TDOT WORK ZONE SAFETY AND MOBILITY MANUAL

Appendix C

TDOT Circular Letters
CIRCULAR LETTER

Section: 105.15 Termination of the Contract
Number: 105.15-02
Subject: Post-Construction Review Process
Date: July 1, 2004

In order to determine future construction process improvements and reduce cost overruns, a post-construction review is required on all projects with an original contract amount of $10,000,000 (ten million) or greater. This review shall be conducted as soon as practical following the completion of all work.

Attendees at this review shall include the prime contractor and representatives from the following area when applicable: Construction, Design, Structures, Materials and Tests, Project Management, FHWA, consultant firm (design and inspection). The review shall be facilitated by Regional Construction personnel or the construction inspection consultant when applicable. The participants will identify all significant project problems and make recommendations on how these problems can be avoided on future projects. Items to be reviewed shall include but are not limited to cost overruns, supplemental agreements, plans completeness and accuracy, and contract obligations.

A post-construction review report shall be submitted to the Director of Construction. The report shall provide recommendations on any construction process improvements and how the identified overruns can be eliminated.
CIRCULAR LETTER

Section: 104.04 - Maintenance of Traffic
Number: 104.04-01
Subject: Structure Width Restrictions
Date: July 1, 1992

When routing truck and/or oversize traffic around or detouring through a work zone, the Project Engineer should advise the Region Construction Office approximately two weeks prior to the restriction of width and/or closing of a structure on the State or Interstate Highway System. This will allow the Regional Construction Office and the Permits Section ample time to make advisements of the lane restrictions. Also, once the restriction or closure has terminated, the Project Engineer should advise the Region Construction Office.

The Region Construction Office will relay restrictions on highway lane widths to the Permits Section at the following address:

Permits Section
Tennessee Department of Transportation
Suite 300 James K. Polk Building
505 Deadrick Street
Nashville, TN 37243-0331
Phone: (615)741-3821
Work Zone Speed Limit Procedure

The appropriate speed limit for any highway work zone can be determined from the procedure presented in this section. The procedure is applicable to stationary construction zones, maintenance zones, and utility operations; intermittent moving operations; and continuous moving operations. The recommended procedure has four steps:

- Step 1—Determine the existing speed limit,
- Step 2—Determine the work zone condition that applies,
- Step 3—Determine which factors for the appropriate condition apply to the specific site, and
- Step 4—Select the work zone speed limit.

Each step is discussed below. This procedure is illustrated by the flow chart in Figure 3. Figure 4 illustrates the seven work zone conditions that are addressed in Step 2.

Step 1—Determine the existing speed limit

The first step in the procedure is to determine the existing (preconstruction) speed limit for the work zone. The preconstruction speed limit is usually, but not necessarily, the same as the speed limit upstream of the work zone during the construction period. 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 such a reduction is warranted by the factors considered in the remainder of the procedure.

Step 2—Determine the work zone condition that applies

The work zone condition is determined by the location of work activities in relation to the traveled way. In general, speed limit reductions are more appropriate for work zones in which work activities take place in or near the traveled way than for work zones where work activities take place in shoulder or roadside areas well removed from the traveled way or behind a positive barrier.

The procedure addresses the following conditions:

1. Activities that are more than 10 ft from the edge of the traveled way (roadside activity),
2. Activities that encroach on the area closer than 10 ft but not closer than 2 ft to the edge of the traveled way (shoulder activity),
3. Activities that encroach on the area from the edge of the traveled way to 2 ft from the edge of the traveled way (lane encroachment),
4. Activities that require an intermittent or moving operation on the shoulder (moving activity on shoulder),
5. Activities that encroach on the area between the centerline and the edge of the traveled way (lane closure),
6. Activities that require a temporary detour roadway (temporary detour), and
7. Activities that encroach on the area on both sides of the centerline of a roadway or lane line of a multilane highway (centerline or lane line encroachment).

The conditions are discussed in greater detail later in this section.

Step 3—Determine which factors for the appropriate condition apply to the specific site

The third step in the procedure is to review the
portion of Table 1 applicable to the condition present in the work zone. Table 1 identifies the factors that should be considered in determining whether a speed limit reduction is appropriate for any given work zone condition. If any of the factors identified in the applicable portion of Table 1 is present, then a work zone speed limit reduction is warranted and may be implemented. Consideration of the factors in Table 1 is especially important at sites where the presence of these factors may not be apparent to motorists.

