

STATE

OF

TENNESSEE

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January 1, 2021

SPECIAL PROVISION
REGARDING
GUARDRAIL REPAIR / REPLACEMENT

SCOPE OF WORK

The Contractor shall be responsible for repairing concrete barrier wall, bridge ends, pier protections, replacing damaged glare foils, removing and/or replacing metal beam guardrail, terminal anchors, post, and miscellaneous hardware in kind or to current standards at all designated sites within the Region specified in the Special Notes for this contract. In addition, entire guardrail sections may be removed and replaced to current standards, if the major portion of the section is damaged beyond repair and directed by the Engineer. The previously specified work shall include all labor, equipment, materials, and incidentals needed to perform the work successfully.

Estimated quantities are for bid purposes only, and quantities shown may be increased, decreased, or eliminated depending on actual need and/or as directed by the Engineer.

MATERIALS, SPECIFICATIONS, AND DESIGN REQUIREMENTS

The Contractor shall be responsible for providing updated and approved manufacturers' drawings, component shop drawings, specifications, and parts catalogs for each approved guardrail system found on the QPL, as well as installation and training documentation for each system if offered by the manufacturer to the Engineer at the preconstruction conference. Product specifications and drawings may be obtained by contacting the manufacturer. A listing of the currently accepted guardrail systems by manufacturer may be obtained by referring to the Material & Tests Divisions, Qualified Products List (QPL). Only qualified manufacturer's products which appear on the QPL shall be installed under the terms of this contract.

All repair work shall be done in accordance with the currently adopted TDOT version of the MUTCD, the currently approved Standard Drawings for safety appurtenances, manufacturer's shop drawings, and the January 1st, 2021 edition of the Standard Specifications for Road and Bridge Construction with all its supplements and modifications within this Special Provision.

Materials used in the replacement or repair of damaged guardrail shall conform to the requirements of Section 909 of the Standard Specifications.

Materials used to construct earth pads for tangential energy absorbing guardrail terminals shall conform to the requirements of Sections 303 and 903.05 of the Standard Specifications.

Concrete and steel bar reinforcement used for the execution of work for this contract shall meet the requirements of Section 604 of the Standard Specifications. All concrete used shall meet "CLASS A" requirements for classification, proportioning, and quality assurance. The Contractor shall provide the Concrete Design and Concrete Process Control Plan at the Preconstruction meeting. Should the Concrete Design and/or Concrete Process Control Plan expire within the timeframe of the contract, the Contractor must resubmit the required

documents before any concrete related work is performed. However, pre-packaged concrete may be used at sites requiring 4-cubic yard or less if approved by the Engineer.

Damaged Materials

Any and all damaged material, whether produced as a result of the repair/replacement work or as a result of the impact, shall become the property of the Contractor and shall be removed from the right-of-way and disposed of at the Contractor’s expense.

EQUIPMENT

All equipment necessary for the satisfactory performance of this work shall be on hand before construction will be permitted to begin.

PROGRESS OF WORK

Callouts

As damaged guardrail locations are identified by the Department, the locations will be provided to the Contractor through a callout. Callouts will be issued at the discretion of the Engineer and may be issued concurrently with multiple active callouts.

Routine Callouts

Upon the Contractor’s receipt of the callout, all locations shall be repaired or replaced within **thirty (30) calendar days**.

Incentives for Accelerated Repairs

Terminals located on Interstates, Access Controlled Highways, and any associated Ramps that are repaired within 14 calendar days of the Contractor’s receipt of the callout will be eligible for an accelerated repair incentive payment of \$1000 per terminal.

The incentive completion date of 14 calendar days is a “no excuse” date and shall not be extended for any reason whatsoever, regardless of plans revisions, design changes, extra work, overruns, mandated holidays, lane closures, weather, or any other reasons, and all incentive calculations will be based on this date.

Incentive payments may be made on progress estimates provided the work has been accepted in accordance with Subsection 105.15 of the Standard Specifications. Payment will be made under

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
108-10.70	Accelerated Repair Incentive Payment	Each

Emergency Callout

In the event damaged guardrail creates a major hazard to the traveling public, the Engineer will issue an Emergency Callout. The Emergency Callout will consist of one (1) site. The work at the one site shall begin within two (2) calendar days. Identification of Emergency Callout sites will be at the discretion of the Engineer.

Once work begins at a specific site, a Continuous Operation shall be maintained. A Continuous Operation is defined as the uninterrupted performance of work on successive calendar days until the completion of a specific site (see Section 101.03 of the January 1, 2021 Standard Specifications for the definition of Calendar Day). Each

damaged guardrail site repair shall be completed before moving to the next site unless approved by the Engineer. Failure to promptly perform the work may result in the work being performed by others at the Contractor's expense in accordance with Subsection 107.12 of the Standard Specifications.

