

# 900 Work Zone Safety

---

## 900.1 General

In order for the New Mexico Department of Transportation (NMDOT) to be in compliance with the federal rules that govern work zone safety and mobility in highway and street work zones (23 Code of Federal Regulations [CFR] Part 630), processes have been developed to address all safety and mobility concerns. This chapter addresses the following rules:

- Work Zone Safety and Mobility Rule, [23 CFR Part 630, Subpart J](#).
- Temporary Traffic Control Devices Rule, [23 CFR Part 630, Subpart K](#).

In addition to NMDOT-let projects, this chapter applies to all work that requires temporary traffic control on State roads, including private developer construction, access (driveway/turnout) construction or modification, and utility work.

### 900.1.1 Policy Statement

NMDOT policy is to plan, design, construct, and maintain highways while providing for the safe and efficient movement of all modes of transportation through or around a temporary traffic control zone and the safety of the workers and motorists.

This policy applies to all types of bridge and highway construction, reconstruction, and maintenance projects on the New Mexico highway system. This includes projects on local systems that are administered by the NMDOT or local governments, or contractors working within NMDOT right-of-way.

This chapter provides the designer with guidance to develop comprehensive work zone strategies and plans to address a project's safety, mobility, and constructability issues.

## 900.2 References

The following references are used in the planning, design, operation, and maintenance of work zones established on New Mexico's highways.

### 900.2.1 Federal/State Laws and Codes

- Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act Accessibility Guidelines, [36 CFR Part 1191](#).
- New Mexico Administrative Code (NMAC) 18.31.6, [State Highway Access Management Requirements](#), October 2001.
- Temporary Traffic Control Devices Final Rule, [23 CFR Part 630, Subpart K](#).
- Title II of the Americans with Disabilities Act (ADA) Implementing Regulation, [28 CFR Parts 35 and 36](#), as revised September 15, 2010.
- Work Zone Safety and Mobility Rule, [23 CFR Part 630, Subpart J](#).

### 900.2.2 Design Guidance

- A Policy on the Geometric Design of Highways and Streets (Green Book), American Association of State Highway and Transportation Officials (AASHTO), current edition adopted by the Federal Highway Administration (FHWA), current edition.
- Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), United States Department of Transportation (USDOT), FHWA, current edition.

- NMDOT [Traffic Control Spreadsheets](#).
- NMDOT Work Zone Design Checklists (provided in Attachment 1 at the end of this chapter).
- [Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way, \(PROWAG\), Supplemental Notice of Proposed Rulemaking](#), 2013.

### 900.2.3 Reference List

- AASHTO Roadside Design Guide, current edition.
- New Mexico State statutes and traffic laws, as amended.
- The current editions, as amended, of the following NMDOT manuals, standards, and policies:
  - [State Access Management Manual \(SAMM\)](#)
  - [Standard Specifications for Road and Bridge Construction](#)
  - Transportation Commission policies
  - [Standard Drawings](#)
  - New Mexico State Traffic Monitoring Standards
  - Materials Manual
  - Construction Manual

### 900.2.4 Web Resources

The following websites have information specifically related to work zone operations or organizations and programs that address work zone issues. The Work Zone Safety Information Clearinghouse maintained by the Texas Transportation Institute is a particularly valuable source of current work zone information and contacts.

- [AASHTO](#)
- [American Road and Transportation Builders](#)
- [American Traffic Safety Services Association \(ATSSA\)](#)
- [Associated General Contractors of America](#)
- [FHWA Work Zone Safety and Mobility Program](#)
- [FHWA Railway-Highway Crossing Program](#)
- [Institute of Transportation Engineers \(ITE\)](#)
- [Local and Tribal Transportation Technical Assistance Program](#)

- [National Highway Institute \(NHI\)](#)
- [National Utility Contractors Association](#)
- [National Work Zone Safety Information Clearinghouse](#)

## 900.3 Definitions

- **Buffer zone** (or buffer space) - The lateral and/or longitudinal area, free of all obstructions (including truck-mounted attenuators), which separates road user flow from the work space or an unsafe area, and might provide some recovery space for an errant vehicle.
- **Clear zone** (or recovery area) - The unobstructed, traversable area provided beyond the edge of the through traveled way for the recovery of errant vehicles. The clear zone includes shoulders, bike lanes, and auxiliary lanes, except those auxiliary lanes that function like through lanes. Clear zone refers to widths provided in the AASHTO Roadside Design Guide.
- **Construction clear zone** - The unobstructed, relatively flat area impacted by construction that extends outward from the edge of the traveled way. Because of the limited horizontal clearance available and the heightened awareness of motorists through construction zones, clear-zone requirements are less stringent than those for non-construction conditions. Construction clear zone requirements generally require engineering judgment, make limited to no adjustment for horizontal curves, and may provide only operational clearance depending on site conditions.
- **Construction zone** - The area within the right-of-way from the first traffic control sign announcing the road work to the last sign announcing the end of road work within which the contractor or NMDOT shall perform construction activities.
- **Highway** - Generally a public way for purposes of vehicular and pedestrian travel.
- **Pavement drop-off** - A section of roadway where the longitudinal edge of the travel line is not flush with the adjacent existing surface.

- **Positive protection devices** - Devices that contain and/or redirect vehicles and meet the crashworthiness evaluation criteria as pursuant to [23 CFR Part 630, Subpart K](#).
- **Posted speed limit** - The permanent posted speed limit on the roadway before construction begins.
- **Right-of-way** - Land or property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
- **Roadway** - The portion of a highway, including shoulders, for vehicular use.
- **Traffic control plan (TCP)** - A documented plan that describes temporary traffic control (TTC) measures to be used for facilitating road users through a construction zone, work zone, or incident area.
- **Transportation management area (TMA)** - An area designated by the United States Secretary of Transportation having an urbanized population of over 200,000.
- **Transportation management plan (TMP)** - A TMP consists of strategies to manage the work zone impacts of a project.
- **Traveled way (or traffic lane)** - The portion of a roadway for the movement of vehicles, exclusive of shoulders.
- **Work zone** - An area of a highway with construction, maintenance, or utility work activities. It extends from the first warning sign to the End Road Work sign or the last temporary traffic control device.
- **Zone of intrusion** - The area behind a barrier, which is to be free of fixed objects that a vehicle could impact.

## 900.4 Work Zone Safety and Mobility Rule (Subpart J)

The NMDOT Work Zone Safety and Mobility Policy was established in order to meet the requirements of [23 CFR 630, Subpart J](#). The goal of this policy is to promote a commitment to implement the requirements of 23 CFR 630, Subpart J by:

- Providing safe work zones for workers and motorists.
- Minimizing the traffic and mobility impacts of a work zone.

- Reducing the number of crashes and deaths in work zones.
- Improving training for all project staff involved in plan development and construction administration related to work zones.
- Improving work zone procedures over time by using knowledge and observations gained from past work zones.
- Developing and implementing TMPs for work zones.

#### **900.4.1 Transportation Management Plans**

The NMDOT Work Zone Safety and Mobility Policy establishes a procedure for the inclusion of TMPs on projects. The TMP for a project is based on the project complexity and potential impacts to mobility through the work zone and highway corridor. The TMP shall include, at a minimum, a detailed TCP that addresses the safe handling of motorized and non-motorized traffic through the work zone. In addition, it may be necessary on some projects to include transportation operations strategies to ease work zone impacts. The TMP may also include a public information component. Public information strategies may be required to inform those affected by the project of the expected work zone impacts and changing conditions. The public information component may be included as a bid item if the project design team determines that it is necessary due to the complexity of the project. Disseminating public information may be the responsibility of the contractor, the District Office, or a public relations firm, based on recommendations of the design team in consultation with the District Office.

##### **900.4.1.1 Temporary Traffic Control**

TTC components are strategies for directing traffic through work zones and minimizing the duration of the impacts. TTC components may include but are not limited to the following strategies:

- Lane closures or shifts; one-lane, two-way operations (flagging and/or pilot car); staged construction; or full road closures and detours.
- Traffic control devices such as temporary signing, channelizing devices, changeable message signs, arrow boards, temporary

signals, temporary pavement markings, and positive protection barriers.

- Corridor project coordination, contracting strategies, and innovative construction strategies such as A+B bidding, incentives/disincentives, and precast members or rapid cure materials.

#### **900.4.1.2 Transportation Operations**

Transportation operations components are strategies for improving traffic flow and safety through the work zone. Examples of transportation operations strategies include:

- Transit service improvements
- Park and ride programs
- HELP trucks
- Revised signal timing coordination
- Separate truck lanes
- Temporary signals
- Automated enforcement
- Intelligent transportation systems (ITS)

#### **900.4.1.3 Public Information**

Public information components are strategies for raising awareness of upcoming project impacts or current roadway restrictions. Examples of public information strategies include:

- Brochures or mailers
- Press releases
- Media alerts
- Project websites
- Public meetings
- Transportation management centers
- Coordination with media, schools, businesses, emergency services

The need for transportation operations components and public information strategies as part of the TMP will usually be

determined by a project's classification (significant, regionally significant, or routine). This classification is determined prior to the beginning of the design phase of the project and is discussed below.

### **900.4.2 Project Classification**

Determining a project's classification is intended to help assess and allocate resources more effectively to projects that are likely to have more work zone impacts. A project that is expected to cause more impacts may warrant additional attention during project development and may require additional funding for transportation strategies that help manage the work zone impacts of the project. The three project classifications in New Mexico are:

- Significant Project
- Regionally Significant Project
- Routine Project

#### **900.4.2.1 Significant Project**

A Significant Project is defined as all interstate system projects within the boundaries of a designated TMA that occupy a location for more than three days with either intermittent or continuous lane closures. A TMA is an area designated by the United States Secretary of Transportation as having an urbanized population of over 200,000<sup>1</sup>.

A Significant Project may also be any project 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 NMDOT policy and or engineering judgment.

#### **900.4.2.2 Regionally Significant Project**

A Regionally Significant Project is any project that is anticipated to have more than minimal disruption, but has not been identified as a Significant Project.

---

<sup>1</sup> [Federal Register, July 8, 2002, Volume 67, Number 130](#)

### 900.4.2.3 Routine Project

A Routine Project is defined as any project that is not anticipated to cause sustained work zone impacts. These projects are typically rural in nature and are located on low to medium volume roads. The level of service (LOS) for these types of roads would not be significantly impacted if a lane is closed during normal work operations.

### 900.4.3 Determining the Project Classification

The project classification should be determined as part of the early planning stages for a project – typically as part of planning for the State Transportation Improvement Program (STIP) or the project definition phase of a project. The project classification will be determined based on the following parameters that can significantly affect work zone impacts:

- Project purpose and need.
- Roadway functional classification (interstate, expressway, principal arterial, major arterial, minor arterial, or collector).
- Area type (urban, suburban, or rural).
- Traffic demand and travel characteristics (lanes affected, average daily traffic [ADT], expected capacity reduction, LOS).
- Type of work (new construction, reconstruction, rehabilitation, maintenance, bridge work, equipment installation/repair).
- Complexity of work (duration, length, and intensity).
- Level of traffic interference with construction activity.
- Potential impacts to the local transportation network and businesses.
- Considerations specific to the region (tourism, special events, weather).

The project design team is responsible for developing the TMP for the project. For all Significant Projects, a **Major TMP** shall be developed that consists of the TCP as well as transportation operations and public information strategies to manage work zone impacts.

**Intermediate TMPs** are intended for Regionally Significant Projects that are anticipated to have more than minimal disruption, but have not been identified as Significant. Intermediate TMPs shall consist of a TCP and may include transportation operation strategies and a public information component, as appropriate.

**Basic TMPs** are typically applied on Routine Projects with minimal disruption and may only involve the development of a TCP.

All projects will include detailed TCP sheets specific to the phasing of traffic as included in the suggested sequence of construction developed by the design team during project development. All projects will include a bid item for Traffic Control Management in addition to bid items for traffic control devices.

The Project Development Engineer (PDE) shall be responsible for developing pay items for bidding on the TCP. This shall be in compliance with the NMDOT's [Standard Specifications for Road and Bridge Construction](#) presented in Section 702, Traffic Control Devices for Construction.

#### **900.4.4 Exemption Process**

For projects that are classified as Significant by definition of a TMA, but in the judgment of the agency do not cause sustained work zone impacts, the PDE may request a design variance to the requirements triggered by the classification. Some examples that might qualify include road work on interstate projects where the capacity far exceeds the demand (e.g., single lane closures on highways that have low volumes of traffic), night work, and off-peak lane closures. Chapter 210 of the Design Manual provides information on NMDOT's design exception and design variance procedures.

## 900.5 Temporary Traffic Control Devices Rule (Subpart K)

The goal of the Temporary Traffic Control Devices Rule ([23 CFR 630, Subpart K](#)) is to decrease work zone fatalities and injuries to workers and road users. NMDOT's approach to meeting this goal is to:

- Build on processes, procedures and/or guidance implemented under Subpart J.
- Establish minimum requirements and provide guidance for use of temporary traffic control devices.

Key components of Subpart K are:

- Providing added emphasis on safety in work zones.
- Clarifying the use of positive protection devices.
- Use of exposure control measures.
- Use of uniformed law enforcement.
- Standardizing the design and use of safe entry/exit for work vehicles and equipment.
- Clarifying payment for traffic control features and operations.
- Establishing quality guidelines.

Each of the key components of Subpart K shall be addressed by either the design team or construction management personnel. Sections 900.5.1 through 900.5.7 identify the parties responsible for the processes associated with each component and when and how each component should be addressed.

### **900.5.1 Providing Added Emphasis on Safety in Work Zone Policy**

The safety considerations used in developing a TCP are intended to ensure the constructability of the project, provide for pedestrians and bicyclists, and minimize inconvenience to road users while simultaneously protecting the workers. The traffic control designer must consider safety of the workers as well as the traveling public at the forefront of the TCPs. The following factors should be considered to address safety issues:

- The permanent posted speed limit of the roadway before construction begins, upon which all TCPs shall be based
- Appropriate speed reduction measures
- Temporary traffic barrier
- Crash cushions
- Temporary rumble strips
- ITS for traffic monitoring/management
- Incident/emergency response plan
- Local detour routes
- Police enforcement
- Increased penalties for work zone violation
- Public information strategies
- Positive barrier protection

The key to work zone improvement is to use available resources such as work zone performance measures and available work zone field observations to:

- Manage the safety and mobility impacts of projects more effectively during implementation.
- Provide the basis for systematic procedures to assess work zone impacts in project development.

NMDOT has developed various checklists for the designer and PDE to systematically assess many key considerations to deliver a safer work zone. These checklists are provided in Attachment 1 at the end of this chapter.

Proper implementation of traffic control and regular inspection and evaluation by trained and/or certified personnel experienced in traffic control and field observation can make work zones safer.

Additionally, the emphasis on safety by all the parties involved in the development, design, implementation, operation, inspection, and enforcement of work zone-related transportation management and traffic control stems from awareness of field-related work zone challenges. Properly trained individuals aware of work zone rules make them safer. Section 900.12 contains more information and recommendations for training.

As required in [23 CFR Part 630.1008\(d\)](#), personnel involved in the development, design, implementation, operation, inspection, and enforcement of work zone-related transportation management and traffic control must be trained, appropriate to the job decisions each individual is required to make. This includes law enforcement officers used for enforcement and first responders responsible for the work zone on a project.

**Exhibit 900-1**

**Responsibility Table 1**

Responsibility	Person Responsible	Activity
Design	PDE/Design Groups/Districts	Review all appropriate checklists, see Attachment 1.
Construction	Project manager	Inspection
Training	Refer to Section 900.12 of this chapter for more information and sources of training.	
Independent Review	District Traffic/Traffic Technical Support Bureau (TTSB)	Design review and field inspection.

