

Work Zone Safety and Mobility

Effective: March 15, 2005

UDOT 08-05

Revised: new

Purpose

Establish guidance and requirements for addressing safety and mobility impacts of work zones.

Policy

Management of work zone safety and mobility impacts during the project development process for all significant projects administered by the Utah Department of Transportation.

Definitions

Significant Project

All Federal-aid Interstate projects within a Transportation Management Area that occupy a location for more than three days with either intermittent or continuous lane closures are considered significant.

A significant project is one that alone or in combination with other concurrent projects nearby is anticipated to cause sustained work zone impacts greater than what is considered tolerable based on engineering judgment. The Region will evaluate the project's characteristics, the magnitude and the extent of the anticipated work zone impacts to determine if a project is significant.

Transportation Management Area

A transportation management area is an urbanized area with a population of more than 200,000 residents.

Transportation Management Plan (TMP)

A TMP is comprised of strategies to manage project work zone impacts. These strategies consist of a Traffic Control Plan (TCP) plan. It also includes a Maintenance Of Traffic (MOT) plan and a Public Information (PI) plan for significant projects.

A TCP plan describes measures to be used for facilitating road users through a work zone or an incident area.

The MOT component of the TMP includes the identification of strategies used to mitigate impacts of the work zone on the operation and management of the transportation system within the work zone impact area.

The PI component of the TMP includes communication strategies that seek 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 on the project.

Work Zone Mobility

Mobility is the ability to move road users efficiently through and around a work zone area with minimum delay compared to a baseline travel when no work zone is present.

Work Zone Safety

Safety is the level of exposure to potential hazards for users of transportation facilities and highway workers. With specific reference to work zones, safety refers to minimizing potential hazards to road users in the vicinity of a work zone and highway workers at the work zone interface with traffic.

Procedure

Implementation of Work Zone Safety and Mobility

UDOT 08-05.1

Responsibility: Region Director

Actions

1. Significant Project Identification
 - (a) Identify significant projects as early as possible in the project delivery and development process in cooperation with the FHWA.
 - (b) Consider UDOT's work zone policy provisions, the project characteristics, and the magnitude and extent of the anticipated work zone impacts when determining if a project is significant.
 - (c) Consider the following applicable provisions for significant projects:
 - (1) Requires MOT strategies – Scope determined by project characteristics and safety strategies identified by the Department.
 - (2) Requires PI component of TMP including communications strategies to inform road users, general public, area residents, businesses, and appropriate public entities about expected work zone impacts and changing conditions.

Responsibility: Leader

2. Department Level Processes and Procedures
 - (a) **Engineer for Construction**
Assessment and management – Systematic procedures to assess work zone impacts in project development and manage safety and mobility during project implementation
 - (b) **Engineer for Traffic and Safety**
Data – Continually pursue improvement of work zone safety and mobility by analyzing work zone crash and operational data to improve processes and procedures. Maintain elements of the data and information sources necessary to support these activities.

- (c) **Engineer for Traffic and Safety**
Training – Require training for personnel involved in the development, design, implementation, operation, inspection, and enforcement of work zone related traffic management/control. Require periodic training updates to reflect changing industry practices and Department processes and procedures.
- (d) **Engineering Services Director/Engineer for Construction**
Process Review – Review process at least every two years. Include work zone data evaluation at Department level or review randomly selected projects. The process reviews will consist of representatives from Project Development, different Regions, and FHWA. Include other stakeholders as appropriate.

Responsibility: Region Director

- 3. Project Level Procedures
 - (a) Develop for significant projects a TMP that consists of a TCP plan and addresses both MOT and PI components.
 - (1) TCP plan – Consistent with provisions of Part 6 of MUTCD, Chapter 9 AASHTO Roadside Design Guide, and Department TC series drawings.
 - (b) Develop and implement the TMP in consultation with stakeholders.
 - (1) Include in the PS&E a TMP or provisions for contractors to develop a TMP (Approved by the Department prior to implementation) using either method or performance-based specifications.
 - (2) Assign responsibility for implementation of the TMP to trained representatives from the Department and the contractor.
 - (3) The TMP may consist of only a TCP plan for non-significant projects.
- 4. Complete a process review for significant projects.

Guidelines

Traffic Guidelines for Work Zone Safety and Mobility

UDOT 08-05.1G

Introduction

This guideline supports the Work Zone Safety and Mobility policy with general traffic guidelines.

Purpose of Guidelines

To address traffic safety and mobility needs in the planning and execution of work zone impacts. This guideline includes documentation requirements for the safety and mobility impacts after the project is complete.

