240 Transportation Management Plan

240.1 General

A Transportation Management Plan (TMP) is required for minimizing activity-related traffic delays and crashes. The goal of a TMP is to reduce congestion during construction by managing traffic through the project area. For TMPs, significant projects are defined as:

(1) A project that, alone or in combination with other concurrent projects nearby, is anticipated to cause sustained work zone impacts.

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

Significant projects may require a multi-disciplined TMP team to plan, coordinate, implement, monitor, and evaluate the details of TMP elements. Depending on the project logistics, the team composition may include FHWA, local government, and business representatives.

Complete the Transportation Management Plan Form, ***Form 240*** (See ***FDM 103***). This form is required for all projects (significant or not) to document compliance with the ***CFR 23, Part 630, Subpart J***.

For projects involving toll facilities, the TMP shall also account for toll site operational continuity, toll equipment protection, and coordination with the Turnpike in accordance with the Toll Site Construction Phasing Requirements of ***FDM 281***.

240.1.1 TMP Reference Documents

Comply with the following documents for the development of TMPs:

(1) ***Manual on Uniform Traffic Control Devices for Streets and Highways***, (***MUTCD***), ***Part 6***

(2) ***AASHTO Policy on Geometric Design of Highways and Streets***

(3) ***AASHTO Roadside Design Guide, Chapter 9***

(4) ***Standard Plans***, ***102 Series*** and ***711-002***

(5) ***FDOT Standard Specifications for Road and Bridge Construction (Standard Specifications)***

(6) ***Basis of Estimates (BOE) Manual***

(7) ***FDOT Accessing Transit Handbook, Chapter 4.6.***

(8) ***AASHTO Guide for the Development of Bicycle Facilities, 4th Edition, Chapter 7***

(9) ***Traffic Analysis Handbook***

240.1.2 TMP Components

A TMP consists of strategies to manage the work zone impacts of a project. The scope, content, and degree of detail will vary based upon the expected work zone impacts of the project. A TMP may include the following three components:

- Temporary Traffic Control Plan
- Transportation Operations Plan
- Public Information Plan

240.2 Temporary Traffic Control Plan

A Temporary Traffic Control Plan (TTCP) is required for all work zones within or adjacent to highways, roads and streets as specified by Florida Statute and Federal regulations. Typical applications of some commonly encountered situations are shown in the ***MUTCD***. Some of these typical applications have been modified by the ***Standard Plans, 102 Series***. Most work zones will require further development of the typical applications to address project-specific conditions.

240.2.1 TTCP Details

240.2.1.1 Emergency Shoulder Use

The requirements for Emergency Shoulder Use (ESU) outlined in ***FDM 211.4.6*** must be maintained during all phases of construction. A Design Variation to omit ESU evacuation requirements for any phase of construction must be approved by the Chief Engineer.

The Design Variation must include all the following:

- Documentation of concurrence with the ESU omission from the District Traffic Operations Engineer, District Construction Engineer, and District Maintenance Engineer
- A statement on how the ESU closure will occur outside of Hurricane Season (June 1 – November 30) to the extent practical

- A time estimate for how long it would take to implement an ESU in the event of an emergency evacuation
- Estimated closure duration for all phases of construction impacting the ESU

240.2.1.2 Work Zone Speed

Work zone speed is used with the ***Standard Plans, 102 Series***, and to select geometric elements within the project limits.

Work zone speed should be the existing posted speed. The existing posted speed is defined as the posted speed prior to the start of any work zone activity. A reduction from the existing posted speed should only be made when geometric constraints make it necessary or when implementing the Motorist Awareness System (MAS) in accordance with ***FDM 240.2.2.12*** and ***Standard Plans, 102 Series***. Include the justification for the reduction of the existing posted speed in the project documentation (see ***FDM 111.7***). The TTCP and the project documentation will suffice as a traffic and engineering investigation.

A work zone speed more than 10 mph below the existing posted speed requires the approval of the District Traffic Operations Engineer and the District Director of Transportation Operations.

A work zone speed below the minimum statutory speed for the class of facility is prohibited.

For projects with interspaced work activities (such as interstate resurfacing), locate speed reductions in proximity to those activities which merit a reduced speed, and not "blanketed" for the entire project.

240.2.1.3 Tapers

Transitions and tapers should be obvious to drivers. If sight distance is restricted (e.g., a sharp vertical or horizontal curve), the taper should begin well in advance of the view obstruction.

Temporary Traffic Control (TTC) devices at intersections must provide sight distances for the road user to perceive potential conflicts and to traverse the intersection safely.

See the ***Standard Plans, 102 Series*** for taper length requirements.

See ***FDM 210*** for required sight distance using the work zone speed.

240.2.1.4 Superelevation

The minimum radii where superelevation is not necessary are provided in ***Table 240.2.1.***

When superelevation is provided, specify the superelevation in accordance with ***FDM 210***.