Damaged guardrail discovered when traveling from one designated site to another may be repaired if approved by the Engineer. Typically, these sites should only be repaired if severely damaged and non-functional at the Engineer's discretion.

A repair site will consist of work to be performed in a section of guardrail. A section of guardrail is defined as one continuous run of guardrail (regardless of length) between two end terminals on one side of the roadway or median. There may be more than one repair or replacement site in a single section of guardrail, e.g., posts, rail, and an end terminal not immediately adjacent to the posts and rail being repaired or replaced (resulting from two separate vehicular impacts).

The Contractor shall provide their work schedule to the Engineer one week in advance to allow for inspection scheduling except on Emergency Callouts.

CONSTRUCTION REQUIREMENTS

All construction methods used to perform work under this contract shall conform to Sections 303, 705, and 706 of the Standard Specification for Road and Bridge Construction dated January 1, 2021 with addenda, and as modified in the Special Notes and this Special Provision.

In accordance with Section 705.06 of the Standard Specification, the Contractor shall be responsible for notifying each utility owner of the plan of operation by calling 1-800-351-1111 and ensuring that utilities within the designated project limits have been properly located and marked prior to beginning work.

The Department reserves the right to perform any guardrail repair within the limits of this contract whenever the Department determines that such work is in the public's interest and safety. Sections of guardrail within construction or maintenance work zones may be temporarily suspended from the terms of this contract.

The Contractor will be relieved of maintenance for a site when the repair or replacement is completed, accepted, and serving its intended purpose. Repairs or replacements completed by the Contractor with defective materials or substandard workmanship, pending final acceptance of the site, shall be corrected by the Contractor without additional compensation.

Guardrail Adjustment, Removal, and Resetting

Substandard or impacted metal beam guardrail sections may require re-alignment, re-setting, removal, or some combination of the three in order to bring the section back to current specification. When required, these items of work are paid according to the following definitions. **Re-align Guardrail** shall be defined as the length in feet of impacted or substandard undamaged guardrail which has been restored to its original functional position within ± 6 inches horizontally and ± 2 inches vertically without having to disassemble and/or replace any of the components over the impacted repair length. **Reset Guardrail** shall be defined as the undamaged length in feet of impacted or substandard guardrail which has been restored to its original functional position by removing the original components, repairing the impacted ground, and resetting them in place. **Remove Guardrail** shall be defined as the length in feet of guardrail which is removed and not replaced and includes removal of all components of the system and the repair of impacted ground from the removal process. Measurement for these items of work shall include the lengths of terminal and in-line type anchors where applicable.

Steel Beam Guardrail

Existing blockouts that are 7.5 inches deep may be replaced with any of the 7.5-inch blockouts on the TDOT Qualified Products List regardless of the type of blockout material, provided the blockout depths remain constant in any given run of guardrail (terminal to terminal).

If guardrail reflectors were present on damaged sections of rail, the reflectors shall be replaced using approved products listed on the Department's QPL 1 Section G.

If requested by the Department, guardrail enhancement delineation shall be used in accordance with the manufacturer's recommendations and is listed on the Department's QPL.

Guardrail End Treatments

Damaged trailing end guardrail terminals on divided roadways shall be replaced with Guardrail Terminal Anchor (Type 13), if feasible.

All end treatment replacements on the National Highway System with a posted speed limit at or above 45 mph shall be replaced with MASH Test Level 3 approved terminals that meet the requirements of and is listed on the Department's QPL or Standard Drawings. The minimal end treatment replacement on the National Highway System below 45 mph, shall meet the requirements of and is listed on the Department's QPL or Standard Drawings.

The Contractor shall furnish the Department the manufacturer's crash tested drawings, component shop drawings, and Specifications. These must be available to the Engineer upon request. These units shall be installed as per the manufacturer's specifications. Installer shall be certified by manufacturer prior to installation.

All bid prices for the above terminals shall include an appropriate hazard marker for the nose piece if present and the labor, equipment, and materials required to install it.

Concrete Barrier

Concrete barrier wall shall be reconstructed in accordance with Section 711 of the Standard Specifications. Damaged sections of concrete barrier wall shall be smoothly sawed from top to bottom in a plane perpendicular to the length of the wall and removed. Sections removed for replacement shall have a minimum length of four (4) feet and shall be at least four (4) feet from the nearest joint. If the damaged section is located within a separately poured glare screen, only the glare screen shall be removed and replaced. In these areas, the glare screen shall be removed one foot wider than the damaged sections or to the construction joint of the barrier wall and saw cut for vertical sides.

Longitudinal reinforcement shall be replaced in kind. Longitudinal reinforcing bars shall be inserted into the undamaged concrete barrier by drilling holes a maximum of 1/4-inch larger than the bar diameter, cleaned properly, and secured with epoxy grout. Embedment length shall be not less than 20 bar diameters.

