


			PAGE	1	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
<b>RESPONSIBLE ORGANIZATION:</b>		Highway Operations				
<b>SUBJECT:</b>	Work Zone Safety and Mobility Policy					

**PURPOSE:**

The State of Michigan transportation system is critical to supporting a vibrant economy by moving traffic and freight safely and efficiently. Growing congestion on many roads with an increased need to perform rehabilitation and reconstruction is resulting in complex challenges to maintain work zone safety and mobility. This policy is being established to improve safety and mobility in work zones by reducing congestion and traffic incidents.

This policy supports and is in accordance with federal regulation 23 CFR 630, Subpart J, referred to as the Work Zone Safety and Mobility Rule, which requires a policy for the systematic consideration and management of work zone impacts on all federal aid highway projects across all stages of project planning, development, delivery, and operations. This policy is in agreement with and does not supersede State Transportation Commission Policy 10015, dated September 25, 1996.


The process defined in this policy will apply to all state trunklines, regardless of the type of roadway or bridge facility, including freeway and nonfreeway facilities.

This policy applies to construction work zones, as well as maintenance and permitted activity work zones. Each type of work zone is to be analyzed in the same manner to provide consistency for travelers in Michigan.

**EXECUTIVE SUMMARY:**

Specific processes, procedures, and guidelines to support implementation of this policy are being developed and will be communicated and distributed through a Work Zone Mobility Manual. This manual will include the use of work zone safety and operational data, work zone training, and work zone process reviews. Project-level procedures to address the work zone impacts of individual projects will be part of this manual. Projects that exceed the mobility analysis thresholds will require the development and implementation of a transportation management plan. These projects are considered significant in that the sustained work zone impacts may be greater than what is considered tolerable based on this policy.

A transportation management plan (TMP) consists of three primary components: (1) a temporary traffic control plan that addresses traffic safety and control through the work zone, (2) transportation operations strategies that will be used to mitigate work zone impacts, and (3) public information strategies to inform those affected by the work zone impacts and the changing conditions. The appropriate TMP provisions and pay items are to be included within the plans, specifications, and project estimates. The TMP is to assign responsibility to those persons, both MDOT and the contractor, responsible to monitor the TMP and other safety and mobility aspects of the project. All MDOT employees must be committed to providing a high level of safety and mobility at

			PAGE	2	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
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<b>SUBJECT:</b>	Work Zone Safety and Mobility Policy					

each step of the project development and delivery process from concept and planning through construction and operations. All management staff is responsible for ensuring this policy is implemented, incorporated, and sustained for safe and efficient travel in Michigan.

Variations from this policy may be considered, evaluated, and incorporated into specific projects on a case-by-case basis with approval of the Region Engineer and the Chief Operations Officer.

**MOBILITY ANALYSIS:**


The following mobility analysis process will apply to all projects or activities to determine if mobility impacts need to be further reviewed, mitigated, or approved. This process is critical and is to be commenced during the planning/scoping phase.

Project staff, during the planning/scoping phase, will determine if a project is *nonsignificant* or *potentially significant* in relation to potential mobility impacts. Projects which are determined to be *nonsignificant* do not require an additional mobility analysis. The TMP for *nonsignificant* projects will contain, at a minimum, a temporary traffic control plan as described within this policy. A nonflagging operation project is to be considered *potentially significant* if any of the following apply:

- A. Any project that occupies a specific location for more than three days with either intermittent or continuous lane closures.
- B. Any project that alone or in combination with other nearby concurrent projects is anticipated to cause sustained work zone impacts that are greater than what is considered tolerable based on an assessment of work zone safety, mobility impacts (volume/capacity, travel time, level of service), and the possible level of mitigation of such impacts.
- C. Any project defined as *potentially significant* or critical by region staff.