Table 240.2.1 Minimum Radii for Normal 0.02 Cross Slopes

Minimum Radii for Normal Cross Slopes (feet)									
Work Zone Speed (mph)									
25	30	35	40	45	50	55	60	65	70
290	430	610	820	1080	1390	1840	2400	3130	4090

For Turnpike projects, use the superelevation criteria described in ***FDM 210*** and ***211***.

240.2.1.5 Lane Widths

See ***Standard Plans, 102 Series*** for lane width requirements.

240.2.1.6 Lane Closure Analysis

Lane closure analysis is a process used to calculate the peak hour traffic volume and the restricted capacity for open road and signalized intersections. The analysis will help determine if a lane closure should be allowed and the times during which a lane closure can occur without causing excessive travel delays.

Common uses for lane closures include:

- Reconstruction, rehabilitation, or resurfacing of travel lanes or shoulders
- Provide lateral offset to the work area
- Staging of construction equipment
- Bicycle and pedestrian accommodations

Many roadways have directional peak hour traffic volumes, with inbound morning traffic, and outbound afternoon traffic. A composite lane closure analysis would, in many cases, require night work or create very short allowable lane closure periods. If a lane closure analysis is calculated for inbound and outbound separately, night work may be avoided, and longer lane closure periods may be allowed.

On limited access facilities, include a traffic analysis of any ramp affected by the lane closure.

When a closure of one or more lanes is necessary, provide an allowable lane closure duration of at least one ten-hour period per 24-hour work period. Approval by the State Roadway Design Engineer is required when at least one ten-hour period per 24-hour work period cannot be provided. ***Form 241*** is a standard template that may be used for this approval request (see the form for additional guidance).

A lane closure duration of more than one calendar day on limited access facilities is prohibited. If a lane closure duration of more than one calendar day on limited access facilities is unavoidable, obtain approval from the District Secretary or Turnpike Executive Director.

See ***FDM 241*** for the lane closure analysis process and worksheet example.

240.2.1.7 Traffic Pacing

Traffic pacing is a temporary traffic control technique that allows short duration work operations by pacing traffic at a slow speed upstream of the work zone. The Department typically allows this technique for:

- Installing overhead sign structures
- Replacing sign panels
- Placing bridge beams
- Installing utility crossings

See the ***Standard Plans*** for additional traffic pacing information.

Specify traffic pacing restrictions for all multilane roadways with work zone speeds of 50 mph or greater. See ***FDM 242*** for the procedure for calculating the traffic pacing restrictions.

Obtain District Traffic Operations Engineer approval prior to adding traffic pacing into the TTCP.

For limited access roadways, include a contingency plan in the event that the construction activities last longer than the allowable pacing timeframe. This plan must note that pacing will only be used at the direction of the Construction Project Manager.

240.2.1.8 Detours, Diversions, and Lane Shifts

Detour: A redirection of motorized and non-motorized traffic onto an alternate route, using state roads or local (county or city) roads to bypass the work zone.

Diversion: A redirection of motorized and non-motorized traffic onto temporary pavement adjacent to the existing or permanent roadway.

Lane Shift: A redirection of motorized and non-motorized traffic onto a different section of the permanent roadway or shoulder.

Design detours, diversions, and lane shifts in accordance with ***FDM 240.2.1.9*** and the following:

- Maintain existing shoulder width where practicable, but no less than:
  - 2 feet for limited access roadways or roadways with existing paved shoulders less than 4 feet, or
  - 4 feet (i.e., maintain bicycle facility) for all other roadways.
- For offsets to barriers and special considerations (e.g., refuge areas or emergency vehicle access), see ***FDM 215***.
- Special detours from a divided highway to an undivided condition must separate opposing traffic using either temporary barrier or temporary lane separators in accordance with the ***Standard Plans***. The use of striping, RPMs, and complementary signing (either alone or in combination) is not considered acceptable for separation purposes.
- Minimize interruption of local transit operations and coordinate with emergency services.
- For diversions on high-speed multilane facilities, place cross-slope breakovers on lane lines, except where the lane is actively transitioning.
- Meet the requirements in ***FDM 211*** for lane cross slopes on limited access facilities.
- Pavement drop offs must be no more than 2 inches away from a lane line.
- Check spread to verify that the provided shoulder width complies with the criteria in ***Chapter 3*** of the ***Drainage Manual***.

Ramps that service tandem trucks must accommodate the WB-109D truck turning radius entirely within the longitudinal pavement markings of each lane.

In addition to the requirements above, design detours in accordance with the following:

- Detour signing must convey clear direction allowing users to safely traverse the entire detour and return to the original path of travel.
- When developing a detour, consider the type of motorized traffic being routed (e.g., vertical clearances for large vehicles). Do not route large vehicles through a U-turn.

- Consider the structural capacity of the detour pavement.
- Obtain concurrence from the local agency when detours are to utilize local roadways.
- Include truck turning templates and AutoTurn analysis in the TTCP design documentation.

