### Trail Bridge with Railing System

#### Stringers

<table>
<thead>
<tr>
<th>Structure Number</th>
<th>Trail No.</th>
<th>Bridge Location</th>
<th>Span (ft)</th>
<th>Clear Length (ft)</th>
<th>Pedestrian Load</th>
<th>Slope Grade</th>
<th>Species</th>
<th>Material</th>
<th>Treatment</th>
<th>Species</th>
<th>Size</th>
<th>Treatment</th>
<th>Type</th>
<th>Species</th>
<th>Size</th>
<th>Width</th>
<th>Height</th>
<th>Treatment</th>
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#### Deck

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<th>Clear Length (ft)</th>
<th>Pedestrian Load</th>
<th>Slope Grade</th>
<th>Species</th>
<th>Material</th>
<th>Treatment</th>
<th>Species</th>
<th>Size</th>
<th>Treatment</th>
<th>Type</th>
<th>Species</th>
<th>Size</th>
<th>Width</th>
<th>Height</th>
<th>Treatment</th>
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#### Backwall

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<th>Span (ft)</th>
<th>Clear Length (ft)</th>
<th>Pedestrian Load</th>
<th>Slope Grade</th>
<th>Species</th>
<th>Material</th>
<th>Treatment</th>
<th>Species</th>
<th>Size</th>
<th>Treatment</th>
<th>Type</th>
<th>Species</th>
<th>Size</th>
<th>Width</th>
<th>Height</th>
<th>Treatment</th>
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#### Railing System/Curb

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<th>Type</th>
<th>Height</th>
<th>Treatment</th>
<th>Yes/No</th>
<th>Species</th>
<th>Size</th>
<th>Width</th>
<th>Material</th>
<th>Treatment</th>
<th>Length Near/Far</th>
<th>Width</th>
<th>Material</th>
<th>Depth</th>
<th>Geosynthetic Type</th>
<th>Coating</th>
<th>Comments</th>
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#### Running Plank

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<th>Height</th>
<th>Treatment</th>
<th>Yes/No</th>
<th>Species</th>
<th>Size</th>
<th>Width</th>
<th>Material</th>
<th>Treatment</th>
<th>Length Near/Far</th>
<th>Width</th>
<th>Material</th>
<th>Depth</th>
<th>Geosynthetic Type</th>
<th>Coating</th>
<th>Comments</th>
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</table>

#### Sill

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<tr>
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<th>Type</th>
<th>Height</th>
<th>Treatment</th>
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<th>Width</th>
<th>Material</th>
<th>Treatment</th>
<th>Length Near/Far</th>
<th>Width</th>
<th>Material</th>
<th>Depth</th>
<th>Geosynthetic Type</th>
<th>Coating</th>
<th>Comments</th>
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#### Approaches

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<th>Structure Number</th>
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<th>Treatment</th>
<th>Yes/No</th>
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<th>Size</th>
<th>Width</th>
<th>Material</th>
<th>Treatment</th>
<th>Length Near/Far</th>
<th>Width</th>
<th>Material</th>
<th>Depth</th>
<th>Geosynthetic Type</th>
<th>Coating</th>
<th>Comments</th>
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#### Hardware

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<th>Treatment</th>
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<th>Length Near/Far</th>
<th>Width</th>
<th>Material</th>
<th>Depth</th>
<th>Geosynthetic Type</th>
<th>Coating</th>
<th>Comments</th>
</tr>
</thead>
</table>

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**Abutment Material Type**:
- **SS**: Solid Sawn
- **GLU**: Glulam
- **CONC**: Concrete

