

# Arizona Department of Transportation



## Implementation Guidelines for Work Zone Safety & Mobility Pursuant to 23 CFR630 Subpart J & K



# **PREFACE**

**Pursuant to 23 CFR630 Subpart J & K**

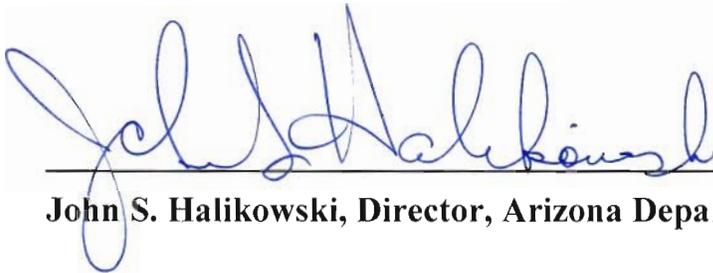
**Arizona Department of Transportation**

**Work Zone Safety & Mobility**

**Policies, Processes, and Procedures**

**ADOT practices currently achieve the intent of this Rule through existing policies, processes and procedures. These guidelines will expand/enhance existing practices currently in place.**

**Approved:**



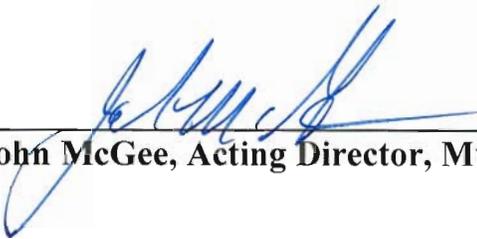
5.29.09

**John S. Halikowski, Director, Arizona Department of Transportation**      **Date**



29 May '09

**Floyd Roehrich Jr., State Engineer**      **Date**



5/28/09

**John McGee, Acting Director, Multimodal Planning Division**      **Date**



5/28/09

**Matthew Burdick, Communication Director**      **Date**

**Primary responsibility for responding to Questions and Revisions of this document is the Arizona Department of Transportation Traffic Standards Engineer (602-712-7766)**

# Table of Contents

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- 1.0 Introduction
- 2.0 Work Zone Safety & Mobility Policy & ENG 07-3
- 3.0 Work Zone Safety & Mobility Process & Procedure
- 4.0 Transportation Management Plans
- 5.0 Work Zone Impact Assessment Tools
- 6.0 Work Zone Training
- 7.0 Process Reviews
- 8.0 23 CFR Part 630 Subpart K Compliance
- 9.0 Appendix ([Hard copies of documents available from Responsible Section](#))
  - A. CCP – Communications and Public Involvement**
  - B. Guidelines for use of DPS/Uniformed Law Enforcement (under review)**
  - C. Construction Bulletins**
  - D. Priority Programming Group – (Define ADOT’s 5 year Construction Plan)**
  - E. Traffic Engineering Policies, Guides & Procedures (PGP)**
  - F. ADOT Traffic Control Design Guidelines**
  - G. Arizona Supplement to the MUTCD**
  - H. ADOT’s Work Zone Inspection Procedures (Quantlists)**
  - I. Project Development Process Manual**
  - J. ADOT Construction Manual**
  - K. ATSSA Training**
  - L. AGC Training**
  - M. Final Rule Language 23 CFR Part 630 Subpart J**
  - N. Final Rule Language 23 CFR Part 630 Subpart K**
  - O. FHWA Website (Work Zone specific)**
  - P. az511.com Web Link**
  - Q. Allowable Closure Time**

## 1.0 Introduction

In September 2004, the Federal Highway Administration (FHWA) published updates to the work zone regulations at 23 CFR 630 Subpart J referred to as *Work Zone Safety & Mobility Rule* (herein referred to as the Rule). In December 2007, FHWA added new regulations at 23 CFR 630 Subpart K referred to as *Temporary Traffic Control Devices Rule*. Both are applicable to all Federal-Aid Highway Projects with the intent to improve road user and workers exposed to motorized traffic. The Safety and Mobility Rule was effective October 12, 2007 and Subpart K was effective on December 4, 2008.

These guidelines describes how ADOT has and will continue to improve Work Zone Safety & Mobility; by identifying the “Level of Significance” (Major or Minor) for all projects added to ADOT’s 5 year Construction Plan beginning with the FY09-FY10 cycle based on the criteria defined in ADOT’s Work Zone Safety & Mobility Policy and these guidelines. All projects will be continually re-evaluated and assessed for Work Zone impacts from Pre-Design through Design, Construction and Maintenance phases.

The Rule broadens some aspects of the former language on work zones in the CFR and also identifies key areas where States have an opportunity to develop and strengthen their current methods for providing mobility through work zones while maintaining a safe and efficient work environment for highway workers. In response to the requirements of the Rule, ADOT developed and is improving the ITD Work Zone Policy ENG 07-3, October 2007. The policy describes ADOT’s recognition of the importance of the Work Zone Safety and Mobility Rule and commits the Department to compliance with essential elements of the Rule. The policy also explains that the Department will develop guidelines for implementation of the Rule on all ADOT projects, which is the purpose of this document.

It is ADOT’s Mission to provide products and services for a safe, efficient, cost-effective transportation system that links Arizona to the global economy, promotes economic prosperity and demonstrates respect for Arizona's environment and quality of life.

A team was established to define, document and implement the Work Zone Safety & Mobility Rule (23 CFR, Part 60, Subpart J & K). The team has cross-functional membership throughout ADOT and work zone safety stakeholders.

Organization/Function	Team Members/Contacts
<b>Multimodal Planning Division (MPD)</b>	Rakesh Tripathi Don Mauller Arnold Burnham
<b>Communications &amp; Community Partnerships</b>	Matt Burdick Timothy Tait
<b>Intermodal Transportation Division (ITD)</b>	
Construction Group	Robert Wade*
Construction District Representatives	Paul Patane (DE Yuma) Madhu Reddy (Senior RE Phoenix District)
Engineering Technical Group	Joe Roman
Office of Environmental Services	Todd Williams
Roadway	Said Asad
Safety	Sonya Herrera
State Construction	Julio Alvarado - Sponsor
State Engineer's Office	Lisa Sinclair*
State Maintenance	Lonnie Hendrix
Statewide Project Management	Guily Caceres Irene Higgs
Traffic Engineering Group	Mike Manthey Scott Orrahood*
Transportation Technology Group	Scott Nodes
Valley Project Management	Larry Langer
<b>Trade Associations &amp; Consultants</b>	
American Council of Engineering Companies of Arizona (ACEC)	Janice L. Burnett (Executive Director)
Arizona General Contractors (AGC)	David Martin (President) Ron Jones (AZ ATSSA/Barricade Contractors)
Arizona Chapter, ATSSA	Ron Jones (AZ ATSSA Chapter President) Dan O'Conner (TC training)
American Traffic Safety Services Association (ATSSA)	Donna Clark (Nat'l Director of Training & Products)
American Traffic Safety Services Association (ATSSA)	Donna Clark (Nat'l Director of Training & Products) Juan M. Morales (ATSSA Trainer Instruction (Consultant))
Carter & Associates	Larry Lambert (Team Facilitator)*
<b>Training Development</b>	
ADOT	Erika Blankenship, LTAP and ITD Tech Director
<b>FHWA (Arizona Safety Representative)</b>	Karen King
<b>* Core work team members</b>	

## 2.0 Work Zone Safety & Mobility Policy - ITD Policy ENG 07-3



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### Intermodal Transportation Division Policy

October 12, 2007  
Effective Date

October 12, 2010  
Review Date

None  
Supersedes

  
Sam Elters,  
State Engineer

### ENG 07-3 WORK ZONE SAFETY AND MOBILITY POLICY

#### PURPOSE

To establish and expand on existing guidance and requirements to systematically consider and manage work zone safety and mobility impacts.