240.2.1.9 Bicycle, Pedestrian, and Transit Accommodation

Include accommodations for the following road users of all ages and abilities in the TTCP:

- Pedestrians
- Bicyclists
- Transit users

Provide accommodations on Florida National Scenic Trail and SUN Trail.

ADA requirements apply during TTC. Include provisions at the same level of accessibility as the existing facility or greater. See ***Standard Specifications, Section 102*** and ***FDM 222*** and ***225*** for more information.

Minimize impacts to existing bicycle, pedestrian, and transit facilities by preserving the following to the extent feasible:

- Safety and accessibility features
- Connectivity of the facilities to and through the project
- Directness of the routes

Incorporate the following requirements into the TTCP:

Design Principles for Temporary Bicycle and Pedestrian Facilities:

(1) Provide like-for-like bicycle and pedestrian facilities to the maximum extent feasible. When this cannot be accomplished for bicycle facilities, separate motorized traffic from bicycle traffic whenever possible. The higher the volumes of motorized traffic or percentage of truck traffic and the longer the duration of construction, the more substantial the separation should be.

Specify temporary bicycle ways that replicate the geometric characteristics of the existing bicycle way. For example, a separated bicycle facility should remain separated during construction. See ***FDM 223*** for more information on separated bicycle facilities.

(2) Phase the construction plans to ensure bicycle and pedestrian facilities are only closed when necessary. Phasing has the following advantages:

(a) Restricts bicycle and pedestrian network disruptions to smaller segments of the project at a time

(b) Limits the number and use of TTC devices on a project to those areas where the bicycle and pedestrian network is currently being disrupted

See ***FDM 921*** for more information on phasing.

(3) See ***Standard Plans, Series 102*** for additional information and requirements on pedestrian facilities in work zones.

(4) Provide temporary barrier per ***FDM 215*** where temporary pedestrian ways divert pedestrian traffic to be immediately adjacent to vehicular traffic (e.g., a paved shoulder) or when a separated bike lane has been moved. This does not apply to temporary pedestrian ways behind curb.

(5) Ensure work zones adjacent to sidewalks or temporary pedestrian ways provide separation between pedestrians and the work area.

Location of Temporary Routes for Pedestrians and Bicyclists:

(1) Do not lead pedestrians or bicyclists into direct conflicts with vehicles, equipment, or operations.

(2) Keep detour lengths and diversions as short as practicable.

(a) Detours should not create more than a 30% increase in the length of the non-motorized facility, or not longer than 0.5 miles for bicyclists or 0.25 miles for pedestrians.

(b) To minimize the detour length, consider providing a temporary mid-block crosswalk instead of detouring pedestrians to the nearest signalized intersection or existing crosswalk.

(3) The order of preference for routing:

(a) Maintain facility on the same side of the road.

i. Narrow the temporary bicycle way or temporary pedestrian way if needed.

ii. Consider closing one lane of motorized traffic to accommodate non-motorized traffic of bicycle or pedestrian facilities with high usership. Separate motorized traffic from pedestrians by providing a temporary barrier where feasible per ***FDM 215*** or by providing LCDs to delineate the temporary pedestrian path.

iii. If the existing bicycle facility is a shared use path or separated bike lane and separation for bicyclists, such as a temporary bike lane, is not possible, bicyclists may be directed onto a temporary or permanent pedestrian way with a minimum width of 8 feet.

iv. When the existing bike facility is a bicycle lane, marked shoulder, or paved outside shoulder 4 feet or greater in width, and the work zone speed is 35 mph or less, bicyclists may be directed onto the travel lane. Provide portable changeable message signs (PCMS) letting motorists know bicyclists will be detoured onto the road per ***FDM 243***. For example:

1. Bike Facility Closed, Bicycles on Road
2. Bike Detour Ahead, Bicycles on Road

(b) Diversion to the opposite side of the road. Return to the original side of the road as soon as possible. For two-lane two-way work within the traveled way, additional bicycle accommodations are not necessary. Standard flagging procedures allow bicyclists to use the opposite shoulder.

i. Phase the construction so bicycle or pedestrian facilities will be open on the other side of the road if facilities cannot be provided on the same side of the road.

ii. Choose crossing points with adequate stopping sight distance.

iii. If using temporary midblock crossings, meet the criteria in ***the Traffic Engineering Manual*** (***TEM***) for permanent midblock crosswalks. Consider the use of temporary traffic signals or RRFBs with temporary midblock crossings. See ***FDM 240.2.2.8*** and the ***TEM*** for more information.

iv. Warn motorized and non-motorized traffic there are extra pedestrian or bicycle crossings through portable changeable message signs (PCMS) per ***FDM 243***. For example:

1. Bike Detour Ahead, Ped Detour Ahead
2. Use Caution, People Crossing Ahead
3. Use Caution, Bicycle Crossing Ahead
4. Use Caution, Ped Bike Crossing Ahead
5. Use Caution, New Xwalks Ahead
6. Use Caution, New Cross Walks
7. Use Caution, New Xwalks 500 Ft

v. Facilitate left-turns for bicyclists. Consider whether accommodations can be made for two-stage left-turns where appropriate.

