

WORK ZONE SAFETY AND MOBILITY

PROCEDURES AND GUIDELINES



September 10, 2007

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CHAPTER I: INTRODUCTION

1. Purpose

The purpose of this document is to provide guidance for systematically addressing the safety and mobility impacts of work zones throughout the various stages of the project development and implementation process, and developing strategies to help manage these impacts.

2. Background

On September 9, 2004, the Federal Highway Administration amended its regulations governing traffic safety and mobility in highway and street work zones and published the Work Zone Safety and Mobility Rule (the Rule) (see Appendix A - Federal Register 69 FR 54562). This Rule updates and renames the former regulation on “Traffic Safety in Highway and Street Work Zones” in 23 CFR 630 Subpart J.

The changes to the regulation require States to perform an evaluation of the broader safety and mobility impacts of work zones across project development stages, and the implementation of appropriate strategies to help manage these impacts. Specifically, the Rule was updated to:

- Address the issue of more work zones, growing traffic volumes and congestion, very little growth in roadway capacity, work zone safety concerns, more work being performed under traffic, and public frustration with work zones.
- Facilitate consideration of the broader safety and mobility impacts of work zones, and the development and implementation of management strategies to reduce these impacts.
- Develop provisions that are sufficiently flexible to be applied to address both current and future work zone issues.

3. Applicability

This document applies to all projects that occur on streets and highways under the Department’s jurisdiction. This includes existing and new State roads, and existing and new subdivision streets maintained by the Department.

These guidelines should be applied to all new projects and all existing projects that have a preliminary plan due date after October 12, 2007. For existing projects with a preliminary plan due date before October 12, 2007, these guidelines may be applied on a case by case basis. These guidelines do not apply to work related to emergency repairs.

CHAPTER II: SIGNIFICANT PROJECTS

1. Identification of Significant Projects

The classification of certain projects as significant is intended to allocate resources more effectively to projects that are likely to have greater impacts. According to FHWA, “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 greater than what is considered tolerable based on State policy and/or engineering judgment.”

Determining whether a project is “significant” dictates what level of detail is required in a Transportation Management Plan (TMP) (see Chapter IV). A TMP defines a set of coordinated strategies and describes how these strategies will be used to manage the work zone impacts of a project. For projects that are considered “not significant,” only a Traffic Control Plan (TCP) is required. For “significant” projects, the TMP shall consist of a TCP, as well as transportation operations (TO) and public information (PI) components.

The following projects are considered to be “significant”:

- 1) All projects on Interstates, freeways, and expressways that occupy a location¹ for more than three days with either intermittent or continuous lane closures. Refer to DelDOT’s Functional Classification maps located at:
http://www.deldot.gov/information/pubs_forms/func_maps/pdf/functional_classification.pdf
- 2) All projects on the National Highway System that occupy a location¹ for more than five consecutive days with either intermittent or continuous lane closures. Refer to FHWA’s National Highway System maps located at:
http://www.fhwa.dot.gov/hep10/nhs/maps/de/de_delaware.pdf
- 3) Any project or combination of projects that are anticipated to cause sustained work zone impacts that are greater than what is considered tolerable as determined by the Chief Engineer.

All other projects are considered to be “not significant”. Specific examples may include:

- Roadside maintenance activities (guardrail replacement, mowing operations, tree trimming)
- Pavement restriping activities
- Traffic control device upgrades (traffic signals, signing)
- Pavement rehabilitation projects excluding projects located on Interstates, expressways, and freeways

2. When to Identify Significant Projects

Significant projects should be identified during the planning phase of the project and/or when the Capital Transportation Plan is updated each year. As more information becomes available, it will be necessary to reconfirm whether a project is significant or not during

¹ A “location” may be defined as a portion of a project work zone and not the entire project work zone.

subsequent project development stages, recognizing that this may delay the project schedule and/or increase project costs.

3. Exception Process

Some projects that are classified as “significant” will not cause a high level of disruption, even though they are on major facilities or involve lengthy closures. For an Interstate project that is classified as “significant” under criterion 1, but in the judgment of DelDOT, the project will not cause sustained work zone impacts, DelDOT may request an exception from the FHWA Division Office. Exceptions may be granted by the FHWA Division Office based on DelDOT’s ability to show that the specific project does not have sustained work zone impacts. Exceptions for non-Interstate projects must be approved by the Chief Engineer.

Blanket exceptions for certain categories of projects may be sought if such projects will not have sustained impacts. Some examples of projects that might qualify for blanket exceptions include:

- Road work on projects where the capacity far exceeds the demand (e.g., single lane closures on highways that have low volumes of traffic)
- Night work on certain routes that have low volumes of traffic
- Off-peak and weekend lane-closures on certain routes
- Short-term, moving operations on certain routes

A. Process for Requesting Exceptions

For Interstate projects, DelDOT should work with the FHWA Division Office throughout the process of requesting an exception.

The following process should be followed for exception requests:

Step 1 - Perform a Work Zone Impacts Assessment (see Chapter V).

Step 2 - Determine whether the project is expected to have sustained work zone impacts.

Step 3 - If the project appears to meet the conditions for an exception, prepare an exception request.

Step 4 - FHWA (Interstate projects) or DelDOT’s Chief Engineer (non-Interstate projects) reviews the exception request.

Step 5 - Take appropriate action based on the results of the review. Either reassess the impacts (go back to Step 1) or implement an appropriate Transportation Management Plan (TMP) based on whether the exception request is approved or not.

B. Contents of an Exception Request

The contents and level of detail in an exception request will vary based on the type, complexity, and expected impacts of a project. For projects that are not complex and are of small size or short duration, the exception request may be very simple. For more complicated projects, the exception request may be more detailed. The main element of an exception request should be the assessment of the expected work zone impacts, and a description of the project and local conditions. Figure 1 below shows a sample Work Zone Exception Request Form.

CHAPTER III: PROJECT PROCEDURES

Potential work zone or constructability issues of a project should be identified as early as practical during the project development process. Figure 2 shows the Transportation Management Plan (TMP) development process. The following is a summary of the procedures that shall be performed during each step of the statewide planning and project development process:

1. Statewide Planning Phase

- A. Identify projects expected to cause “significant” work zone impacts.
- B. When developing the six-year Capital Transportation Plan, consider the locations of regional projects, and their proximity to each other to ensure that multiple parallel routes are not under construction concurrently.
- C. When developing project schedules for each region within Transportation Solutions, consider the proximity of projects to each other and the timing of the start and completion of construction. Where a series of proposed projects are along the same corridor or along corridors of close proximity, consideration should be given to preparing a single Transportation Management Plan (TMP) (See Chapter IV) covering all projects.

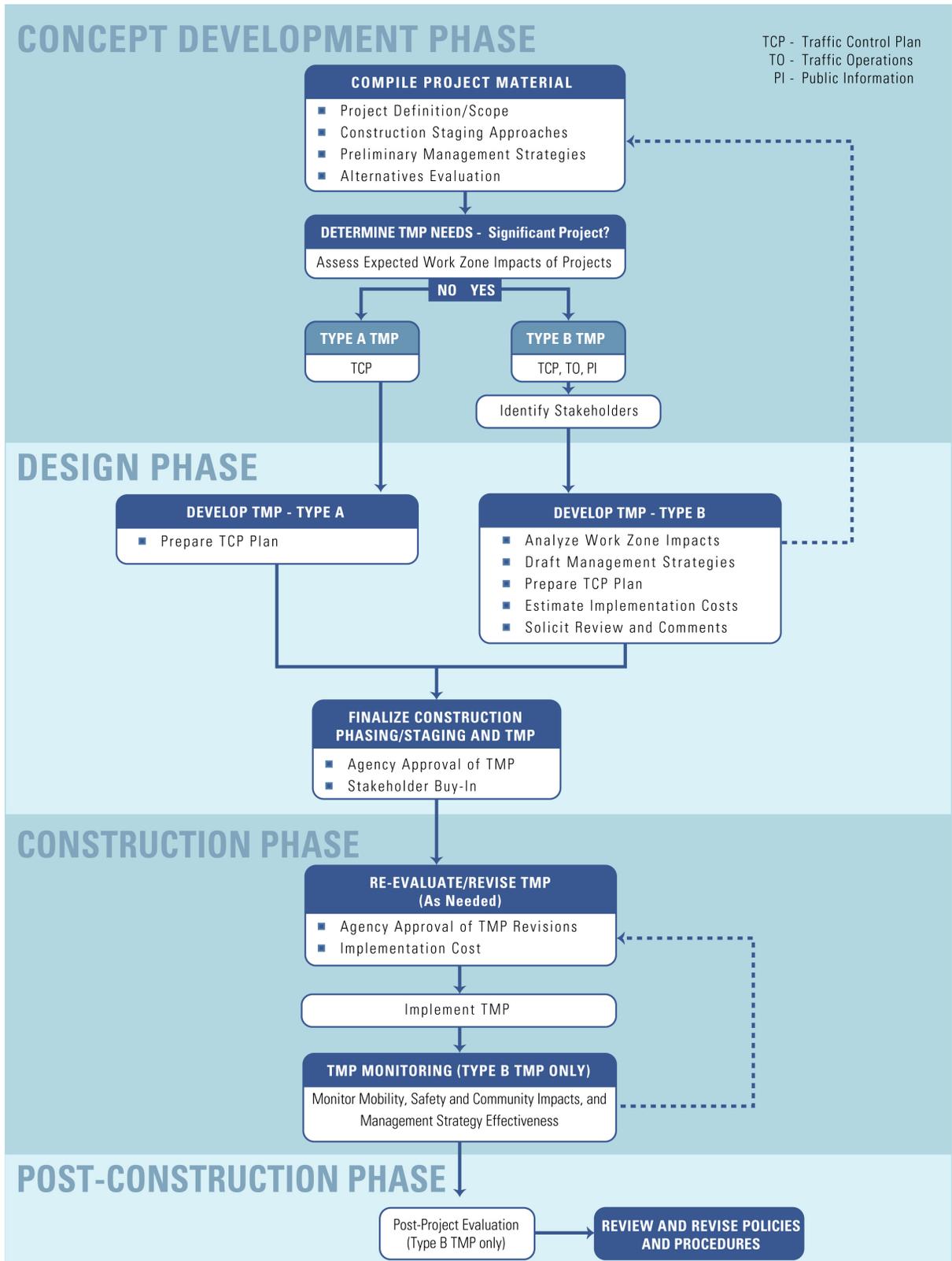
2. Concept Development Phase

A TMP (see Chapter IV) shall be developed for all projects. Although a full TMP document is not developed until the design phase, conducting some TMP analyses during concept development ensures that work zone impacts are identified early in the project development process in order to make the changes necessary to address potential safety or mobility issues. Additionally, at this early stage, more alternatives for addressing work zone impacts are available, so a broader range of strategies can be chosen. This will also help ensure adequate costs are included in preliminary cost estimates.

The following activities should be performed during the Concept Development Phase.

- A. **Perform Preliminary Work Zone Impacts Assessment (see Chapter V)** - As part of the alternatives analyses and evaluation process, work zone safety and mobility should be considered as a factor in the selection of a preferred alternative. The purpose of this analysis is to assess overall constructability of the alternatives under consideration and determine if constructability should be a factor in the selection of a preferred alternative. The specific characteristics of a project will determine the factors to be considered and the level of detail to be included in the evaluation.

Figure 2: TMP Development



- B. **Determine TMP Needs** - The elements of a TMP needed for a project are based on whether the project is determined to be significant (see Chapter II). During the Concept Development Phase, it should be determined what type of TMP will be developed. The two types of TMPs are described below. See Chapter IV for additional guidance.

Type A TMP - Required for construction or maintenance projects that will result in minimal disruption to the traveling public and adjacent businesses and community. A Type A TMP includes only a Traffic Control Plan (TCP).

Type B TMP - Required for Significant projects. Type B TMPs include a TCP, Public Information (PI) and Transportation Operations (TO) components, and a Work Zone Impacts Assessment (see Chapter V).

- C. **Identify Stakeholders and Begin Public Outreach** - For projects requiring a Type B TMP, public outreach often occurs during Concept Development. This is typically when Working Groups are formed and Public Workshops, Hearings and other public outreach activities occur. These activities provide an opportunity to identify stakeholders and begin to engage the public in travel demand management strategies.

Stakeholders should be identified that represent different perspectives and will vary depending on the nature of the project. Stakeholders may include DeIDOT staff from Planning, Project Development, Traffic, Construction, Maintenance, Operations, Public Relations, and external stakeholders such as local governments (county and city), FHWA, DART, WILMAPCO, Dover/Kent County MPO, Delaware State Police, local police, public officials, Transportation Management Association (TMA) of Delaware, contractors, railroad agencies/operators, freight operators, utility providers, emergency services, local businesses, area residents, community groups, and schools.

3. Design Phase

- A. **Develop TMP** - For all projects, a TMP shall be prepared during the Preliminary and Semi-Final Plan Stages. The TMP will outline a set of strategies for managing the work zone impacts of a project (See Chapter IV). A more detailed Work Zone Impacts Assessment (See Chapter V) should be performed (as necessary) during the Semi-Final Plan Stage as part of the development of the TMP.
- B. **Update/Revise TMP** - This step represents the iterative aspect of TMP development. The TMP is a 'dynamic document' that is maintained and revised as the project progresses and when more information becomes available.
- C. **Finalize TMP** - The PS&E package shall include either all the applicable elements of a TMP, or the provisions for a contractor to develop a TMP. Typically, TMP development will have begun prior to awarding a contract, even for design-build projects. In cases where contractors will develop TMPs, the PS&E package shall contain an outline of a TMP developed during the planning and concept development phases, and the provisions for developing a TMP under the contract.

4. Construction Phase

- A. **Reevaluate/Revise TMP** - If alternative construction phasing/staging plans or other management strategies have been suggested, DeIDOT and the contractor should review the TMP to see if changes are needed. If alternative strategies may have an impact on safety or mobility, the work zone impacts assessment should be updated by DeIDOT and/or the contractor to ensure the TMP will operate effectively. Any revisions must be approved by the DeIDOT Project Manager prior to implementation.
- B. **Implement TMP** - Some components of the TMP may need to be implemented prior to construction (e.g. public relations campaign, improvements to detour routes).
- C. **TMP Monitoring** - Safety and mobility should be monitored throughout the duration of construction. Routine work zone reviews should be performed to ensure that work zone traffic control devices are maintained in accordance with specifications, determine whether predicted impacts closely resemble the actual conditions in the field and if the TMP is working effectively. These reviews cover all aspects of work zone traffic control, including signage, traffic control devices and layout, overall traffic control management, pavement markings, and speed limits. Conducting some reviews during daylight and some at night can help identify any variations or special concerns specific to these conditions.

The Traffic Control Inspection Report shown in Figure 3 should be used to conduct consistent and routine work zone reviews. Other field observations (inspector's diary, crash data, and operational information) may also be used to manage work zone impacts. For larger projects, a project specific Traffic Control Inspection Report may be developed to monitor queue lengths, delays or other performance measures.

- D. **Update/Revise the TMP Based on Monitoring** - The TMP should be revised as necessary throughout construction in response to identified issues or deficiencies. Any changes to the TMP should be documented and approved by the DeIDOT Project Manager.

5. Post-Construction

For significant projects (Type B TMP only), a Post-Construction TMP Review Form (see Figure 4) should be completed by the Quality Section as part of the Post-Construction Review. The Quality Section should contact DeIDOT staff involved in all aspects of the project including Construction, Traffic and Public Relations to compile information to be included in the review.

The post-construction evaluations will be used to support process reviews, develop lessons learned, and ultimately improve policies and procedures.