## 900.5.2 Use of Positive Protection Devices

Positive protection strategies are intended to minimize the exposure of workers to motorized vehicles and protect motorists from known hazards. The policy is based on the MUTCD and AASHTO Roadside Design Guide as the minimum guidance. Additional factors as discussed in NMDOT's Drop-off Policy and the concrete wall barrier (CWB) Decision Matrix (located in Attachment 1 at the end of this chapter) must be considered to develop the appropriate

type of separation devices. For the purposes of this document the following will apply:

- Posted speed limit means the permanent posted speed limit on the roadway before construction begins.
- Clear zone refers to widths provided in the AASHTO Roadside Design Guide.
- Construction clear zone refers to work zone clear zone widths provided in the AASHTO Roadside Design Guide.

The rule requires consideration of positive protection devices, but allows flexibility to determine how and when to use them. This determination should be project-specific to adhere to agency guidelines. The AASHTO Roadside Design Guide offers guidance on the use of barriers, but the actual decision on whether positive protection is needed, and the best type of device to use for a specific work zone situation, is typically determined by the design engineer. Consideration of specific site conditions, nature of work and duration, along with characteristics of the various devices that may be available are all important factors in the decision.

In the development of a TCP, safety must be given the primary role. The field conditions will dictate what will be necessary. When the use of CWB is warranted, budgetary constraints do not solely justify alteration of the standard without full consideration of all related factors. In developing a TCP, the following should be considered:

- The process of designing **shall** be based on analysis of existing conditions and a constructability review.
- An engineering study **may** be used to develop positive protection guidelines, or to determine appropriate measures for an individual project.
- The engineering study **should** be based on consideration of site-specific factors and characteristics.

### 900.5.2.1 Factors to Consider

In this section, situations are listed that would typically justify the use of CWB; however, each project has a unique set of factors that should be considered. These factors include:

- Project scope and duration.
- Anticipated traffic speeds through the work zone.
- Anticipated traffic volume.
- Vehicle mix.
- Type of work (as related to worker exposure and crash risks).
- Distance between traffic and workers, and extent of worker exposure.
- Escape paths available for workers to avoid a vehicle intrusion into the work space.
- Time of day (e.g., night work).
- Work area restrictions (including impact on worker exposure).
- Consequences from/to road users resulting from roadway departure (e.g., hazards, construction clear zone).
- Potential hazard to workers and road users presented by device itself and during device placement and removal.
- Geometrics that may increase crash risks (e.g., poor sight distance, sharp curves, lane reductions).
- Access to/from the work space.
- Roadway classification.
- Impacts on project cost and duration.
- Adherence to NMDOT Pavement Drop-off Guidelines.
- Zone of intrusion (ZOI) - this area shall be a minimum of five feet.

For example, a larger lateral clearance to a hazard results in a lesser need to shield the hazard with CWB. Distances for the desired lateral clearance can be found in the AASHTO Roadside Design Guide, current edition.

NMDOT has developed Checklist 1 - CWB Decision Matrix that may be used as a basis for the design of a TCP. This checklist is located in Attachment 1 at the end of this chapter.

**Exhibit 900-2****Responsibility Table 2**

<b>Responsibility</b>	<b>Person Responsible</b>	<b>Activity</b>
Design	PDE/Design Groups/Districts	Review Checklist 1, CWB Decision Matrix (located in Attachment 1 at the end of this chapter).
Construction	Project Manager, Inspector and TTSB	Review the design during the project constructability meetings

The NMDOT Pavement Drop-off Guidelines shall be used for all highway projects. If the TCP does not adhere to the Pavement Drop-off Guidelines, CWB shall be considered. Section 900.9.4 discusses these guidelines.

### **900.5.3 Use of Exposure Control Measures**

This term was added in place of “positive protective strategies” to reflect the fact that strategies were not aimed solely at preventing vehicles from entering the work space, but to reduce worker exposure through a variety of methods. Below are some of the strategies that may be considered:

- Full road closures
- Ramp closures
- Median crossovers
- Full or partial detours or diversions
- Protection of work zone setup and removal using rolling road blocks
- Performing work at night or during off-peak periods
- Accelerated construction techniques
- Encroachments
- Appropriate work zone speed limit and reduction techniques
- Increased lateral offset

Controlling exposure for the workers and safety of the workers must be considered of utmost importance. The process of selecting

traffic control devices shall take into consideration all tools available in providing safer work zones.

Checklist 2, Exposure Control Measures Matrix (located in Attachment 1 at the end of this chapter) provides a few other options that may be available. The options in the matrix should be considered in light of the circumstances under which the workers are placed. If safety of the workers is in jeopardy, consideration of the following options is strongly recommended.

**Exhibit 900-3**

**Responsibility Table 3**

Responsibility	Person Responsible	Activity
Design	PDE/Design Groups/Districts	Review Checklist 2, Exposure Control Measure Matrix and Checklist 1, CWB Decision Matrix (located in Attachment 1 at the end of this chapter).
Construction	Project Manager, Inspector and TTSB	Review the design during the project constructability meetings.

#### **900.5.4 Use of Uniformed Law Enforcement**

In order to provide better mobility and safer work zones, the use of law enforcement should be considered based on NMDOT policy. NMDOT, in partnership with the FHWA, has developed a policy for the use of uniformed law enforcement personnel within construction work zones. The policy consists of processes, procedures, and/or guidance addressing the following:

- Basic interagency agreements between the NMDOT and appropriate law enforcement agencies to address work zone enforcement needs.
- Interaction between the NMDOT and law enforcement agency during project planning and development.
- Conditions where law enforcement involvement in work zone traffic control may be needed or beneficial, and criteria to determine the project-specific need for law enforcement.
- General nature of law enforcement services to be provided, and procedures to determine project-specific services.
- Appropriate work zone safety and mobility training for the officers, consistent with the training requirements in [23 CFR Part 630.1008\(d\)](#).

- Procedures for interagency and project-level communications between NMDOT and law enforcement personnel.
- Establishment of item number (for NMDOT-let projects) during the design phase of the project and/or reimbursement agreements for law enforcement service.

#### **900.5.4.1 NMDOT Policy Statement on Uniformed Law Enforcement**

NMDOT may acquire the services of uniformed law enforcement personnel for select projects where a need for enforcement is established by the design team.

- Each project where the need for law enforcement is established shall develop a memorandum of understanding (MOU).
- The MOU shall be developed using Checklist 3 - NMDOT's Law Enforcement MOU. Checklist 3 is provided in Attachment 1 at the end of this chapter.
- Each item in the checklist must be addressed.

The details of the document shall be drafted in a MOU document within the construction plan at the Plans, Specifications and Estimates (PS&E) design inspection. All seven issues identified in Section 900.5.4 should be addressed in this MOU document. A person with a high stake in the project shall be recognized prior to the start of construction to be the liaison between the agencies and execute the details of the agreement. The MOU will be part of the construction documents.

**Exhibit 900-4**

**Responsibility Table 4**

<b>Responsibility</b>	<b>Person Responsible</b>	<b>Activity</b>
Design	PDE/Design Groups/Districts	Decide during the constructability meetings the level of enforcement and use Checklist 3, Law Enforcement MOU, in Attachment 1 at the end of this chapter to develop an MOU.
Construction	Project Manager and Inspector	Project manager to assign an administrator/coordinator to manage the services.

### **900.5.5 Safe Entry and Exit for Work Vehicles and Equipment**

Provisions for safe means for work vehicles and equipment to enter and exit traffic lanes and for delivery of construction materials to the work space should be based on individual project characteristics and factors. Below are some of the factors to be considered.

- Characteristics of the facility:
  - Speed (acceleration /deceleration, alignment constraints)
  - Traffic volumes and queues
- Configuration of access:
  - How do vehicles gain access?
  - How is traffic affected? Decision sight distance. Are turning radii appropriate?
- Motorist expectations:
  - Is ample direction given to the motorist?
- Work zone signing:
  - Is additional signing necessary for exit/entry locations?
- Truck crossing sign requirements
- Movement of work vehicles in the work zones
- Probability for congestion-causing movements
- Mandates that require vehicle entrance and exit in the direction of traffic flow(acceleration/deceleration lanes)
- Nighttime signing for delivery vehicles
- Lighting requirements for guidance to ensure proper visibility
- Motorist awareness of work vehicle movement
- Coordinating deliveries during off-peak hours
- Environmental factors (e.g., dragging dirt into the roadway)

Checklist 4, Safe Entry/Exit for Work Vehicles and Equipment, should be used to develop provisions for work vehicles and equipment to safely enter and exit work zones. This checklist is located in Attachment 1 at the end of this chapter. The safe entry and exit provisions shall be designed and incorporated into the TCP

and presented to the project manager for review and approval. The design shall be based on the Green Book, AASHTO Roadside Design Guide, and MUTCD guidelines. The project manager shall assign a responsible person for scheduled and random inspection for adherence. Additional guidelines include:

- Truck crossing sign requirements:
  - Signing can be placed according to the shoulder work typical applications, with truck crossing signs replacing all shoulder work signs.
  - Place at same interval as signs for shoulder work.
  - Any distances to be displayed on the truck crossing sign shall be installed using supplemental distance plaques.
  - A W11-10(1) sign may be used on controlled access facilities.
  - A W11-10(1) sign shall be used on any facility where stopping sight distance is less than the requirement and the entrance cannot be relocated.
- Nighttime signing of delivery vehicles:
  - Increases motorist awareness of vehicular movements.
  - Provides specific direction to following motorists.
  - Protects workers from errant vehicles.
  - Includes a sign directing following motorists not to follow the delivery vehicle into the work area.

Exhibit 900-5

**Responsibility Table 5**

Responsibility	Person Responsible	Activity
Design	PDE/Design Groups/Districts/District Traffic Engineer/TTSB	Use Checklist 4, Safe Entry/Exit for Work Vehicles and Equipment, located in Attachment 1 at the end of this chapter.
Construction	Project Manager and Inspector	Monitor implementation.

### **900.5.6 Payment for Traffic Control Features and Operations**

Appropriate pay item provisions for work zone traffic control features are necessary to address the safety impacts of a project. Separate pay items are required for major categories of traffic control devices, safety features, and work zone safety activities.

A separate pay item does not mean it is a unit price pay item. Unit price pay items, lump sum pay items, or a combination thereof may be used with method-based specifications.

Supplemental specifications can address payment for traffic control devices. When specifically designated for measurement and payment in the contract, Traffic Control Devices During Construction will be measured as a lump sum unit. Exceptions to this include price agreements (which may pay per-hour or per-day) or when TTC devices are paid by the contractor doing work for another agency but working within NMDOT right-of-way.

#### **900.5.6.1 Basis of Payment**

Except as noted above, the accepted work for Traffic Control Devices During Construction will be paid by lump sum at the contract unit price. Payment shall be full compensation for furnishing all materials, tools, labor, equipment, hauling, and any other appurtenances necessary to satisfactorily complete and maintain adequate and safe traffic control until construction is completed. This shall include all interim and temporary signing, temporary striping, temporary stripe removals, construction signing, steel posts, base posts, portable sign supports, barricades, drums, sequential arrow displays, and flaggers as necessary to implement the traffic control detailed in the construction plans or modifications to the plan details as approved by the District Traffic Engineer. This includes all setups and resetting of temporary signing and devices listed above. No additional separate measurement or payment will be made for such items.

The cost of traffic control devices shall not be considered incidental to other contract pay items. Traffic Control Devices During Construction shall not be considered as eligible for a cost savings suggestion. Examples of NMDOT pay items for traffic control devices are provided below in Exhibit 900-6 for guidance only; additional pay items may be needed per project scope. Exhibit 900-7 shows the responsibility table for construction traffic control devices.

**Exhibit 900-6****NMDOT Pay Items for Traffic Control Devices\***

Item Number	Item Description	Quantity
618000	Traffic Control Management	LS
702000	Construction Signing	SF
702100	Steel Posts and Base Posts for Construction Signing	LF
702110	Portable Sign Support	Each
702210	Barricade, Type I	Each
702220	Barricade, Type II	Each
702238	Barricade, Type III-8'	Each
702310	Vertical Panel, Type Single	Each
702320	Vertical Panel, Type Back to Back	Each
702400	Construction Traffic Marker	Each
702525	Channelization Devices Type Drum	Each
702527	Lane Separator System	LF
702600	Sequential Arrow Display	Each
702610	Portable Changeable Message Sign	Each
702850	Law Enforcement in Construction Zone	Allow

\* For NMDOT-let projects or Local Governments using NMDOT Standard Specifications. Does not apply to price agreements or other work performed within NMDOT right-of-way.

**Exhibit 900-7****Responsibility Table 6**

Responsibility	Person Responsible	Activity
Design	PDE/Design Groups/Districts	Establish payment for the devices according to <a href="#">IDD-2009-04</a> .

**900.5.7 Quality Guidelines**

The project management team shall use quality guidelines to ensure the effectiveness of devices in use. NMDOT's quality guidelines:

- Ensure a level and frequency of inspection necessary to provide ongoing compliance with the quality guidelines.
  - Regionally Significant and Significant Projects should be evaluated within the first two weeks of traffic control implementation and as often as possible thereafter. Subsequent traffic control reviews should occur at all major phase changes (at a minimum) and in response to complaints.
  - Routine Projects should be reviewed by trained or certified personnel as often as possible.

Provisions should be established as necessary to ensure appropriate payment and quality assurance for all necessary safety features, when not covered by the lump sum devices as established in [IDD-2009-04](#).

The quality of TTC devices is divided into three classifications: acceptable, marginal, and unacceptable. Detailed definitions of these classifications are provided in Attachment 2 at the end of this chapter. A generalization and examples of the terms are provided below.

- **Acceptable** devices (Exhibit 900-8) meet all NMDOT and MUTCD requirements for design, size, color, reflectivity, weight, etc.; are properly placed as specified; and clearly meet quality/cleanliness requirements and their intended function.

Exhibit 900-8  
**Acceptable Devices**



- **Marginal** devices (Exhibit 900-9) are those that are marginally acceptable and nearing the lower end of acceptability.

Exhibit 900-9  
**Marginal Devices**



- **Unacceptable** devices (Exhibit 900-10) are those that shall be removed from or not used on the jobsite.

Exhibit 900-10

### Unacceptable Devices



The required minimum percentage of acceptable devices has been established and varies depending upon the duration of the TTC zone as described below.

#### 900.5.7.1 Intermediate and Long-Term Duration

Within each TTC zone that is planned to remain in place for more than 12 hours, the following requirements shall be followed:

- At the time of the initial set up or at the time of major stage changes, 100 percent of each type of device should be classified as acceptable, though 75 percent is acceptable.
- Throughout the duration of the project, the number of acceptable devices may decrease to 75 percent of the initial quantity of each particular device.
- Devices in the marginal category may remain in the TTC zone until their total number exceeds the 25 percent maximum for that type of device, which is not permissible. Should the percentage of devices in the marginal category exceed 25 percent, all marginal devices shall be replaced to bring the group of devices back up to acceptable standards.
- All devices categorized as unacceptable shall be replaced within seven working days of notification.
- Missing or knocked down devices should be replaced or reset immediately since they may directly affect safety on the project.
- Short-Term Duration.

Within TTC zones that are planned to be in place for less than 12 hours, the following requirements may be followed:

- At the time of the initial setup, 100 percent of all TTC devices shall be classified as acceptable. During the short-term duration of the project, the intermediate and long-term duration standards shall be maintained for these devices.
- At the time of the initial setup, a minimum of 75 percent of each type of channelizer and barricade shall be classified as acceptable. Up to a maximum of 25 percent of these devices may be classified as marginal. Unacceptable devices shall not be installed.
- Missing or knocked down devices should be replaced or reset upon notification.