(c) Detour to another road. Return to the original road and side of road as soon as possible.

i. Coordinate with the owner of the facility that pedestrians or bicyclists will be detoured onto.

ii. Notify motorists on the detoured road through portable changeable message signs (PCMS) per ***FDM 243*** if there are additional crossings or if bicyclists will be detoured to a shared lane condition. Motorists may not be aware of the construction project that has caused the need for re-routing. For example:

1. Bike Facility Closed, Bicycles on Road
2. Bike Detour Ahead, Bicycles on Road
3. Use Caution, People Crossing Ahead
4. Use Caution, Bicycle Crossing Ahead
5. Use Caution, Ped Bike Crossing Ahead
6. Use Caution, New Ped Xing Ahead
7. Use Caution, New Cross Walks
8. Use Caution, New Xwalks 500 Ft

(d) Where the above options are not feasible or are cost prohibitive, consider the use of a vehicle transport service or pedestrian escort operation. Show accessible pickup and drop-off locations in the TTCP. Coordinate with District Design Engineer and District Construction Engineer.

(e) Process a Design Variation if none of the above accommodations are practicable and the bicycle or pedestrian facility is to be closed without providing an alternative route.

Transit Users:

Ensure provisions are made to allow transit users to access transit stops and to board and depart transit vehicles safely. Temporary transit access must include provisions at the same level of accessibility as the existing facility or greater. See FDOT's ***Accessing Transit Handbook*** for guidance on transit stops.

240.2.1.10 Railroads

Ensure that the TTCP does not cause queuing of traffic across railroad tracks. Evaluate the signal timing, tapers, lane closures and distance to intersections as compared to projected peak traffic volumes. Evaluate the effects of the TTCP on interconnected traffic signals and railroad signals to avoid conflicting or ineffective signal controls.

240.2.1.11 Utilities

If contract utility work is anticipated in conjunction with or during the highway construction, the TTCP must account for and adequately protect all work activities. The phasing of construction activities must be compatible with the utility work. Utilities whose work affects traffic are required by FHWA to provide a TTCP. This requires early and effective coordination with utilities.

240.2.1.12 Existing Traffic Signals

Adjust signal heads to maintain proper position when lane shifts are necessary and determine the need for temporary vehicle detection. Coordinate required modifications to existing traffic signal operations with the District Traffic Operations Engineer and show signal adjustments in the TTCP.

Provide signal installation plans that specify the preliminary phasing and timing for each phase of construction in the TTCP. Include project specific requirements (e.g., equipment harmonization or operational responsibilities) in the Technical Special Provisions. Signal displays and locations must meet ***MUTCD*** requirements.

240.2.1.13 Roadside Hazards

See ***FDM 215*** and ***Standard Plans, 102 Series*** for information on the shielding of roadside hazards.

240.2.1.14 Drop-offs in Work Zones

See ***Standard Plans, 102 Series*** for requirements related to drop-offs in work zones.

240.2.1.15 Bridge Construction

To facilitate the development of an optimal design minimizing traffic disruptions and construction costs, the roadway engineer and structures engineer must collaborate with each other prior to completion of the Phase I Roadway Plans or the Bridge Development Report (BDR), whichever is earlier. For very complex urban projects, this collaboration should begin as early as the PD&E phase of the project.

Modification for Non-Conventional Projects:
Delete ***FDM 240.2.1.15*** and replace with the following: **240.2.1.15 Bridge Construction** To facilitate the development of an optimal design minimizing traffic disruptions and construction costs, collaboration between the roadway engineer and structures engineer is required.

240.2.1.16 Emergency Pull Off Area

For long-term TTC operations on Limited Access roadways, include a paved emergency pull-off area when the shoulder width is reduced to less than eight feet for a distance of one mile or more. The preferred location is to the right of the outside travel lane. Coordinate these locations with the District Traffic Operations Engineer to accommodate road users and emergency personnel.

The emergency pull-off area must meet the following:

- Minimum of twelve feet wide and 500 feet long
- Located every ½ to 1 mile, but not closer than ½ mile from an interchange
- Match the adjacent lane or paved shoulder cross slope
- Include chevron pavement markings at 60-ft spacings
- Do not locate an emergency pull-off area near an ingress/egress location for the contractor.

240.2.2 Temporary Traffic Control Devices

The ***MUTCD*** contains detailed instructions on the use of traffic control devices. Special design considerations applicable to Florida are discussed in the following sections.

Temporary traffic control devices should not be placed in locations where they will block or interfere with transit stops, pedestrians, or bicycle traffic.