Figure 3: Traffic Control Inspection Report

<u>STATE OF DELAWARE - DEPARTMENT OF TRANSPORTATION - TRAFFIC CONTROL INSPECTION REPORT</u>											
Corrective Actions By: <input type="checkbox"/> Immediate <input type="checkbox"/> Urgent (24 hours) <input type="checkbox"/> 5 days <input type="checkbox"/> Other											
Date of Inspection: _____	Time of Inspection: _____	Contractor Name: _____									
Inspected by: _____	Project Engineer: _____										
District: _____	Project Location: _____										
Project Description: _____											
Additional information/photographs attached: <input type="checkbox"/> Yes <input type="checkbox"/> No											
CC: <input type="checkbox"/> Construction Engineer <input type="checkbox"/> Project Engineer <input type="checkbox"/> C. Traffic Engineer <input type="checkbox"/> Other											
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>SIGNS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>CHANELIZING DEVICES (CONES, DRUMS, ETC)</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>FLAGGERS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> </tr> <tr> <td style="vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>PORTABLE VARIABLE MESSAGE SIGNS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> <td style="vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>PAVEMENT MARKINGS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> <td style="vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>LIGHT PLANT</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> </tr> <tr> <td style="vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>ARROW PANEL</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> <td style="vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>TEMPORARY BARRIER/CRASH CUSHIONS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> <td style="vertical-align: top; padding: 5px;"> <p style="text-align: center;"><u>GENERAL</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p> </td> </tr> </table>			<p style="text-align: center;"><u>SIGNS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>CHANELIZING DEVICES (CONES, DRUMS, ETC)</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>FLAGGERS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>PORTABLE VARIABLE MESSAGE SIGNS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>PAVEMENT MARKINGS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>LIGHT PLANT</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>ARROW PANEL</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>TEMPORARY BARRIER/CRASH CUSHIONS</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>	<p style="text-align: center;"><u>GENERAL</u></p> <p><input type="checkbox"/> No Problem Found <input type="checkbox"/> Corrective Action Required</p> <p>1 2 3 4 5 6 7 8</p>
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<p style="text-align: center;"><u>OTHER COMMENTS & RECOMMENDATIONS</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>											

Figure 4: Post-Construction TMP Review Form

Post-Construction TMP Review

State Project No. _____ Federal-Aid Project No. _____

Date: _____ Reviewer: _____

Project Title: _____

Were there any changes to the TMP during Construction? Yes No
 If yes, describe the changes and why the changes were made:

Did traffic delays and congestion match those projected by the TMP? Yes No N/A
 If no, describe the delays due to construction and the cause (if known):

Were there any frequent legitimate complaints by the traveling public? Yes No
 If yes, describe the nature of the complaints:

Were there any specific types of recurring crashes within the work zone? Yes No
 If yes, describe the nature of the crashes, cause (if known) and what measures were taken to reduce the potential for these crashes:

Lessons learned for future projects:

Attachments: Crash summaries, traffic control inspection reports, etc. (as necessary).

CHAPTER IV: DEVELOPMENT OF A TRANSPORTATION MANAGEMENT PLAN (TMP)

A TMP describes a set of coordinated strategies and how these strategies will be used to manage the work zone impacts of a project.

1. Determining TMP Needs

The components of a TMP are based on the expected work zone impacts of a project and whether the project is determined to be significant (see Chapter II). Two types of TMPs are defined below:

- **Type A TMP** - Required for construction or maintenance projects that will result in minimal disruption to the traveling public and adjacent businesses and community. A Type A TMP includes only a Traffic Control Plan (TCP) (see Appendix B), which is typically included in Final Construction plans.
- **Type B TMP** - Required for Significant projects. Type B TMPs include TCP, Public Information (PI) and Transportation Operations (TO) components, and a Work Zone Impacts Assessment (see Chapter V).

2. Type B TMP Components

Figure 5 summarizes components that should be included in a Type B TMP. The level of detail included in the TMP should be tailored to match the complexity of the project. Many of the TMP components (e.g. Project Description, Existing and Future Conditions) will already have been prepared as part of the Purpose and Need statement, NEPA documents, or other project documents and can be referenced as necessary to eliminate duplication of work efforts.

Figure 5: Type B TMP Components

TMP Component	Description
A. Project Description	Information such as project background, project area, proposed construction staging, schedule and timeline, and related projects.
B. Existing and Future Conditions	Existing roadway characteristics, traffic operations, traffic data, crash data, local community and business concerns/issues, future traffic projections.
C. Work Zone Impacts Assessment	Depending on the magnitude of impacts, may include a qualitative and/or quantitative assessment of the potential work zone impacts.
D. Work Zone Impacts Management Strategies	Summary of the TCP, PI and TO strategies.
E. TMP Monitoring Requirements	Summary of TMP monitoring requirements.
F. Contingency Plans	Potential problems and corrective actions to be taken.
G. TMP Implementation Costs	Costs and funding sources.

A. **Project Description**

- **Project Background.** A brief description of the project, its purpose and need, and history.
- **Project Area/Study Area Map.** The project area is defined as the limits of construction. At a minimum, the study area is defined as the limits of construction and any potential detour routes. If necessary, parallel routes may be included in the study area if it is anticipated that significant diversion will occur to alternate routes as a result of construction.
- **Proposed Construction Phasing/Staging/Detour Routes.** A description of the project phasing, lane and/or facility closure strategies, whether temporary lanes/shoulders will be utilized for general traffic, ramps/interchange closures, detour routes, construction strategy, closure hours, and duration.
- **Project Schedule and Timeline.** The start and finish dates for the project and phasing schedule (if appropriate), including all major milestones.
- **Related Projects.** Other ongoing/planned projects in the vicinity of the project area that may cause cumulative impacts to the region and corridors.

B. **Existing and Future Conditions:** A summary of existing and anticipated future conditions in the study area.

- **Existing Roadway Characteristics.** A description of roadways in the study area, roadway classifications, number of lanes, geometry, traffic control types, and other relevant features.
- **Existing Traffic Data.** A summary of traffic volumes, percent trucks, speeds, capacity analysis, delays, and queue lengths.
- **Crash Data.** A summary of historical crash data including number and type of crashes. Typically, three years of crash data should be used.
- **Future Traffic Projections (During Construction).** A summary of estimated traffic volumes, delays, and queue lengths anticipated during construction. Methods used to estimate future traffic conditions should also be described.

C. **Work Zone Impacts Assessment:** Depending on the magnitude of impacts, the work zone impacts assessment component may include:

- A qualitative assessment of the potential impacts of the work zone and those of the chosen management strategies
- A quantitative analysis of the impacts of the work zone and those of the chosen management strategies

For Interstate, freeway, and expressway projects requiring a Type B TMP, both a qualitative assessment and a quantitative analysis shall be performed. For other projects requiring a Type B TMP, a qualitative assessment and/or a quantitative analysis shall be performed. For maintenance projects, only a qualitative assessment is required regardless of the roadway functional classification. The Project Manager, in coordination with DelDOT Traffic, should determine whether quantitative analysis is needed based on the type, complexity, and expected work zone impacts of the project. Detailed information regarding the work zone impacts assessment process is contained in Chapter V.

D. Selected Work Zone Impacts Management Strategies: Work zone impacts management strategies are intended to minimize traffic delays, maintain or improve motorist and worker safety, and maintain access for businesses and residents. Work zone impact management strategies should be identified for both the mainline and detour routes for the selected construction phasing/staging approach. The TCP should be documented on plan sheets included in the Final Construction Plans.

TCP, PI, and TO work zone management strategies that could be considered for the TMP are defined in Appendices B, C, and D.

This section of the TMP also highlights key findings for the selected alternative, discusses feasibility, anticipated traffic or safety concerns (e.g., specific roadways with long estimated queues, accessibility issues, ability of the detour routes to handle diverted traffic), and any special provisions or issues related to the work zone management.

E. TMP Monitoring Requirements: This section should include or refer to any DelDOT policies, standards, and requirements, and document procedures for TMP implementation and monitoring. This section may include but is not limited to:

- Methods for verification of work zone setup.
- Process for monitoring TMP performance (e.g., traffic volume counts during construction, queue lengths, crashes, complaints and feedback, etc.).
- Approach for corrective action when TMP performance requirements are not met.
- Process for submission and approval of alternative TMPs.

F. Contingency Plan: The contingency plan component should specify activities that should be undertaken to minimize traffic impacts when unexpected events occur in the work zone (e.g., crashes, unforeseen traffic demand, inclement weather, etc.). The contingency plan may include the following:

- Information that clearly defines trigger points which require lane closure termination (i.e., inclement weather, length of traffic queue exceeds threshold).
- Decision tree with clearly defined lines of communication and authority.
- Specific duties and contact information for all participants during lane closure operations.
- Standby equipment, agency personnel, and availability of local agency personnel for incident response.

G. TMP Implementation Costs: Estimating the work zone management strategy implementation costs of the TMP and including these costs within the overall project cost is critical, as it may be difficult to obtain additional funding at a later time. The cost estimates for the various management strategies should be itemized and documented in the TMP, with funding sources specified.

CHAPTER V: WORK ZONE IMPACTS ASSESSMENT

Understanding the anticipated type, severity, and extent of work zone impacts associated with various project alternatives facilitates the development of an effective transportation management plan (TMP). A Work Zone Impacts Assessment is intended to identify the impact of proposed lane closures or detours within the study area and promote more efficient and effective construction staging, duration and costs.

1. When is a Work Zone Impacts Assessment Required?

A Work Zone Impacts Assessment should be performed during the Concept Development and Design Phases for all projects requiring a Type B TMP. See Chapter IV for information regarding determining TMP needs.

Depending on the magnitude of impacts, the work zone impacts assessment may include:

- A qualitative assessment of the potential impacts of the work zone and those of the chosen management strategies.
- A quantitative analysis of the impacts of the work zone and those of the chosen management strategies. The quantitative assessment will typically include a traffic capacity analysis, but may also examine impacts to businesses, residents, or communities.

For Interstate, freeway, and expressway projects requiring a Type B TMP, both a qualitative assessment and a quantitative analysis shall be performed. For other projects requiring a Type B TMP, a qualitative assessment and/or a quantitative analysis shall be performed. For maintenance projects, only a qualitative assessment is required regardless of the roadway functional classification. The Project Manager, in coordination with DelDOT Traffic, should determine whether quantitative analysis is needed based on the type, complexity, and expected work zone impacts of the project.

2. Work Zone Impacts Assessment During the Concept Development Phase (Type B TMP Only)

The key to work zone impacts assessment during the concept development phase is to examine work zone impacts as early as possible so that work zone related project delays or costs are not incurred in later design stages, and work zone management strategies are identified and developed in a more streamlined manner.

The following are the objectives of work zone impacts assessment during the Concept Development Phase:

- Using available information (e.g., concept plans, preliminary designs, location and design documents, environmental/NEPA assessments) to further incorporate work zone impacts considerations in selecting a preferred alternative and identifying potential construction staging approach(es).
- Define the study area for the work zone impacts assessment.
- Identification of the potential work zone impacts of the project.
- Reassessment/confirmation of significant project designations.

- Identification of potential work zone management strategies.
- Identification of coordination issues with other projects, and other coordination issues (e.g., utilities, enforcement, environmental, ROW, community impacts).
- Estimation of the cost of the identified work zone management strategies and development of implementation plans for the strategies.

The following steps should be followed during the Concept Development Phase:

Step 1: Compile Project Information

This step involves the compilation of available information. If it is clearly evident that a project will not have major work zone impacts, that assertion may be noted, and much data or information need not be collected. The following information should be compiled (if available):

- **Project Scope**, including location, type of work, area type, roadway classification, duration, and length.
- **Roadway/Traffic Characteristics**, including number of lanes, roadway capacity, cross-sectional details, pre-existing safety issues, grade, curvature, and traffic demand/patterns/volumes, available alternate routes.
- **Other Influencing Factors**, including community and public outreach information, weather variation, school-zone issues, emergency vehicle traffic issues, presence of other nearby transportation junctions (e.g., railroad crossings, transit stations), availability of alternate modes, tourist traffic issues, upcoming and planned special events, coordination issues with other projects, utility coordination issues, and local regulations (e.g., noise restrictions).
- **Preliminary engineering information**, including preliminary decisions on roadway alignment and ROW, cross-sectional details, elevation and super-structure details.

The types of information listed above are intended to serve as a guide for the different factors that may influence work zone impacts. All of the above information may not be needed – it may be sufficient to just take note of major issues that are apparent or readily identifiable.

Step 2: Perform Preliminary Work Zone Impacts Assessment of Alternatives

This is the first time that the alternatives under consideration are reviewed from a work zone impacts perspective. The assessment is generally qualitative and relies upon engineering judgment and available information. The result of this conceptual level assessment will be a list of the work zone impacts and related issues for the alternatives under consideration to aid in the selection of a preferred design alternative (see Table 1).

At this stage in the project, the Project Manager, in coordination with DeIDOT Traffic, should identify the study area. At a minimum, the study area is defined as the limits of construction and any potential detour routes. If necessary, parallel routes may be included in the study area if it is anticipated that significant diversion will occur to alternate routes as a result of construction.

Table 1: Preliminary Work Zone Alternatives Evaluation

Factor	Design Alternative			
	1		2	3
	Work Zone Option 1	Work Zone Option 2		
Ability to maintain access	Temporary accesses will be required for properties along the east side of the roadway.	Temporary accesses will be required for properties along the west side of the roadway.	No impact to access.	No impact to access.
Right-of-way and environmental impacts	MOT scheme would not increase R/W or enviro. impacts.	MOT scheme would not increase R/W or enviro. impacts.	MOT scheme would likely require additional R/W impacts on the east side of the roadway.	MOT scheme would not increase R/W or enviro. Impacts.
Construction duration	1 construction season	3 construction season	2 construction seasons	2 construction seasons
Overall impact to traveling public	Minimal	High	High	Medium
Overall constructability	Good	Poor	Poor	Excellent

The following discussion provides an overview of the activities that may be performed as part of the preliminary work zone impacts assessment:

- **Identification of Candidate Construction/Traffic Control Approach(es) for the Project.** This is where a preliminary decision as to how the project will be built is made and an overall strategy for the construction (e.g., phased construction, design-build) and the work zone type (e.g., night work, lane-closure, cross-over, full-closure) is developed.
- **Identification of Safety Issues.** Issues to be considered include:
 - *Pre-existing safety issues.* Examples include high crash history at the project location, obvious safety issues known to staff or the public, line of sight issues, weather related safety issues, lack of adequate shoulder width, and prevailing speeds.
 - *Safety implications of potential construction approach(es).* Examples include implications of night work, lane width issues, lane-closure related safety issues, channelization and work area separation issues, construction staging areas, construction traffic access issues, and management/enforcement of speed in advance of and through the work zone.
- **Identification of Traffic Capacity/Demand Issues.** Issues to be considered include:
 - *Traffic and travel characteristics at the project location.* Examples include heavy traffic volumes, congested urban/suburban corridor, rural corridor with heavy truck traffic, and recreational or seasonal traffic issues.
 - *Recurring congestion issues.* Examples include capacity and level of service (LOS) issues, peak hour congestion, high-volume interchange(s), and pre-existing bottlenecks and choke-points in the vicinity of the project.

- *Non-recurring congestion issues.* Examples include high potential for incident related traffic congestion, special event traffic issues, and weather related traffic delays.
- *Mobility implications of potential construction approach(es).* For example, lack of shoulders during construction may require a work zone traffic incident management plan. Doing work at night may preclude the need for an elaborate TMP. Traffic capacity and management issues may exist on a detour route.
- **Identification of Community Impacts and Related Issues.** This involves the identification of the work zone impacts on the community, businesses, and residents likely to be affected by the project. Types of issues to be considered include:
 - *Accessibility issues.* Examples include business access relocation, ramp-closure related access issues, and detour related mobility impacts on communities.
 - *ROW related issues.* Examples include property relocation, easement, and realignment of property lines.
 - *Other coordination issues.* Examples include utility related issues, and construction noise issues.
- **Identification of Combined Impacts and Coordination Issues with Nearby, Concurrent Projects.** This involves the identification of nearby and/or concurrent projects, and assessing whether the projects may have an impact on the project under consideration, or vice-versa.
- **Identification of Whether the Project is a Significant Project.** See Chapter II for guidance on Significant Projects. It is important to re-confirm whether a project is significant because more detailed project specific information is now available, which may change previous assertions/assumptions.

Step 3: Analyze Potential Impacts (Optional)

Typically, work zone impacts assessment is not a major focus of Concept Development activities; however, a quantitative analysis can help to better understand the potential work zone impacts of the project.

The Project Manager, in coordination with DeIDOT Traffic, should determine whether quantitative analysis is needed at this phase of the project based on the type, complexity, and expected work zone impacts of the project. At this stage of project development, quantitative impacts analysis may generally be performed for significant projects that are expected to have major impacts at the corridor, network, or regional levels.

The following acceptable thresholds shall be used for the evaluation of work zone impacts along Interstates, freeways and expressways. If measured traffic volumes during periods of planned lane closures are less than the work zone capacities shown in Table 2, no additional quantitative analysis may be required.