Step 4—Select the work zone speed limit

The work zone speed limit should be selected considering the factors presented in Table 1. The table includes guidelines on the maximum speed limit reduction that is recommended for each work zone condition. Speed limit reductions larger than the recommended 10-mph maximum should generally be considered only if restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Highway engineers responsible for each work zone should monitor the conditions in the work zone and ensure that the posted speed limit is appropriate for the actual conditions at any given time. For example, the presence of workers in an unprotected position within 10 ft of the traveled way for an extended period of time warrants a speed limit reduction of 10 mph. However, if worker protection is the only warrant for a speed limit reduction, the speed limit should be restored to its original value when the work activity at that location is completed. Use of work zone speed limits that are appropriate for the conditions that actually exist in the work zone is very important in maintaining motorists respect for speed limits. If motorists frequently encounter reduced speed limits that are not appropriate for the actual conditions in the work zone, they may lose respect for all speed limits and, thus, choose a speed that is too high in a situation where reduced speeds are truly necessary.

All work zone traffic controls should be evaluated at the beginning of the project and periodically through the life of the project to determine if the traffic controls are operating as intended. If problems, including traffic accidents, evidence of traffic accidents, such as debris, or near misses are occurring, the responsible person (resident engineer or traffic control specialist) should determine the cause of the problems so that the circumstances causing the problems can be corrected. Correction may require assistance from the traffic control designer, traffic engineer, or other knowledgeable person.

<table>
<thead>
<tr>
<th>Condition 1</th>
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<tr>
<td>Activities that are more than 10 ft from the edge of the traveled way (roadside activity)</td>
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<table>
<thead>
<tr>
<th>Typical Applications</th>
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<tbody>
<tr>
<td>Roadway construction</td>
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<tr>
<td>Cleaning drainage</td>
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<tr>
<td>Landscaping work</td>
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<tr>
<td>Structural work</td>
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<tr>
<td>Utility work</td>
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<tr>
<td>Reworking ditches</td>
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<tr>
<td>Fencing work</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Reductions to Existing Regulatory Speed Limit</th>
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</thead>
<tbody>
<tr>
<td>Should not be used*</td>
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<table>
<thead>
<tr>
<th>Suggested Maximum Amount of Speed Reduction</th>
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<tbody>
<tr>
<td>None</td>
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<table>
<thead>
<tr>
<th>Factors</th>
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<tr>
<td>None</td>
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</table>

The regulatory speed limit shall meet all requirements of the MUTCD.

*There should not be a reduction to the existing regulatory speed limit unless unusual situations create hazardous conditions for motorists, pedestrians, or workers.
Condition 2
Activities that encroach on the area closer than 10 ft but not closer than 2 ft to the edge of the traveled way (shoulder activity)

Typical Applications
- Roadway construction
- Culvert extensions
- Guardrail installation
- Cleaning drainage
- Reworking ditches
- Shoulder work
- Utility work
- Side slope work
- Landscaping work
- Structural work
- Sign installation

Reductions to Existing Regulatory Speed Limit
May be used where Factors exist

Suggested Maximum Amount of Speed Reduction
10 mph

Factors
- Workers present for extended periods within 10 ft of traveled way unprotected by barriers
- Horizontal curvature that might increase vehicle encroachment rate (could include mainline curves, ramps, and turning roadways)

The regulatory speed limit shall meet all requirements of the MUTCD.