240.2.2.1 Signs

The following types of signs are encountered in temporary traffic control:

- Work Zone Signs
- Existing Signs

Work Zone Signs:

Work zone signs are typically post-mounted in accordance with the ***Standard Plans***, ***102 Series***.

Signing for the control of traffic entering and leaving work zones by way of intersecting roadways must be adequate to inform drivers, cyclists, and pedestrians of work zone conditions. At a minimum, provide a "Road Work Ahead" sign.

If the work zone interrupts the continuity of an existing bicycle or pedestrian way, provide signs directing non-motorists alongside or around the work zone and back to the bicycle or pedestrian way.

See the ***Standard Plans, 102 Series*** for required work zone signs and placement.

Existing Signs:

Specify covering, removing, or relocating existing regulatory or warning signs that conflict with the TTCP, or to complement the work zone conditions (e.g., if a stop sign on an existing side road is needed, use the existing sign and show the location that it is to be relocated to).

Modify existing guide signs to show changes made necessary by the construction operations. If existing guide signs are to be removed during construction, make provisions for temporary guide signing. The temporary sign should be black on orange with the legend designed in accordance with ***MUTCD*** requirements for permanent guide signing.

240.2.2.2 Work Zone Pavement Markings

Specify the use of work zone pavement markings in accordance with ***FDM 230*** and ***Standard Specifications, Section 102***.

240.2.2.3 Temporary Raised Pavement Markers

Temporary Raised Pavement Markers (RPMs) are used to supplement work zone pavement markings in accordance with the ***Standard Plans, 102 Series*** and ***Standard Specifications, Section 102***.

240.2.2.4 Channelizing Devices

Channelizing devices direct road users through the work zone. Specify the use of channelizing devices in accordance with the ***Standard Plans, 102 Series*** and ***Standard Specifications, Section 102***.

240.2.2.5 Pedestrian Longitudinal Channelizing Devices

Specify the use of pedestrian Longitudinal Channelizing Devices (LCDs) for the following situations:

- At each closed pedestrian way location, for the full width of the pedestrian way
- In locations where a drop-off hazard exists (see ***Standard Plans, 102 Series***)
- In locations where the active work zone is within 2 feet of the sidewalk or pedestrian walkway
- Along both sides of a temporary pedestrian way
    - Pedestrian LCDs are not required on sides where an existing or temporary barrier delineates the temporary pedestrian way.

240.2.2.6 Arrow Boards

Specify the use of arrow boards to supplement other devices for lane closures on multilane roadways. Refer to the ***MUTCD*** for further information.

240.2.2.7 Portable Changeable Message Signs

Specify the use of Portable Changeable Message Signs (PCMS) as a supplemental device to provide road users with the following information:

(1) Construction schedules

(2) Alternate routes

(3) Expected delays

(4) Detours, diversions, and lane shifts

A PCMS is not to be used to replace any required sign or other device. See ***FDM 243*** for requirements in determining the appropriate uses and messages for the PCMS.

240.2.2.8 Temporary Traffic Signals

Design and detail temporary poles and span wire assemblies for temporary traffic signals using the following criteria:

(1) Design temporary signal supports for a 100-mph wind speed. See the ***Structures Manual, Volume 3*** for additional requirements.

(2) See Lateral Offset Criteria in ***FDM 215*** for placement of temporary traffic signal supports.

Provide sufficient signal timing for pedestrians where a pedestrian crossing is present.

Include temporary traffic signals in the TTCP in accordance with ***FDM 240.2.1.12***.

240.2.2.9 Type III Barricades

Specify the use of type III barricades to close or partially close a roadway or ramp. Two barricades are typically used for a 12-ft-wide lane. One barricade should be used for lanes less than 12 feet in width.

240.2.2.10 Temporary Barrier

See the ***Standard Plans, 102 Series*** and ***FDM 215*** for temporary barrier requirements.

240.2.2.11 Law Enforcement Officers

Law enforcement officers are used to heighten the awareness of passing vehicular traffic and to improve safety through the work zone. The following types of law enforcement officers are used in temporary traffic control:

- Speed and Law Enforcement Officer
- Traffic Control Officer

Speed and Law Enforcement Officer:

Speed and law enforcement officers are used to control the speed of motorists in the work zone. Speed and law enforcement officers should be considered for the following work zone conditions:

(1) Speed reductions

(2) Temporary barrier adjacent to through traffic

(3) Nighttime work

(4) Workers exposed to high-speed traffic

For limited access facilities, coordinate with District Construction when encountering the above criteria. Speed and law enforcement officer use on arterials and collectors requires approval from the District Director of Transportation Operations.

Traffic Control Officer:

Traffic control officers are used to increase the visibility of the work zone or work operation. Uniformed law enforcement officers are respected by motorists, cyclists, and pedestrians. Utilize traffic control officers as a supplement to traffic control devices to assist in traffic movements and provide a safer work zone.