The descriptions established by the NMDOT Construction Bureau should determine if the device is acceptable, marginal, or unacceptable.

#### **900.5.7.2 Inspections and Fines**

Inspection of traffic control devices should involve the NMDOT project manager, NMDOT trained/certified work zone personnel, and the prime or subcontractor.

#### **900.5.7.3 Failure to Comply**

For NMDOT-let projects, failure to comply with NMDOT's requirements of traffic control devices will/may result in:

- An issuance of nonconformance - A nonconformance shall be issued by the project management team for deficiencies that are not addressed by the contractor within a reasonable amount of time.
- Scaled pay according to the percentage of compliance pay scale.
- Use of point system to document deficiencies in safety.
- Stop-work order - Extreme hazards that are an immediate public safety concern can warrant a stop-work order until the hazard is treated or removed.
- Failure to comply with NMDOT requirements for traffic control associated with utilities or driveways will result in a written

request to the responsible party/contractor to correct the issue in a reasonable amount of time. If no correction is made, the responsible party will be asked to leave the roadway and all permits will be revoked (traffic control, driveway, utility) until the issue is resolved to the satisfaction of the District Traffic Engineer. If the issue is a public safety concern all work shall stop immediately until corrections are made to the satisfaction of the District Traffic Engineer.

In addition to the above, the designer should refer to the [SAMM](#) for access/driveway construction requirements.

#### **900.5.7.4 Citation Process**

The citation process involves:

- Daily inspections by the project manager, inspector, or District Traffic Engineer.
- Nightly inspections by the project manager, inspector, or District Traffic Engineer.
- Surprise inspections by the project manager, inspector, or District Traffic Engineer.
- Asking for contractor recognition of the violations.
- Pictures of the field nonconformances.
- Correction guidance and coaching.

The citation process is the responsibility of the construction team as shown in Exhibit 900-11.

**Exhibit 900-11**

**Responsibility Table 7**

<b>Responsibility</b>	<b>Person Responsible</b>	<b>Activity</b>
Construction team	Project Manager and Inspector	Monitor quality guidelines and fines.
Quality inspection during construction	Project Manager, Inspector and TTSB	Perform night/day reviews of traffic control.

## **900.6 Temporary Traffic Control Strategies**

### **900.6.1 Two-Lane, Two-Way Operation (TLTWO) on One Roadway of a Normally Divided Highway**

Often an efficient method of reconstructing a multilane divided highway is to close one roadway and provide two-way operation

on the other roadway. This is accomplished with high speed crossovers at each end of the project. However, this situation violates what drivers normally expect and great care must be exercised in order for this scheme to operate safely.

Section 6G.15 of the 2009 edition of the MUTCD addresses two-lane, two-way traffic on one direction of a normally divided highway. The standard provided for this condition is as follows:

- When two-lane, two-way traffic control must be maintained on one roadway of a normally divided highway, opposing vehicular traffic shall be separated with either temporary traffic barriers (concrete safety-shape or an approved alternative), channelizing devices, or a temporary raised island throughout the length of the two-way operation. The use of markings and complementary signing, by themselves, shall not be used.

#### **900.6.1.1 NMDOT Recommended Standards**

There are many factors involved in deciding the appropriate devices needed to meet the condition of the road for two-lane, two-way traffic control. CWB may be used as an effective way of positive separation. The use of tubular marking or other appropriate devices may be permissible according to the MUTCD. NMDOT has developed a policy to aid designers in addressing positive separation for two-lane, two-way traffic control in TCPs. NMDOT's policy is based on the MUTCD and AASHTO Roadside Design Guide (current editions) as the minimum guidance. Field conditions and site-specific factors must be considered when choosing the appropriate type of separation devices.

- In the development of the TCP, safety must be given the primary role. Site-specific conditions will dictate what will be necessary.
- CWB shall always be considered as a part of engineering analysis to justify its application at the following locations:
  - In transition zones and for positive separation (channelization) between opposing two-lane traffic throughout a crossover where the speed limit is posted at or above 35 miles per hour (mph).
  - On tangent sections and flat curves where an angle of impact of more than seven degrees exists and where an

allowable movement of the barrier, when hit, is not acceptable.

- On all freeway facilities with ADT of 10,000 and a truck percentage of five percent or more.
- Proper end treatment shall always be applied.

## **900.7 Temporary Traffic Control Devices**

### **900.7.1 Concrete Wall Barriers (CWB)**

The following procedure establishes design guidelines for the use of temporary CWB. CWB is effective in protecting workers and road users by providing positive separation between traffic and the work area. When used appropriately, CWB has the potential to reduce the severity of crashes. However, according to the AASHTO Roadside Design Guide, Section 9.2.1, “Improper use of CWB can provide a false sense of security for both road users and workers. Therefore, care should be taken in their design, installation, and maintenance.” Whenever feasible, it is preferable to remove the hazard and avoid the need for CWB. Typical reasons for using CWB include the following:

- As an exposure control method (to protect workers).
- To shield a hazard.
- To protect road users from embankments or drop-offs.
- To separate opposing directions of traffic.
- To separate pedestrians from traffic or the work area.

The NMDOT has [Standard Drawings for Traffic Control](#). The AASHTO Roadside Design Guide, Chapter 9; MUTCD, Section 6F.85; and MUTCD, Typical Application 6H-34, that provide more information.

### 900.7.1.1 Guidelines for CWB Use

If the work area closure is anticipated to last more than three continuous days and nights without a change to the traffic control layout or staging, CWB may be considered after going through Checklist 1, CWB Decision Matrix, located in Attachment 1 at the end of this chapter, or in the following situations:

- A bridge deck or culvert replacement or rehabilitation where any of the following conditions is anticipated to exist for more than three consecutive days and nights:
  - Full-depth holes in the deck.
  - Removing railing.
  - Confined/restricted work area.
- Dropping or removing a bridge deck over a roadway if the work activity will last more than three consecutive days and nights.
- A bridge painting project over the roadway.
- Where permanent positive protection devices are removed for more than three days.
- To separate counter-directional traffic where two or more lanes in each direction are provided and the posted speed limit is greater than or equal to 45 mph.

Depending on the significance of the factors listed above, other common situations which may justify CWB, include:

- Spot (or isolated) locations where the work area closure will last for more than three continuous days and nights without a change to the traffic control layout or staging.
- An exposed hazard that is at the same spot for more than three consecutive days/nights and is within the construction clear zone. Examples include footings, abutments, and construction activities such as false form work for concrete work.
- Where a drop-off or slope steeper than 3:1 is anticipated to exist for more than three continuous days and nights, has a continuous length of 100 feet or more, and is close enough to a traffic lane that the likelihood of vehicles going off the edge of the road are significant.

For roadways with a posted speed limit less than 45 mph, the designer should consider the factors listed previously to determine if a barrier is warranted. The need for CWB to protect from drop-offs may be avoided by using aggregate or other temporary fill material to increase the lateral offset and/or to provide a 3:1 or flatter slope adjacent to the pavement or shoulder. Section 900.9.4 includes more information regarding pavement drop-offs.

The following guidelines should also be considered for implementing CWB:

- CWB shall be used on all freeways.
- CWB should be considered at expressway crossover entrances to prevent vehicles from entering opposing traffic lanes. CWB should also be considered at crossover exits that will be in place for more than one week where average annual daily traffic (AADT) is greater than or equal to 10,000 and the truck mix percentage is greater than or equal to five percent.
- Engineering judgment should be used in other situations where a combination of the severity of hazard, high traffic volumes, geometric concerns, and/or long duration of exposure exists.
- Performance level - Many CWB designs have been tested under the National Cooperative Highway Research Program (NCHRP) Report 350 Test Level 3 and are acceptable for use on higher speed roadways.

Another situation where the use of CWB may be avoided is when the TCP requires a pilot car or flagger that would control the speed through the work zone.

#### **900.7.1.2 CWB Anchoring Requirement/Deflection Distance**

Although CWB is designed to prevent an errant vehicle from entering a construction work zone, research tests have shown lateral deflection of the barrier after a vehicular impact. The barrier shall be anchored unless the appropriate lateral deflection distance can be provided.

### **900.7.1.3 Intersection Sight Distance**

When specifying the need for CWB, it is recommended that the designer check all side road approaches to ensure the CWB does not restrict intersection sight distance. This is especially critical when the roadway segment has horizontal and vertical curves that may further affect sight distance. Appropriate turning radii must be provided in urban areas to accommodate school buses and other large vehicles. Portable crash cushions must be installed so the end of the cushion is located at least 50 feet from the intersecting side road. The intersection may need grading to minimize drop-offs.

### **900.7.1.4 CWB End Treatments in the Construction Clear Zone**

End treatments for CWB should always be based on the permanent posted speed limit on the roadway before construction begins. The AASHTO Roadside Design Guide discusses the need for end treatment for temporary precast concrete barrier in work zones.

One treatment for the exposed end of CWB is to flare the barrier away from open traffic lanes to the edge of the construction clear zone as defined by AASHTO.

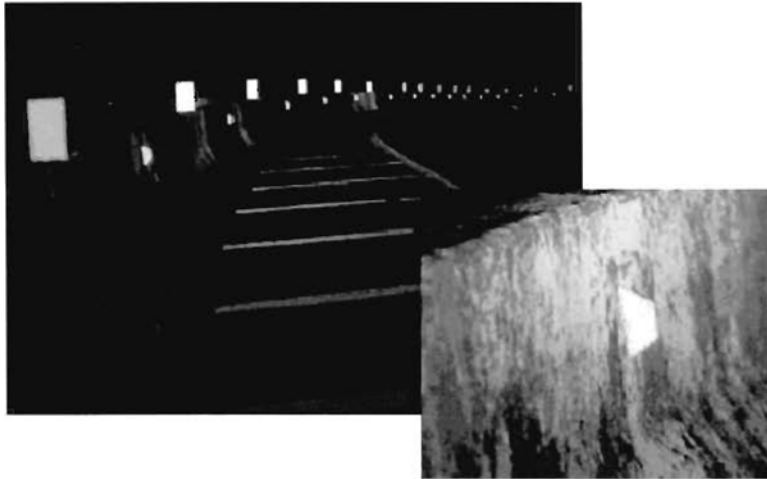
### **900.7.2 Other Devices**

NMDOT provides the following guidance for other traffic control devices such as ballast-filled barriers, traffic drums, traffic tubes, vertical panels, barricades, shadow vehicles, and vehicle arrestor systems:

- A flashing arrow panel at the start of the taper at all right- and left-lane closures should be considered on all roadways.
- The longitudinal spacing of tubular marking channelizing devices (in feet) through a work zone and through taper and transition sections should not be set at more than the speed limit (in mph). In cases where engineering judgment indicates a special need for speed reduction, spacing (in feet) through the taper for a lane closure should not be set at more than one-half the speed limit (in mph).
- The use of side reflectors as shown in Exhibit 900-12 should be considered in addition to the requirements for reflectors in

NMDOT [Standard Drawing](#) 606-21-1/1, Concrete Wall Barrier Traffic Marker Details. Side reflectors with cube-corner lenses on CWB and related concrete channelizing devices should be spaced (in feet) at no more than two times the construction zone speed limit (in miles per hour) through a work zone.

**Exhibit 900-12**  
**Side Reflectors**



- A minimum spacing (in feet) of one times the construction zone speed limit (in mph) should be used for channelizing devices (other than concrete barriers) in transition areas, and through the length of the crossover and in the termination area downstream (where operations as existed prior to the crossover resume).
- On high-volume roadways plastic glare-control louvers (paddles) should be mounted on top of concrete channelizing barriers, when used in transition and crossover areas, at a spacing of not more than 24 inches.

#### **900.7.2.1 Crash Cushion or Sand Barrels**

As indicated earlier in this chapter, if it is not possible to flare the barrier to the edge of the construction clear zone, then NCHRP Report 350 Test Level 3-approved portable crash cushion or sand barrels should be provided as the barrier end treatment. An approved crash cushion or sand barrels should be installed on the exposed end of the barrier if it is within the construction clear zone. These end treatments are designed to absorb the energy of an

impacting vehicle by reducing the impact force to acceptable levels. A crash cushion or sand barrels are required on the upstream end for divided or one-way facilities, and on both ends for all two-way facilities, including temporary two-way facilities such as in freeway counter-directional operations. The types of crash cushions currently used are listed in the NMDOT Approved Products List.

## **900.8 Procedures**

The procedures provided below outline NMDOT's process for developing and carrying out a TMP through the project development process.

### **900.8.1 Project Planning Stage**

These procedures are the responsibility of the project development team during the planning stage of a project.

1. Determine the classification of project.
  - a. Routine Project.
  - b. Regionally Significant Project.
  - c. Significant Project.
2. Compile project information.
  - a. Project definition/scope.
  - b. Preliminary construction staging approaches.
  - c. Discuss work zone management strategies.
  - d. Analyze work zone impact.
  - e. Consider implementation costs.
3. Determine TMP needs based on project classification.
  - a. Assess expected work zone impacts of project (delay, queue, crash characteristics).
    - Routine Project requires a basic TMP as shown in Exhibit 900-13.
    - Regionally Significant Project requires an intermediate TMP.
    - Significant Project requires a major TMP.

**Exhibit 900-13****TMP Components**

<b>Project Classification</b>	<b>TMP Type</b>	<b>TMP Components</b>
Routine	Basic TMP	TCP
Regionally Significant	Intermediate TMP	TCP, transportation operations strategies, public information, as appropriate.
Significant	Major TMP	TCP, transportation operations strategies, public information PDE will develop a draft TMP letter/report identifying TMP elements.

## 4. Identify stakeholders.

- a. Internal - Planning, design, operations, maintenance, public affairs, pavement, bridge, drainage, etc.
- b. External - Local/tribal government, FHWA, contractors, enforcement agencies, emergency services, businesses, schools, utility providers, etc.

**900.8.2 Project Design Stage**

When the project advances to the design stage, the procedures below are to be conducted by the PDE and the constructability review team.

## 1. Reconfirm project classification and develop TMP.

- a. Hold a constructability review meeting and discuss:
  - i. Construction staging approaches.
  - ii. Work zone management strategies.
  - iii. Work zone impacts.
- b. Solicit review and comments.

## 2. Update/revise TMP.

## 3. Finalize construction phasing/staging and TMP.

- a. The PDE will prepare a final TMP letter/report to be submitted to the District Construction Engineer and the project manager and provided to the constructability team.
- b. TMP report will include strategies to be monitored through data collection.

- 
- Discuss the TMP throughout the project development process.
  - Incorporate TMP components into plans, plan notes, and PS&E.
-

### **900.8.3 Project Construction Stage**

During the construction stage of a project, the District will prepare the TMP revision letter/report and will lead the following procedures:

1. Reevaluate/revise TMP.
  - a. TMPs developed during contracting or construction are approved prior to implementation.
  - b. Discuss the TMP at the pre-construction meeting.
  - c. Solicit comments on proposed changes with applicable constructability review team members.
2. Implement the TMP.
  - a. For all projects, NMDOT Specification 618 identifies requirements of the installation, inspection, and maintenance of TMP devices and/or TMP components. All elements of the TMP shall be implemented.
3. TMP monitoring.
  - a. Review crash and operational data.
  - b. Identify transportation operations and public information strategies.
  - c. Identify impacts.
  - d. Monitor the performance of the work zone and the TMP to assess impacts and to determine if strategies in the TMP are effective.
  - e. Record in the project diaries and reports.

### **900.8.4 Performance Assessment Stage**

Post-construction procedures are the responsibility of the District, Construction Bureau, and the Traffic Technical Support Bureau. Post-construction procedures include the following:

1. Post-project evaluation.
  - a. Were the management strategies effective?
  - b. Were the decisions through the process adequately made?
  - c. Do TMP procedures/costs need to be adjusted?