Condition 3
Activities that encroach on the area from the edge of the traveled way to 2 ft from the edge of the traveled way (lane encroachment)

Typical Applications
- Roadway construction
- Utility work
- Guardrail installation
- Shoulder work

Reductions to Existing Regulatory Speed Limit
May be used where Factors exist

Suggested Maximum Amount of Speed Reduction
10 mph

Factors
- Workers present for extended periods within 2 ft of traveled way unprotected by barrier
- Horizontal curvature that might increase vehicle encroachment rate (Could include mainline curves, ramps, and turning roadways.)
- Barrier or pavement edge dropoff within 2 ft of traveled way
- Reduced design speed for stopping sight distance
- Unexpected conditions

The regulatory speed limit shall meet all requirements of the MUTCD. Where work zone geometrics with reduced design speeds cannot be avoided, the work zone speed limit should not exceed the design speed, even if this requires a work zone speed limit reduction greater than 10 mph.
Condition 4
Activities that require an intermittent or moving operation on the shoulder (moving activity on shoulder)

Typical Applications
- Roadway construction
- Widening
- Delineator installation
- Shoulder and slope work
- Utility work
- Guardrail installation
- Landscape work

Reductions to Existing Regulatory Speed Limit
Should not be used

Suggested Maximum Amount of Speed Reduction
None

Factors
None

The regulatory speed limit shall meet all requirements of the MUTCD.

*There should not be a reduction to the existing regulatory speed limit unless unusual situations create hazardous conditions for motorists, pedestrians, or workers.

Condition 5
Activities that encroach on the area between the centerline and the edge of traveled way (lane closure)

Typical Applications
- Roadway construction
- Pavement repair
- Utility work
- Widening
- Pavement resurfacing
- Pavement marking
- Bridge repair

Reductions to Existing Regulatory Speed Limit
May be used where Factors exist

Suggested Maximum Amount of Speed Reduction
10 mph

Factors
- Workers present for extended periods in the closed lane unprotected by barrier
- Lane width reduction of 1 ft or more with a resulting lane width less than 11 ft
- Traffic control devices encroaching on a lane open to traffic or within a closed lane but within 2 ft of the edge of the open lane
- Reduced design speed for taper length or speed change lane length
- Barrier or pavement edge dropoff within 2 ft of the traveled way
- Reduced design speed of horizontal curve
- Reduced design speed for stopping sight distance
- Traffic congestion created by a lane closure
- Unexpected conditions

The regulatory speed limit shall meet all requirements of the MUTCD. Where work zone geometrics with reduced design speeds cannot be avoided, the work zone speed limit should not exceed the design speed, even if this requires a work zone speed limit reduction greater than 10 mph.
Condition 6
Activities requiring a temporary detour to be constructed (temporary detour) **

Typical Applications
Roadway construction
Subgrade restoration
Bridge construction
Culvert repair

Reductions to Existing Regulatory Speed Limit
May be used where Factors exist

Suggested Maximum Amount of Speed Reduction
10 mph

Factors
- Lane width reduction of 1 ft or more with a resulting lane width less than 11 ft
- Reduced design speed for detour roadway or transitions (radius of curvature, superelevation, and sight distance)
- Unexpected conditions

The regulatory speed limit shall meet all requirements of the MUTCD. Where work zone geometrics with reduced design speeds cannot be avoided, the work zone speed limit should not exceed the design speed, even if this requires a work zone speed limit reduction greater than 10 mph.

** Detour and transition geometry with a design speed equal to or greater than the existing regulatory speed limit should be provided whenever possible.

Condition 7
Activities that encroach on the area on both sides of the centerline of a roadway or lane line of a multilane highway (centerline or lane line encroachment)

Typical Applications
Roadway construction
Pavement marking
Pavement resurfacing
Pavement repair
Widening
Crack sealing
Bridge repair

Reductions to Existing Regulatory Speed Limit
May be used where Factors exist

Suggested Maximum Amount of Speed Reduction
10 mph

Factors
- Workers present on foot in the traveled way or in the closed lane unprotected by barrier for extended periods
- Remaining lane plus shoulder width is less than 11 ft
- Reduced design speed for taper length or speed change lane length
- Barrier or pavement edge dropoff within 2 ft of the traveled way
- Reduced design speed of horizontal curve
- Reduced design speed for stopping sight distance
- Traffic congestion created by lane closure
- Unexpected conditions

The regulatory speed limit shall meet all requirements of the MUTCD. Where work zone geometrics with reduced design speeds cannot be avoided, the work zone speed limit should not exceed the design speed, even if this requires a work zone speed limit reduction greater than 10 mph.
Step 1. Determine the existing speed limit
Step 2. Determine the work zone condition that applies

Condition 1: Activities which are more than 10 ft from the edge of the traveled way (Roadside activity)