Definition-TPT

Traffic Planning Team. The Core TPT members consist of:

1. Project Manager and/or Permits Officer – All Project levels
2. Region/Area Traffic Engineer-All Project levels
3. Project Resident Engineer and/or Maintenance Area Supervisor-All Project levels

Process

Each project has a Traffic Planning Team (TPT). The depth and scope of the TPT varies depending on project level and location.

Responsibility: Region Director

Actions

1. Identify TPT members in the project Concept phase that will participate through the completion of the project. The TPT is responsible for the conception and execution of the Traffic Management Plan (TMP) elements.

Responsibility: Core TPT

2. The TPT Members interact with the Core TPT to provide input from their areas of interest and take direction or information on the project impacts. The Core TPT will determine the necessity and degree of involvement of individual TPT members.
 - (a) Region Public Involvement Coordinator-All Project Levels
 - (b) Traffic & Safety Division– Traffic Studies Engineer (Traffic Counts, special studies), as needed

- (c) Traffic & Safety Division– Traffic Safety Programs Engineer (Crash Statistics), as needed
 - (d) Traffic & Safety Division – Traffic Operations Engineer (Safety & Mobility planning oversight) as needed
 - (e) Traffic Management Division – Traffic Operations Engineer (real time safety and mobility feedback and planning oversight, construction phase data collection), as needed
 - (f) User Impact Team (Traffic Modeling Guidelines) – Liaison (System-wide modeling, scenario assessment), as needed
2. The TPT focus areas are:
- (a) Planning Phase – All assessment prior to contract bid
 - (b) Execution Phase – Construction Commencement to Completion
 - (c) Conclusion-Report Phase – Post-Construction Review, Lessons Learned, Impact Summary
3. The seven TPT Phase detailed elements are:
- (a) Preliminary Traffic Assessment (Planning Phase)
 - (1) Current User Inventory
 - (a.) Commuters
 - (b.) Interstate Travelers
 - (c.) Transit users
 - (d.) Bicycle Riders
 - (e.) Pedestrians
 - (f.) Parcel Couriers
 - (g.) Recreational/Vacation Traveler
 - (h.) Special needs (School Walk/Bus Route, elderly or special needs facilities)
 - (i.) Safety and Security Sensitive Facilities
 - (1.) Capitol and Government Buildings
 - (2.) Police-Fire Stations
 - (3.) Airports
 - (4.) Ports of Entry
 - (2) Historical and estimated project year traffic volume
 - (a.) Traffic Variations
 - (b.) Seasonal
 - (c.) Weekday/Weekend

- (d.) AM-PM Peak, Off-Peak Hours
- (e.) Special Traffic Generators
 - (1.) Malls
 - (2.) Convention Centers
 - (3.) Airports
 - (4.) Concert/Sport Event facilities
 - (5.) Holiday Events/Parades
- (3) Crash history
- (4) Safety review
 - (a.) Check for increased risk exposure if compounded by project activities
 - (b.) Check detour/alternate routes for potential increased risk by increasing traffic volume.
- (5) Detour/Alternate Route Identification
- (b) Public Query (Planning Phase) Local Municipalities, Businesses, Residences
 - (1) Identification of Stakeholders
 - (2) Public Involvement/Stakeholder Feedback
- (c) Work Zone User Impact Team Assessment (Planning Phase)
 - (1) Review Alternative Scenarios
 - (2) Prepare a briefing for Region Director to select a scenario
- (d) Project Plans & Specifications (Planning Phase)
 - (1) Identify necessary contract specific mitigations and actions
 - (2) Specify order of deployment for TMP
- (e) Field Deployment of TMP (Construction Phase)
 - (1) Release public information campaign
 - (2) Execute and Advertise Travel Demand Management (TMD)
 - (a.) Strategies
 - (b.) Carpool
 - (c.) Flex Days/Hours
 - (d.) Transit Options
 - (e.) Alternate Routes
 - (f.) Commuter-Link Tools
 - (1.) VMS (permanent and portable)
 - (2.) HAR
 - (3.) Cameras
 - (4.) Website
 - (5.) 511/or Project Hotline