Table 2: Measured Average Work Zone Capacities

Number of Lanes		Work Zone Capacity	
Normal Operations	Open to Traffic in Work Zone	Vehicles Per Hour (VPH)	Vehicles Per Hour Per Lane (VPHPL)
3	1	1,170	1,170
2	1	1,340	1,340
5	2	2,740	1,370
4	2	2,960	1,480
3	2	2,980	1,490
4	3	4,560	1,520

Reference: Highway Capacity Manual, 1997 Update

The following are some examples of scenarios under which it may be useful to quantitatively analyze impacts during the concept development phase:

- **To help choose between multiple project design and construction options.**
- **To help choose between multiple traffic control and management approaches.** Examples include night work vs. daytime work, weekend vs. weekday, lane closure vs. no closure, and full closure vs. partial closure.
- **To justify additional funds for work zone transportation management for a particular project or to justify why a particular project will not have major impacts.**

Sketch-planning tools and deterministic tools may be most appropriate for this level of analysis. Quantitative analysis at this stage is generally aimed at estimating the work zone impacts of the project (at a conceptual-level) in and around the work zone, and/or the immediate transportation network within the impactable vicinity of the work zone. Therefore, sketch-planning tools and deterministic tools may be most suitable. Travel demand modeling tools may also be used, but they are generally intended for regional level analysis, and may not provide the desired level of analysis detail. For example, some deterministic tools are capable of replicating and analyzing the impacts of the traffic control plan (TCP) for a project, including taper lengths, number of lanes, lane widths, shoulder widths, turning lanes, traffic signal information; and the use of different management strategies (e.g., ITS, demand management, real-time information.). However, travel demand modeling tools do not provide this level of detail and may not serve the purpose. This does not mean that travel demand models cannot be used. This decision should be made based upon individual project needs and the types of information required to make an informed decision. Using travel demand models may be better than conducting no analysis at all. Examples of tools that may be most appropriate for conducting quantitative work zone impacts analysis during preliminary engineering are:

- *Work Zone Specific Sketch-Planning Tools* such as MicroBENCOST, QuickZone, and QUEWZ.
- *Deterministic/Highway Capacity Manual (HCM) Based Tools* such as Highway Capacity Software (HCS 2000) and Synchro.
- *Critical Movement Summation (CMS) Analysis*

If the project complexity and the desired level of accuracy for the work zone impacts estimation warrant a more detailed analysis, traffic simulation software (e.g. TSIS/CORSIM, SimTraffic, VISSIM) may be used depending on the availability of the data.

Step 4: Identify Potential Work Zone Management Strategies

This step involves the conceptual identification of potential work zone management strategies based on the impact assessments conducted in the previous steps. This conceptual identification should be sufficient enough to estimate the costs of the management strategies for future programming into transportation plans. At this stage of assessment, the purpose is to identify the management strategies and estimate their costs at a high-level – not to develop the TMP. The level of effort is expected to be minimal compared to that required for the design phase.

Step 5: Compile Preliminary Work Zone Strategy

In this step, the information from the impact assessment is compiled to develop a "Preliminary Work Zone Strategy", which consists of:

- **Candidate construction/staging and traffic control approaches.** These represent the potential alternative(s) to construct the project.
- **Expected Work Zone Impacts.** This includes documentation of the anticipated work zone impacts of the project. It may be a qualitative assertion of the anticipated impacts or a quantitative summary of the anticipated impacts, depending on the type and complexity of the project.
- **Significant Project Status.** This identifies whether the project is a significant project.
- **Potential Transportation Management Strategies for the Work Zone.** This documents the potential transportation management strategies that have been identified for the project. Documentation of the expected benefits of the strategies or how they will mitigate the work zone impacts of the project will also be useful to understand the impacts of the project with and without the strategies.
- **Cost estimate for the transportation management strategies** (may be one or multiple sets of strategies, depending upon whether there is more than one construction/staging alternative). Preliminary cost estimates are typically based on previously available information that help estimate costs of work zone transportation management strategies (e.g., as a percentage of total project cost).

3. Work Zone Impacts Assessment During the Design Phase (Type B TMP Only)

Step 1: Compile Concept Development Material (Preliminary Plan Stage)

This step involves the compilation of materials prepared during the Concept Development phase. If a preliminary work zone strategy has not been developed at this stage of a project, a preliminary work zone impacts assessment and preliminary work zone strategy for the project should be prepared.

Step 2: Reassess Work Zone Impacts (Semi-Final Plan Stage)

The purpose of this step is to reassess the work zone impacts of the project so that any issues are identified and addressed before the Final Plan Stage. Decisions may be made during later design stages that may change the project parameters, potentially changing the work zone impacts implications of the project. Therefore, the reassessment of work zone impacts should

be conducted along with the ongoing design activities. If multiple work zone options are still under consideration during the Semi-Final Plan stage, a more detailed Work Zone Alternatives Evaluation should be performed (see Table 3).

Step 3: Analyze Work Zone Impacts (As Needed) (Semi-Final Plan Stage)

This step may be considered as an extension of the work zone impacts reassessment discussed in Step 2. The purpose of this step is to conduct a more detailed (quantitative) investigation and analysis of the work zone impacts. Similar to Step 2, this quantitative analysis should also be performed iteratively, progressing along with the design activities.

Table 3: Detailed Work Zone Alternatives Evaluation

Factor	Alternative	
	1	2
Right-of-way and environmental impacts		
Construction duration		
Number of construction phases		
Impacts to permanent earthwork, retaining walls, etc.		
Ability to maintain existing drainage, lighting and other roadside systems		
Ability to maintain standard lane widths		
Ability to maintain access		
Impacts to pedestrian and bicycle facilities		
Impacts on emergency services (fire, police, ambulance, hospitals)		
Work zone safety		
Ability to maintain existing number of lanes		
Ability to accommodate all turning movements		
Constructibility and construction equipment access		
Estimated Cost		

EXAMPLE

For Interstate, freeway, and expressway projects requiring a Type B TMP, a quantitative analysis shall be performed (see exception in Table 2). For other projects, a quantitative analysis may be performed. For maintenance projects, a quantitative assessment is NOT required regardless of the roadway functional classification. The Project Manager, in coordination with DeIDOT Traffic, should determine whether quantitative analysis should be performed based on the type, complexity, and expected work zone impacts of the project.

The key difference between the analysis performed during concept development and design is that the analysis is more detailed and will lead to the development of the final design and TMP for the project. The level of detail of analysis is expected to be higher.

Deterministic/Highway Capacity Manual (HCM) based tools, traffic simulation models, and other tools (discussed in the Concept Development Phase) that can help perform a detailed analysis may be most appropriate for this level of analysis. The objective of quantitative analysis during design is to analyze and address specific issues in detail, and make final decisions and recommendations towards development of the final design and TMP for the project. Higher-level travel demand models and sketch planning tools may also be used if the project situation warrants their use. Sometimes a combination of different levels of tools may be needed to appropriately analyze the impacts.

Deterministic tools are capable of providing accurate results for specific locations or small roadway sections provided there is adequate information on traffic volume, roadway geometrics, traffic control and management features, and any roadside friction that may exist. For example, an HCM-based deterministic tool can replicate the TTC plan for a project (i.e., taper lengths, number of lanes, lane widths, shoulder widths, turning lanes, traffic signal information), and predict the delay and queue length for the corridor on which the work zone is setup. A tool such as QuickZone (which uses both deterministic and sketch-planning methods) can estimate queues and delays on the mainline corridor and diversion to the adjoining network. It also provides a high-level estimate of the benefits of different management strategies (e.g., ITS, demand management, real-time information). However, if agencies are interested in simulating the effect of the work zone (e.g., determine the roadways to which traffic may divert, estimate queue development and/or discharge rates, estimate queue durations, identify traffic overflow/spillback, estimate the operating effects and benefits of management strategies) simulation models may be most suitable.

Step 4: Develop/Recommend Final Construction Staging and TMP (Final Plan Stage)

In this step, information from the previous steps is used to complete the final design, the construction staging, the TMP, and the cost estimates for the project. These are then compiled into the PS&E package.

4. Work Zone Impacts Assessment Report

A work zone impacts assessment report is a component of the TMP and should include:

- A. **Qualitative Summary of Anticipated Work Zone Impacts.** A brief discussion of how the project is expected to impact mobility and safety, how traffic patterns are expected to change, and an estimate of how traffic demand might change due to the project.
- B. **Summary of Work Zone Alternatives Evaluation.** A qualitative and/or qualitative assessment of the work zone impacts. The summary should address options investigated for the selected design alternative only. Options examined for other design alternatives need not be included.

C. **Summary of Traffic Analysis (if applicable)**

- **Future Traffic Projections (During Construction).** A brief description of how the expected future traffic conditions were determined. Any traffic reduction factors assumed for the calculations should be documented.
- **Measures of Effectiveness.** A summary of the measures of effectiveness used for the analysis (e.g. capacity, volume, queue, speed, travel time, diversion, safety, noise, environmental, adequacy of detour routes, cost effectiveness, etc.).
- **Analysis Tool Selection Methodology and Justification.** A description of the traffic analysis tools used and a brief methodology of how the tool was selected.
- **Analysis Results.** A comparison of existing and future traffic conditions and operations, with and without the TMP management strategies.

D. **Selected Alternative.** A discussion of the selected alternative and why the alternative was chosen.

CHAPTER VI: PERFORMANCE ASSESSMENT/PROCESS REVIEW

Collection of work zone data and performance assessments are necessary to determine the success of efforts to manage work zones and their impacts. FHWA, working with DelDOT, will conduct process reviews every two years to assess the effectiveness of work zone safety and mobility procedures. Appropriate personnel who represent each of the project development stages will participate in this review.

The process review will include the following steps:

1. **Assemble a Multi-Disciplinary Team.** It may be helpful and appropriate to include some key stakeholders. For example, the staff responsible for implementing and monitoring a TMP in the field are generally following the plan that was developed earlier by design or traffic engineering staff, or consultants. Including designers and consultants in process reviews may help them improve future TMPs.
2. **Develop Review Objectives and Review Methods**
3. **Conduct Review/Analyze and Interpret Results**
 - A. **Perform Crash Analyses.** DelDOT's Safety Data Management (SDM) system allows the crash database to be queried to identify work zone related crashes and their characteristics including crash severity, lighting conditions, pavement conditions, day of week, and contributing factors.

As part of the process review, the following two crash summaries will be prepared:

- Crash data summary before and during the work zone activity for randomly selected projects as shown in Table 4.
- A summary of all work zone related crashes during the previous two year period to identify crash characteristics including severity, lighting conditions, pavement conditions, day of week, and contributing factors.

The results of these two summaries will be analyzed to identify recurring deficiencies or high concentrations of crashes. This analysis will be used to develop improved procedures and processes to address the identified deficiencies.

- B. **Review Randomly Selected Projects Including at Least One "Significant" Project.** This will include a detailed review of crash history, field observations (inspector's diary, traffic control inspection reports) collected during construction and any deviations from the TMP. Reviews should include projects that represent a range of characteristics, such as day and night work, type of work being done, duration of the project, local traffic characteristics, and/or transportation management strategies used.

Table 4: 2004 Work Zone Crash Data Analysis

		Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
Project Data	County	NC	Sussex	Kent	NC	Sussex	Kent
	Route #	5	3	13	24	43	68
	Project #	24-000-00	24-000-01	24-000-02	24-000-03	24-000-04	24-000-05
	Begin MP	1.50	0.00	27.90	2.50	34.50	0.00
	End MP	3.00	5.00	35.50	3.90	37.80	3.20
	Length	1.50	5.00	7.60	1.40	3.30	3.20
Work Zone Data	Begin Month	Jan	Apr	Feb	Jan	May	Jan
	End Month	Mar	Dec	Dec	Oct	Sept	Dec
	Time Period (Days)	90	300	330	300	150	365
	Average ADT	63,000	32,500	12,200	8,000	16,500	54,300
	PDO Accidents	18	65	26	6	13	75
	Injury Accidents	7	23	12	2	8	25
	Fatality Accidents	0	1	0	0	0	0
	Total Accidents	25	89	38	8	21	100
	Acc Rate (Million VMT)	2.85	1.83	1.24	2.38	2.57	1.58
Free Flow Data	Year	2003	2003	2003	2003	2003	2003
	Average ADT	63,000	63,000	63,000	63,000	63,000	63,000
	PDO Accidents	56	125	150	60	102	95
	Injury Accidents	32	30	50	30	85	32
	Fatality Accidents	1	0	0	0	1	0
	Total Accidents	89	155	200	90	188	127
Acc Rate (Million VMT)	2.58	1.35	1.14	2.80	2.48	1.73	
Percent Increase During Work Zone		10.4%	35.4%	8.5%	-14.8%	3.8%	-8.6%

4. Develop and Prioritize Recommendations and Lessons Learned

- Develop revisions to existing work zone safety and mobility procedures to address identified safety or operational deficiencies.
- Identify of any necessary training that should be implemented in response to changes in work zone policies or procedures.

CHAPTER VII: TRAINING

Each person whose actions affect work zone mobility and safety shall receive training every two to three years appropriate to the job decisions each individual is required to make.

1. A formal Work Zone Safety and Mobility training course will be developed and offered periodically to all individuals involved in the design through construction of a project (*potentially offered through the University of Delaware T² Center*).
2. All DelDOT staff involved in the design through construction of a project will complete the training course that will be developed upon completion and adoption of DelDOT's Manual on Uniform Traffic Control Devices (MUTCD) Part 6 – Temporary Traffic Control.
3. Training updates will be required periodically that reflect changes to DelDOT's policies and procedures regarding work zone mobility and safety. Changes resulting from the biannual process review will be presented at the annual Winter Workshop Presentation.

**APPENDIX A
FEDERAL REGISTER - 69 FR 54562**

54562 Federal Register / Vol. 69, No. 174 / Thursday, September 9, 2004 / Rules and Regulations

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

23 CFR Part 630

[FHWA Docket No. FHWA-2001-11130]

RIN 2125-AE29

Work Zone Safety and Mobility

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Final rule.

SUMMARY: The FHWA amends its regulation that governs traffic safety and mobility in highway and street work zones. The changes to the regulation will facilitate comprehensive consideration of the broader safety and mobility impacts of work zones across project development stages, and the adoption of additional strategies that help manage these impacts during project implementation. These provisions will help State Departments of Transportation (DOTs) meet current and future work zone safety and mobility challenges, and serve the needs of the American people.

DATES: *Effective Date:* October 12, 2007.

The incorporation by reference of certain publications listed in this rule is approved by the Director of the Federal Register as of October 12, 2007.

FOR FURTHER INFORMATION CONTACT:

Mr. Scott Battles, Office of Transportation Operations, HOTO-1, (202) 366-4372; or Mr. Raymond Cuprill, Office of the Chief Counsel, HCC-30, (202) 366-0791, Federal Highway Administration, 400 Seventh Street, SW., Washington, DC 20590-0001. Office hours are from 7:45 a.m. to 4:15 p.m., e.t., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION:

Electronic Access

This document and all comments received by the U.S. DOT Docket Facility, Room PL-401, may be viewed through the Docket Management System (DMS) at <http://dms.dot.gov>. The DMS is available 24 hours each day, 365 days each year. Electronic submission and retrieval help and guidelines are available under the help section of this Web site.

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Government Printing Office's Web site at: <http://www.access.gpo.gov/nara>.

Background

History

Pursuant to the requirements of Section 1051 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), (Pub. L. 102-240, 105 Stat. 1914; Dec. 18, 1991), the FHWA developed a work zone safety program to improve work zone safety at highway construction sites. The FHWA implemented this program through non-regulatory action by publishing a notice in the **Federal Register** on October 24, 1995 (60 FR 54562). This notice established the National Highway Work Zone Safety Program (NHWZSP) to enhance safety at highway construction, maintenance, and utility sites. In this notice, the FHWA indicated the need to update its regulation on work zone safety (23 CFR 630, Subpart J).

As a first step in considering amendments to its work zone safety regulation, the FHWA published an advance notice of proposed rulemaking (ANPRM) on February 6, 2002, at 67 FR 5532. The ANPRM solicited information on the need to amend the regulation to better respond to the issues surrounding work zones, namely the need to reduce recurrent roadwork, the duration of work zones, and the disruption caused by work zones.

The FHWA published a notice of proposed rulemaking (NPRM) on May 7, 2003, at 68 FR 24384. The regulations proposed in the NPRM were intended to facilitate consideration and management of the broader safety and mobility impacts of work zones in a more coordinated and comprehensive manner across project development stages, and the development of appropriate strategies to manage these impacts. We received a substantial number of responses to the NPRM. While most of the respondents agreed with the intent and the concepts proposed in the NPRM, they recommended that the proposed provisions be revised and altered so as to make them practical for application in the field. The respondents identified the need for flexibility and scalability in the implementation of the provisions of the proposed rule; noted that some of the terms used in the proposed rule were ambiguous and lent themselves to subjective interpretation. Respondents also commented that the documentation requirements in the proposal would impose undue time and resource burdens on State DOTs.

In order to address the comments received in response to the NPRM, the

FHWA issued a supplemental notice of proposed rulemaking (SNPRM) on May 13, 2004, at 69 FR 26513. The SNPRM addressed the comments related to flexibility and scalability of provisions, eliminated ambiguous terms from the language, and reduced the documentation requirements. We received several supportive comments in response to the SNPRM. Most respondents noted that the SNPRM addressed the majority of their concerns regarding the originally proposed rule. However, they did offer additional comments regarding specific areas of concern. In the final rule issued today, the FHWA has addressed all the comments received in response to the SNPRM that are within the scope of this rulemaking.