Condition 2: Activities which encroach upon the area closer than 10 ft but not closer than 2 ft to the edge of the traveled way (Shoulder activity)

Condition 3: Activities which encroach upon the area from the edge of the traveled way to 2 ft from the edge of the traveled way (Lanes encroachment)

Condition 4: Activities which require an intermittent or moving operation on the shoulder (Moving activity on shoulder)

Condition 5: Activities which encroach upon the area between the centerline and the edge of the traveled way (Lane closure)

Condition 6: Activities requiring a temporary detour to be constructed (Temporary detour)

Condition 7: Activities which encroach upon the area on both sides of the centerline of a roadway or lane line of a multi-lane highway (Centerline or lane line encroachment)

Step 3. Determine which factors for the appropriate conditions apply to the specific site

- NO
  - No speed limit reduction recommended except in unusual situations
- YES
  - Speed limit may be reduced by 10 mph

- NO
  - No speed limit reduction recommended except in unusual situations
- YES
  - Speed limit may be reduced by 10 mph

- NO
  - No speed limit reduction recommended except in unusual situations
- YES
  - Speed limit may be reduced by 10 mph

- NO
  - No speed limit reduction recommended except in unusual situations
- YES
  - Speed limit may be reduced by 10 mph

Note: Where work zone geometries with reduced design speeds cannot be avoided, the work zone speed limit should not exceed the design speed, even if this requires a speed limit reduction greater than 10 mph.

Figure 3. Work zone speed limit procedure flowchart.
CIRCULAR LETTER

Section: 712.07-Maintenance
Number: 712.07-01
Subject: Manual on Uniform Traffic Control Devices

Date: May 15, 1994

All construction warning signs are to be placed in accordance with the Manual on Uniform Traffic Control Devices for Highway Construction and Maintenance Operations.

Construction signs should be erected no closer than 50 feet from an existing sign. Construction signs may be moved plus or minus 100 feet from the Plans location in order to avoid conflicts with existing signs, driveways and side streets. The Regional Traffic Engineer should be contacted if this criteria cannot be met.

At the beginning of work on a project, the construction signs and other traffic control devices are to be placed in accordance with the MUTCD and, thereafter, properly maintained and changed as conditions on the project change.

To direct traffic through construction projects safely and expeditiously, it is imperative that adequate and proper signing be maintained for the full duration of the project. Such maintenance includes the cleaning, repositioning, temporary covering, removing of foliage or other needs as warranted. It should be noted that the MUTCD illustrates minimum desirable standards for normal situations. Additional protection must be provided when special complexities and hazards exist.

To be effective, signing must be credulous. To maintain creditability the signing must convey to the motorist exactly what can be expected on the road ahead. This cannot be accomplished with contradictory or improper signing. Signs should be removed or covered when they are not applicable. If a driver observes a sign several times such as "Right Lane Closed" or "Flagmen Ahead", but as he proceeds he finds the situation conveyed by the message to be nonexistent, he will be much more apt to disregard it in the future. In addition, when a series of signs encroach into the area of another series of signs, only the signs conveying the appropriate message should be displayed. For example, if a series of lane closure signs encroach into the advance warning signs, the advance warning signs should be covered or removed until their need is warranted again.

It is important that the responsibility for inspecting the signing be clearly defined. This responsibility may be assigned to one individual on a region wide basis or on a project basis by the designation of a staff member by the Project Engineer.

Signing should be inspected at least once a week or more often if conditions warrant. Inspections should be made periodically during hours of darkness.

Attached is a check list for use in assuring that proper and adequate signing is maintained at all times. The completed check lists should be filed in the project files.