#### SCOPE

This policy applies to all construction and operational projects determined by ADOT to be significant as defined in this policy.

#### BACKGROUND

In an effort to address the issues associated with work zone safety and mobility, the Federal Highway Administration (FHWA) published updates to the work zone regulations at 23 CFR 630 Subpart J in September of 2004. The updated rule is referred to as *Work Zone Safety and Mobility Rule*. The updated Rule applies to all State and local governments that receive Federal-aid highway funding. The changes made to the regulations broaden the former rule to better address the work zone issues of today and the future.

Transportation agencies are required to comply with the provisions of the FHWA rule by October 12, 2007. A variance will be requested from FHWA for projects in the later stages of development at the time of policy implementation, if it is determined that project delivery would be significantly impacted by the requirements of this rule.

It is ADOT's mission to provide products and services for a safe, efficient, cost-effective transportation system that links Arizona to the global economy, promotes economic prosperity, and demonstrates respect for Arizona's environment and quality of life. A particular element of this mission is the provision for safety and mobility through the work zones which the Department oversees as a regular part of its day to day operations. ADOT will develop a guidance document that will further define key elements of the policy and identify roles and responsibilities for its implementation.

#### AUTHORITY

23 CFR Part 630, Subpart J *Work Zone Safety and Mobility* sections 630.1002 through 630.1016 have been changed.

Arizona Revised Statute (ARS) 28-332 *Department of transportation, jurisdiction, duties, divisions* gives ADOT exclusive control and jurisdiction over state highways and routes.

ARS 28-652 *State highway work zone; definition* sets ADOT's authority to adopt standards and specifications for traffic control and highway work zones.

ARS 28-710 *State highway work zone safety; civil penalty; fund* allows civil penalty for exceeding speed limits in work zones when workers are present.

**DEFINITIONS**

Significant Project	One that, alone or in combination with other concurrent projects nearby, is anticipated to cause sustained work zone impacts that are considered greater than what's tolerable based on engineering judgment. The judgment is based on existing traffic volumes, duration of construction, anticipated impacts to travel time and surrounding transportation network and is further defined in the implementation guidance document. In addition, all Interstate system projects within the boundaries of a Transportation Management Area that occupy a location for more than three days with either intermittent or continuous lane closures are also considered significant.
Mobility	Specifically relating to work zones, mobility pertains to moving road users efficiently through or around a work zone area with a minimum delay compared to travel when no work zone is present, while not compromising the safety of highway workers or road users.
Transportation Management Area (TMA)	An urbanized area with a population of more than 200,000.
Transportation Management Plan (TMP)	Specific set of strategies to manage the work zone impacts of a project.
Work Zone	The area of a highway subject to construction, maintenance, or utility work. It extends from the first warning sign indicating a work area to the END ROAD WORK sign.
Work Zone Safety	Refers to minimizing potential hazards to road users and highway workers in the vicinity of a work zone.

**POLICY**

It is ADOT's policy to:

- a. Assess work zone impacts during project development and to manage safety and mobility during project implementation as outlined in these procedures.
- b. Use field observations, work zone crash data, and operational information to manage work zone impacts for specific projects during implementation.
- c. Provide and require adequate training for personnel involved in the development, design, implementation, operation, inspection, and enforcement of work zone management and traffic control appropriate to their job decision-making authority.
- d. Perform process review every two years to evaluate and improve work zone processes and procedures, with the intent to increase safety and mobility. Process reviews will include, at a minimum, evaluation of work zone data, a review of randomly selected projects, and will involve project personnel from different project development stages, FHWA, and non-State stakeholders.

- e. Identify a project as "significant" early in the development process as determined by a project's characteristics, and the magnitude and extent of the anticipated work zone impacts. Request an exception from FHWA when Interstate system projects are classified as significant but in ADOT's judgment the projects do not cause sustained work zone impacts.
- f. Develop a Transportation Management Plan (TMP), in sustained consultation with stakeholders, that includes:

(1) For Significant Projects

- 1. A plan for Temporary Traffic Control (TTC) that describes measures for facilitating road users through a work zone. The plan must be consistent with Part 6 of the MUTCD, the Arizona Supplement to the MUTCD, and ADOT Traffic Control Design Guidelines.
- 2. A Transportation Operations component that identifies strategies to mitigate impacts of the work zone on the operation and management of the transportation system. This component may include demand management, corridor/network management, safety management, enforcement, and work zone traffic management.
- 3. Public Information component will include communications strategies to inform affected road users, the general public, area residences and businesses, and appropriate public entities about the project, the expected work zone impacts and the changing conditions of the project. The selected communication method(s) should include project characteristics, expected impacts, closure details, and commuter alternatives.

The scope of the Temporary Traffic Control plan is determined by the project characteristics, and the traffic safety control requirements identified for the specific project.

- (2) For less than significant projects, the TMP may consist only of a Temporary Traffic Control plan but may consider addressing both traffic operations and public information.

- g. Develop a Plans, Specifications, and Estimates (PS&E) to include a TMP or provisions for contractors to develop a TMP, and appropriate pay item provisions for implementing the TMP through either method based or performance based specifications.
- h. Designate a trained person, in conjunction with the contractor's trained person, with authority and responsibility for implementing the TMP and other safety and mobility aspects of the project.
- i. Monitor and measure work zone impacts during construction and take corrective action to manage mobility and safety based on criteria such as travel delay, queue lengths, and crash occurrences.

**Departmental Responsibility**

Each Group affected by this policy is required to develop or revise internal processes and procedures for inclusion in the Guidelines for Implementation of the Work Zone Safety and Mobility Policy.

### 3.0 Work Zone Safety & Mobility Process & Procedure

In compliance with 23 CFR 630 Subpart J, ADOT will identify the “Level of Significance” (Major or Minor) to ADOT’s 5-Year Construction Program. All projects are continually re-evaluated as they move from Pre-Design into the Design, Construction and Maintenance Phases.

#### **Definition of a Significant Project:**

Per ADOT Work Zone Safety and Mobility Policy (ENG-07) and in compliance with 23 CFR 630 Subpart J, a significant project is

“One that, alone or in combination with other concurrent projects nearby, is anticipated to cause sustained work zone impacts that are considered greater than what’s tolerable based on engineering judgment. The judgment is based on existing traffic volumes, duration of construction, anticipated impacts to travel time and surrounding transportation network and is further defined in these implementation guidelines. In addition, all Interstate system projects within the boundaries of a Transportation Management Area that occupy a location for more than three days with either intermittent or continuous lane closures are also considered significant.

