

**MARYLAND STATE HIGHWAY ADMINISTRATION
POLICY FOR THE USE OF
TEMPORARY TRAFFIC BARRIER IN WORK ZONES**

1. POLICY STATEMENT

It is the policy of the Maryland State Highway Administration (SHA) that temporary traffic barrier protection is required for all work on high speed facilities where

- (1) the operation occurs on the roadway or shoulder, or is within 10' feet of the edge of a travel lane open to traffic, and the duration of work is expected to be at least two (2) weeks and the limits of the work area remain unchanged for that duration.

OR

- (2) there is no means of escape for workers from motorized traffic (e.g., tunnels, bridges, etc.), and the duration of work is expected to be at least two (2) weeks and the limits of the work area remain unchanged for that duration.

If an engineering study determines that temporary traffic barrier protection is not feasible, a waiver justifying the reasons why it is not feasible shall be prepared and approved by the Senior Manager of the lead office. For work zones that do not meet the aforementioned criteria, the need for positive protection devices should still be considered. Refer to Section 4, Barrier Evaluation Process, for additional information on the process and criteria to determine the need for temporary traffic barrier.

This policy supplements existing standards and practices, including, but not limited to:

- Book of Standards for Highways and Incidental Structures
- Maryland Standard Sign Book
- Maryland Manual on Uniform Traffic Control Devices (MdMUTCD)
- AASHTO Roadside Design Guide

2. DEFINITIONS

- High Speed Facility: All roadways with an existing posted speed \geq 45 mph.
- Temporary Traffic Barrier Protection: This may include the use of moveable concrete barrier, moveable steel barrier, water-filled barrier or temporary F-shaped concrete barrier.
- Roadway: That part of a highway that is improved, designed or ordinarily used for vehicular travel, other than the shoulder.
- Shoulder: That portion of a highway contiguous with the roadway for the accommodation of stopped vehicles, for emergency use and for the lateral support of the base and surface courses of the roadway.
- Duration of Work: The time that work occupies a location, from the first moment a worker is exposed to traffic until the moment the work is completed, including hours where the work zone may be inactive.

3. **GENERAL**

During planning and design, the designer should give careful consideration to traffic control alternatives that do not require the use of temporary traffic barriers, minimize the hazard exposure time, and maximize the separation between workers and traffic (e.g. full road closure, ramp closure, detours, contra-flow, etc.). In general, temporary traffic barriers should be installed only if it is clear that the barrier offers the least hazard potential.

Full closure shall be considered as the first alternative for work performed on a high speed facility where the duration of work is in excess of 2 weeks and the operation occurs in the roadway. When full closure is not feasible, temporary traffic barriers shall be considered per the requirements of this policy.

Even with proper planning and design there may be situations where there is not a clear choice as to whether temporary traffic barrier is warranted. There may also be situations where site conditions or construction operations will exclude the use of a construction barrier even though one is warranted. The designer must exercise engineering judgment when deciding when and where temporary traffic barriers will be needed.

4. **BARRIER EVALUATION PROCESS**

As part of the development of the Temporary Traffic Control Plan (TCP), the Design/Project Engineer will investigate and document the need and usefulness of temporary traffic barrier protection for all construction operations. Representatives from various SHA offices, such as District Construction and Traffic, Office of Traffic and Safety, Office of Construction, etc., will assist the project/design engineer in this process. In some cases, special maintenance of traffic (MOT) coordination meeting(s) may be needed.

If temporary traffic barrier protection is warranted for use on any project operation, the TCP should detail where and when it is to be used and the appropriate pay items should be included in the contract documents. Refer to the most current version of the *State Highway Administration Standard Specifications for Construction and Materials*, Section 104, Maintenance of Traffic, for pertinent pay items. Note, when moveable barrier is implemented, it shall be paid for on a Lump Sum basis, not for linear feet of barrier shifted.

Preliminary Investigation – Screening

Frequently during the preliminary design stage, the TCP has not progressed to the degree where an adequate assessment of the use of temporary barrier can be made. Nevertheless, sufficient data should be available to allow for a screening to make an initial determination on whether temporary traffic barrier is warranted.

In this screening, keep in mind the primary functions of temporary traffic barriers are:

- To separate opposing directions of vehicular traffic (e.g., where two-way traffic must be maintained on one roadway of a normally divided facility);
- To prohibit motor vehicles from entering work areas (e.g., excavations and material storage sites);
- To separate and protect workers, bicyclists and pedestrians from motor vehicle traffic;
- To shield construction elements (e.g., bridge falsework and other exposed objects); and,

- To protect motorists from hazards in the clear zone.

If temporary traffic barrier protection of the work zone is warranted, the Preliminary Investigation Report should document that an engineering study will be conducted during detailed design to reconfirm the need for barrier and to determine the most appropriate type and use of temporary barrier.

Detailed Design – Engineering Study

During detailed design, as MOT concepts are developed further, an engineering study shall be performed to determine the need for barrier, and its most practical and cost effective use.