Section 6B-4 of the MUTCD states that all sign installations should be constructed so as to yield upon impact to minimize hazards to motorists. Also, because of the potential hazard to pole climbers and other considerations, traffic control signs are not to be attached to utility poles.
CHECK LIST FOR TRAFFIC CONTROL DEVICES

Contract No. ___________ Project No. ___________________________ County ___________

Contractor __________________________

1. Have test reports been received on all signing materials? __________________________
2. Are all signs and sign supports constructed in accordance with the Tennessee Manual on Uniform Traffic Control Devices? __________________________
3. Are all signs, barricades, tapers and transitions placed in conformance with at least the minimum standards of the M.U.T.C.D.? __________________________
4. Do stripes on the barricades point in the proper direction? __________________________
5. Are all signs and barricades properly supported? __________________________
6. Are all traffic control devices clean and clearly visible to the approaching motorist? __________________________
7. Has all necessary temporary striping been placed? __________________________
8. Have all contradictory permanent traffic control devices been covered or removed? __________________________
9. Are all signs that are appropriate only during certain periods being covered or removed when not necessary? __________________________
10. Are all flagmen wearing orange vests? __________________________
11. Are traffic control devices set-up in advance of the work area to warn the approaching motorists in ample time to make needed adjustments? __________________________
12. Are lane closures and the beginning of detours clearly visible to the approaching motorist? __________________________
13. Are all traffic control devices being promptly adjusted as changing conditions warrant? __________________________
14. Are traffic control devices adequate to safely and expeditiously guide an unfamiliar motorist through the project? __________________________
15. Have arrow boards been checked and are the three mode (bright, dim, automatic) selector switches working properly as determined by night time inspection? __________________________

EXPLAIN ALL "NO" ANSWERS AND ACTION TAKEN: __________________________

(1) date inspected: ___________ time inspected ___________ am/pm
(2) date inspected: ___________ time inspected ___________ am/pm
(3) date inspected: ___________ time inspected ___________ am/pm
(4) date inspected: ___________ time inspected ___________ am/pm

INSPECTOR'S SIGNATURE: __________________________

cc: Regional Safety Coordinator
CIRCULAR LETTER

Section: 712.04 Temporary Traffic Control - General
Number: 712.04-02
Subject: Review and Approval of Proposed Traffic Control Prior to Major Disruptions of Existing Traffic Patterns

Date: February 1, 1994

Anytime proposed construction requires major disruption to existing traffic patterns the Regional Traffic Engineer is to be consulted. The Regional Traffic Engineer should be provided details on the proposed disruption including but not limited to advance warning, possible alternate routes, type of disruption, time and length of disruption, Contract Plans, etc. The Regional Traffic Engineer should review, modify if needed, and approve the proposed plan prior to implementation. The Regional Traffic Engineer's guidance is crucial to minimize negative impacts and to maximize safety for the public.

Such major disruptions could include closures of interstate, primary, major arterials and/or secondary highways; lane closures on urban interstates or major arterials; and any other disruptions deemed appropriate.
MEMORANDUM

TO:           Regional Engineering Directors
              Regional Traffic Engineers
              Regional Construction Engineers
              Regional Safety Coordinators

FROM:         Mike Tugwell
              Joseph Sweat
              Traffic Engineering Office
              Tennessee Department of Transportation

DATE:         February 25, 2002

SUBJECT:      Guidelines for Establishing Work Zone Speed Limits

The Traffic Engineering Office has developed uniform guidelines for establishing work zone speed limits. The procedures and related guidelines are shown on the following pages.

The guidelines are based on research by the National Cooperative Highway Research Program (NCHRP). (See attached report No. 192). The research was initiated by AASHTO.

The new procedure addresses the problem of speed limits remaining in place during periods when they are no longer warranted.

C:            Commissioner Saltsman
              Bill Moore
              Jim Jeffers
              David Donoho
              Gerald Gregory
              Alex Noble
              Don Dahlinger
              Karen Brunelle
              David Martin
              Doc#WSSpeed.doc
TDOT Guidelines for Establishing Work Zone Speed Limits

Note: These guidelines were developed by the Traffic Engineering Office and are based on research by the National Cooperative Highway Research Program (NCHRP). (See attached report No. 192).

This document outlines the general procedures to be used for establishing speed limits in Tennessee work zones. The Tennessee Department of Transportation acting through its construction engineers and regional personnel, are in the best position to decide if a work zone speed limit is appropriate for the conditions at a given work site. These guidelines are intended to aid in applying work zone speed limits in a more uniform manner and to aid TDOT personnel in making decisions, however, they are not a substitute for sound engineering judgement.

Request for speed reductions are currently initiated by contractors and are granted in most cases. Reductions are currently given for the entire length of the work zone (blanket reduction) and generally remain in place for the duration of the project.

