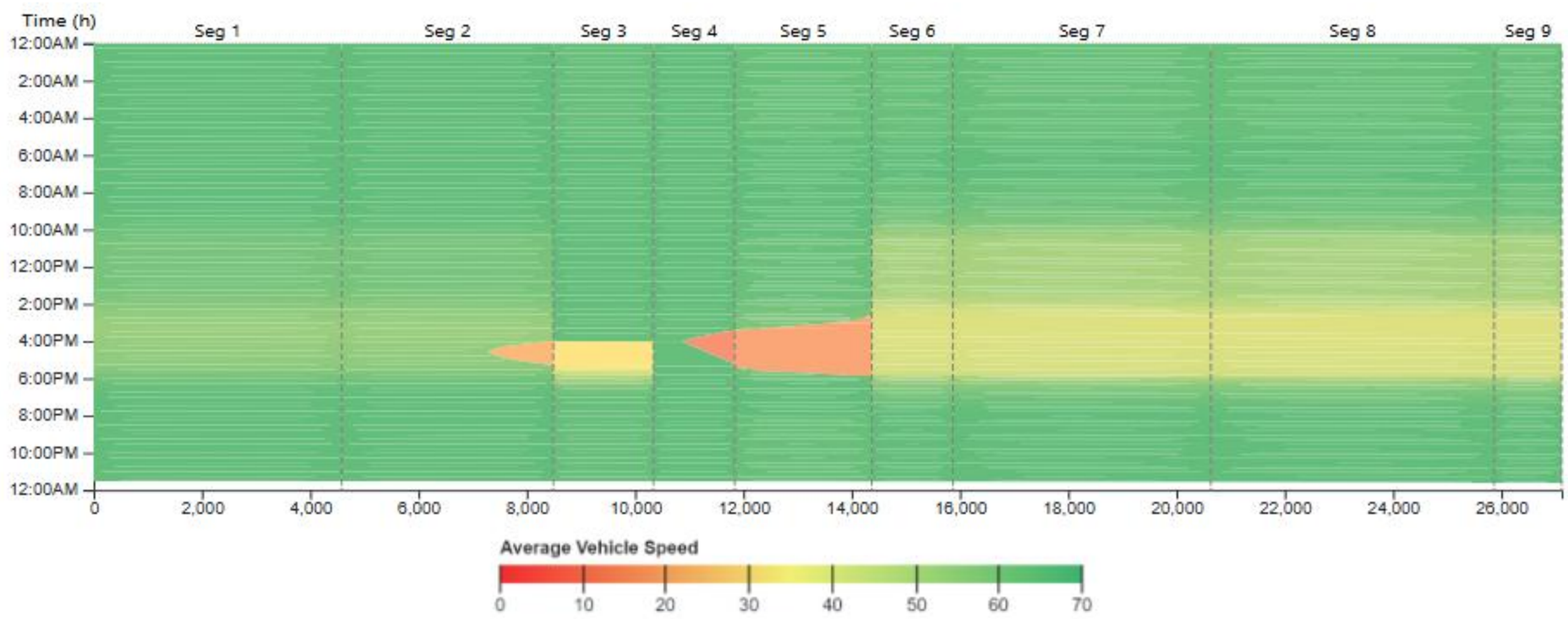
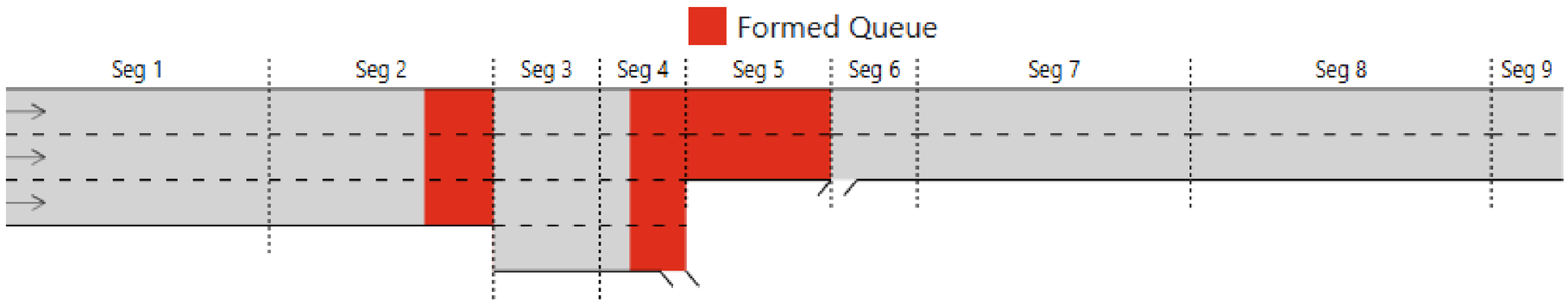
Queuing Analysis and Visualization