For Significant Projects, the activities shown in Exhibit 900-14 will also be completed.

**Exhibit 900-14****Performance Assessment for Significant Projects**

<b>Activity</b>	<b>Responsibility</b>
Document post-project evaluation of successes and failures, changes to the TMP, and results. Distribute report to the constructability team or TMP team.	District
Conduct bi-annual work zone process reviews with FHWA on randomly selected projects. Incorporate into central database.	Construction Bureau
Maintain database of post-project evaluations to define TMPs on future projects and to determine if NMDOT policies or procedures need to be improved.	Traffic Technical Support Bureau/Construction Bureau

## **900.9 Work Zone Design Standards**

### **900.9.1 Lane Widths**

Lane widths in work zones shall be a minimum of 11 feet. Lane widths less than 11 feet will require a variance.

### **900.9.2 Buffer Space and Shy Distance**

Buffer spaces shall be per the MUTCD. Shy distances shall be per the AASHTO Roadside Design Guide.

### **900.9.3 Construction Clear Zone**

The AASHTO Roadside Design Guide, current edition, provides clear zone requirements in work zones.

### **900.9.4 Drop-Offs**

This section sets forth pavement drop-off guidelines for construction zones and shall be followed in the development of TCPs for all highway projects involving construction zones. These guidelines shall be followed in compliance with the current editions of the AASHTO Roadside Design Guide and MUTCD, as applicable, and including, but not limited to, the application of positive protection devices, exposure control measures, and other traffic control measures.

#### **900.9.4.1 Pavement Drop-Off for Activities within the Travel Lane**

Examples of activities in the travel lane include milling and overlay operations. For these types of operations:

- A maximum 1.5 inch vertical drop-off between adjacent surfaces may be allowed at the centerline or lane lines, without treatment.
- When the vertical drop-off is greater than 1.5 inches, a fillet with a slope of 6:1 or flatter shall be provided during non-working hours. The work shall be scheduled to result in not more than one day operation of exposed longitudinal joint between adjacent surfaces.

#### **900.9.4.2 Pavement Drop-Off for Areas Adjacent to the Existing Travel Lane with Buffer Zones Less Than Six Feet in Width**

For travel lane widths within construction work zones of 11 feet or more:

- A slope of 3:1 or flatter shall be constructed whenever possible; however, a maximum three inch drop-off will be allowed without any special treatment, provided that vertical panels or other delineation devices are provided to delineate the drop-off.
- Drop-offs greater than three inches that are exposed to traffic during non-working hours shall be protected by a fillet (3:1 or flatter slopes) with delineation drums, vertical panels, or other delineation devices. If a fillet of less than 3:1 slope is not achievable, positive barrier protection (e.g., concrete wall barrier or an approved equivalent) shall be used.

#### **900.9.4.3 Pavement Drop-Off for Areas Adjacent to Existing Travel Lane with Buffer Zones that Are Six Feet or More in Width**

- A slope of 3:1 or flatter shall be constructed whenever possible.
- In those instances where a 3:1 or flatter slope is not possible, the following shall apply:
  - For drop-offs less than one foot, vertical panels or other delineation devices shall be used.
  - For drop-offs in excess of one foot, Type B drums at a spacing approved by the District Traffic Engineer or design team shall be used.

#### **900.9.4.4 Pavement Drop-Offs for Point Drop-Offs, Such as Drop Inlets and Concrete Box Culvert Ends**

When this type of drop-off is present, every effort shall be made to place the appropriate permanent feature, such as guardrail or inlet grates, as soon as possible. The following temporary measures shall apply:

- For drop-offs located six feet or more from the travel lane, Type “B” drums shall be used to delineate the hazard.
- For drop-offs located less than six feet from the travel lane, positive barrier protection (e.g., concrete wall barrier or an approved equivalent) shall be used, provided that Type B drums are used if the drop-off will be exposed for less than 24 hours.

#### **900.9.4.5 Pavement Drop-Off Exceptions**

During the development of a TCP for a project, the drop-offs shall be reviewed along with the required traffic control. If the criteria set forth in Sections 900.9.4.1 through 900.9.4.4 above cannot be obtained through reasonable and prudent design practices, or otherwise the TCP calls for pavement drop-offs, buffer zones, or other circumstances not referenced above, an exception may be granted, provided it is documented and:

- During the design phase of a project, the design team, with the PDE as the lead member (or District Technical Support Engineer for District-lead projects), shall discuss the situation and provide a recommended course of action. The PDE (or District

Technical Support Engineer) shall initiate action for this to be processed as a design exception in accordance with NMDOT's process for design exceptions and design variances, discussed in Chapter 210 of the Design Manual.

- During the construction phase of a project, the project manager shall contact the Assistant District Engineer and District Traffic Engineer for guidance when the guideline criteria cannot be met. The Assistant District Engineer and District Traffic Engineer shall provide a recommended course of action, along with a change order to the appropriate Bureau, if required.

#### **900.9.4.6 Implementing Exceptions for Pavement Drop-Off Guidelines for Construction Zones**

During the design phase or construction phase of a project, processing exceptions to the NMDOT's pavement drop-off guidelines discussed in Section 900.9.4 shall be done in accordance with NMDOT's design exception and design variance procedures discussed in Chapter 210 of the Design Manual.

#### **900.9.5 Reduced Speeds in Work Zones**

The procedure for determining work zone speed limits for TCPs should adhere to the basic principle that motorists will reduce their speed only when they are clearly aware of a need to do so. Industry standards such as the MUTCD establish this as a basic principle of work zone speed management. This basic principle leads to the reasonable assumption that all plans should be based on the permanent posted speed limit on the roadway or the 85th percentile speed; speed reduction should be avoided as much as practical.

Regulatory construction speed limits should only be established where speed control is of major importance. Reduced speed limits should only be posted in the specific portion of the work zone where conditions or restrictive features are present, not throughout the entire project. Use of unwarranted speed reduction, for example, a speed reduction left in place per plan but not warranted in the field, encourages violation and increases noncompliance.

Appropriate work zone speed limits can be determined by the procedure and guidance presented in this document. NMDOT's procedure and guidelines are based on information from the

MUTCD, AASHTO, and states of Oregon, Idaho, Texas, and Tennessee Department of Transportation Work Zone Speed Limit Guidelines.

- NMDOT establishes that all TCP designs should be based on the permanent posted speed limit on the roadway or the 85th percentile speed established through an engineering study.
- Speed reduction greater than the MUTCD recommendation of 10 mph should be justified by trained personnel; speed zones with reduction greater than 10 mph should be kept as short as possible.
- The speed reduction can be removed during non-working hours provided the temporary design supports this.

#### **900.9.5.1 Policy Statement for Reduced Speeds**

TCP design shall be based on the permanent posted speed limit on the roadway as much as practical. The decision to reduce speeds in the work zone to more than 10 mph below the posted speed limit should be made by trained or certified personnel based on engineering judgment, the nature and scope of work, location of work, and field conditions that may affect the safety of the traveling public and construction workers.

Reduced work zone speed limits will be identified by phase or sub-phase in the design. The work zone speed limit should be used only during specific periods and only in the specific portion of the work zone where the procedure and guidance presented herein has identified a need.

#### **900.9.5.2 Goals and Objectives for Reduced Speeds**

To establish a uniform manner of determining speed reduction in work zones:

- Appropriate conditions must exist.
- The length of the reduced speed zone should be as short as possible.
- Speed control techniques other than regulatory signing shall be used.

### **900.9.5.3 Work Zone Speed Limit Procedure**

This procedure is applicable to long-term stationary work zones, intermediate-term stationary work zones, short-term stationary work zones, and short-duration mobile operations. The recommended procedure has four steps:

1. Confirm the existing speed limit on the roadway.
2. Identify the work zone condition that applies to speed reduction.
3. Identify site-specific conditions that apply to speed reduction.
4. Select the work zone speed limit.

#### **Confirm the Existing Speed Limit**

The first step is to determine the posted or preconstruction speed limit for the proposed work zone. The preconstruction speed limit serves as the default value for the work zone speed limit. The speed limit in the work zone should be reduced only if reduction is warranted by engineering judgment and evaluation of the factors considered in the remainder of this procedure.

#### **Identify the Work Zone Condition That Applies**

The designer must identify which of the following work zone conditions applies to the work zone. Definitions for the work zone conditions listed below are provided in Section 900.9.5.4:

- Long-term stationary
- Long-term, quasi-mobile
- Intermediate-term stationary
- Short-term stationary
- Short-duration mobile

#### **Identify Site-Specific Conditions**

The next step is to identify site-specific conditions. Each work zone should be reviewed by experienced and trained work zone personnel. The following factors related to field conditions in work zones should be considered:

- Visibility of the work zone and the geometry of the roadway and detours.
- Project duration.

- Length of the work zone.
- Work required outside of the construction clear zone and shoulder, work that warrants speed reduction.
- Work, equipment, and personnel within the construction clear zone.
- The speed per phase or sub-phase of the design.
- A specific portion of the work zone where the engineering factors identify a need.

Speed reduction should not be the only measure that is considered to enhance work zone safety. In addition to speed reduction, the following should be considered:

- Use of law enforcement
- Increased lateral offset
- Positive protection devices
- Digital radar display
- Temporary rumble strips (for short duration projects)
- Intrusion reduction methods
- Narrow lanes

A request by a contractor does not alone warrant speed reduction. In addition, notes should be included in the plans prohibiting the contractor to issue a project-wide speed reduction unless otherwise noted in the approved TCP.

### **Select the Work Zone Speed Limit**

A speed limit reduction of more than the recommended 10 mph reduction should be considered only when conditions with a lower design speed are present in the work zone and modifications of the geometrics to a higher design speed is not feasible. The following considerations shall be made when selecting the work zone speed limit:

- Work zone speed limits that are appropriate for actual conditions that exist are very important in maintaining a motorist's respect for the speed limit.

- If worker protection is the only warrant for reduced speed, the speed limit should be restored to its original value when work activity at that location is complete.
- Work zone speed limits and traffic control treatments should be regularly evaluated to ensure they are working as intended.

#### **900.9.5.4 Types of Work Zones/Efficient Speed Reduction**

This section describes the different types of work zones.

##### **Long-Term Stationary**

Examples of long-term stationary projects include roadway construction, reconstruction, rehabilitation, full depth repair, and bridge repair/replacement. Typically, these types of work zones:

- Generally require a speed reduction of 10 mph through the project area.
- Are good candidates for floating speed zones or a two-stage reduction to achieve greater than a 10 mph reduction in areas of concern.
- Require regular, scheduled evaluations to determine the effectiveness of traffic control treatments.

##### **Long-Term, Quasi-Mobile**

Pavement preservation projects are examples of long-term, quasi-mobile projects. These projects typically include mill/inlay, mill/overlay, fog seal, crack seal, or microsurfacing. For these projects, the designer should consider the following:

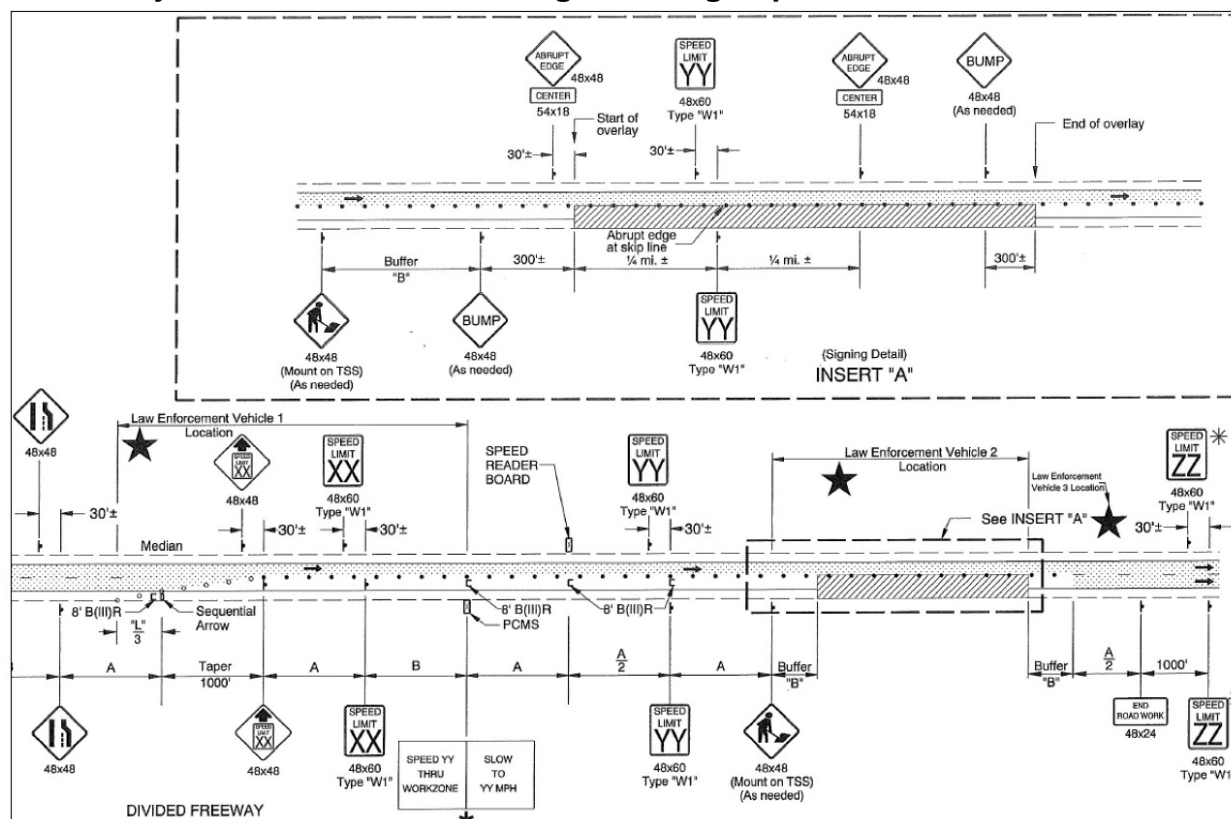
- What is the duration of the work? Is speed reduction warranted for a short duration? Temporary rumble strips or a portable changeable message sign warning of a reduced speed should be considered.
- Is the speed reduction warranted for intermediate-term activities? Two-stage speed reduction, shown in Exhibit 900-15 from a draft pilot study from Idaho, should be considered. In this example:
  - Speed limit XX is the standard 10 mph reduction. Speed limit YY reflects an additional speed reduction based on the area of concern. The designer should note the placement of

the speed reader board (radar trailer) in advance of the additional speed reduction.

- Speed limit ZZ is placed immediately downstream of the work zone returning motorists to the posted speed limit.
- Exhibit 900-15 provides recommendations for placement of law enforcement personnel in strategic locations.

Exhibit 900-15

### Pilot Study Traffic Control Plan Using Two-Stage Speed Reduction



Speed reduction for projects that include many miles of roadway and move daily, such as pavement preservation projects or similar quasi-mobile projects that are in a new location every 24 hours or so, should be treated differently than stationary projects with a larger scope and higher degree of complexity.

The nature of work during pavement preservation projects often places personnel and equipment immediately adjacent to the active travel lane. These areas may require a different treatment and speed reduction technique than more stationary work zones with larger offsets to activity areas. In some cases, speed reductions of up to

20 to 30 mph are necessary when approaching areas of concern with activity two feet or closer to the active lane. This operation also requires regular/scheduled evaluations to determine the effectiveness of traffic control treatments.