Speed limits left in place for the duration of the project are at times unwarranted, particularly near the end of the project, when major aspects of the work, such as paving, are complete. Because of scheduling, there are often significant periods of time when no work is being done and no need for a speed reduction. Unwarranted speed reductions leads to increasing non-compliance by motorists and results in an overall reduction in the safety of the work zone. These procedures address that problem.

Work Zone Speed Limit Procedure:

Refer to attached NCHRP report 192

- Step 1 - Determine the existing speed limit.
- Step 2 - Determine the work zone condition that applies
- Step 3 – Determine which factors for the appropriate condition apply to the specific site, and
- Step 4 – Select the work zone speed limit

Commentary on Procedures:

- The procedures provide a method for considering engineering factors in selecting an appropriate work zone speed limit. The need for a speed limit reduction is
determined in the procedure through consideration of a number of factors related to
the actual conditions in a specific work zone.

- At such locations where work activities are removed from the edge of the traveled
  way by 10 ft or more, it is recommended that the work zone speed limit not be
  reduced.

- When work zone activities are closer than 10’ to the edge of the traveled way and
  where other specific factors are present, as established by NCHRP NO. 192 (see
  attached report) speed limit reductions may be used.

- Work zone speed limit reductions larger than 10 mph are undesirable and should be
  avoided except where required by restricted geometries or other work zone features
  that can not be modified.

- Reduced speed limits are generally most appropriate for project that last at least 72
  hours.

- TDOT personnel should review each work zone to determine if a reduced speed is
  needed. Work zone speed limits may be reduced when factors outlined in NCHRP
  192 exist. See attached NCHRP No. 192.

- Reduced speed limits may remain in place when work is ongoing in any 72 hour
  period.

- If work is halted for more than 72 hours and no factors exist which warrant a speed
  reduction, then the speed limit should be returned to previous regulatory limits.

- In order to for contractors to easily and quickly change the speed limit within the
  work zone, the procedure recommends the use of removable plates which will
  change the speed limit signs by 10 mph increments. A standard regulatory speed limit
  sign is easily modified to meet this requirement.

- A request by a contractor does not alone constitute a need for a reduced speed zone.
NCHRP procedure for determining work zone speed limits follows this page.

From the NCHRP report No. 192:

TDOT Doc no. WSSpeed.doc
Typical Placement For Speed Limit Signs In Work Zones

All signs to be placed on both sides of roadway

Place speed limit sign every two miles and/or after next on-ramp

Cover all signs when not needed

General Notes:

Distances given above may be field adjusted by direction of the engineer.

On freeways and expressway signs to be 48" x 60"

On conventional highways signs may be 36" x 48"
CIRCULAR LETTER

SECTION:    712.04
NUMBER:    712.04-01
SUBJECT:  Reduction of Speed Limit in Active Construction Zones

DATE:      May 15, 2002

In order to enhance safety for both the motoring public and construction personnel the Department will permit, upon written request and written approval by the State Traffic Engineer, the contractor to erect signs for reduced speed limits as warranted by the Guidelines for Establishing Work Zone Speed Limits. The Project Supervisor shall first review the Guidelines to determine if the reduction in speed is warranted before forwarding the request to the State Traffic Engineer.

The intent is to allow a reduction of the legal speed limit for the shortest period warranted in the area of active construction work as outlined in the Guidelines. The reduced speed limit signs are to be furnished, erected, maintained and removed at the contractor's expense. They are to be used only for the immediate area of active construction work.

Enclosed, herewith along with the Guidelines, is a suggested form that may be used for the approval procedure.
Civil Engineering Supervisor  
Tennessee Department of Transportation

Dear Sir:

We _______________, prime contractor, on the above captioned project request permission to reduce speed limit from ____ MPH to ____ MPH to utilize Speed Limit Reduction Signs as shown on Tennessee Department of Transportation Drawing No. T-S-18. We agree to utilize subject signs only in the immediate area of active construction. We further agree to furnish, erect, maintain and remove them at our expense. The flashing lights will only be operational when active work is being performed.

Thanks for your consideration of this matter.

Prime Contractor

Approved:
Civil Engineering Supervisor

Date:

Copy to Regional Construction Engineer