TECHNICAL SPECIFICATIONS
FOR
GUARDRAIL

1. Description

This work shall consist of furnishing and erecting Guardrail, and the construction of anchor blocks and approach ends, of the specified kind and dimensions, in accordance with these Specifications, and in reasonably close conformance with the lines, grades and locations shown on the Plans, or as directed by the Engineer.

Guardrail shall include appurtenant materials and work in making connections with other Guardrail or structures, as may be required to complete the construction as indicated on the Plans.

2. Materials

Materials used in the construction of Guardrail, in addition to the general requirements of these Specifications, shall conform, unless otherwise stipulated, to the following TDOTSS, January 1, 2021 and all Supplemental Specifications thereto pertaining issued prior to the advertisement for this contract:

Material	T.D.O.T. Subsection
Metal Beam Rail	909.05
Guard Rail Posts	909.07
Guard Rail Hardware	909.08

Portland Cement Concrete shall be Class A, and shall be manufactured, placed and cured in accordance with the applicable requirement of Section 15.0 of these Specifications.

3. Construction Requirements

(a) Preliminary Work - Clearing and Grubbing, Removal of Structures and Obstructions, Excavation, Undercutting and Embankment Construction shall be performed in accordance with the provisions of Sections 2, 3, and 4 of these Specifications.

(b) Posts - All posts shall be the shape, size and dimension shown on the Plans, and shall be set reasonably true to the lines and grades shown on the Plans or established by the Engineer.

(c) Installation of Posts - Before beginning any excavation or driving any Guardrail post, the Contractor shall determine the location of any underground electrical, telephone, drainage, water, gas, sewer or other utility lines in the vicinity and shall conduct his work in such a manner as to avoid damage to them. Holes shall be dug or drilled to the depth indicated in the plans; or posts may be driven by approved methods and equipment, provided the posts are erected in the proper position and are free of distortion and burring or any other damage.

All post holes that are dug or drilled shall be of such size as will permit proper setting of the posts, and allow sufficient room for backfilling and tamping.

Holes shall be backfilled with selected earth, or other suitable materials in layers not to exceed 4 inches in thickness and each layer shall be thoroughly tamped. When backfilling and tamping is completed, the posts or anchors shall be held securely in place.

Post holes that are drilled in rock and holes for anchor posts or anchor devices shall be backfilled with concrete.

Posts for metal divider guardrail or bridges shall be bolted to the surface as detailed on the Plans. The anchor bolts shall be set to proper location and elevation, with templates, and carefully checked after the median is placed, and before the concrete has set.

Anchor bolts for metal divider Guardrail, to be placed on a previously constructed bridge, shall be set by drilling holes in proper locations and anchoring the bolts as detailed on the Plans.

Any damaged coating on galvanized steel posts shall be repaired in accordance with Subsection 713.04 (B) of the TDOTSS, January 1, 2021, and all Supplemental Specifications thereto pertaining issued prior to the advertisement for this contract, or the posts replaced, at the Engineers direction, at no cost to the City of Knoxville.

4. Erection

All Guardrail anchors shall be set and attachments made and placed as indicated on the Plans, or as directed by the Engineer.

All bolts or clips used for fastening the Guardrail or fittings to the posts shall be drawn up tightly. End bolts shall have sufficient length to extend at lease 1/4-inch through and beyond the full nut, except where such extension might interfere with or endanger traffic, in which case, the bolt shall be cut off flush with the nut.

All railings shall be erected, drawn, and adjusted so that the longitudinal tension will be uniform throughout the entire length of rail.

5. Method of Measurement

Guardrail of the various classes and dimensions will be measured for payment in linear feet in place between the terminal anchor posts or end elements.

Terminal anchors of end elements of the various types will be measured for payment by the unit per each.

No measurement for payment will be made for projections or anchors beyond the end post except as noted.

Furnishing and placing anchor bolts, and/or devices for Guardrail posts on bridges will be considered incidental to the construction and the costs thereof will be included in the price bid for other items of construction.

No measurement for payment will be made for excavation or backfilling performed in connection with Guardrail erection.

6. Basis of Payment

(a) Guardrail will be paid for at the Contract Unit Price per linear foot for each class and dimension, complete in place which payment shall be full compensation for all posts, blocks, rail elements, fittings, hardware and all incidentals necessary to complete the work.

(b) Guardrail terminal anchors or end elements for each class and dimension, complete in place will be paid for at the Contract Unit Price per each, which payment shall be full compensation for all posts, blocks, rail elements, fittings, hardware, and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Guardrail - W - Beam	Linear Foot
Guardrail - W - Beam with Rub Rail	Linear Foot
Guardrail - Thrie Rail	Linear Foot
Terminal Anchor - Rounded Element	Each
Terminal Anchor - Type II	Each
Terminal Anchor - Flared End Element	Each