Specify the use of traffic control officers in accordance with ***Standard Specifications, Section 102***.

240.2.2.12 Motorist Awareness System

A Motorist Awareness System (MAS) is used to alert motorists to the presence of an active work zone and to emphasize reduced speed limits. A MAS consists of the following devices:

- Portable Regulatory Sign
- Radar Speed Display Unit

Specify the use of a MAS in accordance with ***Standard Plans 102-613.***

For a posted speed of 65 mph or greater, reduce the work zone speed by 10 mph. For a posted speed of 60 mph, use a work zone speed of 55 mph.

Portable Regulatory Sign:

A Portable Regulatory Sign (PRS) is used to highlight the work zone speed. A portable regulatory sign consists of a speed limit sign with flashing lights mounted on a portable trailer. The flashing lights are intended to draw attention to the speed limit sign.

Radar Speed Display Unit:

A Radar Speed Display Unit (RSDU) is used to display a motorist's current speed. A radar mounted on the unit detects the speed and relays it to a LED display panel adjacent to a static speed limit sign.

240.2.2.13 Temporary Raised Rumble Strips

Temporary raised rumble strips are used to warn vehicular traffic of the upcoming work zone. Specify the use of temporary raised rumble strips when both of the following conditions occur:

- Lane closure on a two-lane, two-way roadway
- Existing posted speed prior to construction is 55 mph or greater

240.2.2.14 Temporary Lane Separator

Temporary lane separators should be used to separate opposing traffic on previously divided roadways with work zone speeds of 45 mph or less.

See ***Standard Plans, 102 Series*** for temporary lane separator details.

240.2.2.15 Temporary Highway Lighting

Temporary highway lighting is required for roundabout construction per ***FDM 240.2.2.15.1*** below.

For all other locations, temporary highway lighting may be used at the district's discretion. For example, Districts may determine that temporary highway lighting is warranted for areas such as interchanges or large roadways with complex vehicle movements. When practical, existing highway lighting is to remain in service during all phases of construction or until new lighting is installed and placed in service. Temporary highway lighting is not required where it is necessary to remove existing lighting before new lighting is placed in service.

When temporary highway lighting is used, provide plans content per ***FDM 943*** and comply with the following:

(1) Meet the lighting criteria in ***Table 231.2.1,*** except that the illumination levels may be lowered to a range of 0.8 to 1.0 foot-candles at the district's discretion. Leeway may be given for lighting values given the temporary nature.

(2) Position lights as high as practical, with consideration for avoiding glare.

(3) Meet the minimum lateral offset criteria in ***Table 215.2.2***.

(4) Utilize structural supports that are crashworthy or shielded by a crashworthy barrier that was installed for other purposes.

(5) Utilize structural supports that are attached to and located behind permanent or temporary concrete barriers (or traffic railings) as follows:

(a) Do not install temporary barrier for the sole purpose of supporting or protecting the temporary lighting system.

(b) Do not locate structural supports for temporary lighting on the back side of permanent or temporary barriers/traffic railings if the back side of the barriers/traffic railings are within the work zone clear zone (per ***Standard Plans, 102 Series***) of other traffic lanes.

(c) Attach structural supports to the back face of temporary and permanent barriers/traffic railings using brackets that do not protrude above the top of the barrier/traffic railing.

(d) Use undercut anchor or screw anchor systems for attaching brackets to barriers/traffic railings. Use stainless steel or mechanically galvanized carbon steel anchors. Position anchors as to avoid the reinforcing steel within the barrier/traffic railing.

(e) Design the luminaire pole, support brackets, and anchors for a 100-mph wind speed.

(f) Do not design luminaire pole, support brackets and anchors for vehicular impact loads.

(g) For structural supports attached to and located behind permanent concrete barriers/traffic railings, provide a minimum setback distance from the top edge of the traffic face of the barrier/traffic railing to the traffic face of the luminaire pole in accordance with ***FDM 215***.

(h) For structural supports attached to and located behind Type K Temporary Concrete Barriers (***Standard Plans, 102 Series***), provide a minimum setback distance of 1 foot 6 inches from the top edge of the traffic face of the barrier to the traffic face of the luminaire pole. To minimize the potential for damaging reinforcing steel during the installation of the anchors, attach

brackets within the middle portion, where there is large spacing between the vertical steel reinforcing bars of the Type K Barrier Unit.

(i) Temporary lighting must only be attached to a continuously anchored Type K Temporary Concrete Barrier System.

(j) The supports attached to Type K Temporary Concrete Barrier must not encroach into the required deflection distance when the barrier is shielding an above ground hazard.

(6) For temporary highway lighting near a wildlife area of concern (as determined by the Environmental Management Office), comply with the Wildlife-Sensitive Lighting criteria in ***FDM 231***.