The regulation addresses the changing times of more traffic, more congestion, greater safety issues, and more work zones. The regulation is broader so as to recognize the inherent linkage between safety and mobility and to facilitate systematic consideration and management of work zone impacts. The regulation can advance the state of the practice in highway construction project planning, design, and delivery so as to address the needs of the traveling public and highway workers. The key features of the final rule are as follows:

- A policy driven focus that will institutionalize work zone processes and procedures at the agency level, with specific language for application at the project level.
- A systems engineering approach that includes provisions to help transportation agencies address work zone considerations starting early in planning, and progressing through project design, implementation, and performance assessment.
- Emphasis on addressing the broader impacts of work zones to develop transportation management strategies that address traffic safety and control through the work zone, transportation operations, and public information and outreach.
- Emphasis on a partner driven approach, whereby transportation agencies and the FHWA will work together towards improving work zone safety and mobility.
- Overall flexibility, scalability, and adaptability of the provisions, so as to customize the application of the regulations according to the needs of individual agencies, and to meet the needs of the various types of highway projects.

Summary Discussion of Comments Received in Response to the SNPRM

The following discussion provides an overview of the comments received in response to the SNPRM, and the FHWA's actions to resolve and address the issues raised by the respondents.

Profile of Respondents

We received a total of 33 responses to the docket. Out of the 33 total respondents, 27 were State DOTs; 4 were trade associations; and 2 provided comments as private individuals. The 4 trade associations were namely, the Laborers' Health and Safety Fund of North America (LHSFNA), the American Traffic Safety Services Association (ATSSA), the Associated General Contractors (AGC) of America, and the Institute of Transportation Engineers (ITE). We classified the American Association of State Highway and Transportation Officials (AASHTO) as a State DOT because they represent State DOT interests. The AASHTO provided a consolidated response to the SNPRM on behalf of its member States. Several State DOTs provided their comments individually.

The respondents represented a cross-section of job categories, ranging from all aspects of DOT function, to engineering/traffic/safety/design, to construction and contracting.

Overall Position of Respondents

We received several supportive comments in response to the SNPRM. Most State DOTs, the AASHTO, and all private sector respondents greatly appreciated the FHWA's continued effort to receive input during the development of the proposed rule, and particularly in issuing the SNPRM. Most respondents also noted that the SNPRM addressed the majority of their concerns regarding the originally proposed rule.

The respondents also offered comments on specific areas of concern, and recommended changes to improve the rule's language. The State DOTs and the AASHTO offered comments, which relate to their continued concern that the rule allow for adequate flexibility and scalability while limiting unintended liability and cost. Private sector respondents also offered specific comments on certain areas of concern. Details regarding these issues and FHWA's specific response are discussed in the following section, which provides a section-by-section analysis of the comments.

The level of support for the SNPRM is indicated by the fact that 23 of the 33 respondents expressed overall support for the provisions proposed in the

SNPRM. It is to be noted that these respondents were not necessarily supportive of all the provisions, but rather that, their overall position on the SNPRM was supportive. Many of these respondents provided suggestions on modifications and revised language for specific provisions as they deemed appropriate. Of the 23 respondents who were supportive, 21 represented State DOTs and 2 represented trade associations.

Of the remaining respondents, 2 opposed the issuance of the rule, 2 agreed with the intent and the concepts but did not agree with many of the mandatory provisions, and the remaining 6 did not expressly indicate their overall position.

One of the two respondents who opposed the issuance of the rule was the Iowa DOT. It expressed that it supports the goals of improved safety and reduced congestion, but opposes the proposed rule as it would not necessarily help achieve these goals. It believes that its current work zone policies are sufficient to provide for a high standard of safety and mobility. It noted that the rule is not flexible enough, and that it would require significant commitments from its limited staff.

The other respondent that opposed the rule was the Kansas DOT. It suggested that the FHWA retract the rule and, instead, issue the information on work zone safety and mobility as a guide for use by State DOTs. It believes that encouraging State DOTs to review and improve their current practices on work zone safety and mobility, through closer contact with FHWA and other partners, would be more effective than mandating specific processes. It also suggested changes to specific sections, and recommended that the FHWA implement the AASHTO's recommendations, if retraction of the rule was not an option.

Section-by-Section Analysis of SNPRM Comments and FHWA Response

Section 630.1002 Purpose

There were no major comments in response to this section. The overall sentiment of the respondents was supportive of the language as proposed in the SNPRM, and therefore, we will retain the language as proposed in the SNPRM.

Section 630.1004 Definitions and Explanation of Terms

Most respondents were supportive of this section. Some respondents offered specific comments on some of the

definitions proposed in the SNPRM. They are discussed as follows:

- Definition for "Mobility." The AGC of America remarked that the definition for mobility seems to imply a greater emphasis on mobility than on safety. It recommended that we change the second sentence of the definition to imply that work zone mobility should be achieved without compromising the safety of highway workers or road users. To address this comment the FHWA has amended the definition by adding the words, "while not compromising the safety of highway workers or road users" at the end of the second sentence. In addition, the word "smoothly" after the phrase, "mobility pertains to moving road users," has been replaced by the word "efficiently."

- Definition for "Safety." The AASHTO and several DOTs recommended that the term, "road worker(s)" be changed to "highway worker(s)" for the sake of consistency. We agree with this observation, and made this change. The Georgia DOT recommended that the term "danger" be changed to "potential hazards" to reduce potential liability. We agree with this recommendation, and therefore, replaced the word "danger" with "potential hazards" in the first sentence. In the second sentence, we rephrased "minimizing the exposure to danger of road users" with "minimizing potential hazards to road users."

- Definition for "Temporary Traffic Control (TTC) Plan." We moved the definition for the TTC plan from § 630.1004, Definitions and Explanation of Terms, to § 630.1012(b), Transportation Management Plan (TMP), where the requirements for the TTC plan are laid out. This is in response to a comment from the Georgia DOT that the language under the TTC plan section of § 630.1012(b) was not consistent with the Manual On Uniform Traffic Control Devices (MUTCD).¹ Since the definition for the TTC plan was referenced from the MUTCD, it was removed from the definitions section and placed in § 630.1012(b)(1), where TTC plans are discussed.

- Definitions for "Work Zone" and "Work Zone Crash." There were several comments recommending changes to certain terminology in both these definitions. For example, the AASHTO

¹ The MUTCD is approved by the FHWA and recognized as the national standard for traffic control on all public roads. It is incorporated by reference into the Code of Federal Regulations at 23 CFR part 655. It is available on the FHWA's Web site at <http://mutcd.fhwa.dot.gov> and is available for inspection and copying at the FHWA Washington, DC Headquarters and all FHWA Division Offices as prescribed at 49 CFR part 7.

and several DOTs suggested that the term, “traffic units,” in the first sentence of the Work Zone Crash definition be changed to “road users.” However, we have decided not to adopt the changes in order to maintain consistency with other industry accepted sources—the definition for “work zone” being referenced from the MUTCD, and that for “work zone crash,” from the Model Minimum Uniform Crash Criteria Guideline (MMUCC).²

Section 630.1006 Work Zone Safety and Mobility Policy

The majority of the respondents supported the proposed language in this section. The AASHTO and several DOTs recommended the removal of the second clause in the second to last sentence, “representing the different project development stages.” These respondents believe that this change would grant the States maximum flexibility to implement the most appropriate team for each project. The FHWA agrees with this observation and has deleted the phrase in question.

The ATSSA recommended that we specifically include or encourage the participation of experienced industry professionals in the multi-disciplinary team referenced in the second to last sentence. The FHWA believes that States will solicit the participation of industry representatives if required for the specific project under consideration.

The Kansas DOT commented that the use of the words “policy” and “guidance” in the same sentence could be confusing, as policies usually carry more weight than guidance. This comment refers to the second sentence, the first part of which reads, “This policy may take the form of processes, procedures, and/or guidance * * *” The FHWA disagrees because we believe that policies do not necessarily have to be mandates. For example, it may be a State DOT policy that it “shall” consider and manage work zone impacts of projects, but the actual

methods to do so may be provided as guidance to its district/region offices which may vary according to the different types of projects that they encounter. The underlying purpose of the work zone safety and mobility policy section is to require State DOTs to implement a policy for the systematic consideration and management of work zone impacts, so that such consideration and management becomes a part of the mainstream of DOT activities. How a State chooses to implement the policy is its prerogative—and it may take the form of processes, procedures, and/or guidance, and may vary upon the work zone impacts of projects.

The Virginia DOT commented on the second sentence of this section that it does not agree with the “shall” requirement to address work zone impacts through the various stages of project development and implementation. It justified its objection by saying that “addressing work zone impacts through the various stages of project development and implementation” will not work from a practical standpoint due to unforeseen field conditions and circumstances, and that the shall clause could result in potential litigation. The FHWA disagrees with the Virginia DOT. We would like to mention that the second sentence by itself, when taken out of context, doesn’t quite convey the message of the entire section. The preceding sentence and the following sentence need to be considered in interpreting what the second sentence means. The first sentence requires that State DOTs implement a policy for the systematic consideration and management of work zone impacts on all Federal-aid highway projects. The second sentence further qualifies the term “systematic” by saying that the policy shall address work zone impacts throughout the various stages of project development and implementation—this implies that the consideration and management of work zone impacts progresses through the various stages. The third sentence further clarifies that the methods to implement this policy may not necessarily be absolute requirements, but rather be implemented through guidance. Further, the third sentence provides a more specific delineator by saying that the implementation of the policy may vary based upon the characteristics and expected work zone impacts of individual projects or classes of projects.

Section 630.1008 Agency-Level Processes and Procedures

The AASHTO and several State DOTs remarked that there is inconsistency with the use of “Agency” and “State Agency,” and that this needs to be resolved. Further, a few State DOTs sought clarification as to whether “agency” applies to the State transportation agency or other entities that might be involved in the project development process (*i.e.*, county and/or local governments and authorities). In response to this comment, we changed all instances of the terms “State Agency” and “Agency” in the entire subpart to the term “State,” as referenced in the rule.

Section 630.1008(a), Section Introduction. There were no specific comments in response to the language in this paragraph. In the second sentence, to remove ambiguity and for clarity, we replaced the words “well defined data resources” with the words, “data and information resources.”

The North Carolina DOT observed that the language in this paragraph is an introduction to the section, and that it should not be labeled as “(a).” We did not make this change because the Office of the Federal Register (OFR) requires paragraph designations on all text in a rule.

Section 630.1008(b), Work Zone Assessment and Management Procedures. Most respondents were supportive of the language in this paragraph.

Section 630.1008(c), Work Zone Data. Most State DOTs and the AASHTO opposed the mandatory requirement to use work zone crash and operational data towards improving work zone safety and mobility on ongoing projects, as well as to improve agency processes and procedures. One of the key reasons cited for this opposition was the difficulty and level of effort involved in obtaining and compiling data quickly enough to take remedial action on ongoing projects. A few DOTs also stated that using data to improve State-level procedures was feasible but not at the individual project level. The AASHTO also observed that there is already a reference to data in § 630.1008(e), “Process Review,” where the use of data is optional and not mandatory. Some States recommended that we clarify the term “operational data,” whether it is observed or collected data. They also noted that the “shall” clauses in the first two sentences are inconsistent with the “encouraged to” in the last sentence, and questioned as to how the use of data

² “Model Minimum Uniform Crash Criteria Guideline” (MMUCC), 2d Ed. (Electronic), 2003, produced by National Center for Statistics and Analysis, National Highway Traffic Safety Administration (NHTSA). Telephone 1-(800)-934-8517. Available at the URL: [http://www-nrd.nhtsa.dot.gov](http://www.nrd.nhtsa.dot.gov). The NHTSA, the FHWA, the Federal Motor Carrier Safety Administration (FMCSA), and the Governors Highway Safety Association (CHSA) sponsored the development of the MMUCC Guideline which recommends voluntary implementation of the 111 MMUCC data elements and serves as a reporting threshold that includes all persons (injured and uninjured) in crashes statewide involving death, personal injury, or property damage of \$1,000 or more. The Guideline is a tool to strengthen existing State crash data systems.

can be mandated when the data resources themselves are optional. The California Transportation Department (CalTrans) questioned the objective of developing TMPs and conducting process reviews if appropriate performance measures and data collection standards are not identified for determining success.

The FHWA provides the following comments and responses to the above stated concerns:

- The purpose of the provisions in this section is not to require States to collect additional data during project implementation, but rather, to improve the use of available work zone field observations, crash data, and operational information to: (1) Manage the safety and mobility impacts of projects more effectively during implementation; and (2) provide the basis for systematic procedures to assess work zone impacts in project development.

For example, most agencies maintain field diaries for construction projects. These field diaries are intended to provide a log of problems, decisions, and progress made over the duration of a project. In many States, these diaries log incidents and actions such as the need to replace channelization devices into their proper positions after knockdown by an errant vehicle, or to deal with severe congestion that occurred at some point during the day. These log notes, when considered over time, may provide indications of safety or operational deficiencies. To address such deficiencies, it may be necessary and prudent to improve the delineation through the work zone to prevent future occurrences of knockdown events, or to alter work schedules to avoid the congestion that recurs at unexpected times due to some local traffic generation phenomena.

Police reports are another example of an available source of data that may be useful in increasing work zone safety. Provisions are made in many agencies for a copy of each crash report to be forwarded to the engineering section immediately upon police filing of the crash report. Where a work zone is involved, a copy of this report should be forwarded as soon as possible to the project safety manager to determine if the work zone traffic controls had any contribution to the crash so that remedial action can be taken.

These applications do not necessarily require that agencies gather new data, but there may be a need to improve processes to forward such reports to the appropriate staff member for review during project implementation and/or to provide guidance or training to facilitate

interpretation of these reports. Agencies may choose to enhance the data they capture to improve the effectiveness of these processes by following national crash data enhancement recommendations and/or linking it with other information (e.g., enforcement actions, public complaints, contractor claims). This same data and information can be gathered for multiple projects and analyzed by the agency to determine if there are common problems that could be remedied by a change in practices. The information may also be used for process reviews.

- The first sentence of this paragraph was revised to convey that States are required to use field observations, available work zone crash data, and operational information at the project level, to manage the work zone impacts of specific projects during project implementation. This provision requires States to use data and information that is available to them, so as to take appropriate actions in a timely manner to correct potential safety or mobility issues in the field. Operational information refers to any available information on the operation of the work zone, be it observed or collected. For example, many areas have Intelligent Transportation Systems (ITS) in place, and many others are implementing specific ITS deployments to manage traffic during construction projects. The application of this provision to a project where ITS is an available information resource, would result in the use of the ITS information to identify potential safety or mobility issues on that project.

- The second sentence was also revised to convey that work zone crash and operational data from multiple projects shall be analyzed towards improving State processes and procedures. Such analysis will help improve overall work zone safety and mobility. Data gathered during project implementation needs to be maintained for such post hoc analyses purposes. Such data can be used to support analyses that help improve State procedures and the effectiveness of future work zone safety and mobility assessment and management procedures.

- The respondents indicated that the use of "encouraged to" in the last sentence is inconsistent with the "shall" clauses in the first two sentences. Further, the phrase, "establish data resources at the agency and project levels" does not clearly convey the message of the provision. This provision does not require States to embark on a massive data collection, storage, and analysis effort, but rather to promote

better use of elements of their existing/available data and information resources to support the activities required in the first two sentences. Examples of existing/available data and information resources include: Project logs, field observations, police crash records, operational data from traffic surveillance devices (e.g., data from traffic management centers, ITS devices, etc.), other monitoring activities (e.g., work zone speed enforcement or citations), and/or public complaints. We revised the last sentence to convey that States should maintain elements of their data and information resources that logically support the required activities.

- In response to CalTrans' comment regarding establishing performance measures and data collection standards, we appreciate the value of the input, but we believe that we do not have adequate information at this time to specify performance measures for application at the National level. State DOTs may establish such performance measures and data collection standards as applicable to their individual needs and project scenarios. For example, the Ohio-DOT mandates that there shall always be at least two traffic lanes maintained in each direction for any work that is being performed on an Interstate or Interstate look-alike. We believe that such policies need to be developed and implemented according to individual State DOT needs, and hence we maintain a degree of flexibility in the rule language.

Section 630.1008(d), Training. Most State DOTs and the AASHTO opposed the mandatory requirement that would require training for the personnel responsible for work zone safety and mobility during the different project development and implementation stages. These respondents noted that the proposed language implied that State DOTs would be responsible for training all the listed personnel, including those who do not work for the DOT itself, and that this would create a huge resource burden, as well as increase the liability potential for the DOTs. These commenters also ratified their opposition by quoting the MUTCD training requirement, which does not mandate training, but suggests that personnel should be trained appropriate to the job decisions that they are required to make. Some DOTs, including the New York State DOT (NYSDOT), requested that the reference to personnel responsible for enforcement of work zone related transportation management and traffic control be clarified as to whether it refers to law enforcement officers or to field construction/safety inspectors.