### **Intermediate Duration Stationary**

Intermediate-term stationary work is defined as work that occupies a location more than one daylight period for up to three days, or nighttime work that lasts more than one hour. Examples include guardrail installation, pothole repair, and grading. For these projects:

- Stationary operations that are within the construction clear zone may require speed reduction.
- A speed limit reduction of up to 10 mph may be considered in light of the following factors:
  - Existing speed limit
  - Site-specific work zone conditions
  - Lateral offset of equipment/personnel from edge of travel lane
- Regular, scheduled evaluation is required to determine the effectiveness of traffic control treatments.

### **Short-Term Stationary**

Short-duration stationary work is work that occupies a location for up to one hour during daytime hours. For these projects:

- Generally no speed reduction is warranted for routine maintenance work that is more than the construction clear zone distance from the edge of the travel lane. Examples of these projects include fence repair, sign installation, and culvert maintenance. For these projects, the duration of work and lateral offset should be considered.

- Shoulder work within the construction clear zone may require a speed reduction. Examples of these projects include guard rail repair, culvert repair, and CWB repair. Considerations for these projects include:
  - Existing speed limit.
  - Site-specific work zone conditions requiring speed reduction.
  - Duration of the work.
  - Lateral offset of equipment and personnel from the edge of travel lane.
  - Nature of the work including the visibility of the work zone, sight distance for motorists, drop-off concerns within the construction clear zone, and personnel exposure.
- To offset the need for regulatory signing to reduce speed for short duration work, use of a digital message board warning motorists of the need to reduce speed, the presence of workers, or narrow lanes may be considered in addition to a truck-mounted attenuator with an arrow board in caution mode.

### **Short-Duration Mobile Operations**

Short-duration mobile operations are work zones that move continually or intermittently. Examples of these projects include herbicide spraying and conducting road or sign inventories. For these projects:

- Normally no speed reduction is needed.
- High visibility devices should be used. These devices may include flashing/oscillating strobes on work vehicles, use of a truck-mounted attenuator with arrow board in caution mode as a shadow vehicle, or a buffer between the shadow and work vehicle.
- Work shall occur outside of the peak hours or at night.

## **900.10 Accommodation for Pedestrians, Bicyclists and Other Vehicle Types**

The Pedestrian Work Zone Policy Committee has developed a strategy for the accommodation of pedestrians in work zones. The policy includes guidelines for meeting the ADA, PROWAG, and the MUTCD requirements during temporary traffic control for construction or maintenance operations. The information in the policy also addresses bicyclists, in compliance with MUTCD recommendations.

### **900.10.1 Work Zone Policy for Pedestrians and Bicycles**

Appropriate consideration shall be given to pedestrian and bicycle traffic during planning, design, and implementation of all maintenance and construction activities (including but not limited to striping, utility work, bridge repair, and all roadway rehabilitation operations) where such consideration is applicable. Bicycles are treated as motor vehicles and shall be provided for per recommendations from the MUTCD.

Alternative routes for pedestrians should be provided where designated walkways are temporarily interrupted due to work operations. Alternative routes need to be free of obstructions and hazards (e.g., ditches, trenches, excavations). MUTCD Chapter 6D provides additional requirements; [NMDOT Standard Drawing 702-13- 1/1, Temporary Pedestrian Access Routing](#), provides a typical plan for pedestrian traffic control.

During the project, Checklist 5, attached to this document, should be used to document decision-making during scoping and planning and for final PS&E.

### **900.10.2 Pedestrians**

Most public highways and streets cannot deny access to pedestrians if no other route is available to them. All pre-existing ADA-compliant pedestrian facilities within a work zone must continue to comply with ADA requirements for access during work operations. The sections below discuss pedestrian issues within and around work zones.

### **900.10.2.1 Planning and Design**

Accessibility through the work area for pedestrians must be accounted for during scoping and constructability reviews and prior to starting all work operations. The initial design activity should determine the level of accessibility of the current pedestrian circulation path within the area of the project and the adjacent areas. The impact to the pedestrian circulation path, including transit stops, from the construction or maintenance activity needs to be determined. If a temporary route or detour is required the project limits and required clearances for the area may need to be reassessed. Existing site conditions will dictate what is required.

Pedestrian accommodations should provide the best accessibility practical through all stages of work. The designer should consider obtaining local input through a public meeting or contact with residents or public officials to see where additional accessibility needs should be addressed (e.g. senior centers, medical facilities, schools, public facilities, etc.).

If temporary pedestrian ramps are necessary at the work location all ramps shall duplicate existing conditions or meet temporary ADA standards. Whenever possible, the work should be done in such a manner that it does not create a need to detour pedestrians from existing routes. According to the MUTCD, pedestrians rarely observe detours and the cost of providing accessibility and detectability might outweigh the cost of maintaining a continuous route through the construction zone. All methods should be given consideration, including providing alternate means of traversing the construction zone. If pedestrians are to be directed through the construction zone, safety as well as accessibility must be addressed:

- Pedestrians should be provided with a safe, reasonably convenient path that replicates as nearly as practical the most desirable characteristics of the existing sidewalks or footpath. Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations.
- Pedestrians generally will not go out of their way or retrace steps to access a detour. Alternate pathways must be reasonable.

- Signs and other traffic control devices may pose a hazard if located in the pathway.
- Placement of “sidewalk closure” signs is required in advance of the closure point for pedestrians to make adjustments to their route. Pedestrians with a disability must have advance warning in order to choose their route.

### **900.10.2.2 Temporary Routes**

If a temporary route is created in the roadway, shoulders, parking lanes, or travel lanes can be converted to temporary walkways using appropriate barricades, reflectorized drums, and signage. Walkways must be clearly identified and fully accessible for people with disabilities, protected from motor vehicle traffic, and free from hazards such as holes, debris, abrupt grade changes, mud, and standing water. Drainage of the path or walkway should be given consideration when appropriate.

The width of the existing pedestrian facility should be duplicated for the temporary facility if practical. In all cases a width of at least four feet should be provided on the newly constructed detour path, with a 60-inch by 60-inch landing or turnaround area every 200 feet. Wider walkways may be necessary where there are high pedestrian volumes. Construction traffic control signs and other equipment should not be placed within the walkway, and sidewalks open to pedestrians should not be used as storage areas for construction equipment, workers' vehicles, signs, barricades, or drums. Additionally, signs should not be placed where they block pedestrians using wheelchairs or protrude at head height (between 27 inches and 80 inches).

It is strongly recommended that detour routes be on paved surfaces. Temporary pedestrian facility surfaces must be a smooth, continuous hard surface and should be provided throughout the entire length of the temporary pedestrian facility. The temporary pedestrian facility surface must be removed and a permanent pedestrian facility must be replaced prior to the end of the project.

At intersections, closing crosswalks should be avoided but temporary crosswalks should be marked if necessary. Access to pedestrian push buttons should be maintained, where applicable.

Advance signage should be provided at intersections to alert pedestrians of midblock worksites.

### **900.10.2.3 Protective Barriers**

Barriers to prevent pedestrians from entering construction zones should be continuous and constructed of rigid materials in order to be discerned by pedestrians with vision impairments. The use of “caution” tape, “snow fence,” pedestrian screen fencing, or other measures is not acceptable for defining a pedestrian route as these materials are easily broken and do not adequately direct pedestrians into the temporary pathway. Scaffolding and other construction fencing should not have objects that protrude into the clear head space for pedestrians. Temporary work on sidewalks also needs to be barricaded.

At fixed work sites of significant duration, especially in urban areas with high pedestrian volumes, positive protection may be needed to prevent pedestrian access into the construction site. It may be necessary to use a longitudinal traffic barrier to separate the pedestrian from vehicular traffic. When determining the location of the temporary pedestrian access route, pedestrians should not be placed immediately adjacent to traffic without positive protection when speeds on the roadway exceed 30 mph. The barrier must be of sufficient strength to avoid intrusion by an impacting vehicle. The AASHTO Roadside Design Guide and [NCHRP Report 350](#) include information on barrier system performance. Wooden railings, chain link fences, and other similar systems are not suitable for use in this situation.

### **900.10.3 Bicycles**

Bicycles are treated as motor vehicles and shall be provided for per recommendations from the MUTCD. The following should be considered:

- Provide advance warning for work in or near a bicycle lane or designated bike path when activities affect the movement of bicycles through their normal path.
- When a designated bike path is closed for use, provide an alternate route or designate a shared-use area if no alternate routes are available.

### **900.10.3.1 Planning and Design**

Like pedestrians, bicyclists shall be accommodated through work zones. If bicycle accommodation is normally provided on the roadway, the designer should strive to maintain this accommodation through the work zone. In many cases, however, it is not practical to maintain the required cross section. When it is not possible to maintain the bicycle accommodation, the following shall be considered.

#### **Shared-Use Facility**

In work areas where the motor vehicle speeds are in the range of 25 to 30 mph, the bicycle can use the same route as the motor vehicles. "Share the Road" signs should be used to alert motorists to the presence of bicycles.

On higher speed facilities, the designer should reduce motor vehicle speeds so that they are compatible with shared-lane operations.

#### **Temporary Routes**

Where appropriate shared-use speeds cannot be achieved, a different route or detour is desirable. Bicyclists may also be instructed to dismount and walk their bikes through the work zone, following the route provided for pedestrians.

Loose gravel, abrupt grade changes, milled pavement, standing water, mud, and other hazards create difficulty for bicyclists and should be avoided within the traveled way. Drainage of the path or bikeway should be given consideration when appropriate.

Raised utility covers and other objects along the edge of the traveled way also pose hazards for cyclists and should be avoided when possible. When these objects are present, they should be marked with reflective paint or other means to improve their visibility. Objects protruding from barriers or signs into the bicyclist's head zone pose serious hazards and must be avoided.

### **900.10.4 Motorcycles and Oversized Vehicles**

Special considerations for motorcycles and oversized vehicles in work zones will be made on a case-by-case basis.

## 900.11 Traffic Control Plan

Traffic control plans within NMDOT facilities are subject to approval by the District. This section discusses the development and requirements for a comprehensive TCP.

### 900.11.1 Development

A constructability review is the first step in formulating a complete TCP. The constructability review shall occur early in the design process, preferably prior to Preliminary Design review but always prior to the Plan-in-Hand review.

The PDE shall coordinate a constructability review with personnel from the District Office, the Construction Liaison Engineer, Traffic Technical Support, FHWA and any additional required staff. Prior to the constructability review the PDE shall possess the following information:

- **Project scope** - Does the project consist of rehabilitation, reconstruction, offset alignment, bridge rehabilitation or construction, drainage improvements, etc.?
- **Existing traffic characteristics** - Required information may include AADT, peak hour directional traffic volumes, percentage of heavy vehicles, and turning movements at intersections.
- **Construction concept** - Concepts may include pilot car operations, offset alignments, detours, shoo-flys, flagger operations, lane closures, and nighttime operations.
- **Anticipated impacts to traffic** - Impacts to evaluate may include vehicle delay, anticipated queue lengths, increased density, increased travel time, reductions in passing opportunities on two lane roads, and reductions in LOS.

The constructability review shall be used to present a preliminary suggested sequence of construction, illustrate critical locations during construction, solicit input on anticipated impacts to traffic, determine allowable hours for construction, and solicit input on the general constructability of the project. In addition, a decision should be made as to whether all components of the TCP will be itemized and paid for separately or if Item No. 702810 – Traffic

Control Devices During Construction, Lump Sum will be used as outlined in the NMDOT Special Provisions for Traffic Control Devices During Construction Section 702-C. Only those items listed in the Special Provision may be paid using Item No. 702810. All major components and high cost items of the TCP such as earthwork, detour pavement, changeable message boards, temporary CWB, resetting of temporary CWB, impact attenuators, and resetting of impact attenuators must be listed and paid for separately using their respective NMDOT item numbers. These major items shall not be included in Item No. 702810.

Bid Item 618000 - Traffic Control Management, Lump Sum will be included in all projects. As a rule, the use of Item No. 702800 - Traffic Control Plan, Lump Sum will be limited to simpler miscellaneous projects (i.e. fencing, stockpiling, contract maintenance, etc.) requiring minimal traffic interruption. This will be determined during the constructability review based on the project classification, scope of the project and the type of temporary traffic control required for the project. Otherwise, a comprehensive TCP will be required on the majority of projects in order to assure that the project is constructible. Feedback from the constructability review is critical to providing a complete TCP.

The TCP concept needs to be developed early on in the project development process and in conjunction with determining the alignment and other features of the project. It is very important that a constructability review be conducted early in the project development process to ensure that the project can be constructed while maintaining traffic through the work zone. The PDE will be responsible for completing the appropriate Work Zone Design Checklist located in Attachment 1 at the end of this chapter and providing a copy to the FHWA Area Engineer at the PS&E review meeting. There are three Work Zone Design Checklists depending on project type. These include checklists for Routine Projects, Regionally Significant Projects, and Significant Projects.

TCPs shall be developed in conformance with NMDOT's Pavement Drop-Off Guidelines, discussed in Section 900.9.4. The Traffic Technical Support Section will develop and maintain standard TCP

sheets in compliance with the latest edition of the MUTCD which will aid or provide guidance in the development of site-specific TCPs.

Exhibit 900-16 through Exhibit 900-20 identify the responsibility for each activity to be performed to address traffic handling through the work zone for each phase of the NMDOT project development process:

**Exhibit 900-16****Prior to Preliminary Design**

<b>Responsibility</b>	<b>Activity</b>
PDE/District	Background Information: Project scope/purpose, type of roadway, number of lanes, project location, traffic volumes, anticipated impacts to traffic, preliminary construction concept, posted and design speed for the mainline and cross road or ramp.
PDE/District	Set preliminary horizontal and vertical grade.
PDE/District/Traffic	Develop a preliminary construction sequence, develop and review cross sections for the construction sequence, and identify critical site/field conditions with the District Office.
PDE/District	Set horizontal and vertical grades and sequence considering bridge demolition, construction, drainage extensions, etc.
PDE/ District/ Traffic	Determine work zone lengths, appropriate speed reduction if any, and time restrictions for peak traffic flows with District, Construction Liaison Engineer, and the PDE.

**Exhibit 900-17****Preliminary Design**

<b>Responsibility</b>	<b>Activity</b>
PDE	Plan set includes construction sequence, construction typical sections, earthwork schedule based on phasing, horizontal and vertical geometry reflecting final alignment based on the construction sequence.
PDE	Obtain comments from design team.
PDE	Review the constructability of project with Traffic, District (Project Manager and Assistant District Engineer for Construction), Construction Bureau, and FHWA to gain consensus on the suggested construction sequence in order to proceed with the design of the project.
PDE	Document results of the constructability review meeting including the construction sequence.

**Exhibit 900-18****Grade and Drain Inspection**

<b>Responsibility</b>	<b>Activity</b>
PDE	Finalize the suggested sequence of construction in the plans with preliminary phasing. Preliminary layouts include plan sheets developed for each phase showing preliminary construction signing and striping.

**Exhibit 900-19****Plan-in-Hand Inspection**

<b>Responsibility</b>	<b>Activity</b>
PDE	Finalize the construction sequence.
PDE	Prepare final phasing layouts with final construction signing and striping.
PDE	Develop plan sheet for each phase of construction.
Traffic	Perform a quality control review of the TCP.

**Exhibit 900-20****PS&E**

<b>Responsibility</b>	<b>Activity</b>
PDE	Include comments from final design inspection into the PS&E plans
Traffic	Perform a quality control review of construction signing and striping.

