

ITEM 91606.XXXX M - IRONWOOD GUIDE RAIL
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL,
TYPE I
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL,
TYPE II
ITEM 91606.XXXX M - ANCHORAGE UNIT FOR IRONWOOD GUIDE RAIL
BACKSLOPE

DESCRIPTION. This work shall consist of furnishing or furnishing and installing composite wood/steel Ironwood Guide Rail, end terminals for Ironwood Guide Rail, and Anchorage Units for Ironwood Guiderail for termination in backslopes in accordance with these specifications, the manufacturer's drawings, and the contract documents to the lines and grades shown on the plans or to those established by the Engineer. Ironwood Guide Rail and end terminals and anchorage units for Ironwood Guide Rail are products of Structures of Ironwood L.L.C. @:

P.O. Box 600
Saranac Lake, NY 12983
tel: (518) 891-1669 fax:(518) 891-4322

MATERIALS. Materials shall meet the requirements specified in the following subsections of §700--Materials Details and ASTM Specifications and/or as specified below:

Wood Preservative - Water Borne	708-31
Galvanized Steel Barrier Posts	710-14
Structural Steel	715-01
Galvanized Coatings And Repair Methods	719-01
Reflective Sheeting	730-05 (Materials Designation 730-05.02 or 730-05.03)

Steel Hardware. Steel posts, plates, angles, channels, stiffeners, brackets and other miscellaneous steel hardware not referenced to or in other sections of these specifications shall be fabricated as shown in the manufacturer's drawings and documents from steel meeting the requirements of ASTM A36 M, unless specified otherwise. All components shall be galvanized in accordance with §719-01, Type I. Components shall be fabricated prior to galvanizing. The exposed metal parts of Ironwood Guide Rail and its end terminals and anchorages designated as "Rustic" shall, in addition to being galvanized in accordance with §719-01, additionally be etched with a phosphate solution and sprayed with two coats of electrostatically applied, baked on polyester powder coating.

Fasteners. Bolts, nuts and washers shall conform to the following unless specified otherwise on the manufacturer's drawings or in the contract documents. Bolts, nuts and washers of equivalent properties may be substituted for those specified below:

Bolts	ASTM F568 Class 4.6
Nuts	ASTM A563M Grade A or Better

ITEM 91606.XXXX M - IRONWOOD GUIDE RAIL
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE I
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE II
ITEM 91606.XXXX M - ANCHORAGE UNIT FOR IRONWOOD GUIDE RAIL BACKSLOPE

Washers

ASTM F436M

Bolts, nuts and washers shall be galvanized in accordance with the provisions of §719-01 Galvanized Coatings and Repair Methods, Type II.

Wood. Unless indicated otherwise, wood posts shall be Red Pine No. 2 or equivalent having a modulus of elasticity E equal to 7,580 MPa or greater and an allowable stress in bending of F_b equal to 4.65 MPa or greater. Unless indicated otherwise, wood rails shall be Douglas Fir or an equivalent having a modulus of elasticity E equal to 6,895 MPa or greater and a modulus of rupture equal to 48.95 MPa or greater. Both the posts and railing, unless fabricated from surface dried redwood, red cedar, cypress, or black locust, shall be pressure treated in accordance with §708-31 after all fabrication has been completed.

Concrete Anchor for Type II End Terminal and Anchorage in Backslope. §606-2.02 Anchor Bolts and Studs, §606-2.06 Concrete for End Assembly Anchors and Post Embedments, and §709-01 Bar Reinforcement, Grade 420 shall apply.

Object Marker. Object markers are required at Type I and Type II End Terminals including those at vehicle openings or driveways, and shall be fabricated from the following materials conforming to Section 700 Materials Details:

Aluminum Sign Panels	730-01
Reflective sheeting, Materials Designation 730-05.02 or Materials Designation 730-05.03	730-05
Acrylic Plastic Reflex Reflectors	730-10

The posts for mounting object markers shall be galvanized steel U section posts, fabricated as shown on the Standard Sheets and weighing 1.6 kg/m.

Basis of Acceptance. Ironwood Guide Rail, End Terminals for Ironwood Guide Rail, and anchorage units for Ironwood Guide Rail, Backslope, will be accepted on the basis of manufacturer's certificate of compliance with these specifications.

