SECTION 902 -- GUARDRAIL AND GUARD POSTS

902.01 -- Description

1. This work shall consist of furnishing and erecting guardrails and guard posts at locations shown in the plans.

2. Cable guardrail shall consist of 3 wire cables supported by cable mounts that are attached to steel posts.

3. W-beam and thrie-beam guardrail shall consist of rigid beam elements bolted to the posts with offset blocks.

902.02 -- Material Requirements

1. All materials shall conform to the requirements in Table 902.01.

Table 902.01

Material Requirements	
Applicable Materials	**Section**
Reinforcing Steel	1020
Steel Guardrail Posts, Special Posts, and Offset Blocks	1067
"W" and "Thrie"-Beam Guardrail	1066

2. The concrete for use in guardrail anchors and footings shall be a readily available, commercially designed concrete mixture or Contractor-produced concrete, which shall achieve a minimum compressive strength of 2,900 psi at 28 days. The cement shall be Type I, Type II, or Type III and need not be sampled. The aggregate shall be from acceptable sources.

3. The Contractor shall not order or deliver any guardrail items until the Engineer has furnished a field checked list of items, lengths, and locations.

902.03 -- Construction Methods

1. a. The Contractor shall set all posts plumb, firm, and spaced as shown in the plans and to lines and grades given.

b. (1) The Contractor may elect to drive, rather than set, the posts in prebored holes.

(2) Posts damaged when driven into the ground shall be rejected, removed, and replaced with acceptable materials.

(3) Should the Engineer determine that damage is occurring to the surfaced shoulder during post placement due to the Contractor's driving operation, the Engineer will require that the post holes be dug.

c. All areas where the surface of treated timber is broken by cutting, boring, or other means shall be thoroughly coated with 3 applications of the original preservative. Each application should be reasonably dry before the next coat is applied. Bearing plates or washers shall be positioned as shown in the plans and placed under all heads and nuts of bolts which have bearing on wood posts.

d. (1) Steel intermediate posts for cable guardrail may be either driven or placed in predrilled holes. Steel posts that are driven should be protected with a device to prevent deformation of the post.

(2) Cable guardrail end posts shall be installed in predug holes.

(3) Any damage to galvanizing shall be repaired in accordance with Repair Method 2 as prescribed in Section 1061.

e. Sections of steel "W" beams (W6 x 9 steel post) will be allowed as an alternate to treated timber posts. Any damage to galvanizing shall be repaired in accordance with Repair Method 2 as prescribed in Section 1061.

f. (1) When posts are required in a surfaced area, the Contractor shall backfill all post holes with material approved by the Engineer. The material shall be compacted leaving a space 8 inches deep around the post. This remaining part of the hole shall be backfilled with granular material and approved bituminous material or flowable fill concrete placed to the elevation of the surrounding surfacing as shown in the plans. The material near the post shall be sloped to help any water run off away from the post.

(2) Posts placed in other than bituminous and concrete surfacing shall be backfilled with material approved by the Engineer and moderately compacted to the elevation of the existing surface.

g. The anchorage and bracing of posts shall be as shown in the plans; and all casting, placing, excavating, and backfilling shall be done in a manner approved by the Engineer.

2. a. The Contractor shall install cable guardrail and all associated hardware as shown in the plans. The posts shall be placed, and approved by the Engineer before the guardrail is installed. The cable shall be drawn taut and fastened securely on both ends as shown in the plans. All cable shall be installed with the turnbuckles in approximately the midpoint of take-up or release to provide for future adjustments.

b. Intermediate anchors and terminal anchors shall be installed at the locations shown and in accordance with the applicable plans.

3. a. The Contractor shall assemble "W" and "thrie"-beam guardrail using galvanized steel beams mounted in accordance with the details shown in the plans.

b. Each end of all "W" and "thrie"-beam guardrails shall be fitted with a terminal end section formed in accordance with the details shown in the plans.

c. (1) The beam elements shall be straight and of uniform section, except those elements which must be manufactured to be curved shapes as prescribed in the plans.

(2) Warped or deformed elements will be rejected.

(3) All connections and splices shall be formed with flat round-headed bolts or bolts with heads of similar detail so that no appreciable projection will obstruct a vehicle sliding along the rail.

(4) The edges of the beam elements shall be smooth after fabrication.

d. (1) The Contractor shall install bridge approach sections at the locations shown and in accordance with the plans.

(2) Bridge approach sections shall be mounted directly to the bridge with existing bolts or through special curb mountings or flush mountings shown in the plans. Curb mountings, anchor bolts, and incidentals will be considered as part of the bridge approach sections.

e. The Contractor shall furnish and install, at designated locations, special guardrail posts, fittings, and hardware as prescribed in the plans. The finish will also be prescribed in the plans.

f. The Contractor shall furnish and install all terminal sections at designated locations in conformance with the plans.

g. The Contractor shall submit for the approval of the Engineer such additional plans and shop drawings showing rail and beam punchings, fittings, and assemblies for guardrail as may be requested by the Engineer.

4. Guardrails shall be placed before traffic is allowed access to the road or as indicated in the plans.

902.04 -- Method of Measurement

1. a. Cable guardrail is measured by the linear foot. The Department will compute the cable guardrail length in linear feet from terminal section to terminal section, excluding intermediate anchorage sections.

b. Terminal anchorage sections and intermediate anchorage sections will be measured as single units complete and in place as shown in the plans.

2. a. "W" and "thrie"-beam guardrail is measured by the linear foot. The Department will compute the "W" and "thrie"-beam guardrail length in linear feet from center to center of the end posts and shall not include the distance of the section of rail projecting beyond these points.

b. When "W" and "thrie"-beam guardrail is installed in conjunction with bridge approach sections, the end post shall be indicated in the plans. This post shall not be considered as part of the "W" and "thrie"-beam guardrail but shall be included for payment as part of the bridge approach section.

c. When "W" and "thrie"-beam guardrail is installed in conjunction with terminal end sections, the end post shall be shown in the plans and shall be considered as part of the "W" and "thrie"-beam guardrail.

d. Guardrail end treatment is measured by the each.

e. Special guardrail posts furnished and installed in conjunction with "W" and "thrie"-beam guardrail will be measured by the each.

902.05 -- Basis of Payment

1.

Pay Item	Pay Unit
Cable Guardrail	Linear Feet (LF)
Intermediate Anchorage Sections	Each (ea)
Terminal Anchorage Sections	Each (ea)
Bridge Approach Sections	Each (ea)
Special Bridge Approach Section	Each (ea)
W-Beam Guardrail	Linear Feet (LF)
Thrie-Beam Guardrail	Linear Feet (LF)
Terminal Sections _____	Each (ea)
Special Guardrail Posts	Each (ea)
Special Guardrail Posts _____	Each (ea)
Guardrail Adapter _____	Each (ea)
Guardrail Posts	Each (ea)
Guardrail End Treatment _____	Each (ea)

2. Terminal end shoes, when required by the plans, shall not be measured for payment but shall be considered subsidiary to the items for which direct payment is provided.

3. Payment is full compensation for all work prescribed in this Section.