The FHWA provides the following comments and responses to the above stated concerns:

- The FHWA agrees that the first sentence in the training section seems to imply that the State would be responsible for training all mentioned personnel; therefore, we changed the sentence to convey that the State shall “require” the mentioned personnel be trained. This change will require the State to train direct State employees only, and takes away the burden from the State to train personnel who are not direct employees. We believe that personnel responsible for the development, design, operation, inspection, and enforcement of work zone safety and mobility need to be trained, and this requirement will allow for training to be provided by the appropriate entities. The responsibility of the State would be to require such training, either through policy or through specification. For example, the Florida DOT has developed and required work zone training of their designers and contractors by procedure and by specifications. Similarly, the Maryland State Highway Administration (MD-SHA) provides a maintenance of traffic (MOT) design class to personnel responsible for planning and designing work zones, including consultants and contractors.

- Further, in keeping with the MUTCD language on training, we added the phrase, “appropriate to the job decisions each individual is required to make” to the end of the first sentence. This clarifies that the type and level of training will vary according to the responsibilities of the different personnel. For example, Maryland State Highway Police officers attend a 4-hour work zone safety and traffic control session at the Police Academy.

- We also revised the second sentence to convey that States shall require periodic training updates that reflect changing industry practices and State processes and procedures. Since we revised the first sentence to convey that training of non-State personnel is not a State responsibility, in the second sentence, we deleted the phrase, “States are encouraged to keep records of the training successfully completed by these personnel.”

- In response to the request that “personnel responsible for enforcement” of work zone related transportation management and traffic control be clarified, we believe that this group is inclusive of both law enforcement/officers and field construction/safety inspectors.

Section 630.1008(e), Process Review. Most respondents were supportive of

the language in this section. The AASHTO and several State DOTs recommended that States should have maximum flexibility to implement the most appropriate team for each project. These commenters suggested that the fourth and the fifth sentences of the section be deleted, and that the clause, “as well as FHWA” be added to the end of the third sentence.

The FHWA agrees with the observation made by the AASHTO and State DOTs that States should have maximum flexibility to implement the most appropriate review team for each project. Therefore, as suggested, we deleted the fourth and the fifth sentence of the section, and added the clause, “as well as FHWA” to the end of the third sentence. Further, in the third sentence, we changed the phrase “are encouraged to” to “should.”

Section 630.1010 Significant Projects

All respondents agreed with the concept of defining significant projects, and the requirement to identify projects that are expected to have significant work zone impacts; however, most State DOTs and the AASHTO opposed the requirement to classify Interstate system projects that occupy a location for more than three days with either intermittent or continuous lane closures, as significant. They cited that all Interstate system projects that occupy a location for more than three days would not necessarily have significant work zone impacts, particularly on low-volume rural Interstate sections. Several DOTs remarked that designation of significant projects purely based on the duration would not be prudent, and that the volume of traffic on that Interstate should be taken into account. They also noted that such classification is not consistent with the MUTCD. They remarked that this provision could not be effectively applied to routine maintenance activities performed by State DOT maintenance crews, and that requesting exceptions to such routine work would be unreasonably arduous.

These respondents also objected to the associated exemption clause for the same provision, commenting that it would be very cumbersome to implement. Some States also requested clarification on whether general exceptions would be granted for work categories for defined segments of Interstate projects where the work would have little impact.

The DOTs of Idaho, Montana, North Dakota, South Dakota, and Wyoming commented that the threshold for designating the reference Interstate projects as significant was too low. They suggested that low volume Interstates

and rural Interstates should be excluded, and that, the duration should be extended well above the three-day duration.

The AASHTO and the State DOTs also remarked that the identification of significant projects in “cooperation with the FHWA” should be changed to “in consultation with the FHWA.”

The FHWA provides the following responses and proposed action in response to the referenced concerns:

- We agree with the majority of the concerns raised by the respondents.

- We changed the significant projects clause as applicable to Interstate system projects, to require States to classify as significant projects, all Interstate system projects within the boundaries of a designated Transportation Management Area (TMA), that occupy a location for more than three days with either intermittent or continuous lane closures. We believe that this change addresses all the concerns raised by the respondents. The delineation of projects by the boundaries of a designated TMA will address the work zone impacts of lane-closures on Interstate segments in the most heavily traveled areas with recurring congestion problems. We believe that in general, areas with recurring congestion tend to be severely impacted by lane closures as compared to those without recurring congestion. We also believe that the areas that are already designated as TMAs tend to exhibit patterns of recurring congestion on their Interstates due to heavy traffic demand and limited capacity. This revision, in most cases, would also not require low-volume rural Interstate segments to be classified as significant projects.

- We revised the exemption clause provisions related to the applicable Interstate system projects to allow for exemptions to “categories of projects.” This will provide for blanket exemptions for specific categories of projects on Interstate segments that are not expected to have significant work zone impacts. This will eliminate the burdensome procedural aspect of seeking exemptions for Interstate projects on an individual project basis.

- We also reorganized this section to consist of paragraphs (a), (b), (c), and (d). Paragraph (a) provides the general definition for a significant project, with no changes in language from what was proposed in the SNPRM. Paragraph (b) enumerates the purpose of classifying projects as significant, and lays out the requirements for States to classify projects as significant. This language is also the same as what was proposed in the SNPRM. Paragraph (c) provides the revised definition of significant projects

as applicable to Interstate system projects. Paragraph (d) provides the revised exemption clause as applicable to significant projects on the Interstate system.

- In keeping with the overall recommendation of respondents, we changed all instances of “Agency” and “State Agency” to “State.”

- We do not agree with the recommendation that the identification of significant projects should be done in “consultation” with the FHWA rather than “cooperation with the FHWA.” We believe that this is a cooperative process, rather than requiring just consultation. Therefore, we did not make any change to this terminology.

Section 630.1012 Project-Level Procedures

Section 630.1012(a). The North Carolina DOT observed that the language in this section is an introduction to the section, and that it should not be labeled as “(a).” We did not make this change because the OFR requires paragraph designations on all text in a rule.

The ITE recommended that the FHWA should encourage consideration of work zone impacts prior to project development, at the corridor and Transportation Improvement Program (TIP) and program development stage. It provided examples of decisions that would be made at the earlier stages, such as, life-cycle cost decisions, and project scheduling decisions. We appreciate ITE’s input and agree with the general intent of its suggested content. We believe that the language in §§ 630.1002, Purpose and 630.1010, Significant Projects covers some of the issues to which the ITE refers. Specifically, the following two sentences from the respective sections address the ITE’s concerns:

- From § 630.1002, Purpose: “Addressing these safety and mobility issues requires considerations that start early in project development and continue through project completion.”

- From § 630.1010, Significant Projects: “This identification of significant projects should be done as early as possible in the project delivery and development process, and in cooperation with the FHWA.”

Section 630.1012(b), Transportation Management Plan (TMP). Most respondents were supportive of the provisions in this section.

The Florida DOT requested further definition for the phrase “less than significant work zone impacts.” We believe that the definition for “work zone impacts” as provided in § 630.1004 and the clauses for identification of

projects with significant work zone impacts, as stated in § 630.1010 adequately describe the phrase “less than significant work zone impacts.” We did not take any action in response to this comment.

The New Jersey DOT recommended that, in order to facilitate maximum flexibility to States, the term “typically” be introduced before the word “consists” in the third sentence of this section. We do not agree with the suggested edit because for significant projects, a TMP shall always consist of a TTC plan, and address Transportation Operations (TO) and Public Information (PI) components, unless an exemption has been granted for that project. We did not take any action in response to this comment.

Section 630.1012(b)(1), Temporary Traffic Control (TTC) Plan. In general, most respondents were supportive of the provisions in this section, except the provision regarding maintenance of pre-existing roadside safety features.

Most State DOTs and the AASHTO were opposed to the provision, which required the maintenance of pre-existing roadside safety features in developing and implementing the TTC plan. They recommended that the FHWA either remove the requirement or change the mandatory “shall” to a “should.”

Several DOTs stated that maintenance of all pre-existing roadside safety features would be very difficult, especially, in urban areas. Other DOTs requested clarification on what “pre-existing roadside safety features” would entail—whether it would include items like signs, guardrail, and barriers, or it would include features like shoulders, slopes and other geometric aspects. On that note, several DOTs mentioned that maintenance of pre-existing roadside safety “hardware” would be more practical than maintaining pre-existing roadside safety features.

The Laborers Health and Safety Foundation of North America (LHSFNA) continued to stress the requirement for Internal Traffic Control Plans (ITCPs) for managing men and materials within the work area, so as to address worker safety issues better, and to level the playing field for contractors.

The FHWA offers the following in response to the comments and concerns raised above:

- The FHWA agrees with most of the concerns raised by the respondents.

- In the fourth sentence of paragraph (b)(1), we changed the term “pre-existing roadside safety features,” to “pre-existing roadside safety hardware.” We believe that this change will address all the concerns raised by the

respondents, and eliminate ambiguity and subjectivity from the requirement.

- In response to the LHSFNA’s comment regarding ITCPs, we agree that ITCPs are important for providing for worker safety inside the work area, but we still believe that this issue is outside the purview of this rulemaking effort and this subpart.

- In order to be consistent with the remaining sections of this subpart, and to eliminate ambiguity, we deleted the first sentence of this section, and replaced it with the definition for TTC plan as stated in § 630.1004. Consequently, we removed the definition for TTC plan from § 630.1004.

Section 630.1012(b)(2), Transportation Operations (TO) Component. Most respondents were supportive of the provisions in this section. The AASHTO and several DOTs suggested that “traveler information” be removed as a typical TO strategy because “traveler information” fits more logically in the PI component. The New Jersey DOT recommended that the phrase “transportation operations and safety requirements” be changed to “transportation operations and safety strategies,” so as to soften the tone of the language.

We agree with both of the above observations; therefore, we removed “traveler information” from the listing of typical TO strategies in the second sentence. We also changed the phrase “transportation operations and safety requirements” to “transportation operations and safety strategies” in the last sentence.

Section 630.1012(b)(3), Public Information Component. Most respondents were supportive of the provisions in this section. The AASHTO and several DOTs suggested that “traveler information” be included as a typical PI strategy rather than a TO strategy, because “traveler information” fits more logically in the PI component. The New Jersey DOT recommended that the phrase “public information and outreach requirements” be changed to “public information and outreach strategies,” so as to soften the tone of the language.

We agree with both of the above observations; therefore, we added a new sentence after the first sentence, to indicate that the PI component may include traveler information strategies. We also changed the phrase “public information and outreach requirements” to “public information and outreach strategies” in the third sentence.

Section 630.1012(b)(4), Coordinated Development of TMP. Most respondents were supportive of the provisions in this section. The AASHTO and several DOTs

recommended that the terminology, "coordination and partnership" in the first sentence, be changed to "consultation," so that it doesn't imply active and direct participation from all the subjects. They explained that the term "coordination" implies that all participants have veto/negative powers which may delay project delivery as it is impossible to satisfy everybody. Further, the DOTs of Idaho, Montana, North Dakota, South Dakota, and Wyoming commented that the use of "i.e." for the list of stakeholders implies that all those stakeholders are required for all projects. So they recommended that we change the "i.e." to "e.g." so that it would imply that the list provides examples of possible stakeholders, and that all of them need not be involved in all projects.

The FHWA agrees with both of the above observations and recommendations; therefore, we changed the phrase "partnership and coordination" to "consultation" in the first sentence of this section. We also changed "i.e." to "e.g." for the list of stakeholders.

Section 630.1012(c), Inclusion of TMPs in Plans, Specifications, and Estimates (PS&Es). Most respondents were supportive of the provisions in this section. The DOTs of Idaho, Montana, North Dakota, South Dakota, and Wyoming noted that the last sentence in this section could imply that the State shall approve any TMP that is developed by the contractor, irrespective of whether it meets the standards or not. They recommended that the sentence be revised for clarity.

The FHWA agrees with the above observation. We revised the last sentence of this section to convey that contractor developed TMPs shall be subject to the approval of the State, and that the TMPs shall not be implemented before they are approved by the State. This clarifies the language and explicitly states the notion that it is the State that is ultimately responsible for approving any contractor developed TMP.

Section 630.1012(d), Pay Items. Most respondents were supportive of the provisions in this section. However, the ATSSA and the AGC of America opposed the option in § 630.1012(d)(1) for States to use lump sum pay items for implementing the TMPs. The ATSSA believes that unit bid items provide greater specificity and are a better indicator of the direct cost of work zones. Conversely, the use of a lump sum pay item provides less comprehensive data, and may, in some cases, limit, or eliminate the contractor's ability to make a profit on certain

projects due to unknown equipment or device requirements either during bidding or project implementation. It cited that unit pay items, especially for the TTC plan, would require that all the identified work zone safety and mobility strategies/equipment/devices be provided for by the contractor. This would level the playing field, and not place conscientious contractors (those who lay emphasis on work zone safety and mobility and include them in their bids) at a disadvantage.

The FHWA recognizes ATSSA's and AGC's concerns, but we believe that States have the required understanding of when to use unit pay items and when not to, and that the requirement for unit pay items on all projects is not practical for real-world application. Therefore, we did not remove the option for DOTs to use lump sum contracting.

We changed "i.e." to "e.g." for the list of possible performance criteria for performance specifications in § 630.1012(d)(2), to remove the implication that the list is an exhaustive list of performance criteria.

Section 630.1012(e), Responsible Persons. Most respondents were supportive of the provisions in this section. A few State DOTs remarked that the terms "qualified person," "assuring," and "effectively administered," in § 630.1012(e) were ambiguous and lent themselves to subjective interpretation.

The FHWA agrees with the above observations. We changed the term "qualified" to "trained," as specified in § 630.1008(d) so as to clarify the requirement for the responsible person. We also changed the phrase "assuring that" to "implementing," and deleted the phrase, "are effectively administered."

Section 630.1014 Implementation

Most respondents were supportive of the provisions in this section. We did not make any changes to the language in this section.

Section 630.1016 Compliance Date

Most respondents were supportive of the provisions in this section. We did not make any changes to the language in this section.

Rulemaking Analyses and Notices

Executive Order 12866 (Regulatory Planning and Review) and U.S. DOT

Regulatory Policies and Procedures

The FHWA has determined that this action is not a significant regulatory action within the meaning of Executive Order 12866 or significant within the meaning of the U.S. Department of

Transportation regulatory policies and procedures.

This final rule is not anticipated to adversely affect, in a material way, any sector of the economy. In addition, these changes will not create a serious inconsistency with any other agency's action or materially alter the budgetary impact of any entitlements, grants, user fees, or loan programs; nor will the changes raise any novel legal or policy issues. Therefore, a full regulatory evaluation is not required.

Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (RFA) (Pub. L. 96-354, 5 U.S.C. 601-612), the FHWA has evaluated the effects of this final rule on small entities and has determined that it will not have a significant economic impact on a substantial number of small entities.

This rule applies to State departments of transportation in the execution of their highway program, specifically with respect to work zone safety and mobility. The implementation of the provisions in this rule will not affect the economic viability or sustenance of small entities, as States are not included in the definition of small entity set forth in 5 U.S.C. 601. For these reasons, the RFA does not apply and the FHWA certifies that the final rule will not have a significant economic impact on a substantial number of small entities.

Unfunded Mandates Reform Act of 1995

This final rule will not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, March 22, 1995, 109 Stat. 48). The final rule will not result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$120.7 million or more in any one year (2 U.S.C. 1532).

Executive Order 13132 (Federalism)

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 13132, dated August 4, 1999, and it has been determined that this action does not have a substantial direct effect or sufficient federalism implications on States that would limit the policymaking discretion of the States. Nothing in this document directly preempts any State law or regulation or affects the States' ability to discharge traditional State governmental functions.

Executive Order 12372 (Intergovernmental Review)

Catalog of Federal Domestic Assistance Program Number 20.205,

Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program.

Paperwork Reduction Act of 1995

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the Office of Management and Budget (OMB) for each collection of information they conduct, sponsor, or require through regulations.

The FHWA has determined that this final rule contains a requirement for data and information to be collected and maintained in the support of design, construction, and operational decisions that affect the safety and mobility of the traveling public related to highway and roadway work zones. This information collection requirement was submitted to and approved by the OMB, pursuant to the provisions of the PRA. In this submission, the FHWA requested the OMB to approve a single information collection clearance for all of the data and information in this final rule. The requirement has been approved, through July 31, 2007; OMB Control No. 2125-0600.