240.2.2.15.1 Roundabout Lighting

Temporary highway lighting is required for all construction phases with roundabout lanes open for use by the traveling public. At a minimum, lighting must be provided for the central island and all open lanes of the roundabout, extending at least 200 feet in advance of planned splitter islands. The lighting should also generally assist with awareness of unfinished or closed routes. Provide plans content per ***FDM 943*** and follow the listed requirements per ***FDM 240.2.2.15*** above.

240.2.2.16 Overhead Bridge Related Construction Activities

There are several overhead work activities that must be executed without traffic below. ***Table 240.2.2*** provides typical work durations for common overhead bridge related work activities. The work activity durations given in the table assume a best-case scenario in which the contractor has optimized resources and work planning in advance to minimize traffic disruptions.

Table 240.2.2 Typical Durations for Overhead Bridge Work

Work Activity	Duration
Bridge Demolition	2 to 3 days per span
Beam Placement Simple Span	30 minutes per beam
Beam Placement Continuous Steel I-Beam	60 minutes per beam
Beam Placement Continuous Steel Box Girder	90 minutes per girder, depending on the complexity of the connections
Form Placement	4 hours per lane
Deck Concrete Placement	3 hours per span
Span Sign Structure Placement	20 to 25 minutes per structure
Segment Placement from Land Based Cranes (Balanced Cantilever)	2.5 hours per segment

240.2.2.17 Temporary Structures

The use of temporary structures is often required to allow for the installation of the permanent structure. Temporary structures commonly used for the construction of highway structures include temporary stability towers and temporary sheet pile walls.

Temporary stability towers are commonly used for the erection of segmental bridges constructed in balanced cantilever, steel plate girders, and steel box girders. Temporary sheet pile walls are commonly used for the construction of pier footings or to facilitate the installation of MSE wall straps. It is important to show the location of all temporary structures in each phase of the TTCP to ensure there are no conflicts. See ***FDM 215*** to determine if temporary structures must be shielded.

240.2.2.18 Temporary ACROW Bridge

When using a temporary ACROW bridge, include “Legal Weights Only” sign in accordance with ***Standard Plans, Index 700-102*** and ***Index 700-107***. Specify “Slippery When Wet” (W8-5) signs in advance of all temporary ACROW bridges when an asphalt overlay is not used. See ***Standard Plans, 102 Series*** and the associated ***Standard Plans Instructions*** ***(SPI 102-200*** for the ***300 Series*** and ***102-201*** for the ***700 Series)*** for more information.

For limited access facilities, the ACROW Series 700 bridging must be used. All temporary bridges require a project-specific substructure design.

Coordinate with the State Maintenance Office in a timely fashion because there is a limited quantity of Department-owned temporary ACROW bridges available.

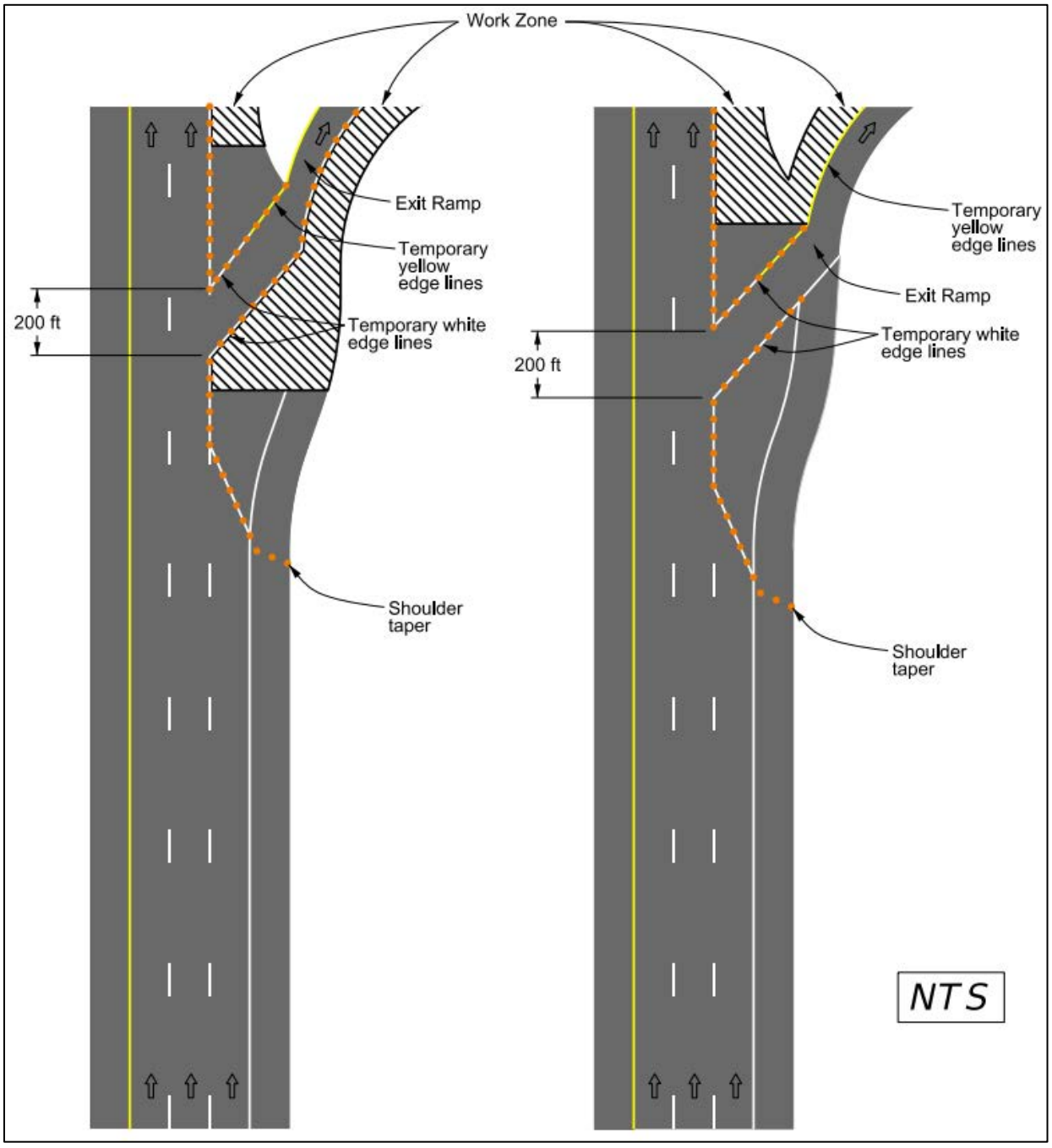
240.2.2.19 Short-Term Raised Rumble Strip Sets