CONSTRUCTION DETAILS

General. At least seven days prior to installation, the Contractor shall provide three copies of Manufacturer's Drawings and Installation Instructions for Ironwood Guide Rail, End Terminals, and Anchorage units. All guide rail, end terminals, and anchorage units for burial in the backslope described by these specifications shall be subject to the following requirements.

A. Inspection of Rail Elements. Immediately prior to erection, the rail elements shall be

ITEM 91606.XXXX M - IRONWOOD GUIDE RAIL

ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE I

ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE II

ITEM 91606.XXXX M - ANCHORAGE UNIT FOR IRONWOOD GUIDE RAIL BACKSLOPE

inspected for damage. Blemishes and structural damage which in the opinion of the Engineer will impair the function and satisfactory appearance of the rail shall constitute sufficient cause for rejection.

Erection of all guide rail and connections shall be subject to the inspection of the Engineer, who shall be given all facilities required for a visual inspection of workmanship and materials.

B. Field Galvanizing For Repair. Field galvanizing repair shall be allowed only when the total damaged area on each piece or component is less than 2 percent of the coated surface, or 10 000 mm², whichever is less. Any single piece or component with total damaged area greater than the amount specified above will be rejected and shall be replaced by the Contractor. Field galvanizing repair shall be done in accordance with the requirements of the Repair section of §719-01 Galvanized Coating And Repair Methods. Repairs to galvanized surfaces shall be performed regardless of whether exposed surfaces are to be painted or not.

C. Erection. Posts, railing, barrier systems, and end terminals shall be erected at the locations indicated in the contract plans or at the locations indicated by the Engineer in accordance with the manner indicated on the manufacturer drawings and contract plans, manufacturer's directions, and in a manner approved by the Engineer. Rail mounting height shall be as indicated on the manufacturer drawings and plans.

Posts shall be driven unless otherwise specified by the Engineer. The driving shall be accomplished with approved equipment and methods that will leave the posts in their final position, free of any distortion, burring or other damage. When posts are driven through asphalt concrete or a bituminous treated material, the Contractor shall take care to prevent damage to the paved or treated areas. Large holes and voids caused by driving the posts shall be filled and compacted with a bituminous treated material or asphalt concrete similar to that damaged. The small area adjacent to the post disturbed during installation or where gaps exist at the post after pavement repairs shall be sealed with a bituminous material approved by the Engineer.

As an alternative to driving posts on unpaved medians and where site conditions are such that driving is not possible, the Contractor shall carefully excavate for all post holes. Post holes and post foundation structures and concrete anchors shall be backfilled and backfilled material compacted in accordance with §203-3.15, Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables.

The work of installing the guide railing system when it abuts stabilized shoulder courses shall be coordinated and progressed to provide the least disturbance between the two phases of the work.

All posts shall be aligned to a tolerance of 6 mm for plumb and grade line.

During non-working hours, exposed approach ends (free ends) of the guide railing or median

ITEM 91606.XXXX M - IRONWOOD GUIDE RAIL

ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE I

ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE II

ITEM 91606.XXXX M - ANCHORAGE UNIT FOR IRONWOOD GUIDE RAIL BACKSLOPE

barrier shall be dropped to the ground and pinned in a manner approved by the Engineer.

D. . Rustic Guide Railing and Terminals. The exposed surfaces of metal parts of products designated as “Rustic,” Ironwood Guide Railing, End Terminals, and Anchorage Units, in addition to being galvanized in accordance with §719-01, shall additionally be etched with a phosphate solution and then receive two coats of polyester powder coating, electrostatically spray applied and baked on. Damaged powder coatings shall be repaired in accordance with the manufacturer’s instructions.

E. Ironwood Guide Railing, End Terminal, and Anchorages designated as “Furnish Only.” Items so designated shall be delivered to, stacked, and stored at the locations indicated in the Contract Documents in accordance with the directions of the Engineer.

METHOD OF MEASUREMENT

Ironwood Guide Railing. The quantity of guide railing measured for payment will be the number of meters, measured to the nearest 0.1 m, measured along the axis of the railing between its extreme outer limits, less the length described below occupied by the end terminals or anchorage units for backslope burial. Ironwood Guide Railing designated as “Furnish Only” will be measured as the length of rail of the indicated type, satisfactorily delivered, stacked and stored, and complete with two posts per four meter length, all necessary hardware, fasteners, and timber parts.

