New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

**SUBJECT:** Infrastructure Design Directive
IDD-2018-14
Temporary Concrete Wall Barrier

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Transportation Design Community

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The following IDD shall be used to ensure consistency in the development of all projects to be let by NMDOT in relation to Temporary Concrete Wall Barrier (TCWB). This design directive is to establish the procedure for determining the need for the use of temporary concrete wall barriers (TCWB) when positive protection is specified in the construction plans.
Positive protection is physical separation by a device that stops or redirects an errant vehicle.

This procedure is applicable for any construction or maintenance project designed and constructed by the New Mexico department of Transportation (NMDOT) and contractors working on NMDOT facilities.

NMDOT design standards are based on guidance provided in the Roadside Design Guide. However, other factors must be considered in use of TCWB. For the purpose of this guidance, positive protection is TCWB.

Federal Highway Administration 23 CFR Part 630 Subpart K (The Rule) allows for flexibility in determining how and when to use positive protection, which should be applied on a project specific basis. The Roadside Design Guide offers guidance on the use of barriers. The decision on whether to use positive protection for a specific work zone situation should be determined by the engineer in responsible charge after consideration of the conditions expected to be encountered in the work zone compared to the functions and capabilities of the traffic control (?) devices available.

When developing a traffic control plan the safety of the traveling public and the workers is paramount. Field conditions will dictate the level of protection necessary to ensure safety for the workers and traveling public. When it has been determined that the use of TCWB is required, budgetary constraints do not solely justify deviation from The Rule without full consideration of all related factors.

The procedure used to determine the need for positive protection shall be based on an analysis of the existing conditions and a constructability review.

Procedure

This procedure requires the following conditions to be considered when determining the need for TCWB. Keep in mind that each project has a unique set of conditions and how those conditions impact each other should be considered.

The engineer in responsible charge shall document the rationale used to determine the need for positive protection. To aid in determining the need, NMDOT has developed a checklist that may be used as a basis of the design of a traffic control plan; this checklist is included in IDD-2009-05 - Temporary Traffic Control Devices Rule - Subpart – K - Figure 3. Once the determination has been made, the PDE, shall document the decision in a memo to the design file or completion of the aforementioned checklist and copies of either document shall be kept in the project's files. The engineer shall also ensure conformance to NMDOT Pavement Drop off Guidelines (AD 241 dated 7/30/2015) shall be ensured when evaluating the use of positive protection devices for maintenance and construction work zones.

Consideration of the following conditions and factors should be included in the determination:

1. Project scope
2. Project duration;
3. Anticipated traffic speeds through the work zone;
4. Anticipated traffic volume;
5. Vehicle mix;
6. Type of work (as related to worker exposure and crash risks);
7. Distance between traffic and workers, and extent of worker exposure;
8. Escape paths available for workers to avoid a vehicle intrusion into the work space;
9. Time of day (e.g., night work);
10. Work area restrictions (including impact on worker exposure);
11. Consequences from/to road users resulting from roadway departure;
12. Potential hazard to workers and road users presented by device itself and during device placement and removal;
13. Geometrics that may increase crash risks (e.g., poor sight distance, sharp curves);
14. Access to/from work space;
15. Roadway classification; and
16. Impacts on project cost and duration.

For example, larger lateral clearance to a hazard results in a lesser need to shield the hazard with TCWB. Where a range of distances for the desired lateral clearance is listed in this procedure, consider factors such as traffic speed/volume/type and duration of exposure to determine appropriate lateral clearance for a project, and whether CWB should be used.

Design Considerations

Once the need for positive protection is determined, the following bid items are available for 10 foot and 20 foot TCWB sections.

Also bid items for TCWB are as follows:

606600 Temporary CWB Retained by the Department (10')

606610 Temporary CWB Retained by the Contractor (10')

606619 Resetting of Concrete Wall Barrier (10')

606620 State Furnished Concrete Wall Barrier (10')

606700 Temporary CWB Retained by the Department (20')

606710 Temporary CWB Retained by the Contractor (20')

606719 Resetting of Concrete Wall Barrier (20')

606720 State Furnished Concrete Wall Barrier (20')

Standard drawings have been developed for both options. They are located on NMDOT web site at the following address:
http://dot.state.nm.us/content/dam/nmdot/Plans_Specs_Estimates/Standard_Drawings/606.pdf

The use of 10 foot and 20 foot TCWB can be determined once available deflection areas are identified and work zone conditions are determined.

Temporary Concrete Wall Barrier Deflection

. The decision to anchor the barrier vs. non-anchored impacts the expected deflection of the TCWB. The following table shows deflection compared to the TCWB length and type of anchoring:

| Barrier Segment Length | Anchoring Type | Deflection |
|---|---|---|
| 10’ foot | Anchored | 20 inches |
| 20 foot | Anchored | 10 inches |
| 10 foot | Unanchored | 65 inches |
| 20 foot | Unanchored | 44 inches |

Curve radii limitations of 20 foot TCWBs should be considered during the design. Below is guidance for minimum achievable radius corresponding to barrier segment length. The barrier can deflect up to 7 degrees between segments; see below for equivalent centerline radius:

10-foot barrier, 51 pieces, 84-foot radius

20-foot barrier, 51 pieces, 165-foot radius

Another consideration for use of anchored TCWBs is the impact to the new pavement and pavement smoothness. The designer shall consider the deflection criteria and shall not eliminate anchoring solely to maintain pavement smoothness. If damage to the new or existing pavement is a significant concern, other traffic control options must be considered while maintain the same level of safety.

The NMDOT will not allow 10-foot TCWB and 20-foot TCWB segments to be combined in the same run (Mix & Matching of Barrier Lengths). If both 10-foot and 20-foot barrier segments are used in the same project, separate schedules quantifying 10-foot and 20-foot barriers must be used.