For an Interstate system project or categories of Interstate system projects that are classified as significant through the application of this provision, but in the judgment of the State they do not cause sustained work zone impacts, the State may request from the FHWA, an exception to the requirements triggered by the classification. Exceptions to these provisions may be granted by the FHWA based on the State's ability to show that the specific Interstate system project or categories of Interstate system projects do not have sustained work zone impacts.

#### **ADOT Process for Defining the Level of Significance:**

The intent of ADOT’s Policy is to maintain flexibility in determining the level of significance (Major or Minor) for all projects added to ADOT’s 5-year Construction Program. The Department identifies upcoming projects that are expected to be significant as early as possible in the process and in cooperation with FHWA. All projects are continually re-evaluated as they move from Pre-Design into the Design, Construction and Maintenance Phases using the Transportation Management Plan Memo.

To better anticipate the impacts associated with individual projects every project will require a Transportation Management Plan (TMP). As indicated in Section 5.6.2 of ADOT’s Project Development Process Manual, the TMP will be initially submitted at Stage 1 in the development process and then updated as needed at each successive submittal. The TMP will identify project’s level of significance (Major or Minor) which will determine the complexity of the TMP.

Projects of Major Significance: Projects of Major Significance have a high level of public interest and will likely impact a large number of travelers. This impact must be analyzed individually and also in combination with concurrent active projects. It will have moderate to high user-cost impacts and the duration is usually moderate to long. These characteristics create work zone impacts that fall outside of the typical work zone safety and mobility thresholds. Examples of this work type may include major corridor reconstruction, high impact intersection reconstruction, full closures on high volume

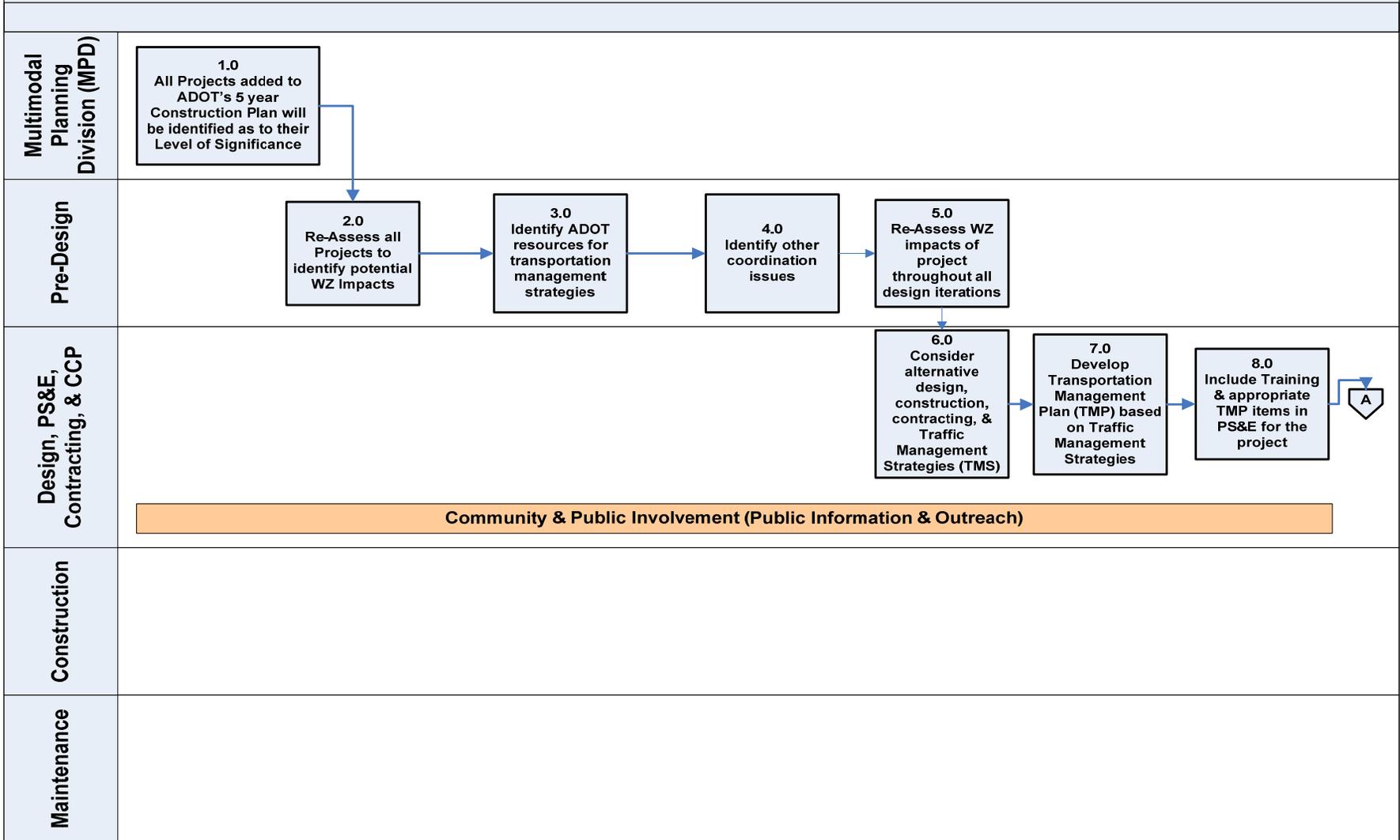
facilities, major bridge reconstruction or repair, repaving projects that require long term lane closures, etc. It is important to note that projects of major significance are unique in that they have considerable impacts to areas outside of the project area as well as the surrounding community.

Projects of Minor Significance: Minor projects have the potential to affect the level of public interest and may impact a modest number of commuters. These projects would include various maintenance activities.