End Terminals for Ironwood Guide Railing and Anchorage Unit for Termination in Backslopes. End terminals and anchorage units for termination in backslopes will be measured by the actual number of units installed in accordance with the plans, manufacturer drawings and/or as directed by the Engineer. The payment limits for end terminals and anchorage units shall include the object marker, if any, the concrete anchor block, and four meters (4 m) of railing, and the post attached to the four meters of railing.

End Terminals for Ironwood Guide Railing and Anchorage Unit for Termination in Backslopes designated as “Furnish Only” will be measured as the number of End Terminals of the Type indicated for Ironwood Guide Railing and Anchorage Unit for Termination of the type indicated in Backslopes satisfactorily delivered, stacked and stored, and complete with all necessary hardware, fasteners, and timber parts.

BASIS OF PAYMENT

Ironwood Guide Rail. The unit price bid per meter for the above work shall include the cost of all labor, equipment and material necessary to complete the work, including the cost of any repairs required.

ITEM 91606.XXXX M - IRONWOOD GUIDE RAIL
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE I
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE II
ITEM 91606.XXXX M - ANCHORAGE UNIT FOR IRONWOOD GUIDE RAIL BACKSLOPE

When posts are driven through asphalt concrete or bituminous treated material, repairs to damaged paved or treated areas shall be at no cost to the State.

End Terminals for and anchorage units for backslope burial of Ironwood Guide Rail. The unit price bid for each end terminal shall include the cost of furnishing all labor, materials and equipment necessary to complete the work between the above described payment limits.

Progress Payments. Progress payments will be made when the railing and/or end terminals are satisfactorily erected in the position and manner indicated on the manufacturer's drawings and in a manner approved by the Engineer, exclusive of bituminous repair and final alignment. Payment will be made at that time, at the unit price bid, for 90% of the measured quantity thus erected. The balance of the quantity erected will be paid for upon proper repair to the bituminous surfaces and alignment of the railing to the specified tolerances.

Payment will be made under:

91606.10 M	Ironwood Guide Railing	Meter
91606.1001 M	Ironwood Guide Railing with Extra Long Posts	Meter
91606.1050 M	Ironwood Guide Railing (Rustic)	Meter
91606.1051 M	Ironwood Guide Railing with Extra Long Posts (Rustic)	Meter
91606.11 M	End Terminal for Ironwood Guiderail (Type I)	Each
91606.1150 M	End Terminal for Ironwood Guiderail (Type I)(Rustic)	Each
91606.12 M	End Terminal for Ironwood Guiderail (Type II)	Each
91606.1250 M	End Terminal for Ironwood Guiderail (Type II)(Rustic)	Each
91606.13 M	Anchorage Unit for Ironwood Guiderail, Backslope	Each
91606.1350 M	Anchorage Unit for Ironwood Guiderail, Backslope(Rustic)	Each
91606.20 M	Ironwood Guide Railing, Furnish Only	Meter
91606.2001 M	Ironwood Guide Railing with Extra Long Posts, Furnish Only	Meter
91606.2050 M	Ironwood Guide Railing (Rustic), Furnish Only	Meter
91606.2051 M	Ironwood Guide Railing with Extra Long Posts (Rustic),	Meter

ITEM 91606.XXXX M - IRONWOOD GUIDE RAIL
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE I
ITEM 91606.XXXX M - END TERMINAL FOR IRONWOOD GUIDE RAIL, TYPE II
ITEM 91606.XXXX M - ANCHORAGE UNIT FOR IRONWOOD GUIDE RAIL BACKSLOPE

Furnish Only

91606.21 M	End Terminal for Ironwood Guiderail (Type I), Furnish Only	Each
91606.2150 M	End Terminal for Ironwood Guiderail (Type I), (Rustic) Furnish only	Each
91606.22 M	End Terminal for Ironwood Guiderail (Type II), Furnish Only	Each
91606.2250 M	End Terminal for Ironwood Guiderail (Type II),(Rustic) Furnish Only	Each
91606.23 M	Anchorage Unit for Ironwood Guiderail, Backslope, Furnish Only	Each
91606.2350 M	Anchorage Unit for Ironwood Guiderail, Backslope, Furnish Only(Rustic)	Each

DISAPPROVED
BY EI 07-029