**900.11.2 Traffic Control Plan Requirements**

A comprehensive TCP shall comply with the most current edition of the MUTCD and will include the following, at a minimum:

- **Construction signing general notes** - Both standard and project-specific.
- **Construction signing sign face sheet** - May include special signs.
- **Suggested construction sequence** - The sequence shall incorporate input received in the constructability review.
- **Construction typical sections** - Typical sections for each phase of construction shall be shown. These typical sections shall be referenced in the construction sequence and shall illustrate construction zones and placement of devices such as drums or temporary concrete wall barrier, detour pavement, construction tie slopes, location of traffic, and the dimensions of construction typical section elements (driving lanes, shoulders, buffers, offsets from existing centerline, etc.).
- **Construction phasing layouts** - Layouts shall be prepared for each phase of construction and shall include work zone signing, detour signing, construction striping, traffic control devices, temporary concrete wall barrier, horizontal curve data for detour geometry, work zone delineation, and traffic flow arrows. It may be possible on some projects to substitute

NMDOT [Standard Drawings](#) or project-specific standard details in place of construction phasing layouts. This shall only be done if the Standard Drawings or details clearly communicate all required signing, striping, detour geometry, traffic control devices, etc., for all expected construction phases. NMDOT Standard Drawings or details must still be referenced in the suggested sequence of construction.

- **Vertical profiles for detour** - Vertical profiles may be required for some detour alignments, especially in areas where the detour involves substantial earthwork or steep grades. Profiles may also be requested by the design team.
- **Construction signing quantities** - Quantities shall be prepared for each construction phase including a detailed breakdown of expected earthwork, temporary CWB including resetting, construction signing, construction striping, removal of striping, traffic control devices, and vehicle impact attenuator units including resetting, etc. The bid item 618000 - Traffic Control Management shall be included in all projects.
- **Temporary striping plans** - Temporary striping plans shall be required for urban areas and/or dark (unlit) roadway segments that may require added delineation to keep motorists in the travel lane. For example, when a roadway with an existing right turn lane is being resurfaced, an edge line should be defined to prevent a motorist from running into an existing splitter island or other raised channelization.

While the specifications still provide flexibility in allowing the contractor to propose a different plan, the designed TCP serves as a basis for negotiations based on a sound methodology. NMDOT has developed [spreadsheets for designers to use when developing construction signing plans](#).

## 900.12 Training

As required in [23 CFR Part 630.1008\(d\)](#), personnel involved in the development, design, implementation, operation, inspection, and enforcement of work zone-related transportation management and traffic control must be trained, appropriate to the job decisions each

individual is required to make. This includes law enforcement officers used on projects.

Training and certification programs provided by national organizations shall be required as a prerequisite in design, implementation, operation, inspection, and enforcement of the TCPs. Work zone training shall be provided by a nationally recognized resource such as the FHWA, NHI, ATSSA, and International Municipal Signal Association (IMSA). In addition, work zone training will also be provided through in-house NMDOT resources such as the Traffic Technical Support Bureau, District Personnel, the Construction Bureau, and others involved in aspects of work zones.

The training will reflect industry practices and agency processes and procedures. Personnel requiring training includes, but is not limited to, transportation planners, designers/consultant designers, project development engineers, traffic engineers, safety engineers, construction project staff, maintenance staff, contractors, and utility staff.

The training shall be effective for four years upon completion of the course and retraining will be required every four years. Retraining may consist of a shorter refresher course.

The NM Technician Training and Certification Program (TTCP) has established training programs for contractors and NMDOT construction personnel. Listed below is a sample of suggested training courses. NMDOT recommends the following guidelines for identifying who should be trained and what training courses should be used.

### **900.12.1 Training for Design Personnel**

The NMDOT Programs and Infrastructure Organization will require training for design personnel involved in the implementation, inspection, and enforcement of work zone-related transportation management and traffic control. All personnel involved in construction work zone projects should have a basic knowledge of TTC that allows them to assist in monitoring and recognition of deficiencies during the course of a project.

Suggested training courses for design personnel, PDEs, construction project managers, or project engineers include:

- **Traffic control supervisor (ATSSA)** - All projects from the simplest maintenance job to a multi-million dollar reconstruction project require traffic control expertise to make the project as safe as possible for the motorist and workers. The project manager or project engineer on the project needs to be trained in the latest standards, practices, and procedures to accomplish this goal.
- **Traffic control design specialist (ATSSA)** - This training course addresses the entire process for designing, installing, maintaining, and evaluating temporary traffic control in work zones. This training is recommended for traffic engineers, engineering technicians, consultants, and other individuals responsible for temporary traffic control design and for individuals who are responsible for designing TCPs for approval.
- **Design and operation of work zone traffic control (NHI) 3-day course** - This course provides participants with information on the safest and most efficient work zone traffic controls, including the application of effective design and installation concepts, and using signs and markings for detours, construction zones, and maintenance sites. The legal, administrative, and operational aspects are also discussed. Classroom presentations include lectures, case histories, and workshops.
- **Advanced work zone management and design (NHI)** - This course provides participants with advanced levels of knowledge and competencies with technical and non-technical aspects of work zone traffic control practices including work zone planning, design, project management, and contract issues. The course is designed to provide maximum flexibility by including core, recommended, and optional lessons. Each participant receives a copy of the Advanced Work Zone Management and Design reference manual and a participant workbook that contains all lesson materials.

### 900.12.2 Training for Personnel Involved with Implementation, Operation, Inspection, or Enforcement

The NMDOT will require training for construction personnel involved in the implementation, inspection, and enforcement of work zone-related transportation management and traffic control. Traffic Control Supervisors employed by the contractor must be certified according to the specifications outlined in the current edition of the NMDOT [Standard Specifications for Highway and Bridge Construction](#). Suggested training courses for construction project managers or project engineers include:

- **Traffic control supervisor (ATSSA)** - All projects from the simplest maintenance job to a multi-million dollar reconstruction project require traffic control expertise to make the project as safe as possible for the motorist and workers. The project manager or project engineer on the project needs to be trained in the latest standards, practices, and procedures to accomplish this goal.

Suggested training course for construction inspectors and technicians include:

- **Traffic control technician (ATSSA)** - All those involved in construction work zone projects should have a basic knowledge of temporary traffic control that allows them to assist in monitoring and recognition of deficiencies during the course of a project.
- **Comprehensive inspection training course (ATSSA training CD)** - This training consists of 14 modules geared towards specific topics: inspection basics, nighttime traffic control, flagging operations, signs and supports, portable changeable message boards, arrow panels, channelizing devices, pavement markings, raised pavement markers and delineators, warning lights and floodlights, crash cushions, portable concrete barriers, truck-mounted attenuators, and guardrail installation and inspection.
- **Construction zone safety inspection (1.5 day)** - This course provides training in the management of TCPs and the inspection of construction zone safety devices. Participants

receive instruction in TCP review, inspection of traffic control procedures and safety devices, and the resolution of discrepancies from the TCP, as well as on deficiencies in safety hardware maintenance. The following major topics are covered: Inspection of TCP operation, maintenance of work zone signs and markings, inspection of construction safety hardware, and resolution of discrepancies from contract requirements.

Suggested training course for enforcement personnel include:

- **FHWA work zone law enforcement course** - This course provides basic knowledge to promote the safe and effective use of law enforcement in work zones. As a result of this course, participants will understand the role of law enforcement personnel in work zones, recognize proper practices and procedures related to the use of law enforcement personnel in work zones, recognize the component parts of a typical work zone, and understand standards and guidelines related to temporary traffic control in work zones.

### **900.12.3 Maintenance Personnel**

The NMDOT shall develop and maintain a training program for maintenance personnel involved in the implementation, inspection, and enforcement of work zone-related transportation management and traffic control.

All those involved in maintenance work zone projects should have a basic knowledge of temporary traffic control that allows them to assist in monitoring and recognition of deficiencies during the course of a project.

Suggested training courses for Maintenance Supervisors include:

- **Low speed lane closures (ATSSA training CD)** - Introduces the basic concept and techniques related to lane closures in low speed areas, such as advance warning areas, transitions, buffers, work spaces, ad termination areas, and residential and urban areas. Other topics include standards, typical setups, channelizing devices, use of flaggers, and installation and removal of traffic control devices.

- **Moving mobile operations (ATSSA training CD)** - Review of issues related to work zones that are in motion such as mowing, striping, parching, and line painting. Other topics include standards and procedures, fundamental principles, using flaggers, operations on the shoulders and beyond the shoulders, and more.
- **Basic worker safety (ATSSA training CD)** - Introduces principles and concepts related to basic worker safety such as training, garments, visibility, nighttime work, worker safety regulations, use of barriers, shadow vehicles, use of police, special devices, and more
- **Mowing operations (ATSSA training CD)** - Reviews issues related to traffic control during mowing operations, including standards and procedures, factors to consider during mowing, work beyond the shoulder and in the median, personal safety, visibility, and sign spacing
- **Truck-mounted attenuator operations (ATSSA training CD)** - Review of issues related to work zones where truck-mounted attenuators are used, when to use crash cushions, type of truck-mounted attenuators, typical uses, shadow vehicles, advance warning trucks, positioning of truck-mounted attenuators, roll-ahead distances, and additional situations.
- **Comprehensive inspection training course (ATSSA training CD)** - The training consists of 14 modules geared towards specific topics: inspection basics, nighttime traffic control, flagging operations, signs and supports, portable changeable message boards, arrow panels, channelizing devices, pavement markings, raised pavement markers and delineators, warning lights and floodlights, crash cushions, portable concrete barriers, truck-mounted attenuators, and guardrail installation and inspection.

Given the preceding sources of training the NM Technician Training and Certification Program (TTCP) has developed minimum training requirements and set standards of certification for all the personnel involved in the development, design, implementation, operation, inspection and enforcement of work zone-related transportation management and traffic control.

## **900.13 Documentation**

### **900.13.1 Work Zone Safety and Mobility Rule (Subpart J)**

The PDE will be responsible for completing the appropriate Work Zone Design Checklist, located in Attachment 1 at the end of this chapter, and providing a copy to the FHWA Area Engineer at the PS&E review meeting.

### **900.13.2 Temporary Traffic Control Devices Rule (Subpart K)**

The following checklists are required as part of the PS&E review meeting:

- Checklist 1 CWB Decision Matrix
- Checklist 2 Exposure Control Measure Matrix
- Checklist 3 Law Enforcement MOU
- Checklist 4 Safe Entry/Exit for Work Vehicles and Equipment
- Checklist 5 Pedestrian Considerations Checklist
- Work Zone Design Checklist

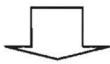
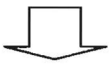
## **900 Work Zone Safety**

### **Attachment 1**



Check list 1			
CWB decision matrix			
Work Zone	Yes	No	N/A
1. Project scope and duration?			
a. Short term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Long term (longer than three days)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Permanent lane/shoulder/ramp closures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
6. Anticipated traffic speeds through the work zone larger than 35 mph;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Anticipated traffic volume; larger than 10,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Vehicle mix; more than 5% truck volume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Type of work (as related to worker exposure and crash risks); High risk, bridge deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
6. Distance between traffic and workers, and extent of worker exposure; Less than 6'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
8. Work area restrictions (including impact on worker exposure);	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Escape paths available for workers to avoid a vehicle intrusion into the work space;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
9. Time of day (e.g., night work);	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Consequences from/to road users resulting from roadway departure;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
12. Potential hazard to workers and road users presented by device itself and during device placement and removal;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
12. Geometrics that may increase crash risks (e.g., poor sight distance, sharp curves);	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
2. Access to/from work space;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
14. Roadway classification;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
15. Impacts on project cost and duration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
16. NMDOT drop off policy is met.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
Review all the factors. Safety of the workers and public should be evaluated and based on engineering judgment traffic control plan should be designed.			
<b>Will CWB be required? Use this matrix and department policy to decide on the use of CWB. Refer to next pages for more guidance.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>



Check list 2				
Exposure Control Measures Matrix				
Ask the following questions:	Can you provide?		Can you see any?	
				
	Yes	No	Cost saving	Time saving
1. Full road closure <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Ramp Closure <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Median Crossovers <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Full or partial detours and diversion <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Protection of WZ setup and removal using rolling road block <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Work area restrictions (including impact on worker exposure) <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Performing night or during off-peak periods <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Accelerated construction techniques <b>Comments:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Will additional safety be provided taking available one or several measures?	Yes	No		N/A



Check list 3			
Law Enforcements MOU should address the following issues:			
Work Zone	Yes	No	N/A
Scope of Work, Description	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Statement of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inter-agency agreement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Law Enforcement Responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Department Responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contract Period	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contract management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Budget DETAILS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Payment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost Limitation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Termination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Subcontracting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disputes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indemnification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change in Terms of agreement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1- Pre Job/ Planning			
a. Understanding of site duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Method of Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Defining acceptable traffic delay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			
Each item should be reviewed and addressed in the MOU			
	Yes	No	N/A



### Check list 4

## Safe entry/exit for work vehicles and equipment

Ask the following questions:		Comments on accommodations
<b>Characteristics of the Facility</b>	<input type="checkbox"/>	
Speed (acceleration /deceleration, alignment constraints?)		
Traffic Volumes and Queues	<input type="checkbox"/>	
<b>Configuration of Access</b>	<input type="checkbox"/>	
How do vehicles gain access?		
How is traffic affected? Decision sight distance		
Are turning radii appropriate?	<input type="checkbox"/>	
<b>Motorist Expectancy</b>		
Is ample direction given to the motorist?	<input type="checkbox"/>	
<b>Work Zone Signing</b>		
Is additional signing necessary for exit/entry locations?	<input type="checkbox"/>	
Truck crossing signs requirements	<input type="checkbox"/>	
Night time signing of delivery vehicles	<input type="checkbox"/>	
<b>Movement of work vehicles in the work zones.</b>		
<b>Probability for congestion causing movements</b>	<input type="checkbox"/>	
<b>Mandates vehicle entrance and exit in the direction of traffic flow.</b>	<input type="checkbox"/>	
<b>Light requirements for guidance to ensure proper visibility</b>	<input type="checkbox"/>	
<b>Motorist awareness of work vehicle movement.</b>	<input type="checkbox"/>	
<b>Recommendation for Delivery Coordination (off peak hours)</b>	<input type="checkbox"/>	
<b>Environmental factors (dragging dirt into the roadway)</b>	<input type="checkbox"/>	
<b>After examination of all the factors, how have the safety issues been accommodated:</b>		



**CHECKLIST 5****PLANNING AND DESIGN – PEDESTRIAN CONSIDERATIONS****TTC= temporary traffic control**

Pedestrian Work Zone Impacts- Ask the following questions	Yes	No	N/A
<b>PLANNING: Assess the TTC impact on existing pedestrian facilities</b>			
a. Existing pedestrian facility to remain open?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. If closed is alternate route available?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Does alternate route provide same service and accessibility as existing pedestrian path?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Considerations if existing to remain open:</b>			
1. Determine needs and level of accessibility. Identify generators: Schools, businesses, senior centers, transit stops; can these be accommodated thru all phases with TTC activity?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Are there conflicts with pedestrians, and work vehicles or equipment operations?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Are there conflicts with pedestrians and mainline traffic moving thru the work zone?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Will temporary nighttime lighting thru TTC zone be needed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Considerations if detouring pedestrians to alternate route:</b>			
5. Has level of accessibility of alternate route been determined?			
a. Observe existing pedestrian patterns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Determine level of accessibility needed. Are pedestrians with special needs present?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Do temporary facilities reasonably replicate existing facilities for ADA accessibility?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Will additional work/funding be needed on alternate route to ensure level of service matches existing?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Project limits and required clearances for the area may need to be reassessed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>DESIGN: Clear and positive guidance for pedestrians</b>			
a. Existing pedestrian facility to remain open?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. If closed is alternate route available?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Does alternate route provide same service as existing pedestrian path?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Considerations if existing to remain open:</b>			
8. Does TTC plan provide pedestrian information thru entire work zone?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a. Advance warning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Guidance in Transition areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Work area information/ barricades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Ingress/egress information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Based on existing pedestrian patterns will detectable devices be required?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Will there be a continuous accessible path of travel thru all phases of construction?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CHECKLIST 5 Cont'd	Yes	No	N/A
<b>Considerations if detouring pedestrians to alternate route:</b>			
11. Does TTC plan include the following?			
a. Clearly defined detour route- signing, public relations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Provide advance signing at intersections allowing pedestrian to choose their route?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Clearly identify work zone and closure of pedestrian path with appropriate barricades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Is temporary route about the same distance as existing route or not much longer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Is temporary route delineated and well-marked? Signs, devices etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Will continuous access to transit stops be maintained?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Will additional work and funding be needed on alternate route to ensure level of service and accessibility match existing?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a. ADA ramps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Pedestrian signals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Clear of Obstructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Width	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Does TTC plan prohibit use of "caution" tape stretched between traffic control devices?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Will temporary nighttime lighting be needed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*Project limits and required clearances for the area may need to be reassessed			
Are temporary facilities in compliance with PROWAG 2011, most recent edition of MUTCD and ADA of 1990?	YES	NO	N/A
Is a Variance Required?	YES	NO	N/A

## Utility Construction

If the pedestrian circulation path is disturbed during utility construction, the requirements of this policy will apply.