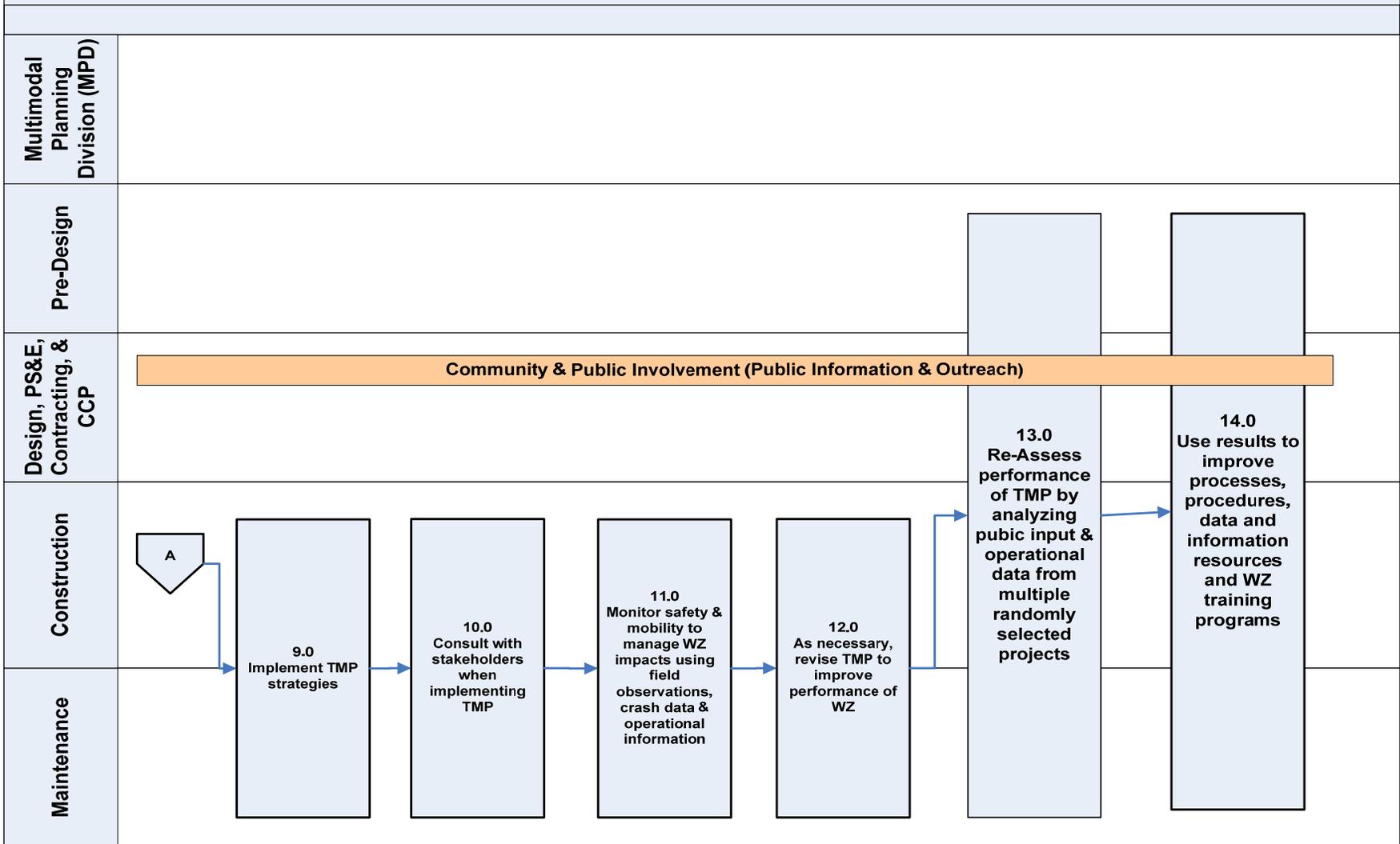
ADOT's process for the Identification, Assessment, Implementation and Re-assessment of Work Zone Safety & Mobility is defined in the Process & Procedures in this section.

# ADOT's Work Zone Safety & Mobility Process

23 CFR 630 Subpart J



**ADOT's Work Zone Safety & Mobility Process**  
23 CFR 630 Subpart J



<b>Title: Work Zone Safety &amp; Mobility Procedure</b>	
<b>Process Owner(s): MPD, CCP, PreDesign, Design, Districts' &amp; Maintenance</b>	<b>Date &amp; Revision: 02/26/09 Version 3.0</b>
<b>Activity</b>	<b>Tasks/Key Actions</b>
<b>1.0</b> <b>All Projects added to ADOT's 5 year Construction Plan will be identified as to their Level of Significance</b> <u>Responsible: MPD, CCP, Pre-Design, and ITD Leadership Team</u>	<p>Starting FY09-FY10 cycle projects added to ADOT's 5 year Construction Plan will be identified, as to their level of significance (Major or Minor).</p> <p>The level of significance will be designated in the Pre-Design Scoping Document in Activity 2.0</p> <p>Projects will be continually re-assessed throughout Pre-Design, Design, Construction &amp; Maintenance for Work Zone Safety &amp; Mobility issues.</p> <p>Review of Work Zone Impact will be included in the Stages Checklist; including a Traffic Management Plan Memo.</p>
<b>2.0</b> <b>Re-Assess all Significant Projects to identify potential work zone impacts</b> <u>Responsible: Pre-Design, Traffic Engineering, Districts &amp; CCP</u>	<p>The Project Manager needs to coordinate with Contract Phasing, Traffic Control, and Communications &amp; Community Partnerships (CCP) at each phase of project.</p> <p>Reference - Arizona Supplement to MUTCD can be found in Appendix G</p>
<b>3.0</b> <b>Identify ADOT resources for transportation management strategies</b> <u>Responsible: Pre-Design, Traffic Engineering, Districts, CCP, Environmental, Local Governments, IPA &amp; IGA</u>	<p>Starting from typical ADOT strategies in limiting traffic restrictions, closures and closure times, examine contract acceleration and construction phasing. CCP is at the same time identifying Public Notice &amp; feedback strategies.</p> <p>Environmental strategies (Hazard Identification and Reduction plans) are developed to eliminate hazards such as; vehicle collisions with wildlife, tree removal, etc.</p>
<b>4.0</b> <b>Identify other coordination issues</b> <u>Responsible: Pre-Design, Traffic Engineering, Districts, CCP, Environmental, U&amp;RR, Local Governments, Uniformed Officers, IPA &amp; IGA</u>	<ul style="list-style-type: none"> <li>• Utility &amp; Railroads (U&amp;RR)</li> <li>• Enforcement (Uniformed Law Enforcement/DPS)</li> <li>• Local Government</li> <li>• Environmental strategies</li> </ul>
<b>5.0</b> <b>Re-Assess WZ impacts of project throughout all design iterations</b> <u>Responsible: Pre-Design, Design, Districts, Valley &amp; SW Project Mgmt &amp; CCP</u>	<p>This re-assessment should be completed at all phases of the project starting with Pre-Design, Design, Construction &amp; Maintenance. Review of Work Zone Impact will be included in the Stages Checklist; including a Traffic Management Plan Memo identified at Stage 1 and updated as necessary during each successive phase.</p>