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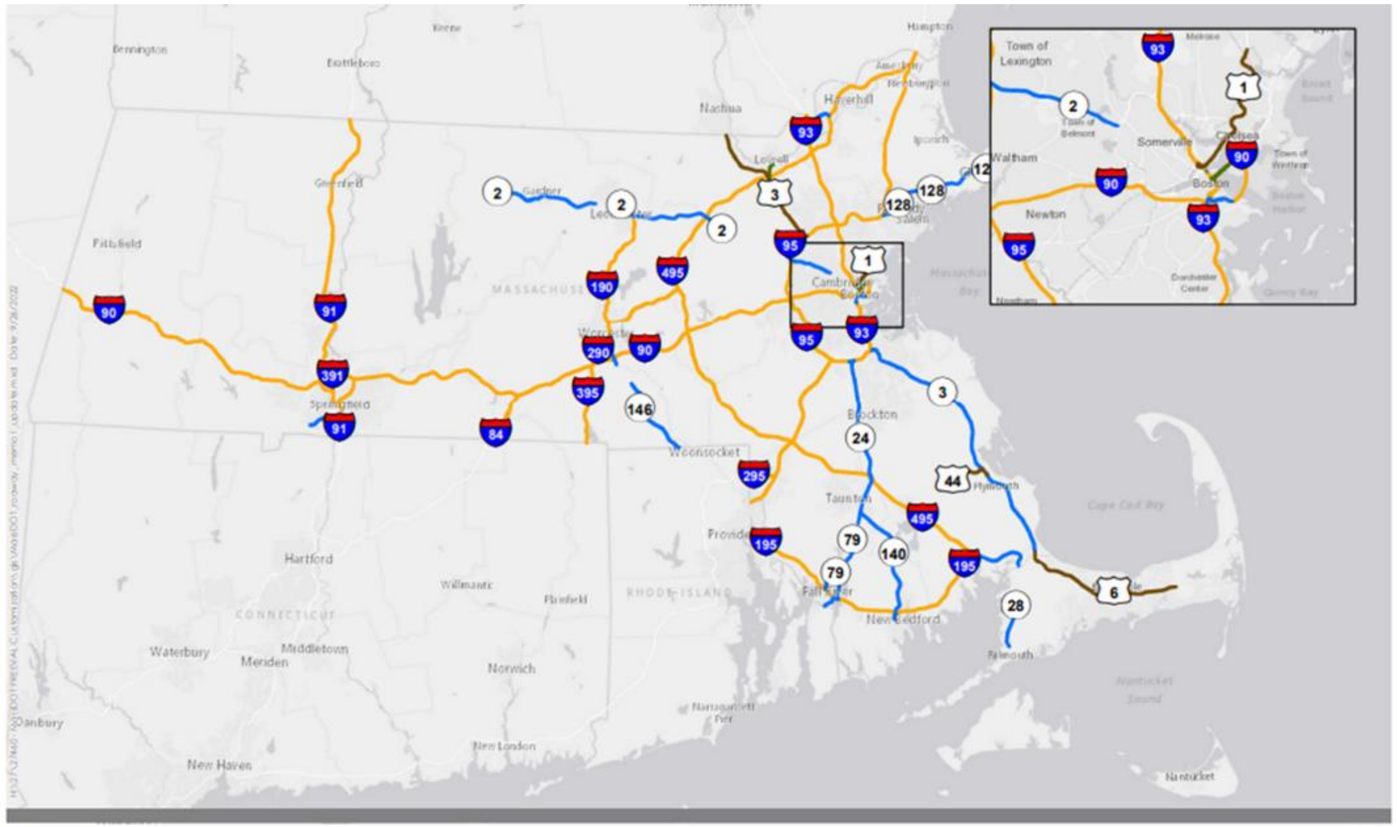
Statewide Segmentation and Data