**Hardware Coating Type**:
- **CALV**: Galvanized
- **UNC**: Uncoated
- **WEA**: Weathering Steel

---

**Approach Fill**

**Approach Not Shown for Clarity**

**Decks/Planks**

** появлитесь на странице 3 для более детальных сведений**
**GLULAM STRINGER SIZE REQUIREMENTS - LRFD**

**SPECIES - SP/SP, COMBINATION SYMBOL 24F - V3**

<table>
<thead>
<tr>
<th>STRINGER SPAN (FEET)</th>
<th>PEDESTRIAN LIVE LOAD</th>
<th>GROUND SNOW LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>25</td>
<td>5 1/8&quot; x 15 1/8&quot;</td>
<td>5 1/8&quot; x 15 1/8&quot;</td>
</tr>
<tr>
<td>30</td>
<td>5 1/8&quot; x 16 1/2&quot;</td>
<td>5 1/8&quot; x 16 1/2&quot;</td>
</tr>
<tr>
<td>35</td>
<td>5 1/8&quot; x 17 7/8&quot;</td>
<td>5 1/8&quot; x 17 7/8&quot;</td>
</tr>
<tr>
<td>40</td>
<td>5 1/8&quot; x 20 5/8&quot;</td>
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<td>50</td>
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<td>5 1/8&quot; x 26 1/8&quot;</td>
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<tr>
<td>55</td>
<td>5 1/8&quot; x 28 7/8&quot;</td>
<td>5 1/8&quot; x 28 7/8&quot;</td>
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<tr>
<td>60</td>
<td>5 1/8&quot; x 31 3/8&quot;</td>
<td>5 1/8&quot; x 31 3/8&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**
1. FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 60d (6'-INCH) RING SHANK NAILS PER PLANK AT EACH STRINGER ALTERNATE CENTERS.
2. FASTEN STRINGERS TO DECK WITH 45d (5'-INCH RING SHANK) NAILS AT 24-INCH SPACING, ALTERNATE CENTERS WITH TWO AT EACH END.
3. SPACE NAILS AT POSTS. NAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONE NAIL AT ANY ONE POST.
4. THE MINIMUM STRINGER DEPTH FOR BRIDGES WITH PEDESTRIAN RAILS IS 15-INCHES.
5. BRIDGES WITH STRINGER DEPTHS LESS THAN 15-INCHES SHALL HAVE CURB ONLY.

**TABLE-10:**

<table>
<thead>
<tr>
<th>PEDESTRIAN LIVE LOAD</th>
<th>GROUND SNOW LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>150</td>
<td>200</td>
</tr>
</tbody>
</table>

**ELEVATION:**
GRADE SHOWN = 0.0%
- FABRICATE GLULAM STRINGERS WITH CAMBER BASED ON A 2000 FOOT RADIUS.
- RUNNING PLANKS NOT SHOWN FOR CLARITY.

**NOTES:**
- INSTALL DIAPHRAGMS AT MID-SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS.
- INSTALL DIAPHRAGMS AT MID-SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS.
- STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SNOW LOAD SIZE.
- REQUIRED FOR THE SITE CONDITIONS.
- STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT.
- **Requires Regional Bridge Engineer Approval**

**Sheet 2 of 4**

**U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE**
**STANDARD TRAIL PLAN**

**963 - GLULAM TRAIL BRIDGE**
**Typical D**
**GSB**

**Design No. STD_963-10-02d**
**NOT TO SCALE**
BRIDGE W/RAILING SYSTEMS

DECK SECTION W/STRINGERS @ 2'-0" O.C.

* MINIMUM NUMBER OF STRINGERS IS 3.
** DIAPHRAGM DEPTH SHALL BE A MINIMUM OF 75% OF STRINGER DEPTH.

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FH-P-30) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS.


GLULAM STRINGERS:
- CONSTRUCTION SYMBOL 24x10, SPECIES - SP/SP DRY CONDITION USE AND INDUSTRIAL APPEARANCE.
- SOUTHERN PEARL ROUGH SAWN NO. 2 GRADE, GRADING RULES AGENCY - SPB.
- RAILS & POSTS: SEE PROJECT CRITERIA.
- TREATED:
  - PSEUDOPHYLLOXYL, SBS, NO. 1 GRADE, GRADING RULES AGENCY - SPB.
- WHITE OAK, SBS, SELECT STRUCTURAL GRADE, GRADES RULES AGENCY - NELMA.