All *potentially significant* projects are to be further evaluated for potential mobility impacts to the transportation system by being reviewed against the following three critical evaluation items:

- A. Volume to Capacity Ratio - The volume to capacity (V/C) ratio of the work zone design hour volume will be ascertained. This analysis is to be completed utilizing the work zone volume and capacity values during a representative time of the work zone activity. If the work zone V/C ratio is determined to be greater than 0.80, an in-depth TMP is required to be developed and implemented. Mitigation measures to reduce delay are to be designed into the project.

			PAGE	3	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
<b>RESPONSIBLE ORGANIZATION:</b>		Highway Operations				
<b>SUBJECT:</b>	Work Zone Safety and Mobility Policy					

- B. Travel Time - The travel time delay is to be calculated for the work zone. If the work zone travel time delay is determined to be 10 minutes greater than the normal travel time, an in-depth TMP is required to be developed and implemented. Mitigation measures to reduce delay are to be designed into the project. Normal travel time should be determined utilizing the average speeds on the facility.
  
- C. Level of Service - The level of service (LOS) is to be calculated for the work zone based on the proposed maintaining traffic conditions. If the LOS is determined to be level D or lower or level C is calculated and the existing facility currently operates at level A, an in-depth TMP is required to be developed and implemented. Mitigation measures to reduce delay are to be designed into the project.

Projects that exceed any one of the three critical evaluation item thresholds are considered *significant* and must have a project specific TMP developed and implemented. Mitigation measures to minimize travel delay are to be designed into the project.


A *potentially significant* project that does not exceed the thresholds listed above after completion of the mobility analysis is to be considered *nonsignificant* and only a temporary traffic control plan will be required in the TMP, as described within this policy.

Flagging operations are to be reviewed based upon a travel time delay evaluation. A flagging operation is considered to be *significant* if traffic is delayed by more than ten minutes. If delays greater than ten minutes are calculated, a TMP is required to be developed and implemented. Mitigation measures to reduce delay are to be designed into the project.

Variations from the above thresholds may be considered, evaluated, and incorporated into specific projects on a case-by-case basis, with approval of the Region Engineer and the Chief Operations Officer.

**TRANSPORTATION MANAGEMENT PLAN (TMP):**

A TMP provides strategies, elements, and details for managing project work zone safety and mobility impacts. A TMP is required on all *significant* projects and is to be commenced during the project planning/scoping phase. The TMP is intended to be dynamic and enhanced as a project progresses through the planning and design phases. Direct work zone impacts, alternative designs, alternative contracting methods, and other transportation management strategies should be evaluated to minimize safety and mobility impacts and these strategies should be documented in the TMP. The TMP will designate a trained staff person from MDOT (Project Engineer, Lead Project Technician, etc.) and the contractor who will have the responsibility for implementing the TMP and other safety and mobility aspects within the project. There are three major components to a TMP:

			PAGE	4	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
<b>RESPONSIBLE ORGANIZATION:</b>		Highway Operations				
<b>SUBJECT:</b>	Work Zone Safety and Mobility Policy					

A. Temporary Traffic Control Plan (TTCP) - The TTCP consists of the maintaining traffic plan sheets, detail sheets, maintaining traffic typicals, the Special Provision for Maintaining Traffic, and other direct components relating to the maintenance of traffic. TTCPs are also to include appropriate pay items for implementing the TMP and designated contract specifications for construction work zones. Maintenance and permitted activity work zones shall include the appropriate maintaining traffic details, work zone devices, and work requirements to properly address work zone safety and mobility impacts.


Specific attention is to be focused on the initial implementation of temporary traffic control and all temporary traffic control changes during staged construction. These times are critical for safety and mobility in the work zone and should be planned accordingly.

B. Transportation Operations Plan (TOP) - The TOP includes strategies for operations and management of the work zone and facilities affected by the work zone, including all transportation modes, such as transit, roadway, freight, rail, air, and pedestrians. Proposed mitigation measures shall also be included in this plan. These strategies should include traffic incident management plans, planned special events, ITS components, maintaining or enhancing other modes of transportation, emergency service provider access and communication, work zone law enforcement, and other related strategies. The TOP is to include the proposed methodology for monitoring and measuring mobility during the active work zone phase.