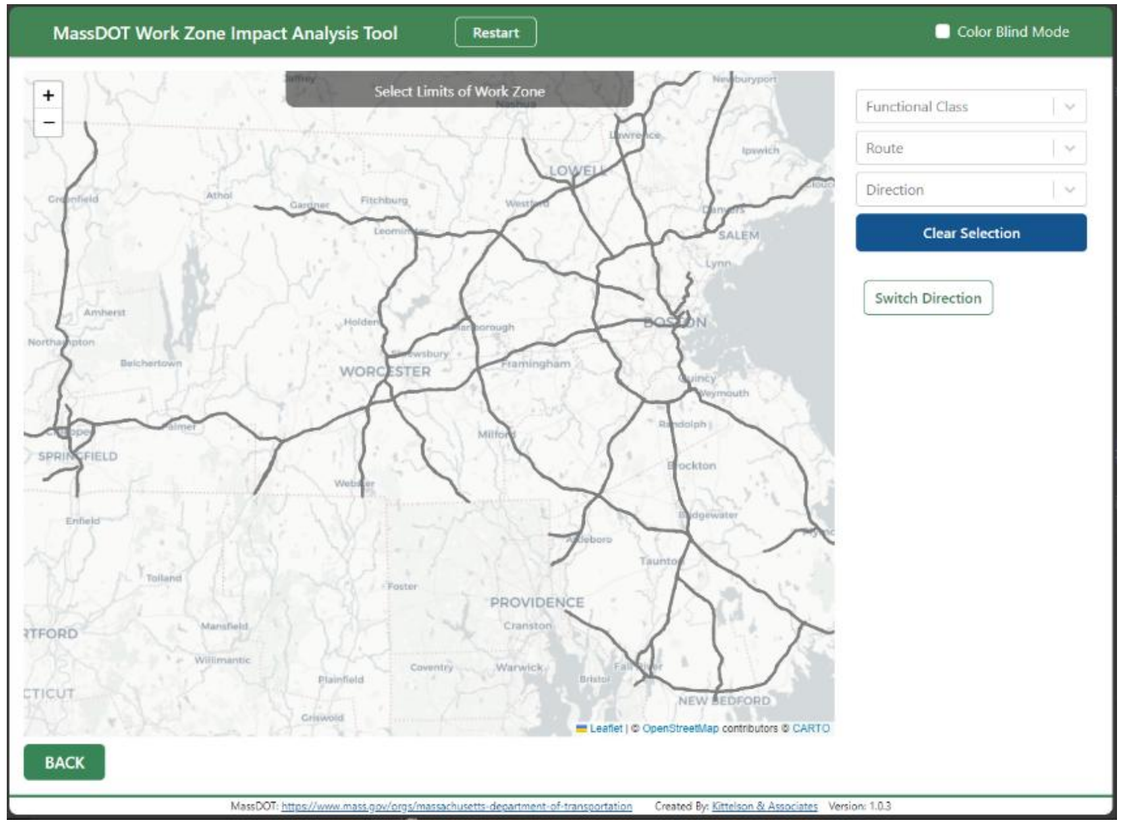


Figure 1

Work Zone Impact Analysis Tool

Next Steps

Develop a MassDOT Standard Operating Procedure for designers and DOT staff for when and how the tool is used

Continue training staff and consultants on the use of the tool

Tool updates, including streamlining data entry

- Use feedback from users

Explore expansion of the tool's functionality, possibly incorporating predicted safety impacts