Factors to be considered in the study may include, but are not necessarily limited to the following:

- (1) Project exposure and duration
- (2) Traffic speed
- (3) Traffic volumes (including seasonal fluctuations)
- (4) Lateral clearance to hazards (proximity of traffic to construction workers, equipment, and other unprotected features)
- (5) Adverse geometrics that may increase the likelihood of run-off-the-road vehicles (poor sight distance, sharp curves, etc.)
- (6) Vehicle mix (truck percentage)
- (7) Type of work operation (mobile, stationary or both)
- (8) Roadway classification
- (9) Time of day (night work)
- (10) Nature of work zone hazards
- (11) Consequences from/to motorists resulting from roadway departure
- (12) Potential hazard to traffic presented by the device itself and to workers and traffic during device placement
- (13) Access to/from work zone
- (14) Work area restrictions (including impact on worker exposure)
- (15) Presence of “no-escape” areas, such as work zones in tunnels or on bridges
- (16) Impacts on project cost and duration

Waivers

If the engineering study determines that temporary traffic barrier protection is not feasible, a waiver documenting the findings of the engineering study shall be prepared by the Project/Design Engineer with the assistance of all appropriate SHA offices involved in the engineering study. The waiver shall specify additional safety strategies that will be employed on the project, as outlined in the following section. The documentation should also include feasibility/cost analysis for all options considered. **The feasibility of temporarily widening a highway to allow for the installation of barriers shall be considered for all projects.** For significant projects, findings of the engineering study may be included as part of the Transportation Management Plan.

Additional Safety Strategies

For projects where the use of temporary traffic barrier is required, but not feasible, additional safety strategies shall be employed to manage work zone exposure and reduce the risk of crashes. These strategies may include:

- Uniformed law enforcement officers
- Warning flags and lights on signs
- PVMS and arrow panels
- Longitudinal and lateral buffer space
- Intrusion alarms
- Temporary transverse rumble strips
- Wider lane lines
- Rolling road blocks
- Reduced channelizing device spacing
- Work zone speed limit reduction
- Drone radar
- PCMS with speed display
- Work zone ITS
- Use of protection vehicles with TMAs

A summary of work zone safety strategies, including intrusion countermeasures, and their potential applications can be found in SHA's *Transportation Management Plan Guidelines*. In addition, a comprehensive list of work zone safety strategies can be found in *SHA's Work Zone Design Checklist*.

5. ADDITIONAL RESOURCES

Moveable Concrete Barrier

Moveable concrete barriers are commonly justified for use on construction projects in congested areas where it is beneficial to change the number of lanes available during each work day. They are also used to provide a safe means of expanding the contractor's work area and to provide the opportunity to stage projects in a more effective manner.

The use of moveable concrete barriers should be considered on long-duration projects, such as lane additions, bridge or shoulder reconstruction, on busy roads where positive separation is highly desirable for protection of workers but where additional lanes should be made available for peak traffic conditions. Factors that favor the use of moveable concrete barriers include:

- Peak period traffic that is expected to exhibit levels of construction congestion judged unacceptable by the State.
- Site constraints that preclude temporary or permanent widening.
- Traffic that must be managed on-site since alternate routes lack sufficient excess capacity or other operational concerns exist.
- Highly directional traffic flow that is conducive to use of reversible lanes.
- Nighttime construction conditions that warrant positive barrier as added worker protection.
- Significant construction quality, efficiency or schedule benefits that can be achieved by widening the work area during off-peak periods.
- High volumes or long work zones where vehicle break down space and/or lateral offsets will improve traffic safety while the work zone is not active.

A determination should be made by the designer that the additional costs associated with moveable concrete barrier are offset by a time savings in the project schedule, safety of the workers, reduced delay to motorists, etc.

Questions for Consideration

In determining the feasibility and usefulness of temporary traffic barrier, the designer should address the following questions:

- Can the speed of vehicles be maintained at such a value through the work zone that, in combination with worker/roadside hazard clearance and the quality of the traffic arrangements (traffic control, road surface/alignment, etc.), the risk of injury to either workers or road users is consistent with good practice?
- As a temporary barrier has to cater to the highest speed environment that applies during its deployment, what is the traffic speed likely to be outside of peak hours?
- Bearing in mind the duration of the particular operation and the space available to locate temporary traffic barriers, is it practical to install them?
- Is the consequential effect for a vehicle striking a construction feature, such as bridge false work, such that protection must be provided?
- In view of the nature and duration of the particular operation, the speed of vehicles through the work zone, and the clearance between traffic and workers/roadside hazards, would the use of temporary traffic barriers improve the safety of both workers and road users and should they therefore be provided?
- Will the placement of temporary traffic barrier impede sight distances for drivers entering and leaving the work site near barriers or traveling adjacent to the site?
- Will placement of barrier impact roadway drainage to the point that storm water will form ponds adjacent to the barrier and/or flow across the road at a depth that could cause vehicles to hydroplane?
- Will there be sufficient lateral offset behind the barrier to accommodate barrier deflections upon impact?
- Can suitable crashworthy end treatments be provided?

Typical Situations that Warrant Temporary Traffic Barrier

Situations that may warrant the use of temporary traffic barrier include:

- Shielding pavement edge drop-offs greater than 2 ½ inches
- Shielding obstacles in the work area, such as trenches, material stockpiles, construction equipment and bridge false work
- Separating opposing traffic flow, for example separating two-way traffic on one roadway of a normally divided facility
- Part-width bridge construction (bridge widening)
- Transition areas at crossovers
- Separating pedestrians from vehicular traffic
- Areas where existing traffic barriers and bridge railings are removed during a construction phase
- Protection of workers and the work area on long term, stationary construction projects