<b>Title: Work Zone Safety &amp; Mobility Process</b>	
<b>Process Owner(s): MPD, Pre-Design, Design, Districts' &amp; Maintenance</b>	<b>Date &amp; Revision: 02/26/09 Version 3.0</b>
<b>Activity</b>	<b>Tasks/Key Actions</b>
<b>6.0</b> <b>Consider alternative design, construction, contracting &amp; Traffic Management strategies</b> <u>Responsible: Design, CCP, Districts, Traffic Engineering</u>	<ul style="list-style-type: none"> <li>Design continues coordination as in Pre-Design</li> <li>Update TMP Memo to reflect any changes</li> </ul>
<b>7.0</b> <b>Develop TMP based on Traffic Management strategies</b> <u>Responsible: Design, Traffic Engineering &amp; CCP</u>	<ul style="list-style-type: none"> <li>Update TMP Memo to reflect any changes</li> </ul> <p>Reference – CCP- Communications &amp; Public Involvement See Appendix A</p> <p>Reference – ADOT Traffic Control Design Guidelines See Appendix F</p> <p>Reference – Arizona Supplement to MUTCD See Appendix G</p>
<b>8.0</b> <b>Include Training &amp; appropriate TMP items in PS&amp;E for the project</b> <u>Responsible: C&amp;S, LTAP / ITD Tech Training, Approved Providers, CCP &amp; Consultant Construction Administration (CCA), Districts</u>	<p>ADOT is developing a two tiered training program for workers, and supervisors and managers. It also differentiates between operations (field) and design (office) personnel with a third course. These courses will ensure targeted training for the Project Team, including (but not limited to) Pre-Designers, Designers, Construction Workers, Construction and Permit Inspectors, and Maintenance Workers. Training shall be required for personnel involved in the supervision and / or oversight of Design, Implementation (set up &amp; maintenance of TC devices), Operation &amp; Enforcement of the Work Zone. See Section 6.0 for more details.</p>
<b>9.0</b> <b>Implement TMP strategies</b> <u>Responsible: Districts &amp; CCP</u>	<p>Reference – Contract &amp; Project Specifications</p>
<b>10.0</b> <b>Consult with stakeholders when implementing TMP</b> <u>Responsible: Districts &amp; CCP</u>	<p>CCP hosts meetings with Contractors, Local Government, ADOT Technical staff, PM's, Local Government, Traffic Engineering and Uniformed Law Enforcement/DPS</p>
<b>11.0</b> <b>Monitor safety &amp; mobility to manage WZ impact</b> <u>Responsible: Districts, CCP, MPD (Mr. Talley) &amp; GTSAC</u>	<ul style="list-style-type: none"> <li>Community Feedback available through CCP</li> <li>Operational data – Scope, Schedule, Budget &amp; Quality</li> </ul> <p>NOTE: Crash data – available at project level through RE/Inspectors or at statewide level through ALISS database. Contact Larry Talley (MVD), Traffic Records Coordinating Committee (TRCC) Coordinator (602) 712-7029.</p>
<b>Title: Work Zone Safety &amp; Mobility Process</b>	
<b>Process Owner(s): MPD, Pre-Design,</b>	<b>Date &amp; Revision: 02/26/09 Version 3.0</b>

Design, Districts' & Maintenance	
Activity	Tasks/Key Actions
<p><b>12.0</b> As necessary, revise TMP to improve performance of WZ</p> <p><u>Responsible: Districts, CCP &amp; Design</u></p>	<p>ADOT uses Community Input, Operational Data, and Crash reports (done by RE's) to determine if any changes are necessary.</p>
<p><b>13.0</b> Assess performance of WZ Safety &amp; Mobility</p> <p><u>Responsible: CCP, Districts, Traffic Engineering, Pre-Design, Design, Valley &amp; SW Project Mgmt &amp; MPD</u></p>	<p>Use Community feedback &amp; Operational data from multiple randomly selected projects.</p> <p>At a minimum, process reviews to be held every two years commencing FY10.</p> <p>This information will be presented to the ITD Leadership Team meeting at least once every two years. The ITD Leadership team will identify a sub-group to define improvements to WZS&amp;M and CCP will facilitate the bi-annual assessment process.</p>
<p><b>14.0</b> Use results to improve Work Zone Safety &amp; Mobility</p> <p><u>Responsible: CCP, Districts, Traffic Engineering, Pre-Design, Design, Valley &amp; SW Project Mgmt &amp; MPD</u></p>	<ul style="list-style-type: none"> <li>• Eng07-3 Work Zone Safety &amp; Mobility Policy</li> <li>• Processes</li> <li>• Procedures</li> <li>• Data &amp; Information resources</li> <li>• WZ Training programs</li> <li>•</li> </ul>

## 4.0 Transportation Management Plans (TMP)

TMP's are strategies/methodologies that will be implemented to ensure safe and mobile work zones within transportation projects. The project classification will determine the detail level of significance required for the TMP.

Projects of Major Significance: The TMP for high significance projects shall consist of a TTC, a TO, and a PI.

Projects of Minor Significance: The TMP for minor projects shall consist of a TTC. A TO and a PI are not required, but may be applicable to certain projects as determined by the Project Manager.

To better anticipate the impacts associated with individual projects every project will require a Transportation Management Plan (TMP). As indicated in Section 5.6.2 of ADOT's Project Development Process Manual, the TMP memo will be initially submitted at Stage 1 in the development process and then updated as needed at each successive submittal to re-assess work zone impacts. The TMP memo is a "dynamic document" that will be maintained and revised by the project team as project development progresses. As the TMP evolves, it is important to reassess the management strategies to confirm that the work zone impacts are addressed and the necessary funding is available. The TMP shall consist of four components -

- Transportation Management Plan Memo
  - Initiated in the Pre-Design process, using a multidisciplinary approach
- Temporary Traffic Control Plan
- Transportation Operations
- Public Information and Outreach

**Temporary Traffic Control Plan (TTC):** A TTC plan describes temporary traffic control measures to be used for facilitating road users through a work zone or an incident area. The TTC plan plays a vital role in providing continuity of reasonably safe and efficient road user flow and highway worker safety when a work zone, incident, or other event temporarily disrupts normal road user flow. The TTC plan shall be consistent with the provisions of the State Supplement of the MUTCD and AASHTO Roadside Design Guide. The Traffic Control Design Guide is intended to provide design guidelines for the State of Arizona Highway System, and should be used in addition to the State Supplement of the MUTCD

### **Traffic Engineering Group**

- The Traffic Engineering Group is responsible for the preparation of TTC plans, design exceptions, construction zone traffic control plans, traffic analyses, traffic signal and illumination plans, signing plans and pavement marking plans.

**Transportation Operations Component (TO):** The TO component shall include the identification of strategies to mitigate impacts of the work zone on the operation of the transportation system within the work zone impact area. The work zone impact area consists of the immediate work zone as well as affects to the surrounding roadways and communities.

**Traffic Control & Safety (Specification in Development)**

- For projects of Major Significance a provision for Traffic Control Coordinator as identified in contract documents. The Traffic Control Coordinator shall be a representative of the contractor with the primary responsibility of maintaining traffic control and responding to incidents resulting from or adversely affecting the project traffic control. **See Contracts & Specifications for Section 701 Traffic Control Coordinator (DRAFT stored specification)**

**Public Information Component (PI):** The PI component shall include communication strategies that seek to inform the general public of work zone impacts and the changing condition of the project. The general public may include road users, area residences and businesses, and other public entities.

Communications and Community Partnerships are responsible for developing public information and outreach plans in conjunction with the TMP. The process and procedures for determining the extent of the PI component and the types of strategies utilized in Appendix

## 5.0 Work Zone Impact Assessment Tools

The work zone impact assessment is a process for understanding the safety and mobility impacts of a road construction/maintenance/rehabilitation projects. For all projects, work zone impacts are continually re-assessed at all stages of the project; including Systems Planning (MPD), Pre-design, Design, Construction & Maintenance.

Factors that will influence the level of impact in a work zone include traffic conditions and characteristics, project characteristics, geographic/physical features, and aspects of the surrounding area (e.g., alternate routes, nearby businesses).

ADOT has been very proactive in using a work zone evaluation process to improve existing work zones and to modify future work zone traffic management plans; some examples are provided here.