In locations with existing raised rumble strip sets (e.g., intersections, approaches to horizontal curves, toll plazas), maintain or replace the raised rumble strip sets throughout construction. Provide short-term raised rumble strip sets when existing raised rumble strip sets are removed for construction activities until the permanent raised rumble strip sets are installed. Short-term raised rumble strip sets must be installed prior to opening the road to traffic; therefore, quantities may include multiple applications due to construction phasing. Refer to ***Standard Plans***, ***Index 546-001*** and ***Standard Specifications, Section 546*** for additional requirements and information.

240.2.2.20 Limited Access Exit Ramp Opening

Meet the requirements of ***MUTCD Part 6*** for work near a limited access facility exit ramp and include a minimum ramp opening of 200 feet. See ***Figure 240.2.1***.

Figure 240.2.1 Work in the Vicinity of an Exit Ramp



240.2.2.21 Temporary Drainage

Refer to the ***Drainage Manual*** for temporary drainage criteria. Additional guidance can be found in the ***Drainage Design Guide***.

240.3 Transportation Operations Plan

The Transportation Operations Plan (TOP) contains strategies to improve mobility, work zone access, and safety. Strategies will include items such as work zone Intelligent Transportation System (ITS) components and incident management. ***Table 240.3.1*** provides common TOP items.

A TOP should be considered for significant projects as defined in ***FDM 240.1***.

Table 240.3.1 Transportation Operations Strategies

Category			
Demand Management	**Corridor/Network Management**	**Work Zone Traffic Management**	**Safety Management and Enforcement**
Transit services improvements	Signal timing/ coordination improvements	Speed limit reductions or variable speed limits	ITS for traffic monitoring and management
Transit incentives	Temporary traffic signal	Temporary traffic signal	Transportation Management Center (TMC)
Shuttle services	Intersection improvements	Temporary barrier	Aerial surveillance
Ridesharing/ carpooling incentives	Bus turnouts	Crash cushions	Milepost markers
Park-and-Ride promotion	Turn restrictions	Automated flagger assistance devices (AFAD)	Service patrol
Variable work hours	Truck restrictions	On-site safety training	Local detour routes
Telecommuting	Dynamic lane close system	TMP inspection team meetings	Contract support for incident management
	Ramp closures		Incident/emergency response plan
	Railroad crossing controls		Law enforcement
			Emergency access, emergency pull off areas, glare screens

240.4 Public Information Plan

The Public Information Plan (PIP) describes how project information will be communicated to affected parties, the traveling public, and project stakeholders prior to and during construction. The PIP will also describe the most efficient method of communicating this information (e.g., local media, business groups, message signs). The PIP should be integrated into the project's Community Awareness Plan (CAP) when the CAP is to include communication strategies.

A PIP should be considered for significant projects as defined in ***FDM 240.1***.

See the following for additional information on public involvement and CAP requirements:

(1) ***FDM 104***

(2) ***Public Involvement Handbook***

(3) ***PD&E Manual***

240.5 Temporary Traffic Control Training

The Department has prescribed temporary traffic control training requirements outlined in the ***Temporary Traffic Control (Maintenance of Traffic) Training Handbook***.