When sawing does not occur at a joint, tie bars shall be inserted along the centerline of the sawed face on six (6) inch centers beginning six (6) inches from the top of the wall. Tie bars shall be installed by the method described above and shall have a length of at least 40 bar diameters.

The exposed surface of concrete barrier repairs shall be given the same finish (texture coating) as the exposed surface of the wall being repaired in accordance with Subsection 604.21. Failure to supply the required approved documents and promptly perform the concrete work may result in the work being performed by others at the Contractor's expense in accordance with Subsection 107.12 of the Standard Specifications.

Guardrail at Bridge Ends or Pier Protection

The guardrail attachments of concrete bridge ends and pier protections shall be reconstructed in accordance with Section 604 of the Standard Specifications. The damaged concrete wall sections shall be removed a minimum of one (1) foot wider than the damaged area or to a construction joint. Damaged sections of the guardrail attachments shall be smoothly sawed a minimum depth of 1 ½ inches so as not to damage the reinforcing steel. Damaged reinforcing steel requiring embedment shall be as detailed in Concrete Barrier above. In areas where the reinforcing steel may remain the concrete shall be removed 1 ½ inches beyond the reinforcing steel.

Replaced portions of concrete bridge ends, pier protections and barrier wall shall be finished in the same manner and color as the existing structure in accordance with Sections 604 or 711 of the Standard Specifications. The replacement in-kind includes texture coating surfaces.

Nothing in the general notes or special provisions shall relieve the Contractor of his responsibilities toward the safety and convenience of the general public and the residents along the highway. In the event the guardrail operation causes an unsafe situation for the traveling public, the Engineer has the authority to stop work and set working times that must be followed by the Contractor to rectify the safety concern.

Earth Pads

Earth pads installed in conjunction with tangential energy absorbing guardrail terminals shall be constructed per Standard Drawings S-GRT-2P and S-GRT-2R or as directed by the Engineer.

Environmental

The Contractor shall take all appropriate steps to ensure that environmental features (streams, wetlands, or springs) are not impacted by the work conducted under the terms of this contract without the approval of the Engineer and the TDOT Environmental Permits Section.

Quality Assurance Testing

Random verification of post installations will be conducted under this contract for all guardrail posts installed region-wide by all Contractors for the term of this contract. The Contractor will be required to remove posts as directed by Regional Materials & Tests staff for inspection. Costs for removing and reinstalling posts will be paid for under Item Number 706-10.72, Pull and Reinstall Guardrail Post for Verification, Each. If a new replacement post is required due to damage to the pulled post, it will be paid for under Item No. 706-03.01, Posts Furnished, Each. A mobilization payment will be made for each callout performed exclusively for post-verification.

TRAFFIC CONTROL

The Contractor shall establish and maintain traffic control work zones and all traffic control devices according to these notes, the State of Tennessee currently adopted edition of the Manual on Uniform Traffic Control Devices (MUTCD) defined under the Rules of Tennessee Department of Transportation Chapter 1680-3-1, and the Standard Specifications.

Arrow boards utilized for traffic control under this contract shall be "Type B" flashing boards as defined in the MUTCD or an approved equivalent (see Std. Dwg. T-WZ-FAB1).

All ramp and lane closures including traffic control for mobile operations must be requested by the Contractor and approved in advance by the Engineer. All requests shall be made a minimum of seven (7) days in advance of the anticipated work for callouts. Since lane closures are scheduled and approved in advance, if the Engineer

determines that work cannot commence as scheduled, callout time should be suspended until a future lane closure can be scheduled and approved.

Signs and channelizing devices for lane closures shall be erected immediately before work begins each day and shall be removed at the end of work each day to permit traffic to have unrestricted use of all traffic lanes when work is not in progress.

The use of drums in all transition tapers for lane closures on multi-lane roads shall be required as stated in Section 712.04G of the January 1, 2021 edition of the Standard Specifications for Road and Bridge Construction.

Truck Mounted Attenuator with Mounted Message Board

The following truck shall be utilized on all Interstate and Access Controlled Highways with AADT \geq 25,000 AADT.

1. A truck-mounted attenuator that meets the requirements of and is listed on the Department's Qualified Products List. The attenuator truck cab & chassis must meet and/or exceed manufacturer's recommended gross vehicle weight (GVW) requirements.
2. Four (4) strobe lights (with auto-dimmers) positioned rear facing
 - a. Two (2) mounted under rear bumper
 - b. Two (2) mounted at cab level
3. One (1) standard cab-mounted light bar.
4. A truck-mounted message board with a full matrix display and a minimum panel size of 72" W x 35" H mounted as per manufacturer specifications and in accordance with Sections 2L.04 and 6F.60 of the MUTCD for Portable Changeable Message signs
5. All truck-mounted attenuator operators shall be certified in the operation and application of truck-mounted attenuators by the American Traffic Safety Services Association (ATSSA)

COMPENSATION

Method of Measurement

Re-Aligned, Reset, and Removal of guardrail will be measured by the Linear Foot. Each repaired section of guardrail will be measured separately. No measurement for payment will be made for excavation or backfilling performed in connection with removing or installing post or terminal anchors.