- (6.) Email/Pager alerts
- (3) Prepare mitigations on, or for detour routes prior to main project work
- (4) Safety & Capacity Modifications
 - Shield clear zone hazards
 - (a.) Add Left and Right turn capacity at needed intersections
 - (b.) Add necessary vehicle detection to improve signal operations
 - (c.) Special Slip Ramps
 - (d.) Re-stripe shoulder to lane
 - (e.) Remove-Relocate Access points
 - (f.) Add-Modify non-vehicular devices and services
 - (1.) Construct temp ped button, or ramp landing
 - (2.) Designate pedestrian routes and crossing points
 - (3.) Re-establish or Construct temporary ped/bicycle access
- (f) Assessment of in-place TMP (Construction Phase)
 - (1) Recommend adjustments
 - (a.) Area approaching Work Zone
 - (b.) Work Zone
 - (1.) Extended impact area
 - (2.) Detour/Alternate Routes
 - (2) Prepare for next phases
- (g) Construction Conclusion-Post Evaluation and Report
 - (1) Compile Traffic Volume Summaries
 - (2) Prepare Mobility Impact Summary
 - (3) Compile and Review Traffic Crashes
 - (4) Compile Summary of User/Stakeholder Satisfaction
 - (5) Prepare final project user impact summary and future recommendations

Introduction

Work Zone congestion, delays, and safety issues present challenges for motorists, pedestrians, local businesses, communities, and construction workers. The Department attempts to balance the impacts associated with construction work zones versus safety, congestion, delay, construction costs, and schedules. Full road closure is one method Project Managers and Designers can use to balance these conflicting requirements. There may be circumstances where full road closures are the best solution to the conflicting requirements of safety, mobility, congestion, community impacts, construction costs, and schedules.

Purpose of Guidelines

The purpose of these guidelines is to raise the awareness of application issues to be analyzed by designers and construction engineers and recommend whether to use full road closures during reconstruction of highways.

Definition – Full Road Closure

A full road closure is when traffic is detoured, usually for a predetermined amount of time, allowing contractors full access to the roadway. The duration of the closure can range from several hours to several months. Alternative closure strategies can include, nighttime, weekend, ramp, limited capacity, or full road closure.

Process – Full Road Closure

Determine the feasibility of using a Full Closure Strategy. Analyze the Full Closure Strategy alternatives.

Responsibility: Project Manager

Actions

1. Selects team to analyze Full Closure Strategy alternatives.

2. Performs analysis on the Full Closure Strategy alternatives comparing critical items and provides a recommendation to the Region Director. The Alternatives are:

Full Closure Strategy	Description
Full Closure	The removal or suspension of traffic operations either directionally or bi-directionally from a segment of roadway for the purpose of reconstruction and/or maintenance activities.
Weekend Full Closure	The removal or suspension of traffic operations either directionally or bi-directionally from a segment of roadway during a weekend for the purpose of reconstruction and/or maintenance activities. Often work will begin on Friday night following peak period and continue until Monday morning, ending prior to the peak period.
Limited Capacity Closure	The removal or suspension of a portion of traffic operations either directionally or bi-directionally from the segment of roadway for the purpose of reconstruction and/or maintenance activities. Traffic can be suspended based on vehicle type and/or destination.
Night time/ Off peak Closure	The removal or suspension of traffic from a segment of roadway during night or off-peak traffic periods, for the purpose of reconstruction and/or maintenance activities.
Ramp Closure	The removal or suspension of traffic from a ramp or series of ramps for the purpose of reconstruction and/or maintenance activities.
Intermittent Closure	The removal or suspension of traffic from a segment of roadway for specified time increments typically five to thirty minutes while roadwork takes place, for the purpose of reconstruction and/or maintenance activities.

3. Full Closure Critical Items to be analyzed:

Critical Items	
1.	Public and other agency outreach
2.	Lead time for increased planning
3.	Availability of adequate alternate routes
4.	Development of a Traffic Management Plan
5.	Impact to businesses and events
6.	Accelerated schedule for completion (reduction in duration)
7.	Commuter delay
8.	Increased traveler/worker safety
9.	Increased work space
10.	User Costs

4. Full Closure Strategy recommendations include but are not limited to the above critical items. Report to the Region Director how to expedite project completion, reduce the impact of construction on travelers, maximize workspace available to the contractor, increase productivity, reduce overall congestion resulting from construction, improve safety for workers and travelers, and reduce work zone accidents.

Responsibility: Region Director

5. The Region Director reviews the recommendation and approves use of Full Closure Strategy alternative.

Introduction

These recommendations specifically help the Permits Offices comply with the Work Zone Safety and Mobility Policy.

Purpose of Guidelines

The purpose of these guidelines is to raise the awareness of application issues analyzed by Project Managers, Designers, and Construction Engineers with respect to permits.