ADOT uses three Quantlists for traffic control to assist the project engineer with analyzing the traffic control plan and evaluating the work zone on a weekly basis. ADOT trains their inspectors in the use of these Quantlists. The Quantlists evaluate each work zone for conformance with the approved Traffic Control Plan. Additionally the State Construction Engineer's Construction Operations section conducts independent Quality Assurance (QA) project reviews using the same Quantlists. The results of these QA evaluations are distributed by the Assistant State Engineer for Construction, to the responsible District Engineer (DE) as an aid in improving congestion and safety in that, and future projects. Contact ADOT Construction Operations. See Appendix H.

ADOT's Intelligent Transportation Systems' (ITS) Highway Condition Reporting System (HCRS) is a versatile and powerful system collecting, coordinating, and disseminating highway information. (Motorist Information System (MIS) and Incident Management included in this section, as examples)

ADOT internally uses ITS as a conduit between DPS dispatch and project level management. In Metropolitan areas, ITS camera links are available in District offices to monitor Freeway congestion.

ITS uses both telephone and web reporting of real time traffic conditions as an aid for drivers to avoid congestion. AZ511 (send) is available from any cell phone. AZ511.com provides travelers and ADOT personnel both camera images of major Freeway conditions, and graphic representations on traffic movement and conditions with reasons (Construction, Maintenance, Incidents, Crashes, Special Events, etc.). Media are afforded real time camera information for broadcast as an aid to commuters, commercial, and recreational travelers.

## **az511 - MOTORIST INFORMATION SYSTEMS**

The ADOT motorist information systems provide accurate, timely, and reliable information in order to provide for a safe and convenient environment. The principal systems currently used include the following:

### **Variable-Message Sign**

- Primary technique for providing information to motorists
- Capable of quickly change messages remotely
- Fiber-optic signs used throughout the state furnished by a single vendor to facilitate operations and maintenance
- All signs are alphanumeric character matrix with 18-inch-high character and three-line display
- Signs are placed at the following locations: a) at intermediate locations based on volume-to capacity ratio, accident rate, and diversion potential; b) in advance of freeway-to-freeway interchanges; c) at entrances to system; d) at approximately two-mile spacing in urban areas
- Dynamic Message Signs are located at fixed locations with four (4) lines of fourteen (14) characters each

### **Highway Condition Reporting System (HCRS)**

The HCRS is a unique, versatile, and powerful system, which has been developed by ADOT to provide accurate and reliable information on roadway conditions, incidents, special events, roadway closures, detours, traffic flow, and weather. The HCRS attributes are described below:

- Dynamic GIS-based graphics
- Communications take place via Internet, wide-area network, and dial-up
- ITIS Codes are used to categorize information
- HCRS retrieves weather forecast and advisory from the National Weather Service
- HCRS server automatically feeds data to other systems such as Internet and 511

### **Internet**

The ADOT TOC maintains the “az511.com” as its Web site to provide relevant and useful information on travel patterns, roadway conditions, incidents, and live camera images from roadways.

### **511 Telephone System**

In March 2002, Arizona launched its statewide 511 System. This current system utilizes information from the Highway Conditions Reporting System (HCRS), which aggregates data from multiple sources, including data gathered by the operators at the ADOT Traffic Operations Center. Arizona has successfully completed the important first steps in

implementing a comprehensive 511 System. The 511 Model Deployment Initiative (MDI) will build upon Arizona's current systems for integrated data fusion (HCRS) and the Voice Remote Access System (VRAS).

## **INCIDENT MANAGEMENT**

An incident is defined as any non-recurring event that causes a reduction of roadway capacity or an abnormal increase in demand. Such events include traffic crashes, disabled vehicles, spilled loads, highway construction and maintenance activities, and special events (e.g., ball games, concerts, parades).

The purpose of the incident management is to become aware of occurrence of an incident (either through the FMS or by receiving reliable information) and initiate appropriate procedures to restore the roadway to full capacity. The main responsibility of the Arizona Department of Transportation (ADOT) Traffic Operations Center (TOC) is to respond to incidents and dispatch appropriate teams to manage and clear the incidents. The TOC operators can help improve the safety of motorists, road construction and maintenance workers, and emergency crews during incidents. The CCTV camera system is the primary source of incident verification. All incidents are logged and documented using the automated incident logging system. The principal elements of incident management are listed below:

1. Detection
2. Verification
3. Response
4. Removal
5. Site Management
6. Motorist Information
7. Freeway Service Patrol
8. ALERT (Arizona Local Emergency Response Team)

For additional information about az511 – See Appendix P.

## 6.0 Work Zone Training

ADOT is developing a two tiered training program for workers, and supervisors and managers. It also differentiates between operations (field) and design (office) personnel with a third course. These courses will ensure targeted training for the Project Team, including (but not limited to) Pre-Designers, Designers, Maintenance & Environmental Workers, and Construction and Permit Inspectors. Training shall be required for personnel involved in the supervision and / or oversight of Design, Implementation (set up & maintenance of TC devices), Operation & Enforcement of the Work Zone.

Designer Training shall be required for those with responsibility or authority to decide on specific maintenance of traffic requirements including the Engineer responsible for work zone traffic control phasing and plans; and Technicians drafting or electronically generating work zone traffic control plans.

ADOT currently trains all field workers (Construction, Maintenance & Environmental) in Traffic Safety courses TCH 3004 & TCH 3005. These Matrix courses' are not affected by this program.

Courses are currently under development by ADOT. Point of Contact (POC) is:

Erika Blankenship, LTAP and ITD Tech Director

EBlankenship@azdot.gov

602-712-4252

After the training courses are available, notice of the new training requirements for Work Zone Safety and Mobility shall be by revision to ADOT's Standard Specifications / Stored Documents, Project Development Process Manual, and Construction Manual.

## 7.0 Process Reviews

### **What is a Process Review?**

A process review is an assessment of the functionality and effectiveness of a particular program and the practices and procedures used for carrying out an aspect of ADOT's normal business operations. Reviews can also help ensure that operational processes are consistent with established processes, procedures, standards and expectations, performing at the most effective and efficient level, and that best practices are captured and made available to all levels.

A process review has several characteristics, including that it is:

- **Planned:** Preparation is done
- **Deliberate:** There is a defined purpose and scope for the review
- **Organized:** A method/approach is followed
- **Multi-disciplinary:** It is conducted by a representative team
- **Action-oriented:** Seeks to identify steps that can be taken (if any) to foster improvement

### Requirements of the Rule

The Rule requires a process review at least every two years to assess the effectiveness of their work zone safety and mobility procedures. The State has the option to evaluate work zone data at the agency level or to randomly selected projects across jurisdictions or use a combination of both.

