



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 21-05

March 11, 2021

TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/ Jeremy Hunter
Jeremy Hunter
Chief Engineer of Design
Engineering Department

SUBJECT: Traffic Management for Design Projects

EFFECTIVE: Stage 1 Submittals on or after August 1, 2021

This memorandum outlines some reminders regarding current policies, as well as modifications to existing policy to enhance the work zone design process.

Work Zone Safety Guidance

When developing maintenance of traffic plans, special consideration must be given to providing adequate mitigation measures for protection of the workers in the work zone, as well as traffic entering the work zone.

The designer must spend time researching the Indiana Manual on Uniform Traffic Control, Indiana Design Manual, as well as INDOT's *Standard Specifications* and Standard Drawings. The designer should consider innovative strategies for both worker safety and queue protection, and collaborate with INDOT regarding potential innovative solutions.

The designer should ensure that feedback is sought and incorporated from construction, traffic engineering and traffic management professionals early in the project development process. It is important to ensure that feedback from the INDOT Construction Area Engineer is received and incorporated into the maintenance of traffic plans.

The following locations provide valuable information to help designers select the appropriate work zone type and mitigation measures.

- [INDOT Designers Webpage](#) under the heading “Work Zone Safety” there are a number of links to valuable information regarding work zone safety.
- [INDOT Policies, Processes, and Procedures for Work Zone Safety and Mobility](#)
- [National Work Zone Safety Information Clearinghouse](#) is a library of resources to improve roadway work zone safety for all roadway users. The website provides current guidance on several topics including rear end crashes, accommodating pedestrians in work zones, smarter work zones, transportation management plans, and working at night.
- [National Work Zone Safety Information Clearinghouse – Hot Topics](#)

Plan Development Requirements

Maintenance of traffic plans should be complete by the Stage 2 submittal. The plans should include all proposed mitigation measures related to work zone safety. It is important that the designer includes the necessary work zone safety and queue protection mitigation measures with the Stage 2 submittal. All Level One Design Exceptions for the Maintenance of Traffic should be submitted as soon as possible, but no later than with the Stage 2 Submittal. At Stage 1 the IHCP policy should be reviewed to determine if an exception is needed. Final approval must be received by the Stage 3 submittal to ensure compatibility with the final MOT plans. Additional information can be found in the sections below.

A typical layout should be included along with details for critical points, such as intersections, ramps, or large driveways. The layout should include the width of the temporary traffic devices such as barrier wall, barrels, or other devices. It is also important to recognize and design for the complexities associated with maintaining traffic at intersections and ramps. These locations should be a focus of discussions with the Area Engineer and District Traffic Engineer during the field checks.

Transportation Management Plan (TMP)

Ensure that all of the necessary information is in the scoping document. Pertaining to the TMP, IDM 503-2.0 states that “All projects require a TMP.”, and “*The Engineer’s Report should indicate whether a project will have significant impacts and have a TMP that includes a TOP and PIP*”. All projects will be identified as either significant or non-significant in relation to work zone impacts. This determination should be made during project scoping and documented in the Engineer’s report using the [Significant Work Zone Impact Determination Worksheet](#). The worksheet should be completed and attached to the scoping report. If the Significant Work Zone Impact Determination Worksheet was not included with the scope, then the designer should complete the worksheet early in the design process, Stage 1, and submit it to the INDOT Technical Services Division as a Scope Addendum.

Sample Transportation Management Plans are available at the [FHWA Work Zone Management Program website](#).

For projects that are not classified as significant projects, the TMP may consist only of a Temporary Traffic Control (TTC) plan.

Interstate Highway Congestion Policy Guidance

In accordance with IDM 503-3.02, INDOT's Interstate Highway Congestion Policy (IHCP) is applicable to all construction or maintenance activities that require the closure of, or restrictions to, one or more lanes on an interstate highway, interstate shoulder closures, interstate ramp closures greater than 10 minutes, or rolling closures not following pre-approved methods. The policy is available from the [IHCP webpage](#).

Prior to submitting an Interstate Highway Congestion Policy Exception Request, the designer should thoroughly research, plan, and detail the maintenance of traffic plans and provisions that provide comprehensive mitigation measures. For projects with complicated MOT schemes, preliminary coordination should be performed with the District Traffic Engineer, the INDOT Office of Work Zone Safety, and the IHCP exception approval authority to assess the appropriate solutions with regard to the IHCP.

Preliminary IHCP Review should involve initial coordination of the IHCP with the District Traffic Engineer while the maintenance of traffic is being developed and before it is finalized. IHCP exception requests should include all phases of work and not just the main phases of the work. Set up and take down of the MOT phases (including temporary markings), temporary closure of ramps, and final pavement marking placement can often involve the need for IHCP exception approvals.

For interstate projects that may involve the complete closure of an interstate (either one direction or both directions) will require substantially more effort to document the recommendations and to seek internal approval as well as FHWA approval. The decision for this strategy should be made early in the project development phase to allow for complete analysis and approval of this strategy.