The FHWA estimates that a total of 83,200 burden hours per year would be imposed on non-Federal entities to provide the required information for the regulation requirements. Respondents to this information collection include State Transportation Departments from all 50 States, Puerto Rico, and the District of Columbia. The estimates here only include burdens on the respondents to provide information that is not usually and customarily collected.

Executive Order 13175 (Tribal Consultation)

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that this action will not have substantial direct effects on one or more Indian tribes; will not impose substantial direct compliance costs on Indian tribal governments; and will not preempt tribal law. This rulemaking primarily applies to urbanized metropolitan areas and National Highway System (NHS) roadways that are under the jurisdiction of State transportation departments. The purpose of this final rule is to mitigate the safety and mobility impacts of highway construction and maintenance projects on the transportation system, and would not impose any direct compliance requirements on Indian tribal governments and will not have any economic or other impacts on the

viability of Indian tribes. Therefore, a tribal summary impact statement is not required.

Executive Order 13211 (Energy Effects)

The FHWA has analyzed this action under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution or Use. We have determined that this is not a significant energy action under that order because it is not a significant regulatory action under Executive Order 12866 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Further, we believe that the implementation of the final rule by State departments of transportation will reduce the amount of congested travel on our highways, thereby reducing the fuel consumption associated with congested travel. Therefore, the FHWA certifies that a Statement of Energy Effects under Executive Order 13211 is not required.

National Environmental Policy Act

The FHWA has analyzed this action for the purposes of the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347 *et seq.*) and has determined that this action will not have any effect on the quality of the environment. Further, we believe that the implementation of the final rule by State departments of transportation will reduce the amount of congested travel on our highways. This reduction in congested travel will reduce automobile emissions thereby contributing to a cleaner environment.

Executive Order 12630 (Taking of Private Property)

The FHWA has analyzed this final rule under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this action will affect a taking of private property or otherwise have taking implications under Executive Order 12630.

Executive Order 12988 (Civil Justice Reform)

This action meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

Executive Order 13045 (Protection of Children)

The FHWA has analyzed this action under Executive Order 13045, Protection of Children from

Environmental Health Risks and Safety Risks. The FHWA certifies that this action will not cause an environmental risk to health or safety that may disproportionately affect children.

Regulation Identification Number

A regulation identification number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross reference this action with the Unified Agenda.

List of Subjects in 23 CFR Part 630

Government contracts, Grant programs—transportation, Highway safety, Highways and roads, Incorporation by reference, Project agreement, Traffic regulations.

Issued on: September 1, 2004.

Mary E. Peters,

Federal Highway Administrator.

■ In consideration of the foregoing, the FHWA amends title 23, Code of Federal Regulations, Part 630, as follows:

PART 630—PRECONSTRUCTION PROCEDURES

■ 1. The authority citation for part 630 continues to read as follows:

Authority: 23 U.S.C. 106, 109, 115, 315, 320, and 402(a); 23 CFR 1.32; and 49 CFR 1.48(b).

■ 2. Revise subpart J of part 630 to read as follows:

Subpart J—Work Zone Safety and Mobility

- Sec.
- 630.1002 Purpose.
- 630.1004 Definitions and explanation of terms.
- 630.1006 Workzone safety and mobility policy.
- 630.1008 State-level processes and procedures.
- 630.1010 Significant projects.
- 630.1012 Project-level procedures.
- 630.1014 Implementation.
- 630.1016 Compliance date.

§ 630.1002 Purpose.

Work zones directly impact the safety and mobility of road users and highway workers. These safety and mobility impacts are exacerbated by an aging highway infrastructure and growing congestion in many locations. Addressing these safety and mobility issues requires considerations that start early in project development and continue through project completion. Part 6 of the Manual On Uniform Traffic

Control Devices (MUTCD)¹ sets forth basic principles and prescribes standards for the design, application, installation, and maintenance of traffic control devices for highway and street construction, maintenance operation, and utility work. In addition to the provisions in the MUTCD, there are other actions that could be taken to further help mitigate the safety and mobility impacts of work zones. This subpart establishes requirements and provides guidance for systematically addressing the safety and mobility impacts of work zones, and developing strategies to help manage these impacts on all Federal-aid highway projects.

§ 630.1004 Definitions and explanation of terms.

As used in this subpart:

Highway workers include, but are not limited to, personnel of the contractor, subcontractor, DOT, utilities, and law enforcement, performing work within the right-of-way of a transportation facility.

Mobility is the ability to move from place to place and is significantly dependent on the availability of transportation facilities and on system operating conditions. With specific reference to work zones, mobility pertains to moving road users efficiently through or around a work zone area with a minimum delay compared to baseline travel when no work zone is present, while not compromising the safety of highway workers or road users. The commonly used performance measures for the assessment of mobility include delay, speed, travel time and queue lengths.

Safety is a representation of 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. The commonly used measures for highway safety are the number of crashes or the consequences of crashes (fatalities and injuries) at a given location or along a section of highway during a period of time. Highway worker safety in work zones refers to the safety of workers at the work zone interface with traffic and the impacts of the work zone design on

¹ The MUTCD is approved by the FHWA and recognized as the national standard for traffic control on all public roads. It is incorporated by reference into the Code of Federal Regulations at 23 CFR part 655. It is available on the FHWA's Web site at <http://mutcd.fhwa.dot.gov> and is available for inspection and copying at the FHWA Washington, DC Headquarters and all FHWA Division Offices as prescribed at 49 CFR part 7.

worker safety. The number of worker fatalities and injuries at a given location or along a section of highway, during a period of time are commonly used measures for highway worker safety.

*Work zone*² is an area of a highway with construction, maintenance, or utility work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to the END ROAD WORK sign or the last temporary traffic control (TTC) device.

*Work zone crash*³ means a traffic crash in which the first harmful event occurs within the boundaries of a work zone or on an approach to or exit from a work zone, resulting from an activity, behavior, or control related to the movement of the traffic units through the work zone. This includes crashes occurring on approach to, exiting from or adjacent to work zones that are related to the work zone.

Work zone impacts refer to work zone-induced deviations from the normal range of transportation system safety and mobility. The extent of the work zone impacts may vary based on factors such as, road classification, area type (urban, suburban, and rural), traffic and travel characteristics, type of work being performed, time of day/night, and complexity of the project. These impacts may extend beyond the physical location of the work zone itself, and may occur on the roadway on which the work is being performed, as well as other highway corridors, other modes of transportation, and/or the regional transportation network.

§ 630.1006 Work zone safety and mobility policy.

Each State shall implement a policy for the systematic consideration and management of work zone impacts on all Federal-aid highway projects. This policy shall address work zone impacts

² MUTCD, Part 6, "Temporary Traffic Control," Section 6C.02, "Temporary Traffic Control Zones."

³ "Model Minimum Uniform Crash Criteria Guideline" (MMUCC), 2d Ed. (Electronic), 2003, produced by National Center for Statistics and Analysis, National Highway Traffic Safety Administration (NHTSA), Telephone 1-(800)-934-8517. Available at the URL: <http://www-nrd.nhtsa.dot.gov>. The NHTSA, the FHWA, the Federal Motor Carrier Safety Administration (FMCSA), and the Governors Highway Safety Association (GHSA) sponsored the development of the MMUCC Guideline which recommends voluntary implementation of the 111 MMUCC data elements and serves as a reporting threshold that includes all persons (injured and uninjured) in crashes statewide involving death, personal injury, or property damage of \$1,000 or more. The Guideline is a tool to strengthen existing State crash data systems.

throughout the various stages of the project development and implementation process. This policy may take the form of processes, procedures, and/or guidance, and may vary based on the characteristics and expected work zone impacts of individual projects or classes of projects. The States should institute this policy using a multi-disciplinary team and in partnership with the FHWA. The States are encouraged to implement this policy for non-Federal-aid projects as well.

§ 630.1008 State-level processes and procedures.

(a) This section consists of State-level processes and procedures for States to implement and sustain their respective work zone safety and mobility policies. State-level processes and procedures, data and information resources, training, and periodic evaluation enable a systematic approach for addressing and managing the safety and mobility impacts of work zones.

(b) *Work zone assessment and management procedures.* States should develop and implement systematic procedures to assess work zone impacts in project development, and to manage safety and mobility during project implementation. The scope of these procedures shall be based on the project characteristics.

(c) *Work zone data.* States shall use field observations, available work zone crash data, and operational information to manage work zone impacts for specific projects during implementation. States shall continually pursue improvement of work zone safety and mobility by analyzing work zone crash and operational data from multiple projects to improve State processes and procedures. States should maintain elements of the data and information resources that are necessary to support these activities.

(d) Training. States shall require that personnel involved in the development, design, implementation, operation, inspection, and enforcement of work zone related transportation management and traffic control be trained, appropriate to the job decisions each individual is required to make. States shall require periodic training updates that reflect changing industry practices and State processes and procedures.

(e) Process review. In order to assess the effectiveness of work zone safety and mobility procedures, the States shall perform a process review at least every two years. This review may include the evaluation of work zone data at the State level, and/or review of randomly selected projects throughout

their jurisdictions. Appropriate personnel who represent the project development stages and the different offices within the State, and the FHWA should participate in this review. Other non-State stakeholders may also be included in this review, as appropriate. The results of the review are intended to lead to improvements in work zone processes and procedures, data and information resources, and training programs so as to enhance efforts to address safety and mobility on current and future projects.

§ 630.1010 Significant projects.

(a) A significant project is one that, alone or in combination with other concurrent projects nearby is anticipated to cause sustained work zone impacts (as defined in § 630.1004) that are greater than what is considered tolerable based on State policy and/or engineering judgment.

(b) The applicability of the provisions in §§ 630.1012(b)(2) and 630.1012(b)(3) is dependent upon whether a project is determined to be significant. The State shall identify upcoming projects that are expected to be significant. This identification of significant projects should be done as early as possible in the project delivery and development process, and in cooperation with the FHWA. The State's work zone policy provisions, the project's characteristics, and the magnitude and extent of the anticipated work zone impacts should be considered when determining if a project is significant or not.

(c) All Interstate system projects within the boundaries of a designated Transportation Management Area (TMA) that occupy a location for more than three days with either intermittent or continuous lane closures shall be considered as significant projects.

(d) For an Interstate system project or categories of Interstate system projects that are classified as significant through the application of the provisions in § 630.1010(c), 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 §§ 630.1012(b)(2) and 630.1012(b)(3). 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.

§ 630.1012 Project-level procedures.

(a) This section provides guidance and establishes procedures for States to manage the work zone impacts of individual projects.

(b) *Transportation Management Plan (TMP)*. A TMP consists of strategies to manage the work zone impacts of a project. Its scope, content, and degree of detail may vary based upon the State's work zone policy, and the State's understanding of the expected work zone impacts of the project. For significant projects (as defined in § 630.1010), the State shall develop a TMP that consists of a Temporary Traffic Control (TTC) plan and addresses both Transportation Operations (TO) and Public Information (PI) components. For individual projects or classes of projects that the State determines to have less than significant work zone impacts, the TMP may consist only of a TTC plan. States are encouraged to consider TO and PI issues for all projects.

(1) A TTC plan describes TTC 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 under Part 6 of the MUTCD and with the work zone hardware recommendations in Chapter 9 of the American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide, Chapter 9 of the AASHTO Roadside Design Guide: "Traffic Barriers, Traffic Control Devices, and Other Safety Features for Work Zones" 2002, is incorporated by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51 and is on file at the National Archives and Record Administration (NARA). For information on the availability of this material at NARA call (202) 741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. The entire document is available for purchase from the American Association of State Highway and Transportation Officials (AASHTO), 444 North Capitol Street, NW., Suite 249, Washington, DC 20001 or at the URL: <http://www.aashto.org/bookstore>. It is available for inspection from the FHWA Washington Headquarters and all Division Offices as listed in 49 CFR Part 7. In developing and implementing the TTC plan, pre-existing roadside safety hardware shall be maintained at an equivalent or better level than existed prior to project implementation. The scope of the TTC plan is determined by the project characteristics, and the traffic safety and

control requirements identified by the State for that project. The TTC plan shall either be a reference to specific TTC elements in the MUTCD, approved standard TTC plans, State transportation department TTC manual, or be designed specifically for the project.

(2) The TO component of the TMP shall include the identification of strategies that will be used to mitigate impacts of the work zone on the operation and management of the transportation system within the work zone impact area. Typical TO strategies may include, but are not limited to, demand management, corridor/network management, safety management and enforcement, and work zone traffic management. The scope of the TO component should be determined by the project characteristics, and the transportation operations and safety strategies identified by the State.

(3) The PI component of the TMP shall include communications 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. This may include traveler information strategies. The scope of the PI component should be determined by the project characteristics and the public information and outreach strategies identified by the State. Public information should be provided through methods best suited for the project, and may include, but not be limited to, information on the project characteristics, expected impacts, closure details, and commuter alternatives.

(4) States should develop and implement the TMP in sustained consultation with stakeholders (e.g., other transportation agencies, railroad agencies/operators, transit providers, freight movers, utility suppliers, police, fire, emergency medical services, schools, business communities, and regional transportation management centers).

(c) The Plans, Specifications, and Estimates (PS&Es) shall include either a TMP or provisions for contractors to develop a TMP at the most appropriate project phase as applicable to the State's chosen contracting methodology for the project. A contractor developed TMP shall be subject to the approval of the State, and shall not be implemented before it is approved by the State.

(d) The PS&Es shall include appropriate pay item provisions for implementing the TMP, either through method or performance based specifications.

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(1) For method-based specifications individual pay items, lump sum payment, or a combination thereof may be used.

(2) For performance based specifications, applicable performance criteria and standards may be used (*e.g.*, safety performance criteria such as number of crashes within the work zone; mobility performance criteria such as travel time through the work zone, delay, queue length, traffic volume; incident response and clearance criteria; work duration criteria).

(e) Responsible persons. The State and the contractor shall each designate a trained person, as specified in § 630.1008(d), at the project level who has the primary responsibility and sufficient authority for implementing the TMP and other safety and mobility aspects of the project.

§ 630.1014 Implementation.

Each State shall work in partnership with the FHWA in the implementation of its policies and procedures to improve work zone safety and mobility. At a minimum, this shall involve an FHWA review of conformance of the State's policies and procedures with this regulation and reassessment of the State's implementation of its procedures at appropriate intervals. Each State is encouraged to address implementation of this regulation in its stewardship agreement with the FHWA.

§ 630.1016 Compliance Date.

States shall comply with all the provisions of this rule no later than October 12, 2007. For projects that are in the later stages of development at or about the compliance date, and if it is determined that the delivery of those projects would be significantly impacted as a result of this rule's provisions, States may request variances for those projects from the FHWA, on a project-by-project basis.

[FR Doc. 04-20340 Filed 9-8-04; 8:45 am]

BILLING CODE 4910-22-P

APPENDIX B TRAFFIC CONTROL PLAN (TCP)

Traffic control strategies, devices, and contracting/construction techniques and coordination are used to facilitate traffic flow and safety through and around work zones. Standards, guidance, and other information defining the proper use of the traffic control strategies and devices are provided in Part 6 - Temporary Traffic Control of the DeIDOT MUTCD, DeIDOT's Road Design Manual and Chapter 9 - Traffic Barriers, Traffic Control Devices, and Other Safety Features for Work Zones of the AASHTO Roadside Design Guide.

Where appropriate, the construction approach/phasing/staging strategy should be provided on detailed plan sheets with plans for accommodating traffic at each stage. The work zone transportation management strategies should be documented on the plan sheets where possible (e.g., geometric improvements, control devices, etc.). If not, the strategies should be listed with text describing any restrictions, usage (duration, stage/phase, etc.), or other considerations. The type, number, location, and timing for traffic control devices should be listed for directing traffic through the work zone. Any work schedule restrictions should be documented for each stage (e.g., night work, peak hour restrictions, etc.).

1. Control Strategies

This category includes various traffic control approaches used to accommodate road users within the work zone or the adjoining corridor in an efficient and safe manner, while providing adequate access to the roadway for the required construction, maintenance, or utility work to be performed.