C. Public Information Plan (PIP) - The PIP includes public/stakeholder information and communication strategies. The PIP will include strategies that will be commenced during the planning and design phases, as well as during construction or operations activities. These strategies may include public information meetings, project brochures, visitor information cards, project Web sites, press releases, highway advisory radio (HAR) messages, messages on portable or permanent changeable message signs, and other related strategies.

The three subcomponents of a TMP are to be analyzed and developed into contractual language and project work items, where appropriate, during the planning and design phase. It is the intent of this policy that work zone impacts are planned, discussed, coordinated, and mitigated during the early phases of project development.

All projects which are determined to be *nonsignificant* will only require a TTCP as part of the TMP. A TOP and PIP for these projects is suggested, where appropriate, but are not required.

			PAGE	5	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
<b>RESPONSIBLE ORGANIZATION:</b>		Highway Operations				
<b>SUBJECT:</b>	Work Zone Safety and Mobility Policy					

Significant Project

Transportation Management Plan

- TTCP
- TOP
- PIP

Nonsignificant Project

Transportation Management Plan

- TTCP
- TOP (Not Required)
- PIP (Not Required)


**MITIGATION PROCESSES AND TECHNIQUES:**

Typically, work zone temporary traffic control devices represent 10 percent of the project cost and are utilized to maintain traffic through a work zone without primary regard to mobility. It is expected that this policy may result in an additional 10 to 15 percent of project costs for work zone temporary traffic control devices and measures which are necessary for safety and mobility mitigation and enhancement efforts.

Projects are subject to the review and approval of the Region Engineer and the Chief Operations Officer, when combined temporary traffic control and safety and mobility mitigation costs are expected to be above 25 percent of the project cost. This review and approval process will also apply for projects that cannot further mitigate safety and mobility issues.

The following mitigation strategies should be evaluated when the mobility analysis has been completed. This list is not exhaustive, but should be used as a reference:

- A. Nighttime/weekend work requirements.
- B. Incentive/disincentive for early completion or open to traffic dates.
- C. Intelligent Transportation System (ITS) devices and strategies.
- D. Lane/ramp rental provisions.
- E. A+B contract provisions and completion dates.
- F. "No Excuse" project completion/open to traffic dates.
- G. Complete closure and detour of facility, including onto ramps.
- H. Temporary or permanent widening to maintain traffic.
- I. Temporary crossovers in lieu of part-width construction activities.
- J. Restricted work hours (e.g., no work or lane closures from 4:00 to 6:00 p.m.).
- K. Reduced length of work zone lane closures or impact area.
- L. Movable barrier systems or contraflow activities.
- M. Signal timing adjustments within the project work zone and/or alternate and detour routes.
- N. Geometric improvements within the project limits or on alternate/detour routes (e.g., additional turn lanes, curb improvements, pavement markings).

			PAGE	6	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
<b>RESPONSIBLE ORGANIZATION:</b>		Highway Operations				
<b>SUBJECT:</b>	Work Zone Safety and Mobility Policy					

Project work zones must be considered in regard to the regional network and corridor impacts. A regional network is not necessarily the MDOT jurisdictional region, but the regional area of transportation influence (e.g., Rural Task Force, MPO, etc.) or transportation management area (urbanized area with a population of over 200,000). The network and corridor review is to include overlapping alternate or detour routes, adjacent construction projects, local agency construction projects, permitted activities, etc. This review is intended to reduce the work zone impacts to the traveling public each construction season.

Approved alternate routes should not be under construction, have active maintenance or permitted activity work zones, nor should there be any overlapping usage of alternate routes without an in-depth review of traffic operations. If impedances are discovered and cannot be eliminated, action is to be taken to minimize the impedance. This action can be accomplished with various techniques and may utilize any of the following initiatives:


- A. Staggering adjacent project schedules.
- B. Incentives and/or disincentives to enhance completion dates.
- C. Staggering project work hours to minimize diverted traffic.