## CN      Routine Work Zone Design Checklist

**PDE:**                      (                      Region Design)

**Termini:**

**PS&E Review Date:**

Overview			
<b>Step 1 - Identify Traffic Control Options</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ General Work Zone Setup			
▪ Project Timing			
▪ Detour			
▪ Roadside Safety			
<b>Step 2 - Identify Work Zone Impacts</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ Data Collection			
▪ Work Zone Analysis			
▪ Mobility Impacts			
▪ Construction Related Impacts			
<b>Step 3 - Identify Impact Management Strategies</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ Temporary Traffic Control			
▪ Transportation Operations			
▪ Public Information and Outreach			
<b>Project Classification</b>			
Routine Project			

General Consideration	Yes	No	N/A
1. Will there be other construction along the detour that might influence traffic?			
2. Have affected Cities, Districts, Counties, or States been notified of the proposed work zone?			
3. Will all fronting businesses have acceptable ingress and egress?			
4. Can the work zone be continued during winter (snow removal concerns)?			
5. Are alternate routes available to local motorists?			
6. Should any of the following be contacted?			
a. Public school system			
b. Public transit system			
c. Police, fire, and ambulance services			
d. Postal mail route services			
e. Others			
7. Have the following enforcement strategies been considered?			
a. Cooperative police enforcement			
b. Drone radar			
8. Is a public information meeting required?			

General Consideration Cont.	Yes	No	N/A
9. Have innovative or accelerated construction techniques been considered?			
a. Prefabricated/precast elements			
b. Rapid cure materials			
c. Accelerated Construction Technology Transfer (ACTT) Workshop			
Project Timing	Yes	No	N/A
1. Can the contractor restrict the roadway during			
a. AM or PM rush hours?			
One direction?			
Both directions?			
b. Overnight?			
c. Local celebrations?			
d. Holidays or weekends?			
e. Sporting events?			
f. Other special events?			
2. Will project timing (for example, start or end date) be restricted by			
a. School closings or openings?			
b. Holidays?			
c. Sporting events?			
d. Other projects in the area?			
e. Other?			
3. Is there present or future roadwork in the immediate area that may affect traffic or the Contractor's operations?			
Work Zone	Yes	No	N/A
1. Consider all applicable work zone types from following list			
a. Work outside of roadway			
b. Full roadway closure			
c. Permanent lane/shoulder/ramp closures			
d. Crossovers/contraflow			
e. Detour			
f. Intermittent road closures (i.e., 15-minutes, weekend)			
g. Reduced lane widths			
h. Reduced shoulder widths			
i. Lane shifts			
j. Daily lane/shoulder closures			
k. Use of shoulder or median			
l. Shoo-fly			
m. One-lane, two-way operation			
Temporary Signal			
Flagger			
n. Use of positive protection devices			
o. Reversible lane			

Work Zone Cont.	Yes	No	N/A
p. Use of temporary structures			
q. Use of temporary pavement			
r. Widening			
s. Nighttime work			
t. Weekend work			
u. Railroad impacts			
v. Geometric considerations			
w. bridge restrictions and other structures			
x. Portable Changeable Message Sign			
y. Removal of pavement stripe			
z. Safe entry and exit for construction equipment considered?			
2. Does pedestrian/bicycle traffic or ADA access need to be considered?			
3. What is the minimum allowable lane width? Width =			
4. Should a reduced work zone speed limit variance required?			
5. Should certain types of vehicles be prohibited from entering the work zone (over-height, weight restrictions)?			
6. Consideration of non-compliance by Contractor. Are Liquidated Damages established? \$/Day =			





## CN **Regionally Significant Work Zone Design Checklist**

**PDE:** ( **Region Design**)

**Termini:**

**PS&E Review Date:**

Overview			
<b>Step 1 - Identify Traffic Control Options</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ General Work Zone Setup			
▪ Project Timing			
▪ Detour			
▪ Roadside Safety			
<b>Step 2 - Identify Work Zone Impacts</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ Data Collection			
▪ Work Zone Analysis			
▪ Mobility Impacts			
▪ Construction Related Impacts			
<b>Step 3 - Identify Impact Management Strategies</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ Temporary Traffic Control			
▪ Transportation Operations			
▪ Public Information and Outreach			
<b>Project Classification</b>			
Regionally Significant Project			

General Consideration	Yes	No	N/A
1. Will there be other construction along the detour that might influence traffic?			
2. Have affected Cities, Districts, Counties, or States been notified of the proposed work zone?			
3. Will all fronting businesses have acceptable ingress and egress?			
4. Can the work zone be continued during winter (snow removal concerns)?			
5. Are alternate routes available to local motorists?			
6. Should any of the following be contacted?			
a. Public school system			
b. Public transit system			
c. Police, fire, and ambulance services			
d. Postal mail route services			
e. Others			
7. Have the following enforcement strategies been considered?			
a. Cooperative police enforcement			
b. Drone radar			
8. Is a public information meeting required?			

General Consideration Cont.	Yes	No	N/A
9. Have innovative or accelerated construction techniques been considered?			
a. Prefabricated/precast elements			
b. Rapid cure materials			
c. Accelerated Construction Technology Transfer (ACTT) Workshop			
<b>Project Timing</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Can the contractor restrict the roadway during			
a. AM or PM rush hours?			
One direction?			
Both directions?			
b. Overnight?			
c. Local celebrations?			
d. Holidays or weekends?			
e. Sporting events?			
f. Other special events?			
2. Will project timing (for example, start or end date) be restricted by			
a. School closings or openings?			
b. Holidays?			
c. Sporting events?			
d. Other projects in the area?			
e. Other?			
3. Is there present or future roadwork in the immediate area that may affect traffic or the Contractor's operations?			
<b>Work Zone</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Consider all applicable work zone types from following list			
a. Work outside of roadway			
b. Full roadway closure			
c. Permanent lane/shoulder/ramp closures			
d. Crossovers/contraflow			
e. Detour			
f. Intermittent road closures (i.e., 15-minutes, weekend)			
g. Reduced lane widths			
h. Reduced shoulder widths			
i. Lane shifts			
j. Daily lane/shoulder closures			
k. Use of shoulder or median			
l. Shoo-fly			
m. One-lane, two-way operation			
Temporary Signal			
Flagger			
n. Use of positive protection devices			
o. Reversible lane			
p. Use of temporary structures			

Work Zone Cont.	Yes	No	N/A
q. Use of temporary pavement			
r. Widening			
s. Nighttime work			
t. Weekend work			
u. Railroad impacts			
v. Geometric considerations			
w. Bridge restrictions and other structures			
x. Portable Changeable Message Sign			
y. Removal of pavement stripe			
z. Safe entry and exit for construction equipment considered?			
2. Does pedestrian/bicycle traffic or ADA access need to be considered?			
3. What is the minimum allowable lane width? Width =			
4. Should a reduced work zone speed limit variance required?			
5. Should certain types of vehicles be prohibited from entering the work zone (over-height, weight restrictions)?			
6. Consideration of non-compliance by Contractor. Are Liquidated Damages established? \$/Day =			
Transportation Operations	Yes	No	N/A
1. Have the following Work Zone ITS strategies been considered for traffic monitoring/management?			
a. Late Lane Merge Concept			
b. Advanced Speed Information			
c. Advanced Congestion Warning			
d. Conflict Warning			
e. Travel Time Monitoring			
f. Freeway Queue Monitoring			
g. CCTV Monitoring			
h. Real-time Detour (or other traffic diversion strategies)			
2. Have the following demand management strategies been considered?			
a. Transit service improvements			
b. Transit incentives			
c. Shuttle services			
d. Ridesharing/carpooling incentives			
e. Park-and-ride promotion			
f. High-occupancy vehicle (HOV) lanes			
g. Toll/congestion pricing			
h. Ramp metering			
i. Parking supply management			
j. Variable work hours			
k. Telecommuting			
3. Have the following corridor/network management strategies been considered?			
a. Signal timing/coordination improvements			
b. Temporary traffic signals			
c. Street/intersection improvements			

Transportation Operations Cont.	Yes	No	N/A
d. Bus turnouts			
e. Turn restrictions			
f. Parking restrictions			
g. Truck/heavy vehicle restrictions			
h. Separate truck lanes			
i. Reversible lanes			
j. Ramp metering			
k. Ramp closures			
l. Railroad crossing controls			
m. Coordination with adjacent construction site(s)			
Public Information and Outreach	Yes	No	N/A
1. Have the following <b>public awareness strategies</b> been considered?			
a. Branding			
b. Brochures and mailers			
c. Newsletters			
d. Press releases			
e. Media alerts			
f. Mass media (earned and/or paid)			
g. Press kits			
h. Business survival kits			
i. Public service announcements			
j. Project information center			
k. Project website			
Web-connected traffic cameras			
Real-time traffic data			
General project information			
Construction progress			
Others			
l. Public meetings, workshops and community events			
m. Community task forces			
n. Coordination with media, schools, businesses, and emergency services			
o. Work zone education and safety campaigns			
p. Work zone safety highway signs			
q. Rideshare promotions			
r. Visual information (videos, slides, presentations) for meetings and web			
s. Public opinion surveys			
2. Have the following <b>motorist information strategies</b> been considered?			
a. Radio traffic news			
b. Changeable message signs			
c. Temporary motorist information signs			
d. Billboards			
e. Highway Advisory Radio (HAR)			

Public Information and Outreach Cont.	Yes	No	N/A
f. Project information hotline			
g. 511 Telephone Line			
h. Email alerts			
i. NMROADS.com			
j. Freight travel information			





## CN      **Significant Work Zone Design Checklist**

**PDE:**                      (                      **Region Design)**

**Termini:**

**PS&E Review Date:**

Overview			
<b>Step 1 - Identify Traffic Control Options</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ General Work Zone Setup			
▪ Project Timing			
▪ Detour			
▪ Roadside Safety			
<b>Step 2 - Identify Work Zone Impacts</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ Data Collection			
▪ Work Zone Analysis			
▪ Mobility Impacts			
▪ Construction Related Impacts			
<b>Step 3 - Identify Impact Management Strategies</b>	<b>Required?</b>	<b>Completed?</b>	<b>N/A</b>
▪ Temporary Traffic Control			
▪ Transportation Operations			
▪ Public Information and Outreach			
<b>Project Classification</b>			
Significant Project			

General Consideration	Yes	No	N/A
1. Will there be other construction along the detour that might influence traffic?			
2. Have affected Cities, Districts, Counties, or States been notified of the proposed work zone?			
3. Will all fronting businesses have acceptable ingress and egress?			
4. Can the work zone be continued during winter (snow removal concerns)?			
5. Are alternate routes available to local motorists?			
6. Should any of the following be contacted?			
a. Public school system			
b. Public transit system			
c. Police, fire, and ambulance services			
d. Postal mail route services			
e. Others			
7. Have the following enforcement strategies been considered?			
a. Cooperative police enforcement			
b. Drone radar			
8. Is a public information meeting required?			

General Consideration Cont.	Yes	No	N/A
9. Have innovative or accelerated construction techniques been considered?			
a. Prefabricated/precast elements			
b. Rapid cure materials			
c. Accelerated Construction Technology Transfer (ACTT) Workshop			
Construction Related Impacts	Yes	No	N/A
1. Has the Maintenance of Traffic Plan (MOT) identified impacts on any of the following?			
a. Sight distance and merge/diverge areas at ramps			
b. Right-of-way			
c. Environment			
d. Required bridge widths			
e. Earthwork, retaining walls, pier clearances, profile differences, etc.			
f. Ability to maintain existing drainage, utility and lighting systems			
g. Construction duration			
h. Construction costs			
i. Constructability			
j. Noise levels			
k. Roadway surface conditions			
l. Storage of equipment or materials			
m. Service life (bridges, pavements, etc.)			
2. Have innovative contracting strategies been considered?			
a. Incentive/Disincentive clauses			
b. Lane Rental			
c. Performance specifications			
Project Timing	Yes	No	N/A
1. Can the contractor restrict the roadway during			
a. AM or PM rush hours?			
One direction?			
Both directions?			
b. Overnight?			
c. Local celebrations?			
d. Sporting events?			
e. Holidays or weekends?			
f. Other special events?			
2. Will project timing (for example, start or end date) be restricted by			
a. School closings or openings?			
b. Holidays?			
c. Sporting events?			
d. Other projects in the area?			
e. Other?			
3. Is there present or future roadwork in the immediate area that may affect traffic or the Contractor's operations?			

Work Zone	Yes	No	N/A
1. Consider all applicable work zone types from following list			
a. Work outside of roadway			
b. Full roadway closure			
c. Permanent lane/shoulder/ramp closures			
d. Crossovers/contraflow			
e. Detour			
f. Intermittent road closures (i.e., 15-minutes, weekend)			
g. Reduced lane widths			
h. Reduced shoulder widths			
i. Lane shifts			
j. Daily lane/shoulder closures			
k. Use of shoulder or median			
l. Shoo-fly			
m. One-lane, two-way operation			
Temporary Signal			
Flagger			
n. Use of positive protection devices			
o. Reversible lane			
p. Use of temporary structures			
q. Use of temporary pavement			
r. Widening			
s. Nighttime work			
t. Weekend work			
u. Railroad impacts			
v. Geometric considerations			
w. bridge restrictions and other structures			
x. Portable Changeable Message Sign			
y. Removal of pavement stripe			
z. Safe entry and exit for construction equipment considered?			
2. Does pedestrian/bicycle traffic or ADA access need to be considered?			
3. What is the minimum allowable lane width? Width =			
4. Should a reduced work zone speed limit variance required?			
5. Should certain types of vehicles be prohibited from entering the work zone (over-height, weight restrictions)?			
6. Consideration of non-compliance by Contractor. Are Liquidated Damages established? \$/Day =			
Roadside Safety	Yes	No	N/A
1. Are temporary barriers required? (Refer to Drop Off Policy)			
2. Will temporary impact attenuators be required?			
3. Will extra protection be required for			
a. Pedestrians/Bicyclists?			
b. School areas and crossings?			
c. Playgrounds and parks?			