Maintenance of Traffic Cross Section

The designer should take special care to minimize shoulder drop offs, elevation differences, and potential crossover obstructions. All of the above elements along with truck edge distance, paved shoulder widths, and median widths should be reviewed and accounted for in MOT design. The designer should try to provide 2 feet of barrier offset. For outside shoulders, it is desirable to provide a minimum of 4 feet from the edge of the temporary travel lane to the shoulder break location.

Work Zone Safety Mitigation Measures

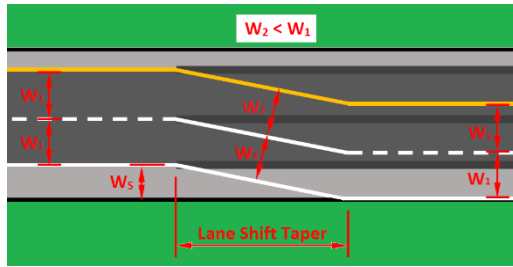
Lane Tapers

The most important element in the transition area is the taper that provides channelization. Please reference IDM Figure 503-7D and 503-7E for the types of lane tapers. An inadequate taper produces undesirable traffic operations, which could lead to crashes within the work area. A merging taper is used on multilane roadways when the number of traffic lanes is reduced. The length of the merging taper must be long enough for vehicles traveling side-by-side to adjust their speeds and merge into a single lane before the end of the transition. Please reference INDOT Standard Drawing [801-TCDV-03](#); this table provides minimum taper lengths based on speed and either the width of the lane or the shift. The minimum speed that is used to determine the taper length should match the posted speed limit of the road in advance of the construction zone. This speed is the normal posted speed limit of the road, and not the work zone design speed.

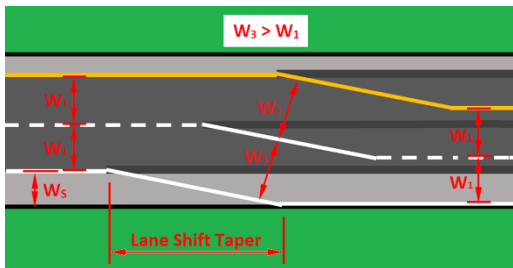
On roads with high ADT, or significant truck traffic, longer tapers should be considered. It is advisable in those situations to consider taper lengths that correspond with a speed that is 10 mph greater than the normal posted speed of the highway. This is particularly important when configuring the first taper into a work zone where large trucks require greater distances to adjust their speed and maneuver safely. An important consideration when designing tapers is to recognize that the taper must be accomplished with pavement markings and channelizing devices, which should be placed well in advance of temporary traffic barriers. This practice not only provides for a safer work zone, but also helps construction traffic to be able to safely access the work zone. Table 6C-2 in the IMUTCD provides “Stopping Sight Distance as a Function of Speed” and should be used as minimum Longitudinal Buffer Space Lengths. Although many of the Typical Applications show the Longitudinal Buffer Space as “Optional”, these buffer spaces should be provided whenever practical and shall be provided for all first merges and shifts transitioning into work zones where longer tapers described in this paragraph are deemed necessary.

Another strategy to be considered is to offset pavement marking tapers to manage the widths of lanes through the work zones by staggering the beginning of the lane shifts as depicted below:

ACCEPTABLE: Initiate lane and shoulder tapers at the same station



BETTER: Offset the start of lane and shoulder tapers to create wider lanes through the tapers



The current methodology provides for tighter lane widths within the taper; the proposed methodology is more flexible and should provide wider lane widths. For instance, 12' interstate lanes could transition into 14' lanes within the taper and again to 11' lanes within the work area. This should enhance the safety of these transitions.

Positive Protection Toolbox

The workzonesafety.org website contains a page titled the "[Workzone Positive Protection Toolbox](#)." Designers should review the information contained on this page for a better understanding of the different types of positive protection available for use, as well as the advantages and limitations of each system.

Moveable Temporary Traffic Barrier

Moveable Temporary Traffic Barrier is a potential solution for work zones that need concrete barrier adjacent to the work zone, but also needs to be shifted frequently. For consideration of the use of Moveable Temporary Traffic Barrier on a project, the District Traffic Engineer, and Project Manager should be consulted for an evaluation of this method.

Truck Mounted Attenuators

Truck Mounted Attenuators should be considered based on the guidance from the MUTCD. The recurring special provisions are available for Truck Mounted Attenuators, RSP 801-T-227, Truck Mounted Attenuators and RPD 801-T-227d, Truck Mounted Attenuators.

Temporary Worksite Speed Display

The Temporary Worksite Speed Displays provide an effective way to ensure drivers remain aware of their speed in the work zone. A unique special provision is available for Temporary Worksite Speed Displays in the list of [Unique Special Provisions](#).

Portable Temporary Traffic Signals

For projects that would qualify for the use of a flagger in accordance with the MUTCD, consideration should be given to the visibility of the flagger's location, and the duration that the flagger will be required. Portable Temporary Traffic Signals should be considered anywhere that the sight distance to the flagger's location is limited, or when the project will require traffic control at night. For bridge thin overlay projects on two-way, two lane roadways, Portable Temporary Traffic Signals should be used instead of flaggers. Portable Temporary Traffic Signals are included in Standard Specifications 801.15(d).