- A. **Construction Phasing/Staging.** Staging typically refers to how the contractor will position the equipment and materials. Phasing refers to the sequencing of the aspects of a project, completing portions of the project one part at a time.
- B. **Full Roadway Closures.** This strategy involves complete closure of the roadway for various time periods to minimize the duration of the project and improve worker safety by reducing traffic conflicts. Full closures may be brief (e.g., intermittent, off-peak), short-term (e.g., night, weekend), or long-term (e.g., continuous for the duration of the project).
- C. **Lane Shifts or Closures.** Lane shifts or closures last for varying durations of time. They may be intermittent, off-peak, night, weekend, for a single project phase, or continuous for the duration of the project. This strategy involves multiple approaches including:
 - **Lane Closures to Provide Worker Safety.** This strategy closes one or more existing traffic lanes to accommodate work activities.
 - **Reduced Shoulder Width to Maintain Number of Lanes.** This involves reducing the width of the inside and/or outside shoulder to maintain the existing number of lanes on the facility while allowing access for the work activities to take place.
 - **Shoulder Closures to Provide Worker Safety.** This strategy closes the shoulder to traffic, making it available to accommodate the work activities.
- D. **Reduced Lane Widths to Maintain Number of Lanes.** This involves reducing the width of one or more lanes in order to maintain the existing number of lanes on the facility while permitting work access to part of the facility.

- **Lane Shift to Shoulder/Median to Maintain Number of Lanes.** This strategy involves diverting traffic onto the shoulder, or a portion of the shoulder, for use as a traffic lane.
- E. **One-Lane, Two-way Operation.** One lane, two-way traffic control involves using one lane for both directions of traffic, allowing work activities to occur in the lane that is closed.
- F. **Two-Way Traffic on One Side of Divided Facility (Crossover).** This strategy involves closing one side of a divided facility to permit the work to proceed without traffic interference while both directions of traffic are accommodated on the opposing side of the roadway.
- G. **Reversible Lanes.** This strategy, also known as variable lanes or contra-flow lanes, involves sharing lane(s) of travel to accommodate peak-period traffic flow. The direction of travel in the shared lane varies by time of day or day of the week.
- H. **Ramp Closures/Relocation.** Ramp closure involves closing one or more ramps in or near the work zone for specific time periods or construction phases to allow work access or improve traffic flow on the mainline.
- I. **Night Work.** Work is performed at night (end of evening peak period to beginning or morning peak period) to minimize work zone impacts on traffic and adjacent businesses.
- J. **Weekend Work.** Construction work (all or individual phases) is restricted to weekend periods from the end of the Friday afternoon peak period to the beginning of the Monday morning peak period.
- K. **Work Hour Restrictions for Peak Travel.** This involves restricting work hours such that work that impacts traffic does not occur during periods of peak travel demand and congestion (e.g., peak hours, holidays, special events).
- L. **Pedestrian/Bicycle Access Improvements.** This strategy involves providing alternate facilities for bicyclists and pedestrians in places where the work zone impacts their accessibility.
- M. **Business Access Improvements.** Some projects will have a direct impact on businesses, particularly to accessibility. Accessibility improvements for businesses may include signage or information to direct motorists to the businesses and/or relocation of access locations.
- N. **Off-Site Detours/Use of Alternate Routes.** This strategy involves re-routing some or all traffic off of the roadway under construction and to other existing roadways.

2. Traffic Control Devices

The DelDOT MUTCD provides standards, guidelines, and other information pertaining to installing, maintaining, and operating traffic control devices on streets and highways. Part 6 of the DelDOT MUTCD - Temporary Traffic Control, addresses safety, mobility, and constructability issues in work zones. Traffic control devices and other safety devices used for work zones include:

- A. **Temporary Signs.** Several types of temporary signs can be used to provide information to road users to enable safe and efficient travel through the work zone or a detour. Temporary signs are an essential and integral part of temporary traffic control, and are used in nearly all work zones.
- B. **Changeable Message Signs (CMS).** Both fixed and portable changeable message signs are highly effective in conveying work zone information to drivers, especially when that information is subject to frequent change or it addresses a short term or current

situation or condition within the work zone. These signs provide real time information to drivers concerning specific work operations, traffic patterns, and other conditions in the work zone. These devices assist drivers in avoiding conflicts and potential crashes as they travel through the work zone. Consideration should be given to providing a CMS that is controlled by DelDOT potentially via the Transportation Management Center.

- C. **Arrow Panels.** Also referred to as arrow boards, arrow panels operating in flashing or sequential mode are intended to aid motorists in navigating and merging through and around the work zone.
- D. **Channelizing Devices.** This strategy involves the use of channelizing devices such as traffic cones, drums, barricades, or tubular markers for traffic control through the work zone. The purpose is to define the intended travel path through the work zone and delineate potential work zone hazards.
- E. **Temporary Pavement Markings.** Various types of temporary markings on the pavement are available to define travel lanes and provide guidance and information for the road user through the work zone.
- F. **Flaggers and Uniformed Traffic Control Officers.** Flaggers, and to a lesser extent police or traffic control officers, are used to direct and control road user and pedestrian traffic in work zones.
- G. **Temporary Traffic Signals.** This strategy involves the use of fixed or portable temporary traffic signals to improve traffic flow through and near the work zone and/or address safety concerns.
- H. **Lighting Devices.** A wide range of lighting devices, listed in Part 6 of the Delaware MUTCD, is available for use in work zones. Lighting strategies offer enhancement to other work zone strategies by attracting attention to the devices and improving delineation, particularly for adverse conditions. They can also be used for improved worker safety and for guiding road users through a work zone, particularly for night work.

3. Project Coordination, Contracting, and Innovative Construction Strategies

- A. **Project Coordination.** Project coordination strategies having the potential to reduce mobility and safety impacts of work zone activities include:
 - **Coordination with Other Projects.** This involves coordinating, sequencing, and scheduling projects to minimize motorist delay and impacts to potentially affected businesses and communities.
 - **Utilities Coordination.** This involves coordinating and scheduling utility work both within the impacted work zone area and near the project to minimize potential work disruptions or interruptions due to utility work, and reduce overall construction duration. Coordination can also reduce the recurrence of work zones by doing two jobs together. For example, the installation of a communications conduit (for traffic management, ITS, etc.) along a highway corridor may coincide with a pavement reconstruction project on that highway.
 - **Right-of-Way Coordination.** Increased consideration of potential right-of-way needs and issues may help reduce project delays and duration.
 - **Coordination with Other Transportation Infrastructure.** Coordination with non-highway transportation facilities such as transit junctions, railroad crossings, and intermodal facilities can help minimize traffic disruptions.

- C. **Contracting Strategies.** These strategies typically involve contractual agreements to reduce the project duration or traffic impacts including:
- **Design-Build.** This strategy involves the use of one contract to design and build the project thus reducing project duration by allowing construction to begin prior to design completion.
 - **A+B Bidding.** A+B bidding encourages contractors to minimize construction impacts by reducing construction time. Part A refers to the contractor's bid for the actual items of work, and Part B is the total of the number of days bid to complete the project multiplied by the daily road user cost stipulated in the contract. The combined values of the A and B portions determine the winning bid. The contractor's payment is based on both Part A and the actual number of days used under Part B.
 - **Incentive/Disincentive Clauses.** This strategy involves the use of incentives and/or disincentives in the construction contract to minimize construction duration.
 - **Lane Rental.** Lane rental involves a charge assessed to the contractor when a portion of the roadway is obstructed and unavailable to traffic. The lane rental charge can vary according to time of day, day of week, number of lanes impacted, and duration. The contractor's bid includes an estimate of the number of hours that closures will be in place, with the actual payment to the contractor based on the actual use of closures.
- D. **Innovative Construction Techniques (Precast Members, Rapid Cure Materials).** These strategies involve the use of special materials such as quick curing concrete or precast items (e.g., culverts, bridge deck slabs, and pavement slabs) to minimize the duration of construction or maintenance activities where traffic restrictions need to be minimized (e.g., roadways with high volumes), and when work activities need to be completed during night or weekend periods to allow reopening travel lanes for normal weekday travel.

APPENDIX C

TRAFFIC OPERATIONS (TO) STRATEGIES

Transportation operations strategies are used to mitigate work zone impacts through the use of improved transportation operations and management of the transportation system. TO strategies typically include demand management, corridor/network management, work zone safety management strategies, and traffic/incident management and enforcement strategies.

1. Demand Management Strategies

Demand management strategies include a wide range of techniques intended to reduce the volume of traffic traveling through the work zone by diverting travelers to alternate modes, shifting trips to off-peak hours, or shifting vehicles to alternate routes. These strategies include:

- A. **Transit Service Improvements.** Where appropriate, transit service improvements may include the modification of transit schedules and/or routes, increases in frequency, or the establishment of transit service in the corridor.
- B. **Transit Incentives.** Transit incentives include employer and/or traveler transit subsidies and guaranteed ride home programs.
- C. **Shuttle Services.** Shuttles and charter buses can reduce traffic volumes through a work zone if a sufficient number of users along the corridor are anticipated to use the service.
- D. **Ridesharing/Carpooling Incentives.** This strategy involves the use of rideshare/ carpool incentives to reduce the number of vehicles traveling through a work zone. Incentives may include preferential parking for carpools or provision of vanpool vehicles, etc.
- E. **Park-and-Ride Promotion.** This involves the creation, expansion, and/or promotion of park-and-ride lots to encourage ridesharing or transit use, thus reducing the number of vehicles traveling through the work zone.
- F. **Toll/congestion Pricing.** Tolls involve fees paid by motorists to drive on a particular roadway. Congestion pricing, or value pricing, is intended to reduce peak-period vehicle trips through the use of higher tolls during congested conditions.
- G. **Variable Work Hours.** This strategy involves encouraging motorists who typically travel through the work zone during periods of high demand to work variable hours (off-peak) in order to reduce travel demand during peak periods.
- H. **Telecommuting.** Telecommuting means working at home, or at a telecommuting center near home, either full or part time. Motorists who normally travel through the work zone would be encouraged to telecommute for the duration of the project to reduce the demand.

2. Corridor/Network Management Strategies

This category includes strategies to optimize traffic flow through the work zone corridor and adjacent roadways using various traffic operations techniques and technologies, including:

- A. **Signal Timing/Coordination Improvements.** This involves retiming traffic signals and bringing signals “on system” by providing a connection with the TMC to increase throughput of the roadway(s), improve traffic flow, and optimize intersection capacity in

and around the work zone. Consideration should also be given to providing system loops to gain traffic volume information to aid in monitoring traffic impacts.

- B. **Temporary Traffic Signals.** The installation of temporary traffic signals can be used to improve traffic flow through and near the work zone. At a corridor or network level, using temporary traffic signals is more effective than stop signs or flaggers for providing mobility through the work zone area. These temporary traffic signals may also be coordinated with existing signals.
- C. **Street/Intersection Improvements.** Improvements on streets and intersections for the roadway and/or alternate routes may be necessary to provide increased capacity to handle the traffic through the work zone or within the adjacent corridor. This may include improvements to the mainline and intersections, including roadway and/or shoulder widening and additional through and/or turn lanes.
- D. **Bus Turnouts.** This involves the construction of bus stop areas that are recessed from the travel lanes. This strategy may be helpful in work zones or on detour routes with a high occurrence of bus traffic and stops.
- E. **Turn Restrictions.** This involves restricting turn movements for driveways and/or intersections to increase roadway capacity, reduce potential congestion and delays, and improve safety. Restrictions may be applied during peak periods or all day.
- F. **Parking Restrictions.** This strategy involves the elimination of parking in all or part of the work zone and/or alternate routes, or parking restrictions during work hours or peak traffic periods. Parking restrictions can be used to increase capacity by converting the parking lane to an additional travel lane, reduce traffic conflicts, or provide improved access to the work area.
- G. **Truck/heavy Vehicle Restrictions.** This strategy, which imposes restrictions on truck travel through the work zone either during specific periods or at all times, can increase passenger vehicle capacity of the roadway when a facility normally has a high truck volume.
- H. **Separate Truck Lanes.** This strategy involves the provision of a separate truck lane through the restricted use of an existing lane, use of the shoulder or median, or construction of a new lane.
- I. **Reversible Lanes.** This strategy, also known as variable lanes or contra-flow lanes, involves sharing lane(s) of travel to accommodate peak period traffic flow. The direction of travel in the shared lane varies by time of day or day of the week.
- J. **Dynamic Lane Closure System (also called Dynamic Lane Merge System).** This system uses dynamic electronic signs and other special devices to control vehicle merging at the approach to lane closures.
- K. **Ramp Metering.** Ramp meters are traffic signals located on on-ramps or freeway connectors to maintain safe and smooth freeway operations by controlling the entry of vehicles onto the roadway. This strategy serves both to decrease demand on a facility by controlling the entrance of vehicles, and to improve flow by matching entering vehicles to gaps in the traffic stream.
- L. **Ramp Closures.** Ramp closure involves closing one or more ramps in or around the work zone. The ramp closure may be necessary to provide work access within the work space or can be used to improve traffic flow on the mainline.
- M. **Railroad Crossings Controls.** When a rail crossing is located within a work zone and/or on a detour or diversion route, traffic control improvements at the crossing may become necessary for safety purposes, especially if work zone delays and congestion have the potential to force vehicles to stop on the tracks or between the crossing gates. Improvements may include advanced warning signs, railroad crossing signs, pavement

markings, flashing lights, gate arms, flaggers or police officers, and possibly closure of the crossing to traffic during work periods.

- N. **Coordination with Adjacent Construction Sites.** This involves combining or coordinating projects within a specific corridor to minimize the combined impacts on the public and community. Coordination typically involves scheduling projects within a corridor to ensure that adequate capacity remains available to accommodate the anticipated travel demand within the corridor by not implementing work zones on adjacent or parallel highways at the same time. This may entail communicating about the timing of lane closures and occurrence of incidents, and coordinating diversion routes. It may also involve the completion of needed capacity and safety improvements on a highway prior to its use to carry traffic diverted or detoured from another project.

3. Work Zone Safety Management Strategies

This category includes devices, features, and management procedures used to address traffic safety concerns in work zones. Work zone safety management strategies include:

- A. **Speed Limit Reduction/Variable Speed Limits.** A reduced speed limit may improve traffic safety in a work zone and help protect workers. Speed limit reductions may be implemented through an entire work zone or only in active work areas or adjacent to workers. Reduced speed limits may also be appropriate on detours where traffic volumes and conflicts are increased.
- B. **Temporary Traffic Signals.** This involves the installation of temporary traffic signals to address safety concerns. In some work zones, temporary traffic signals can be used in place of traffic control officers or flaggers, which can increase safety by removing these personnel from the roadway.
- C. **Temporary Traffic Barrier.** Temporary traffic barriers provide positive physical separation between travel lanes and the adjacent work space, or between opposing travel lanes. Screens may be mounted on the top of temporary traffic barriers to discourage gawking and reduce headlight glare.
- D. **Movable Traffic Barrier Systems.** This system consists of a mechanical transfer machine, which quickly shifts temporary barrier laterally up to the full width of a travel lane while both the transfer operation and traffic in the work zone are protected. This system permits the rapid and safe reconfiguration of the traffic barrier system, allowing daily opening and closing of lanes for reversible lane operations and to provide additional space for the contractor to work during off-peak conditions.
- E. **Crash-Cushions.** Also known as an impact attenuator, a crash cushion is a fixed or mobile barrier used to protect a temporary hazard or prevent vehicle intrusion into the workspace or other hazardous area. It works by gradually decelerating the vehicle to a stop or by redirecting the vehicle away from the hazard.
- F. **Temporary Rumble Strips.** Rumble strips are grooves or raised strips placed across or adjacent to a travel lane to alert motorists to a change in roadway conditions, or that they have strayed out of the travel lane.
- G. **Intrusion Alarms.** This strategy involves the use of various types of sensors to detect vehicles that stray out of the travel lane approaching or adjacent to the workspace and into the work area. When an intrusion is detected, a loud siren and/or flashing lights provide a warning to workers.
- H. **Warning Lights.** Various types of warning lights, as described in the MUTCD, are available to alert drivers and pedestrians and draw attention to critical signs, channelizing devices, and other work zone features.

- I. **Construction Safety Supervisor/Inspectors.** Daily inspection and supervision of safety and/or traffic control operations is an integral part of project management, and can be provided by various contractor and/or agency personnel, as appropriate to their specific project responsibilities.
- J. **TMP Monitor/Inspection Team.** This strategy involves the establishment of a team (or person) to monitor and inspect implementation and monitoring of the work zone transportation management strategies.
- K. **Project On-Site Safety Training.** This strategy provides on-going safety training to ensure that workers are familiar with safety procedures and specific risks associated with the project, and to maintain a high level of safety awareness.
- L. **Windshield Surveys.** This strategy involves a designated DOT employee and/or contractor driving through the work zone area to conduct a firsthand assessment of safety and/or traffic flow. This strategy provides periodic assessments of the effectiveness of project safety features.

