TST-1-99 GENERAL NOTES:

GENERAL: This drawing provides design and construction details. The project plans for each structure shall provide necessary additional railing dimensions including railing lengths, post spacings, post lengths and any other pertinent information including special notes and details. For additional guardrail details, see Std. Consip. Gr-1-1, Gr-1-2 and other drawings pertaining to design of specific guardrail types.

APPLICATION: The twin steel tube railing shall be used on structures designed to drain surface water over the sides of the structure. This railing is not applicable to composite girder bridges, in which design changes greater than 2" on top flange thicknesses less than 5".


DESIGN SPECIFICATIONS: This design conforming to the "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway and Transportation Officials, 1996, including the 1997 interim specifications, and the ODOT bridge design manual.

DESIGN DATA:
- Reinforcing steel: Minimum yield strength = 60 ksi (8000 psi), minimum yield strength = 40,000 psi, all other steel: minimum yield strength = 50,000 psi

MATERIALS: Formed stainless steel structural tubing. According to TDF-04 (AISI 304L, Grade 304, in lieu of the shop weight, test ASTM E691. The manufacturer may choose to supply tubing that meets impact toughness according to ASTM E29, "Notch Char Impact Testing of Metallic Materials", the V-notch impact requirements shall be 3.5 ft-lb at 70°F, for each heat supplied. The manufacturer shall furnish one 3" X 3" specimen, marked with its heat number, for impact testing.

FORMED STAINLESS STEEL SHAPES, PLATES AND PLATE WASHERS ACCORDING TO TDF-04.

GALVANIZED: Galvanize all shaped structural tubes, posts, plates, hardware and accessories in accordance with TDF-04. Prior to galvanizing, round all structural tubing ends and remove burns from all steel tubing, shapes and plates.

HORIZONTAL CURVATURE: This standard is applicable to structures having a railing curvature radius of 20 feet or more. For a radius of less than 20 feet, the design shall be special for all curved structures, heat curve the horizontal rail elements according to the AASHTO standard specifications for highway bridges.

TUBE SPACES: Locate splices so that each tube segment is connected to not less than two posts. Stagger splices in the top and bottom tubes to avoid occurrences in the same panel.

FASTENERS: Furnish material conforming to the following:
- All anchor bolts, sleeve nuts, nuts and washers shall conform to AASHTO A 490.
- End welded pegs shall conform to AASHTO A 490.
- The tube rail to post connection bolts and hex nuts shall conform to T-11-10 (AASHTO). Refer to standard construction drawing or-3-6 for the bridge terminal assembly connection hardware.
- The hex cap screws (bolts), nuts, and washers shall conform to AASHTO A 490.

FOR BRIDGE RAILING:
- The distance from the centerline of a guardrail post to the abutment end of the beam up to the centerline of a guardrail post to the pier end of the beam shall not be less than 3' - 0".
- The location of the horizontal tie rods may need to be adjusted in order to accommodate each post anchor device.

METHOD OF MEASUREMENT: The department will measure twin steel tube bridge railing by the number of feet. The department will measure the length of railing as the distance between the centers of the flush mounted posts at the approach and trailing ends plus 4' - 0".

BASIS OF PAYMENT: The department will consider the costs associated with furnishing and installing steel tubing, steel posts, post anchor devices, anchor plates, tube splice plates, guardrail connection plates, anchor bolts, round head bolts, sleeve nuts, nuts, cap screws, washers and other hardware to be included with the twin steel tube railing. The department will pay for accepted quantities at the contract price for item 577, railing (twin steel tubes).

The department will pay for bridge terminal assembly hardware separately.