#### **WORK ZONE MANAGEMENT:**

Work zone management occurs during the construction, maintenance, or permitted activity work phase. TMP mitigation measures are to be implemented and engagement of project stakeholders is to occur. Work zone safety, mobility, and mitigation impacts are to be monitored and documented using field observations, crash data analysis, and other pertinent operational information.

Project staff is to be actively engaged with local/state law enforcement agencies and emergency service providers to assure open communications concerning incidents, mobility, etc. A safety and mobility peer team and process will be established to conduct field reviews of complex projects and/or those experiencing unexpected safety and mobility issues. The team will consist of statewide work zone administration personnel, safety administration staff, and traffic and safety personnel from a region external to the project. This team will provide guidance relative to improving safety and mobility within the work zone mobility. Where this policy states that specific projects will require review and approval by the Region Engineer and the Chief Operations Officer, such approval will not be granted until the safety and mobility peer team have reviewed these projects to ensure consistent statewide mobility treatments.

All *significant project* work zones shall be analyzed and measured for volume/capacity and level of service performance. In addition, actual traffic delays shall be measured. Work zones needing apparent performance improvements are to have practical mitigation actions implemented wherever possible. All potential

			PAGE	7	OF	8
	<b>GUIDANCE DOCUMENT</b>	<b>IDENTIFIER</b>	<b>EFFECTIVE DATE</b>			
		10177	09/01/07			
		<b>SUPERSEDES</b>	<b>DATED</b>			
		New	08/24/07			
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improvements are to be documented as the documentation will be reviewed on a statewide basis. This documentation will provide the basis for future improvements to the mobility process.

#### **WORK ZONE SAFETY:**

In conjunction with mobility, the safety of both motorists and roadway workers is a high priority and will be monitored on each project. Safety aspects to be reviewed are work zone crashes, emergency communications, internal work zone traffic control (contractor egress/ingress points, etc.), and other safety factors in order to provide a safe work zone environment to conduct work operations and provide a safe and functional corridor through or around the work zone.

#### **MOBILITY ANALYSIS TOOLS:**

There are several programs, processes, and reference tools that may be used for mobility analysis during the planning and development phases. These tools include: Highway Capacity Software (HCS), MicroSimulation, Work Zone Capacity Worksheets, Portable Traffic Sensor Devices, Construction Congestion Costs (CO3) Software, Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS) Software, MPO/Statewide Travel Demand Models, and QuickZone. Other tools may be utilized as deemed appropriate.

#### **WORK ZONE SAFETY AND MOBILITY MANUAL:**

Specific processes, procedures, and guidelines to support implementation of this policy are being developed and will be communicated and distributed through a Work Zone Safety and Mobility Manual. This manual will include the use of work zone safety and operational data, work zone training, and work zone process reviews. Project-level procedures to address the work zone impacts of individual projects will be a part of this manual.

#### **LOCAL AGENCY FEDERAL AID PROGRAM:**

MDOT will take all necessary actions to facilitate Final Work Zone Safety and Mobility Rule compliance on all local agency federal aid projects by January 1, 2009.

#### **PHASED IMPLEMENTATION AND APPROVALS:**

This policy will be effective on September 1, 2007, for all state trunkline work zones, and is to be implemented in phases as follows:



## GUIDANCE DOCUMENT

IDENTIFIER

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DATED

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08/24/07

**RESPONSIBLE ORGANIZATION:** Highway Operations

**SUBJECT:** Work Zone Safety and Mobility Policy

- A. Full implementation for all MDOT construction projects in the 2008 construction season, regardless of the development schedule.
- B. January 1, 2008, full implementation for all state trunkline maintenance work zones.
- C. January 1, 2009, full implementation for all state trunkline permitted activity work zones.

Approved: \_\_\_\_\_  
Chief Operations Officer

Date: \_\_\_\_\_

Approved: \_\_\_\_\_  
Director

Date: \_\_\_\_\_