Definition – Permits

Responsibility: Region Director

Actions

1. Assign individuals to the following:
 - (a) Appoint a liaison to coordinate work zone impacts with Maintenance and Construction.
 - (b) Submit Permit application 48 hours before construction permit will be issued.
 - (c) Determine criteria for a significant work zone/special event impact area.
 - (d) Provide brochure for contractors on UDOT processes and include information on:
 - (1.) Construction zones
 - (2.) Allowable closure times, general information
 - (3.) Permits contact information
 - (4.) Risk Managers contact information
 - (e) Provide contractor training/information on work zone impacts and Department processes on significant projects.
 - (f) Notify the Region PIC of lane/road closures and include:
 - (1.) Route and location
 - (2.) Scope of closure
 - (3.) Time/days of operation
 - (4.) Restrictions
 - (5.) Beginning and ending dates
 - (6.) Speed limit
 - (g) Assess work zone impacts from the information on the Work Zone Inspection Report for lessons learned.
 - (h) Review detailed and specific Temporary Control Plan (TCP), consistent with Part 6 of the MUTCD required for all lane/road closures. Each approved TCP must be stamped and signed by the Region Traffic Engineer.

- (i) Develop standardized calculation methods for closure times and put the information on the on-line permitting program and web page.
- (j) Coordinate Inspector training, implement guidelines and inspection reports, and change work hours to include nights.
- (k) Issue no permits and keep all existing lanes open to traffic during the following designated holidays or events:
 - New Years Day, January 1st
 - Dr. Martin Luther King Jr. Day, third Monday of January
 - Presidents Day, third Monday of February
 - Memorial Day, last Monday of May
 - Independence Day, July 4th
 - Pioneer Day, July 24th
 - Labor Day, first Monday of September
 - Columbus Day, second Monday of October
 - Veterans' Day, November 11
 - Thanksgiving Day, fourth Thursday of November
 - Christmas Day, December 25th
 - Any day designated by the Governor as a legal holiday.
- (l) Determine the period of time that the lanes are open related to the day of the week on which the holiday or event falls. Use the following schedule to determine this period:

<u>Day of the Week</u>	<u>Time All Lanes Must Be Open to Traffic:</u>
Sunday	12:00N Friday through 6:00 AM Monday
Monday	12:00N Friday through 6:00 AM Tuesday
Tuesday	12:00N Monday through 6:00 AM Wednesday
Wednesday	12:00N Tuesday through 6:00 AM Thursday
Thursday	12:00N Wednesday through 6:00 AM Monday
Friday	12:00N Thursday through 6:00 AM Monday
Saturday	12:00N Friday through 6:00 AM Monday
- (m) Apply lane/road closure requirements during the construction season – April 15 thru October 15.
- (n) Prohibit construction during the non-construction season – October 15 thru April 15. Plates are not permitted during the winter months to avoid snowplow impact.
- (o) Enforce inspection Guidelines for lane closures:
 - (1.) Strict adherence to times listed on permit
 - (2.) Additional temporary traffic control training
 - (3.) Implement Work Zone Inspection Report for Permit Office
 - (4.) Inspectors to rate Contractors work zone traffic control
 - (5.) Provide overtime or change working hours to include inspection of nighttime permitted construction

Score: _____

WORK ZONE Inspection for Permits

(Infraction weight: -1 within 5 days -2 urgent (24 hours) - 3 Immediate x 2 for major or repeat)

Date: _____ Time: _____ Speed Limit: _____ Permit # _____

Contractor: _____ Contact: _____

Location: _____ Project #/Work: _____

FLAGGING

- _____ A. Flaggers certified?
- _____ B. Dressed properly?
- _____ C. Proper control of traffic?
- _____ D. Proper work signs & paddle?
- _____ E. Flaggers Visible?
- _____ F. Nighttime flagging/lights?
- _____ G. Flagging area obstruction?

GUIDANCE

- _____ G. Travel path defined?
- _____ H. Lane change/closure ok?
- _____ I. Obsolete marks removed?
- _____ J. Devices clean/undamaged?
- _____ K. Proper device spacing?
- _____ L. Proper Sign set-up?
- _____ M. UDOT Standard Drawings?

PROTECTION

- _____ N. Public protected?
- _____ O. Warning of hazards?
- _____ P. Flags/reflectivity on signs?
- _____ Q. Device removed/not in use?
- _____ R. Traffic devices/signs comply?
- _____ S. Attractive Nuisance?
- _____ T. OTHER?

COMMENTS:

SAFETY:

- _____ 1. Tracking?
- _____ 2. Dust control?
- _____ 3. Full lane closure
- _____ 4. Plates secured
- _____ 5. Stockpiles out of clear zone?
- _____ 6. Excavation/trench?
- _____ 7. Personal safety equipment?
- _____ 8. Pedestrian consideration?
- _____ 9. Attenuation Required?
- _____ 10. Housekeeping?
- _____ 11. Heavy equipment safety?