Concrete Barrier Wall Repair, Bridge End Repair, or Pier Protection Repair will be paid for by the cubic yard of concrete measured in place.

Guardrail End Terminals will be paid per each for complete assemblies complete and in place.

W Beam guardrail will be paid per lineal foot complete and in place.

Truck Mounted Attenuator with Message Board will be paid per day and shall include providing the truck as defined above including driver. A day is defined as a work shift and includes all incidentals.

Basis of Payment

Guardrail elements which are to be installed on a curve with a radius of 150 feet or less shall be shop curved and will be paid for as Radius Rail Item No. 706-06.03.

Payment for reset guardrail, including but not limited to W-Beam, Thrie Rail, Box Beam, and Weak Post Systems, shall include the removal and resetting of the guardrail including the furnishing of all labor, tools, equipment and incidentals to satisfactorily complete the work.

Payment for the removal of guardrail and post(s) shall include the complete removal of all guardrail elements including rails, posts, anchors, footings, and miscellaneous hardware.

Damaged guardrail parts requiring removal prior to replacement with new guardrail components will be paid under the items for new guardrail items. No additional payment will be made under the removal item.

Payment for the replacement of damaged guardrail end terminals shall be for a complete new unit. This work shall include the complete removal of the damaged unit from the right-of-way, all required rails, posts, anchors, footings, miscellaneous hardware, and decals as directed by the Engineer. No additional payment will be made for the removal of the damaged end terminal.

All costs associated with the replacement of guardrail reflectors shall be paid for using Item No. 706-10.81. All costs associated with the installation of guardrail enhancement delineation shall be paid for using Item No. 705-04.21.

All work necessary to construct Earth Pads, for guardrail end terminals, shall be paid for under item 705-04.11 per ton. This item shall include the delivery and placement of stone, grading of stone, erosion control, and final stabilization items necessary to complete the work as detailed in Standard Drawing S-GR-38A.

Payment for Concrete Barrier Wall Repair, Bridge End Repair, or Pier Protection Repair will be made at the contract unit price bid per cubic yard of concrete measured in place and shall include sawing, removal, and disposal of the damaged portion of the structure. These items of work shall also include furnishing and installation of guardrail attachments, steel bar reinforcement and tie bars as described above, finishing, texture coating if required, and all costs of forms, labor, materials, and incidentals necessary for the complete performance of the work. Payment for concrete repairs shall be a minimum of one half (0.5) cubic yard per site. No payment will be made for concrete repairs, until all formwork has been removed, the required finish has been applied, and all debris at the site has been removed. Prior to payment for the estimate, the Contractor shall be required to provide the Engineer the Concrete Design and Concrete Process Control Plan.

Payment for the repair or replacement of Glare Foils will be made at the contract unit price per each and shall include full compensation for all labor and incidentals required to complete this item of work in accordance with these Specifications.

All cost for temporary traffic control, excluding lane closures, shall be included in unit prices bid on other items of work. Payment will be made for each lane closure at the contract unit price per each and shall include full compensation for all flagmen, traffic control devices, and other equipment and materials required to complete this item of work in conformance with the requirements described above and subject to the following:

- a) Only one lane closure payment will be made for lane closures erected at a single work site for the duration of the callout.
- b) Only one lane closure payment will be made for repair operations performed within a continuous highway section one-quarter mile or less in length. On divided highways, each directional roadway will be considered independently in establishing the length of the continuous highway section.
- c) No lane closure payment will be made if the lane is not properly closed and deemed necessary by the Engineer. Lane closures will be identified by the Engineer per callout
- d) A maximum of four (4) lane closures per site may be used for concrete work.

All costs for the use of drums on lane closure transition tapers will be included in Item No. 717-01.

The Department will pay for Emergency Callouts per each site. The payment shall include one Mobilization for each Emergency Callout. Payment for Emergency Callout mobilization will be paid under Item Number 717-01.04,

The accepted quantities of work will be paid for at the contract unit price for each item shown on the plans or as tabulated in the general notes. The price shall be full compensation for repairing concrete barrier wall, bridge ends, pier protections, glare foil, metal guardrail, terminal anchors, posts, and miscellaneous hardware in kind or to current standards in accordance with the plans, tabulated quantities in the general notes, or as directed by the Engineer, including the furnishing of all labor, tools, equipment, and incidentals to satisfactorily complete the work.