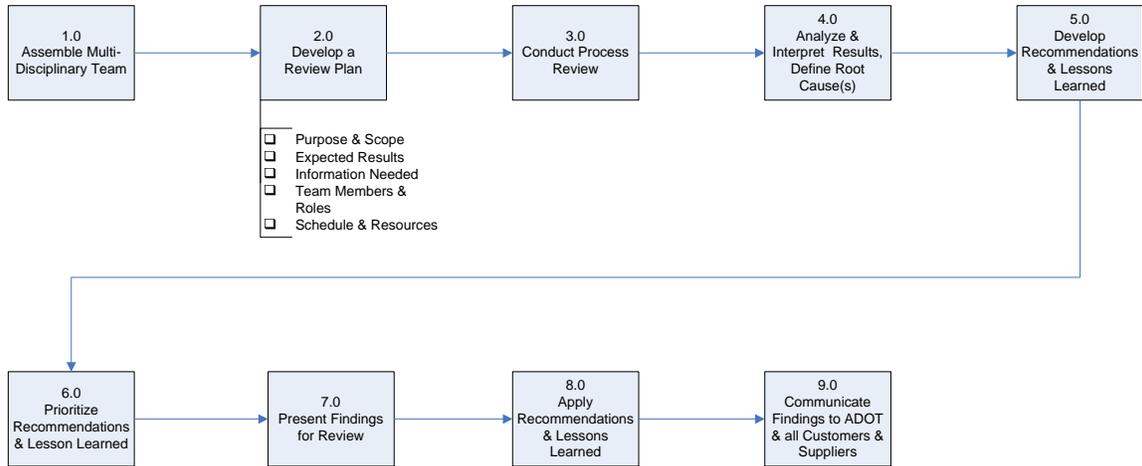
### Process Review objectives

The Rule recommends that appropriate personnel, who represent the projects development stages and the different offices within ADOT, as well as FHWA, participates in the review of processes, procedures, data and information resources, and training to address safety and mobility on current and future projects.

ADOT uses community input as its key driver of potential changes to the Traffic Management Plan for a specific project. The data is collected by CCP, who then facilitates a review with the DE, RE and/or PM for that project. The discussion includes the community input, potential changes to the TCP and a response to the community input. In addition, an ADOT Core Team working group will conduct a statewide bi-annual review and present the findings to the ADOT Leadership Team.

# Work Zone Safety & Mobility Bi-Annual Process Review

Recommended



## ADOT’s approach for FHWA Work Zone Self Assessment

To help states evaluate their work zone practices, and to help assess work zone practices nationally, the FHWA developed the Work Zone Safety & Mobility Self Assessment (WZSA) tool. The WZSA tool consists of 46 questions designed to assist those with work zone management responsibilities in assessing their programs, policies, and procedures against many of the good work zone practices used today.

The WZSA is completed on an annual basis, due to FHWA by June 1 of each year. The goal is to accurately capture the state of work zone management practices within Arizona. It is recommended that a comprehensive re-assessment be done at least every 2 to 3 years. The WZSA can be completed in conjunction with the ADOT bi-annual process review.

## ADOT’s approach for Process Review

### 1. Assemble multi-disciplinary team.

In an agency, there are generally several units, teams, or departments responsible for carrying out a program or operation. It is important that these different perspectives are represented in a process review team. A practice that works well for one unit may cause difficulties for the next unit (e.g., decisions made independently by the design unit could make development of effective TMP’s or traffic control plans problematic for the traffic engineers). Or a step that is done by one unit might be more effective if done earlier in the process by another unit (e.g., identifying significant projects). The appropriate personnel, who represent the various project development stages and the different offices within the agency, as well as the FHWA, should participate in the process reviews. Non-agency stakeholders should be invited to participate in the reviews, as appropriate. They

can provide a useful perspective and may have insights that agency personnel are not in a position to see.

The maximum effective team size is generally around 8 people. If the team is too large, the participation of some members will likely be limited. Other people can support the review but not be a member of the core review team. For example, the review team may interview other stakeholders on specific topics of interest or make use of data collected by others.

## 2. Develop a review plan

Preparing a review plan can be helpful to ensure that all team members have a common understanding and remain focused on the scope of the review.

What needs to be considered to plan for a review?

- Purpose
- Scope: Function/processes reviewed
- Expected results
- Information needed
  - What do we know now?
  - Gaps in information and possible sources
- Team members and roles
- Schedule and resources

**Purpose and Scope:** Having a clear purpose and scope for the review and an agreed upon set of objectives is vital to the success of a review. The scope of the review should identify the limits of the review to ensure it remains focused on the key processes, and should specify the timeframe to be covered by the review (e.g., the most recent 2 years). The agency and the FHWA Division Office generally work together to identify the scope of review, based on the Stewardship Agreement and a risk assessment.

**Expected results:** The process review should have clear and concise goals that define what the review is trying to accomplish and identify the expected results. Base the selection of topics on opportunities for improvement and consider a fairly uniform distribution of review topics among the various program areas.

**Information needed:** Information for review should come from a variety of sources. After determining the information the review team needs, it should next assess what information is already available and identify what needs to be generated. Information sources may include field data collection, data records (e.g., crash reports), project logs, and interviews with key stakeholders, post-construction reports, and other sources. This may include:

- Collection of data including project related information as well as public and stakeholder perception.
- Synthesis and analysis of data at multiple levels (project, local, regional, State, and national) and comparison of findings to performance metrics
- Application of the analysis results toward continually improving work zone practices, policies, processes, and procedures.

**Team members and roles:** The team members should also know their roles, limitations, and authority.

**Schedule and resources:** The review team should also identify target dates for conducting the review and presenting the results, as well as the resources available for the review. Resources should include staff time and expertise, data availability, and budget.

### **3. Conduct review**

This step involves carrying out the review plan developed by the team. The review team leader should make appropriate assignments among the team members to promote active participation by everyone. It is valuable to document the steps taken and information collected during the review to have a good basis for any conclusions reached and recommendations made.

### **4. Analyze and Interpret results**

In this step, the team should compile and analyze the data information collected, and compare the results against the stated goals of the processes and functions being reviewed to identify the gaps and problem areas. If the goals are not being met in certain areas, then the analysis should attempt to identify the “root cause.” It is valuable to identify the “root cause(s)” as much as possible, rather than focusing on the symptoms and how treat them. Symptoms may need to be dealt with, but real change occurs when you address the root causes.

### **5. Develop inferences, recommendations, and lessons learned**

Once the root causes of problem areas or gaps are identified, the team needs to develop recommended improvements targeting these areas. The team may find it helpful to brainstorm solutions or conduct follow-up interviews to identify or assess alternatives for improvements.

During the review, the team may also identify weaknesses, as well as best practices that should be noted in the findings. Noting best practices is an opportunity to give credit for good things that are discovered, can help build rapport with partners, and may lead to solutions that can be shared.

Recommendations/solutions should be:

- Conceivable
- Achievable
- Valuable
- Manageable
- Constructive
- Realistic

## **6. Prioritize recommendations and lessons learned**

The team should suggest a prioritization to the recommendations based on several considerations, including the amount of influence the recommendation will have on the desired outcomes and ability to implement it.

## **7. Present the findings from the review**

A close-out meeting should be held with the affected stakeholders to present the findings and receive feedback. The review team should provide a brief overview of the process followed; the information considered and the basis for each recommendation. The review team should be prepared to support its findings and may encounter the need to defend the recommendations.