TREATMENT: SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVES INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

GLULAM STRINGER:
- AMERICAN USE CATEGORY SYSTEM (US) FOR USE CATEGORY 3B ABOVE GROUND - EXPOSED (UC3B).
- FENCING/PENETRATABLE IN LIGHT OIL (TYPE C SOLVENT).
- COPPER NAPHTHALENE (CAN) IN LIGHT OIL (TYPE C SOLVENT).

DECKING, RAILING PLANKS, & RAILING SYSTEM, IF TREATED:
- AMERICAN USE CATEGORY SYSTEM (US) FOR USE CATEGORY 3B ABOVE GROUND - EXPOSED (UC3B).
- MAGNETIC/PENETRATABLE IN LIGHT OIL (TYPE C SOLVENT).
- COPPER NAPHTHALENE (CAN) IN LIGHT OIL (TYPE C SOLVENT).

FIELD TREATMENT: COPPER NAPHTHALENE (CN) SOLUTION SHALL BE PENETRATED FOR FIELD TREATING OS WOOD. ALL UNPAINTED AND FIELD CUTS APPROVED BY THE C.O.R. SHALL BE CAREFULLY TREATED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION, WHERE APPROVED FIELD DRILLING OR RAIL NAILS ARE REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF ASTM A572, GRADE 50, WITH NUTS AND BOLTS CONFORMING TO ASTM A578, GRADE 5, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 5. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE SPECIFIED.

WHEN STRUCTURAL STEEL IS TO BE TREATED, THE TREATING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE ON SERVICE.

FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.
TIMBER SILL CONNECTION DETAIL

- Timber Sill can be either 12" × 12" solid sawn 10 3/4" × 12" glue-laminated, built-up 3" × 12", 4" × 12", & 6" × 12" treated members.

** See standard drawings 965-10, 965-20, 965-30, & 965-40 for foundation alternatives.

NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FHWA-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS.

CONCRETE - USE STRUCTURAL CONCRETE WITH 7 SACK MINIMUM MIX APPROVED BY THE C.O. CONCRETE SHALL BE OF TIDAL SURFACE FINISH. CONCRETE SHALL HAVE 45-55% ENTRAINED AIR. MAXIMUM SIZE AGGREGATE SHALL BE 3/4-INCH AND CONCRETE SLUMP SHALL NOT EXCEED 4-INCHES.

REINFORCING STEEL: PROVIDE REINFORCING STEEL THAT CONFORMS TO ASTM A615 (A500) No. 40 or 60. PROVIDE 2-INCH CIRCULAR CONCRETE COVER FOR ALL REBAR, UNLESS NOTED OTHERWISE ON THE PLANS.

HAZARD, AND STRUCTURAL STEEL: SEE SUPERSTRUCTURE DRAWINGS FOR PROJECT DESIGN CRITERIA AND GENERAL NOTES.

TREATED TIMBER & LUMBER: REFER TO THE GENERAL NOTES ON THE SUBSTRUCTURE DRAWINGS FOR TREATED TIMBER & LUMBER SPECIFICATIONS AND FIELD TREATING OF WOOD.

LAG SCREW INSTALLATION: PRE-BORE LAG SCREW HOLES USING TWO DIAMETERS, ONE FOR THE SHANK AND ONE FOR THE THREADS. THE HOE FOR THE SHANK IS TO BE 1/16-INCH LARGER THAN THE SHANK DIAMETER AND IS TO BE DRIED TO THE DEPT OF PENEITATON OF THE SHANK. THE HOE FOR THE THREADED PORTION IS TO BE 70 PERCENT OF THE BOLT DIAMETER AS SHOWN ON THE PLANS AND IS TO BE BORED AT LEAST TO THE LENGTH OF THE THREADS. DO NOT DRIVE LAG SCREWS WITH A HAMMER.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME

SECTION

963 - GLULAM TRAIL BRIDGE

TYPICAL ID

GSB

REVIEW DATE

NOT TO SCALE

DRAWING NO

STD_963-10-04

SHEET X OF 4