Contact Information

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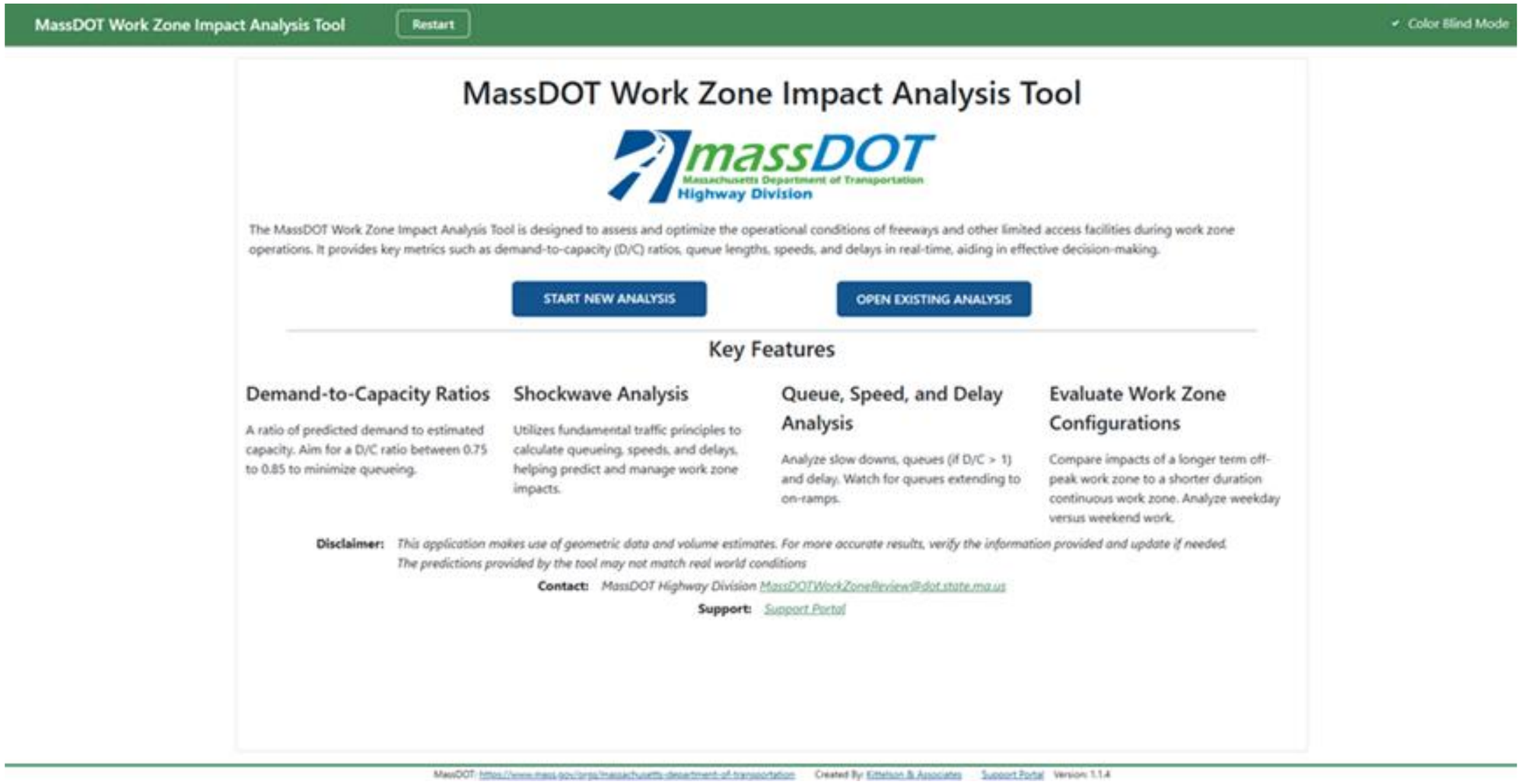
Work Zone Impact Analysis Tool Demo



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