PERMITS:

- _____ 1. Permit on site
- _____ 2. Work in compliance with permit?
- _____ 3. Pavement protection?
- _____ 4. Flowable fill under pavement?
- _____ 5. 97% compaction in shoulders?
- _____ 6. Environmental infraction?
- _____ 7. Depth of Bury?
- _____ 8. Shoulders dressed
- _____
- _____
- _____

NIGHT INSPECTION:

- _____ 1. Signs visible?
- _____ 2. Signs removed or covered?
- _____ 3. Construction area well lit?
- _____ 4. Plastic Drums?
- _____ 5. Pavement marking clean/visible?
- _____ 6. Flagging area illuminated?
- _____ 7. Advance warning arrow?
- _____ 8. Work hour restrictions?
- _____ 9. Pavement marking?
- _____ 10. Equipment in clear zone?
- _____ 11. Other

COMMENTS:

INSPECTED BY:

NAME: _____ Title: _____ Company: _____ Phone: _____

Introduction

Transportation related projects in high volume and congested areas often result in significant negative impacts to users in the form of increased delay, crashes, and air pollution. A well planned project can greatly reduce these impacts by shortening the construction time, keeping lanes open during peak hours, informing the public about alternate routes, and other strategies.

Purpose of Guidelines

Estimate the user impacts for Significant Projects within the Transportation Management Area (TMA). Include pavement, bridge, safety improvement, and other projects that meet the definition of a Significant Project. Options for inclusion in the Transportation Management Plan (TMP) will be analyzed.

Definition – User Impact Team

The User Impact Team consist of the following: Innovative Contracting Engineer, Region Materials Engineers, Urban Planning Engineer, STIP Coordinator, Engineer for Planning and Programming, MPO Representatives, and University of Utah Traffic Lab Manager.

Definition – No Work Zone

An area established within the corridors and construction season where user impacts will be avoided. Corridors will include by-pass routes, detour routes, alternate routes, etc. defined in the traffic model. User impacts may include: Non-emergency work, maintenance work, construction work, utility work, local government work, etc. Emergency work is allowed in a No Work Zone.

Level 1 Project Guidelines

Significant Projects Within Transportation Management Area

Responsibility: Region Director

Actions

1. Identify Significant Project and Submits to the “Work Zone User Impact Team” for analysis.
 - (a) The team will identify scenarios for analysis including: contracting methods, project timing, and model input assumptions.

Responsibility: Work Zone User Impact Team

2. Identify scenarios for analysis including: contracting methods, project timing, and model input assumptions.

Responsibility: Engineer for Planning/Programming

3. Analyze the selected scenarios utilizing an appropriate traffic model (initially the University of Utah Traffic Lab traffic model) in the TMA and use the project assumptions. Deliver information related to each project including:
 - (a) Traffic related data for each scenario including travel time, speeds on corridors, throughput, queue lengths, vehicle hours of delay, and delay costs.
 - (b) A Project Report including charts and graphs comparing the scenarios and recommendations for inclusion in the TMP.

Responsibility: Work Zone User Impact Team

4. Review the information and recommendations in the report and select a contracting method and project timing. Establish a “No Work Zone” within corridors and construction seasons where user impacts will be avoided.

Level 2 Project Guidelines

Significant Projects Outside Transportation Management Area

Responsibility: Region Director

Actions

1. Identify a Significant Project and Submits to the “Work Zone User Impact Team” for analysis. The team will identify scenarios for analysis including: contracting methods, project timing, and model input assumptions.

Responsibility: Work Zone User Impact Team

2. Identify scenarios for analysis including: contracting methods, project timing, and model assumptions.
3. Calculate user impacts under the oversight of the team. The BYU model will be used to calculate vehicle hours of delay and delay costs for each scenario.
4. Select a contracting method and project timing. Establish a “No Work Zone” within corridors and construction seasons where user impacts will be avoided.

Level 3 Project Guidelines
Non-Significant Projects

Responsibility: Region Director

Actions

1. Identify a Non-Significant Project and Submits to the Project Manager and Innovative Contracting Engineer for analysis

Responsibility: Project Manager and Innovative Contracting Engineer

2. Calculate user impacts. Use the BYU model to calculate vehicle hours of delay and delay costs for each scenario.
3. Recommend a contracting method and project timing. Project timing will restrict the project from “No Work Zones” related to other projects where possible.

Responsibility: Work Zone User Impact Team

4. Review the information and recommendations in the report and select a contracting method and project timing. Establish a “No Work Zone” within corridors and construction seasons where user impacts will be avoided.

Work Zone User Impact Process