## **8. Apply recommendations and lessons learned**

Based on the team's findings and the feedback during the closeout meeting, the team should develop an action plan that identifies the actions, responsible parties, timeframe for implementation, and expected outcomes. The results of the review and carrying out the action plan should lead to improvements in agency processes and procedures.

## **SAMPLE Process Review Questions**

### **General**

- Has the District begun to implement the Agency's Work Zone Safety and Mobility Policy?
- Who in the District is responsible for compliance with the Policy?
- How many projects have implemented the Policy?
- Has District staff been adequately trained?
- Please address any overall concerns you have with the Policy

### **Planning**

- Has the District discussed the Work Zone Safety & Mobility Policy with the planning partners?
- Does the programming of projects consider the minimization of road user impacts?
- Are projects sequenced to consider the overall network and region-wide impacts?

### **Project Scoping**

- Is consideration given to potential work zone impacts and does that influence the evaluation and selection of a build alternative?

### **Preliminary Engineering**

- On Interstates, freeways, and arterials, how is the analysis of work zone delay impacts being conducted?
  - What software is being used?
  - Is it done by consultant or District staff?
  - Please provide examples.
- For long-term projects on the Interstate within a TMA, have any exception requests been submitted because of low traffic impacts?
- Are submissions made in a timely fashion according to the Policy?
  - Is significance determined and approved before the alternative analysis?
  - Is the alternative analysis prepared?
- Provide examples of draft TMP's that have been prepared because of work zone impacts that are unacceptable.
- Describe the involvement of FHWA (for Federal Oversight projects) and DOT Bureau of Design.

### **Final Design and PS&E**

- How many TMP's have been developed (or are in the process) since the Policy became effective? Please provide examples.
- How do the TMP requirements get incorporated into the PS&E?
- What TMS's are commonly utilized in this District?
- Has the implementation of the Policy caused you to consider additional or different strategies than what has been used in the past?
- How has the Policy affected project delivery and costs?

## **Work Zone Crash Review**

When a work zone experiences a significant crash or a re-occurrence of vehicular crashes, a Work Zone review is performed by the RE and / or the Regional Traffic Engineer. It shall review the adequacy of the existing Traffic Control Plan (TCP), and consider refinements and / or alternative traffic control. At a minimum it shall include:

- 1) A site visit
- 2) A review police crash reports (if available)
- 3) Interviews with the construction staff and contractor
- 4) Collaboration with the Design Engineer of Record / district staff / Regional Traffic Engineer

When the review is complete, a report containing recommended changes (if any) is sent to the District Engineer for review. The intent is a timely review to implement changes as necessary, not the creation of a lengthy or formal report – the use of e-mail is encouraged.

If change(s) are implemented, changes to contract documents shall be made in accordance with the Standard Specifications. A paper copy of the report / e-mail shall be filed with project records.

- Each project will conduct process reviews, similar to the crash review, to examine adjustments to traffic management strategies when the TCP is not meeting desired outcomes.
- Mitigation / changes to the TCP are then agreed to and implemented, by the appropriate District Engineer (DE); again, if changes to contract documents are made, they shall be in accordance with the Standard Specifications.

## 8.0 23 CFR630 Subpart K (Temporary Control Devices)

### ADOT Compliance with Subpart K

Category	Use	Status & Location	Responsible
<b>Positive Protection Devices</b>	Based on an Engineering Study (agency-wide or to determine measures to be applied on an individual project)	Addressed in Traffic Control Design Guidelines and Standard drawings	Traffic Group
<b>Exposure Control Measures</b>	Considered to avoid or minimize exposure for workers & road users (Full road closures, ramp closures, median crossovers & night work)	Addressed in Traffic Control Design Guidelines and Standard drawings  Valley Transportation White Paper on lane closure	Traffic Group
<b>Other Traffic Control Measures</b>	Considered to reduce work zone crashes, risks & consequences of intrusions into the work space	Addressed in Traffic Control Design Guidelines	Traffic Group
<b>Uniformed Law Enforcement/DPS</b>  <i>(See Appendix for Guidelines)</i>	Develop a policy for use on Federal-aid highway projects	DRAFT Being Reviewed  See: Construction Bulletin 08-03	Construction Group
<b>Safe Entry/Exit for Work Vehicles</b>	Develop a Policy	Being Developed  Traffic Control Design Guidelines	Traffic Group
<b>Payment for Traffic Control Features &amp; Operations</b>	Incidental to the contract or included in payment of work unrelated to traffic control and safety	Standard Specifications/Special Provisions Bid Tabs	Contract & Specifications (C&S)
<b>Quality Guidelines</b>	Maintain quality & adequacy of TCC devices during project	Quantlists  See: Construction Bulletins 06-01 & 07-01	Construction Operations

## 9.0 Appendix

- A. CCP – [Public Information & Outreach Strategies](#)
- B. Guidelines for use of Uniformed Law Enforcement / DPS (under review - Contact Traffic Engineering Group)
- C. Construction Bulletins  
<http://www.azdot.gov/Highways/ConstGrp/Bulletins.asp>
- D. Priority Programming Group – (Define ADOT’s 5 year Construction Plan)  
<http://mpd.azdot.gov/pps/process.asp>
- E. Traffic Engineering Policies, Guides & Procedures (PGP)  
<http://www.azdot.gov/Highways/Traffic/PGP.asp>
- F. Traffic Control Design Guidelines  
[http://www.azdot.gov/highways/traffic/standards/Traffic\\_Control/Trafficcontrol.pdf](http://www.azdot.gov/highways/traffic/standards/Traffic_Control/Trafficcontrol.pdf)
- G. Arizona Supplement to the MUTCD  
<http://www.azdot.gov/Highways/traffic/standards/mutcd/2003ADOTMUTCD.pdf>
- H. ADOT’s Work Zone Inspection Procedure (Quantlists)  
*Available in the PEN system; Hard copies available to Contractors*
- I. Project Development Process Manual  
<http://wss1/default.aspx>
- J. ADOT Construction Manual  
[http://www.azdot.gov/Highways/ConstGrp/construction\\_manual/index.asp](http://www.azdot.gov/Highways/ConstGrp/construction_manual/index.asp)
- K. ATSSA Training  
[http://www.atssa.com/cs/course\\_information](http://www.atssa.com/cs/course_information)
- L. AGC Training  
[http://www.agc.org/cs/career\\_development/craft](http://www.agc.org/cs/career_development/craft)
- M. Final Rule Language 23 CFR Part 630 Subpart J  
<http://frwebgate.access.gpo.gov/cgi>
- N. Final Rule Language 23 CFR Part 630 Subpart K  
[http://ops.fhwa.dot.gov/wz/resources/temptraf\\_qa.pdf](http://ops.fhwa.dot.gov/wz/resources/temptraf_qa.pdf)
- O. FHWA Website – Work Zone Safety & Mobility  
<http://ops.fhwa.dot.gov/wz/outreach/outreach.htm>
- P. az511.com Web Link  
[http://www.az511.com/Documents/adot\\_its.pdf](http://www.az511.com/Documents/adot_its.pdf)
- Q. Allowable Closure Times (For latest information contact Valley or SW Project Mgmt)