4. Traffic/Incident Management and Enforcement Strategies

This category includes various strategies to manage work zone traffic operations. Work zone traffic management strategies involve monitoring traffic conditions and making adjustments to traffic operations based on changing conditions. These strategies involve improved detection, verification, response, and clearance of crashes, mechanical failures, and other incidents in work zones and on detour routes. This category also includes strategies to provide adequate enforcement of traffic regulations in work zones. Strategies in this area include:

- A. **ITS for Traffic Monitoring/Management.** ITS can be used in work zones to identify areas where traffic flow is impeded so that traveler information can be provided and/or adjustments to the work zone can be made. This may include loop detectors or video cameras to observe real time traffic information and automatically feed this information to the DeIDOT's Transportation Management Center (TMC).
- B. **Transportation Management Center (TMC).** This strategy involves the use of DeIDOT's TMC for coordinating and managing traffic and incident management activities in and around the work zone.
- C. **Aerial Surveillance.** This involves the use of aerial surveillance to identify and verify traffic problems and incidents.
- D. **Motorist Assistant Patrols (MAP).** This strategy involves the use of specially equipped vehicles to reduce the time required to remove vehicles involved in an incident. The offer motorist assistance, assist and incident scenes and communicate problems and observations to the TMC.
- E. **Coordination with Media.** This strategy involves working with local news media to publicize traffic delays, incidents, and incident management. Working with media contacts in advance to establish procedures to be followed in the event of a major delay or incident can facilitate the dissemination of specific information upon the occurrence of a major delay or incident.
- F. **Local Detour Routes.** Advance identification and approval/authorization of local detour routes is an especially useful strategy to address major traffic delays and incidents, particularly for high volume and incident prone work zones. Flip signs or potentially color coded routes may be considered for permanent or long term detours.
- G. **Contract Support for Incident Management.** This strategy provides additional contract support for incident management and response beyond that available from the

construction contractor or within the agency. Contracts may include entities such as police agencies, towing/recovery providers, engineering consultants, or others, depending on the support needed for a project.

- H. **Incident/Emergency Management Coordinator.** This strategy provides a designated individual with overall responsibility for incident and emergency management on a project. Responsibilities may include developing incident and/or emergency response plans, overseeing implementation and monitoring of the work zone management strategies, and overall management of incidents or emergencies.
- I. **Incident/Emergency Response Plan.** This involves the development of a plan with information needed to respond to an incident. This information typically includes roles and responsibilities, response agencies, processes/procedures, actions to take for various incident types and levels, contact information, alternate routes, personnel and equipment information, staging area locations, and other information as appropriate to the individual project.
- J. **Dedicated (Paid) Police Enforcement.** This strategy provides police patrols in the work zone under a contractual arrangement with DelDOT.
- K. **Cooperative Police Enforcement.** Cooperative enforcement is similar to dedicated enforcement, except it is implemented through a cooperative agreement between the police and DelDOT.
- L. **Automated Enforcement.** Automated enforcement involves the use of various technologies such as radar, cameras, video, and sensors to detect and record vehicle speed or traffic signal violations. When a vehicle speed exceeds a specified threshold or a red signal violation occurs, the vehicle's license plate and/or driver are photographed. The citation with the photo(s) is then mailed to the registered owner of the vehicle. Legislation would be required for automated enforcement initiatives including speed enforcement.
- M. **Increased Penalties for Work Zone Violations.** This strategy involves the imposition of increased penalties for speeding or other violations in work zones. Such penalties include increased fines, increased points, license suspension, and even mandatory prison terms for serious violations.

APPENDIX D

PUBLIC INFORMATION AND OUTREACH STRATEGIES

1. What is a Work Zone Public Information and Outreach Campaign?

A work zone public information and outreach campaign involves several strategies to communicate with road users, the general public, area residences and businesses, and appropriate public entities regarding road construction projects.

More information can be found in FHWA's Work Zone Public Information and Outreach Strategies available at www.ops.fhwa.dot.gov/wz/resources/final_rule.htm.

2. Designing a Public Information and Outreach Campaign

For work zones, particularly those that are determined to be significant, a public information and outreach campaign should be developed and implemented. This section describes the steps needed to develop a campaign.

A. Determine the Appropriate Size and Nature of the Campaign

The size and nature of a public information and outreach effort should ideally be determined by the anticipated impacts of the road construction project. For a short-lived, small project causing minor traffic disruption, public information and outreach may be limited to routine publication of a Press Release on DelDOT's website and local newspapers. For a longer, more disruptive work zone, a more elaborate public information and outreach campaign may be warranted.

A range of elements should be considered when determining the size and nature of a public information and outreach campaign. These include the effects of the project on:

- Traffic delay and safety at both the corridor and network levels, including the effects on parallel corridors and alternate routes
- Traffic delay and safety at nearby intersections, interchanges, and railroad crossings.
- Special traffic and safety conditions such as heavy truck traffic and poor weather
- Disruptions of other modes of transportation including public transportation, pedestrian and bicycle access
- Evacuation routes
- Hazardous material transportation routes
- Emergency responders
- Other public and private entities (such as schools and universities)
- Planned special events (Dover Downs, holiday parades, concerts, etc.)
- Seasonal beach traffic
- Businesses and residences

B. Identify Resources

To be successful, a public information and outreach campaign must be supported with sufficient resources and therefore should be considered when developing project budgets.

Both internal DelDOT resources and external resources can play a role in developing and implementing a public information and outreach campaign. Internal resources include DelDOT staff, facilities and equipment (web sites, WTMC), dynamic message signs, kiosks). External resources may include paying for public relations expertise (possibly including graphic design and web design); radio, TV, and newspaper advertising; printing; or a public information center or kiosk. External resources that are low cost or free of charge may include radio and TV traffic broadcasts, newspaper articles, and help from project partners.

The budget for a work zone public information and outreach campaign will depend on several factors, including the size and nature of the campaign; the communication strategies selected; whether the selected strategies are already established by DelDOT and can readily be used; and the role of partners.

C. Identify Partners

In both the planning and implementation stages of a public information and outreach campaign consideration should be given to working with a range of partners. Partners in the public information and outreach process may include:

- State and local agencies (including neighboring municipalities, DART, Delaware State Police, DRBA)
- elected and appointed public officials
- major employers and service providers (e.g. hospitals) in the affected area
- TMA Delaware
- other groups such as neighborhoods associations, business associations, local Chambers of Commerce, etc.
- traveler information providers, including radio, TV, and newspapers

The major reasons for including these partners are:

- **To Establish Lines of Communication.** Such connections will be particularly important during major periods of disruption and when changes occur.
- **To Distribute Information.** Involving outside groups in the planning of an outreach campaign is in itself a way to distribute information. Holding a meeting with the aim of soliciting community input, for example, is also a way to inform the public of disruptions and plans to deal with them.
- **To Improve the Product.** Partners in developing outreach strategies will bring unique perspectives about successful types of message and methods of communication. This may be particularly important in areas with diverse population groups (e.g. non-English speaking communities, truck drivers, the elderly).
- **To Share the Costs.** Partners may be willing to share the costs of producing materials or to provide free forms of advertising. For example, major employers are often willing to incorporate messages in company communications.

One way to obtain input from affected parties is through a Working Group made up of stakeholders from the community likely to be impacted by the work zone. Ideally developed during the planning stage of the project, the objective of creating such a group is to obtain input and review/comment on the development and implementation of construction and transportation management strategies to minimize the impacts of the project on the community. Both DelDOT and the contractor may meet with the Working Group to obtain input and recommendations at various stages of the project delivery

process starting during planning and extending through design, construction, and project assessment.

While meeting with all stakeholders is important, meeting specifically with local businesses and business organizations is often a very important element of a public information and outreach effort. Businesses are a conduit for providing project information because they have a vested interest in communicating what they know with customers and suppliers. In addition, these meetings provide businesses the opportunity to suggest ways a project can be managed to minimize any negative effects.

D. Identify Your Target Audiences

A key to any public information and outreach campaign is to identify the target audience(s). This will help to determine the types of messages that need to be conveyed and the best methods of communicating those messages. Audiences can be identified through three categories listed in Figure 6. An outreach campaign also needs to take into consideration the different types of people affected by a work zone. Certain groups may need special information or information provided in a different way. Residents who live near an upcoming work zone are often a primary audience since they may be affected by the work zone on a daily basis. One of the most common situations is a large group or groups of limited-English speaking residents. Other segments of the population that may warrant special consideration are the elderly, children, and the disabled.

Figure 6: Public Information and Outreach Campaign Audiences

<p>Types of Travelers</p> <ul style="list-style-type: none"> • Pre-trip • En route • Personal – local, commute • Personal – local, non-commute • Personal – non-local (e.g., tourists) • Commercial – local • Commercial – non-local (long distance)
<p>Types of Trip Generators</p> <ul style="list-style-type: none"> • Major employers • Shopping districts/malls • Recreation and tourist facilities (e.g., parks, museums) • Organizers of planned special events • Emergency responders/hospitals • Business associations • Transportation management associations • Intermodal passenger terminals (e.g., airport) • Intermodal freight terminals (e.g., port)
<p>Types of People</p> <ul style="list-style-type: none"> • Residents (and neighborhood associations) • Minorities (particularly groups with limited English-speaking capability) • Special demographics (particularly elderly, children) • Disabled • Small business owners

E. Develop the Campaign Message(s)

Successful work zone public information and outreach campaigns generally incorporate three messages:

- **Safety First** - Encouraging motorists to take safety precautions to protect themselves and highway workers is the most important message to convey to drivers. Drivers should be continuously reminded to adhere to posted speed limits and stay alert to prevent crashes. This can be reinforced with warnings about increased traffic fines and enforcement activity if appropriate.
- **Plan Ahead to Minimize Delay and Frustration** - The disruptions caused by a work zone can be reduced if travelers plan ahead. Additionally, if travelers know what to expect they will be less frustrated about delays. Another general message that should be conveyed to the public is to think ahead about the timing of travel, the route, the mode, and the destination.

Work Zone Details - The current details of a work zone can be provided through a variety of public information and outreach strategies, including the web, project hotline, newspaper articles, dynamic message signs (DMS), and others. At a minimum the details of a work zone should include the dates and times of work zone activity and the routes, lanes, and ramps affected. If these details are changing, it is important to provide the most current information. Incorrect and out-of-date information can compromise the effectiveness of a public information and outreach campaign.

Travel Times and Delays - Public information on travel times and delays can range from very general (e.g., “Expect delays”) to very specific (e.g., “Travel time through work zone is 20 minutes”). More specific information is generally more useful to travelers and preferable when it is available.

Alternate Methods and Modes of Transportation - Reducing the amount of traffic through a work zone is one way of reducing congestion and travel delay. This may involve providing detailed information on carpooling/ridesharing, transit, park and ride, and telecommuting options. Messages regarding telecommuting may be targeted to major employers as well as commuters.

Alternate Routes - In many cases alternate routes will need to be devised and communicated to travelers. These routes may be different depending on the type of driver (local, long distance, commercial drivers) and timing. Alternate route messages are essential when construction involves shutting down an entire route. Alternate route messages may involve DMS located at decision points for drivers.

- **We Care** - Motorists are more willing to cope with disruptions and cooperate with directions when they feel that all necessary steps are being taken to make things easier. Acceptance of inconvenience related to the work being performed is more likely with a genuine message from those involved.

F. Determine Communication Strategies

After identifying the appropriate audience and messages for the work zone project the next step is to determine the strategies that will be used to get the messages to the target audiences. There is a wide range of ways to communicate with the public about work zones. The strategies used must be tailored to the project context, the message being conveyed, and funding limitations.

The following is a list of a number of communication strategies for disseminating work zone messages.

- Project websites
- Email alerts
- Web-connected traffic cameras
- Direct mail
- FYI brochures/flyers/fact sheets
- Newsletters
- Legislative briefings
- Public meetings/workshops/events
- Newspaper/TV/Radio advertising and articles
- Maps
- Project video
- Billboards
- Advertising on buses
- Information center or kiosk
- Project hotline
- Dynamic message signs (DMS)
- WTMC (travel advisory radio)
- Press kit

Communication strategies can be modified to fit the needs of the project for which they are being used. A combination of several of strategies may make sense for some projects, while only one or two of the strategies may be necessary for other projects. Typically there will be a significant amount of interaction between different means of communication. For example, informational materials such as brochures and fact sheets are often posted to project web sites, thereby making them more widely accessible. Similarly, information posted to project web sites or gained from project materials may be used by news media to provide information through newspapers, the radio, and television news. Furthermore, drivers are likely to use a variety of different means of communication, meaning that messages must be consistent across all communication strategies.

G. Determine When to Communicate

Providing information to the public should not be limited to when a work zone is up and running. A public information and outreach campaign should also consider strategies to be implemented before construction begins and after the project is complete. In the before phase, the campaign should concentrate on general information about the project, the problems it may cause, and how to find out more information. Near the

commencement date of a work zone, it may be appropriate to add other methods such as free media coverage and paid advertising, a telephone “hotline,” and the use of dynamic message signs. After the completion of the project, information can be provided about successes and failures of the project and thank project partners.

H. Evaluate Effectiveness

During a long road construction project the effectiveness of the public information and outreach campaign should be periodically evaluated with the aim of redirecting resources if necessary. An evaluation might include:

- Documenting and reporting the impacts of the work zone, such as the number of crashes and traffic delay
- Documenting and reporting the questions, comments, compliments, and complaints received via hotline, web site, letter, etc.
- Assessing perceptions of successes and failures among the project partners
- Surveying the public, businesses, or commercial truck drivers affected by the work zone
- Surveying tourism bureaus or other major facilities near the work zone, such as rest stops

3. Communication Strategies

This section describes a number of commonly used communication strategies:

A. Branding

Branding, such as distinctive project names and “trademark” graphics, logos, and catchphrases, is often an effective method to enable the target audience(s) to easily recognize any information related or pertaining to the work zone.

B. Using the Mass Media

Radio, television, and newspapers are still some of the main ways people receive traveler information. Using these methods to share information should be a cornerstone of any public information and outreach campaign. Paid advertising is relatively expensive, but can be a cost-effective way to reach a wide audience. Paid advertising may be necessary in the case of dramatic changes to the road network such as full closure of an Interstate.

C. Web Sites

Web sites are one of the primary tools for disseminating (pre-trip) traveler information. Web sites have many advantages over other types of communication methods, with the primary advantage being that they can provide up to the minute information on a 24-hour basis.

There are usually two options for the use of a web site to provide information about a work zone project. Project information may be displayed on DelDOT’s Travel Advisory website which contains scheduled travel restrictions, real time travel advisories, live traffic cameras, and a live broadcast from the Transportation Management Center (WTMC). This is useful for smaller projects in which information does not change frequently or in which there is not a lot of public information to post about the project.

The other option is to create a web site or web page on DelDOT's website dedicated solely to the work zone project. Project web sites are often used for larger projects. This can provide both static and real-time information, including many of the other forms of project information such as all types of written material, traffic camera images, travel times, photographs, maps, and links to other sources of information. A successful project web site must provide accurate and up-to-date information, be easy to locate, and people need to know about it. How often a web site is updated will depend on the project, but most large project web sites will need to be updated at least weekly.

D. Email Alerts

Email alerts provide another way for travelers to get timely information on work zone activity and traffic delays. Lane closures, delays, and incident/crash information can be distributed to travelers who have signed up on DelDOT's website to receive the information.

E. Printed Materials

There are many ways to employ printed materials to convey work zone information to the public, including brochures, newsletters, flyers, fact sheets, and maps. These materials can include upcoming project phases, events, and other important work zone details. Printed materials may be mailed, handed out, placed for pickup (in welcome centers, commuter stores, etc.), placed in newspapers, or distributed door to door. Printed materials may also be posted to project web sites for downloading and printing.

F. Project Hotline

Travel information provided through a toll-free telephone "hotline" is accessible both pre-trip and en route. In addition, a project hotline can be used to publicize public meetings, survey information, and for the public to leave comments and suggestions.

G. Dynamic Message Signs and Highway Advisory Radio (WTMC)

Dynamic message signs (DMS) can be used to publicize when a work zone will begin, and other types of traveler information. To be most useful, DMS should provide information at key junctions giving drivers plenty of time to make an informed decision about which route to take. DelDOT's WTMC broadcasts nonstop traffic information 24 hours a day and can publicize many types of work zone information.

H. Public Meetings, Workshops, and Community Events

As noted earlier, interaction with the public can be the determining factor in the success of a public information and outreach campaign. Hosting public meetings or developing a Working Group gives the affected parties an opening to gain knowledge about the project but also to convey information and concerns to the project partners. Events such as ground-breaking ceremonies are great for grasping the attention of the public. Additional events that can be outlets for spreading information are fairs, school assemblies, tours, and informational workshops.

I. Project Office

For large, long-term work zones, a project office or information center can be a useful strategy to disseminate information and provide a key point of contact for the public.

J. Videos

A powerful way to give the public a clearer view of the intended outcome of the work taking place is via video. Videos can be shown in an assortment of settings such as public meetings, fairs, school assemblies, and workshops. While videos can be expensive to produce, the advantage of a video is the projection of a consistent message.