Data Collection	Yes	No	N/A
1. Has the appropriate data been collected?			
a. Traffic Volumes			
b. Signal Timing			
c. Origin-Destination			
d. Travel Time			
e. Crash History			
f. Speed			
g. Delay			
e. Other			
Work Zone Analysis	Yes	No	N/A
1. Has the work zone traffic analysis been completed?			
a. Have work zone and ramp capacities been identified?			
Work Zone Capacity =			
Ramp Capacity =			
b. Has the required number of maintained lanes and allowable lane closure hours been identified?			
c. Has the appropriate analysis tools been identified/used?			
HCS			
Synchro/SimTraffic			
Corsim			
Vissim			
Other			
Work Zone Analysis Cont.	Yes	No	N/A
d. Has the appropriate traffic analyses been conducted?			
Signal timing optimization			
Ramp meter analysis			
Travel time analysis			
Delay analysis			
Other			
2. Was a Maintenance of Traffic Plan (MOT) Prepared?			
3. Has user Cost (Delay) been addressed?			
Transportation Operations	Yes	No	N/A
1. Have the following Work Zone ITS strategies been considered for traffic monitoring/management?			
a. Late Lane Merge Concept			
b. Advanced Speed Information			
c. Advanced Congestion Warning			
d. Conflict Warning			
e. Travel Time Monitoring			
f. Freeway Queue Monitoring			
g. CCTV Monitoring			
h. Real-time Detour (or other traffic diversion strategies)			
2. Have the following demand management strategies been considered?			
a. Transit service improvements			
b. Transit incentives			
c. Shuttle services			

Transportation Operations Cont.	Yes	No	N/A
d. Ridesharing/carpooling incentives			
e. Park-and-ride promotion			
f. High-occupancy vehicle (HOV) lanes			
g. Toll/congestion pricing			
h. Ramp metering			
i. Parking supply management			
j. Variable work hours			
k. Telecommuting			
3. Have the following corridor/network management strategies been considered?			
a. Signal timing/coordination improvements			
b. Temporary traffic signals			
c. Street/intersection improvements			
d. Bus turnouts			
e. Turn restrictions			
f. Parking restrictions			
g. Truck/heavy vehicle restrictions			
h. Separate truck lanes			
i. Reversible lanes			
j. Ramp metering			
k. Ramp closures			
l. Railroad crossing controls			
m. Coordination with adjacent construction site(s)			
4. Have the following work zone safety management strategies been considered?			
a. Speed limit reduction/variable speed limits			
b. Temporary traffic signals			
c. Temporary traffic barrier			
d. Movable traffic barrier systems			
e. Crash-cushions			
f. Temporary transverse rumble strips			
g. Warning lights			
h. Project task force/committee			
i. PCMS with speed display (refer to WZ Safety Toolbox)			
j. Rolling road blocks (refer to WZ Safety Toolbox)			
k. Wider lane lines (refer to WZ Safety Toolbox)			
l. Construction safety supervisors/inspectors			
m. Road safety audits			
n. TMP monitor/inspection team			
o. Use of temporary structures			
p. Use of temporary pavement			
q. Widening			
r. Nighttime work			
s. Weekend work			
t. Railroad impacts			
u. Geometric considerations			
v. bridge restrictions and other structures			
w. Portable Changeable Message Sign			
x. Removal of pavement stripe			



## **900 Work Zone Safety**

### **Attachment 2**



## Work Zone Safety – Attachment 2

### Quality Guidelines

The following descriptions, together with the accompanying photographs, should be used to determine if the device is acceptable, marginal, or unacceptable.

#### SIGNS

##### Acceptable Signs

To be considered acceptable, a sign shall meet all of the following conditions:

- There may be several abrasions on the surface, but very little loss of lettering.
- There has been no touchup of the lettering.
- This message is legible both day and night.
- Signs on portable structures shall be longitudinally perpendicular to the ground and may be placed on a side slope resulting in no more than three inches out-of-plumb per foot of height.
- Post-mounted signs shall be installed within three inches of plumb for the height of the posts.
- The back side is free of any reflective materials except small logos or identification markings and shall have a bare surface or be painted a uniform color as approved by the local road authority.
- The sign is in place at the specified spacing and is properly aligned to traffic.
- The sign support structure has been installed according to the approved crashworthy requirements.

##### Examples of Acceptable Warning Signs



## Marginal Signs

The sign is considered marginal if it meets any of the following conditions:

- There are many surface abrasions throughout the sign face, and only a few are within the individual letters of the message.
- The sign face is free of any residue.
- Some color fading may be evident, but the background color and reflectivity are still apparent at night.
- This message is legible both day and night.
- Signs on portable structures are longitudinally perpendicular to the ground and the side slope results in no more than three inches out-of-plumb per foot of height.
- Post mounted signs shall be within three inches of plumb for the height of the posts.
- All warning signs are in place at the specified spacing and properly aligned to traffic.

### Examples of Marginal Warning Signs



## Unacceptable Signs

A sign is considered unacceptable if it meets any of the following conditions:

- Asphalt splatter, cement slurry, or abrasions are evident throughout the face of the sign.
- A letter has a loss of more than 50 percent or more of its stroke area or portions of letters are missing such that they become confusing to identify.
- There is noticeable color fading or loss of reflectivity is noticeable at night.
- The message is illegible.
- The sign is missing, knocked down, or turned such that the message cannot be seen.

### Examples of Unacceptable Warning Signs



## CHANNELIZING DEVICES

### Acceptable Channelizing Devices

To be considered acceptable, a channelizing device shall meet all of the following conditions:

- The device's shape should remain clearly identifiable with no significant distortion and must be freestanding in its normal position.
- Surface is free of punctures and abrasions.
- Surface is free of asphalt splatter, cement slurry, or other material and will readily respond to washing.
- The reflective bands have little or no loss of reflectivity, with only minor tears and scratches.
- Any dents do not seriously reduce the reflectivity of the sheeting.

### Examples of Acceptable Channelizing Devices



## Marginal Channelizing Devices

The channelizing device is considered marginal if it meets any of the following conditions:

- The surface has some asphalt splattering or cement slurry and may not be readily cleaned due to abrasions and discoloration.
- The reflective bands have numerous tears and scratches but have no large areas of residue or missing reflective material.
- Any dents do not reduce the strength of the device.
- The device maintains its intended shape.
- No more than one device in a row is missing.

### Examples of Marginal Channelizing Devices



## Unacceptable Channelizing Devices

A channelizing device is considered unacceptable if it meets any of the following conditions:

- The device has punctures or large areas of staining asphalt splatter or cement slurry that cannot be cleaned due to abrasions or discoloration.
- There is noticeable fading of the device's color.
- The device has large areas of missing or stained reflective material.
- There is substantial deformation of the device which reduces the original dimensions, or the device has lost the intended shape.
- Several dents or fractures affect the stability or ability to retain the reflective sheeting.
- Two or more consecutive devices are missing.

### Examples of Unacceptable Channelizing Devices



## BARRICADE OR VERTICAL PANELS

### Acceptable Panel

To be acceptable, the panel shall meet all of the following conditions:

- Panels are not deformed to an extent that decreases the panel's target value.
- There may be several abrasions on the surface but very little loss of reflective sheeting.
- The orange is vivid and the stripes provide contrast.
- The barricade is installed in its specified location with adequate ballast, and properly aligned to traffic.
- The Type III barricade has been fabricated according to the approved crashworthy requirements.

#### Example of Acceptable Panel



### Marginal Panel

The panel is considered marginal if it meets any of the following conditions:

- There are numerous surface abrasions through the panel surface.
- Some color fading is evident; however, it has no large areas of residue or missing reflective material.
- The orange is vivid and the stripes provide contrast.
- The barricade is turned at a skew to traffic that reduces its effectiveness.

#### Example of Marginal Panel



### Unacceptable Panel

A panel is considered unacceptable if it meets any of the following conditions:

- The surface is marred over a high percentage of the panel area.
- There is a noticeable loss of reflectivity and obvious color fading.
- Asphalt splatter and/or cement slurry, or any combination of missing and covered reflective material, make the panel unacceptable.
- Barricades have bent or twisted legs, or the support assembly is deformed to the extent that the barricade panel is not reasonably parallel to the roadway surface.
- The barricade is missing, knocked down, or turned away from traffic.

#### Example of Unacceptable Panel



## **WARNING LIGHTS**

### **Acceptable Warning Lights**

To be acceptable, the warning lights shall meet all of the following conditions:

- One hundred percent (100%) of all warning lights shall be operating properly. Any warning light that is out of alignment from the intended driver's line of vision is considered not operating properly.
- Type A Low-Intensity Flashing warning lights and Type C Steady-Burn warning lights shall be maintained to be visible on a clear night from a distance of 3,000 feet.
- Type B High-Intensity Flashing warning lights shall be maintained to be visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1,000 feet.
- Warning lights shall have a minimum mounting height of 30 inches to the bottom of the lens.

### **Marginal Warning Lights**

The warning light is marginal when it meets any of the following conditions:

- Type A and C warning lights - at least 90% of the warning lights are operating properly, with no more than three adjacent lights failing.
- Type B warning lights - no more than one light is failing.

### **Unacceptable Warning Lights**

A warning light is considered unacceptable if it meets any of the following conditions:

- Type A and C warning lights - fewer than 90% of the warning lights are operating properly, or more than three adjacent lights are failing.
- Type B warning lights - more than one light is failing.

## FLASHING ARROW BOARDS

### Acceptable Conditions for All Arrow Panels

For an arrow panel to be acceptable, it must meet all of the following conditions:

- All lamps are properly aligned for the intended driver's line of vision. Any operating lamp which is out of alignment shall be considered not functioning properly.
- No lamps are burnt out.
- All lamps dim properly.
- All lamps are the same level of intensity.

### Unacceptable Conditions Only for Trailer-Mounted Arrow Panels

An arrow panel is considered unacceptable if it meets any of the following conditions:

- The arrow panel is not within three inches of plumb for the height of the panel.
- The arrow panel is not raised to at least seven feet above the roadway surface (measured to the bottom of the panel).

## FLASHING ARROW MODE (SEQUENTIAL ARROW)

### Marginal Flashing Arrow Panels

An arrow panel in this mode is marginal when it meets the following condition:

- Up to two lamps are out in the stem but no lamps are out in the head.

**Example of Marginal Flashing Arrow**

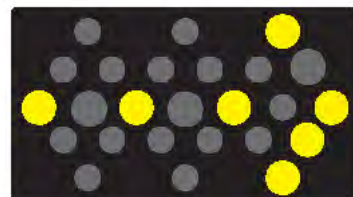


### Unacceptable

An arrow panel in this mode is considered unacceptable if it meets any of these conditions:

- Any lamp is out in the head.
- More than two lamps are out in the stem.
- The arrow panel is not dimming properly.

**Example of Unacceptable Flashing Arrow**



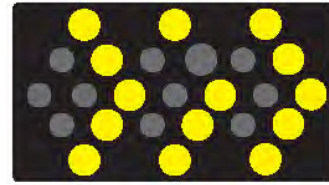
## CHEVRON MODE

### Marginal Chevron Mode

An arrow panel in this mode is marginal when it meets the following condition:

- No more than one lamp is out in any one chevron segment.

### Example of Marginal Chevron Mode

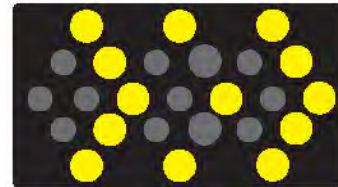


### Unacceptable Chevron Mode

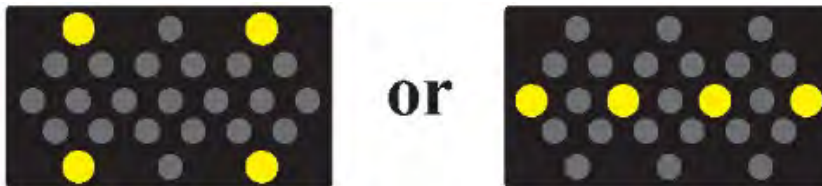
An arrow panel in this mode is considered unacceptable if it meets either of the following conditions:

- Two or more lamps are out in any one chevron.
- The arrow panel is not dimming properly.

### Example of Unacceptable Chevron Mode



## CAUTION MODE (Four Corners or Bar)



### Marginal Caution Mode

An arrow panel in this mode is marginal when it meets the following condition:

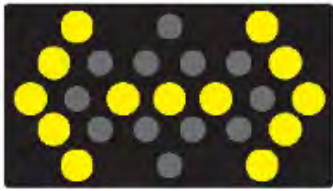
- All four lamps are functioning properly.

### Unacceptable Caution Mode

An arrow panel in this mode is considered unacceptable if it meets either of the following conditions:

- Fewer than four lamps are functioning properly.
- The arrow panel is not dimming properly.

## DOUBLE ARROW MODE



### Marginal Double Arrow

An arrow panel in this mode is marginal when it meets the following condition:

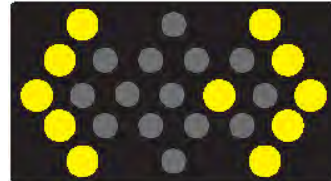
- Up to two lamps are out in the stem but both heads are completely functional with no lamps out.

### Unacceptable Double Arrow

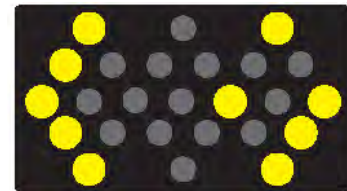
An arrow panel in this mode is considered unacceptable if it meets any of the following conditions:

- More than two lamps are out in the stem.
- One lamp is out in the head.
- The arrow panel is not dimming properly.

### Example of Marginal Double Arrow



### Example of Unacceptable Double Arrow



## **PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)**

### **Acceptable PCMS**

To be acceptable, a PCMS shall meet the following condition:

- One hundred percent (100%) of the pixels per character module shall be operating properly.

### **Marginal PCMS**

A PCMS is marginal when it meets the following condition:

- At least 90% of the pixels per character module are operating properly.

### **Unacceptable for All PCMS**

A PCMS is considered unacceptable if it meets either of the following conditions:

- Fewer than 90% of the pixels per character module are operating properly.
- The PCMS is not properly aligned for the intended driver's line of vision.

### **Unacceptable for Trailer-Mounted PCMS**

A trailer-mounted PCMS is considered unacceptable if it meets either of the following conditions:

- The sign panel is not within three inches of plumb for the height of the panel.
- The sign panel is not raised to at least seven feet above the roadway surface (measured to the bottom of the panel).

## **PAVEMENT MARKING TAPE OR PAINT**

### **Acceptable Pavement Marking Tape or Paint**

Pavement marking tape or paint is acceptable when it meets the following condition:

- All pavement marking tape or paint (solid lines and skip lines) are in place and meet all material specifications.

### **Marginal Pavement Marking Tape or Paint**

Pavement marking tape or paint is marginal when it meets any of the following conditions:

- Less than 10% of all tape, paint, message, or symbol is missing.
- Fewer than two consecutive skip lines are missing.
- Less than a 50-foot section of solid line is missing.

### **Unacceptable Pavement Marking Tape or Paint**

Pavement marking tape or paint is considered unacceptable if it meets any of the following conditions:

- More than 10% of all tape, paint, message, or symbol is missing.
- More than two consecutive skip lines are missing.
- More than a 50-foot section of solid line is missing.

## **TEMPORARY RAISED PAVEMENT MARKERS (TRPM)**

### **Acceptable TRPM**

TRPMs are acceptable when they meet the following condition:

- All temporary raised pavement markers required are in place and meet all material specifications.

### **Marginal TRPM**

TRPMs are marginal when they meet either of the following conditions:

- Less than 10% of all TRPMs are missing.
- Fewer than three consecutive temporary raised pavement markers are missing.

### **Unacceptable TRPM**

TRPMs are considered unacceptable if they meet either of the following conditions:

- More than 10% of all TRPMs are missing.
- More than three consecutive temporary raised pavement markers are missing.

The content of this attachment was adapted from:

- [Quality Standards: Methods to Determine Whether the Various Traffic Control Devices are Acceptable, Marginal, or Unacceptable](#), Minnesota Department of Transportation.
- [Temporary Traffic Control Zone Layouts Field Manual](#), Minnesota Department of Transportation, February 2011.