

SP00250 (Special Provisions for the 2024 Book)

(Bidding on or after: 076-01-26

Last updated: 042-0326-26

Requires SP02520 and SP02530

This Section requires SP00230

*When temporary surfacing
is required.)*

(Use this Section when the Contractor is to provide a diversion structure. This Section is for diversion bridges.)

SECTION 00250 - DIVERSION BRIDGES

(Follow all instructions and make all edits with "Track Changes" turned on. This Section is not published in the Oregon Standard. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the Project, unless the item(s) that are included in the subsection, paragraph, sentence, or bullet are not required on the Project and then they should be deleted. In general do not re-number or re-letter subsections when item(s) are deleted. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Section 00250 is not a Standard Specification and is included in this Project by Special Provision.

Description

00250.00 Scope - This Work consists of designing, constructing, inspecting, maintaining, and removing diversion bridges as shown or directed.

00250.03 Submittals - Submit the following at least 14 Calendar Days before the preinstallation conference:

- The Diversion Bridge Design Checklist, signed and stamped by the designer (see 00150.35(b)(1)) and is included at the end of this Section.
- Stamped Working Drawings and calculations, including hydraulic, scour, and foundation calculations, according to 00150.35.
- For used material, provide the following:
 - The locations of all acceptable defects on the Working Drawings with supporting design calculations.
 - Documentation that all primary and secondary members to be incorporated into the diversion bridge meet the requirements of 00250.10.
 - A statement that the Design Engineer of Record has inspected the used Material to be incorporated into the diversion bridge.

00250.04 Preinstallation Conference - Hold a preinstallation conference with the Engineer, Contractor personnel, fabricator, Design Engineer of Record, and all other personnel involved in installing the diversion bridge. Meet at a mutually agreed time two

weeks before installation work begins. Present and discuss all phases of the diversion bridge installation work.

Materials

00250.10 Material - Furnish new or used material for diversion bridges.

(a) New and Used Material - New and used material for diversion bridges may contain the following defects:

- Precast prestressed concrete members with spalling, cracking, section loss, or other distress that still satisfy the strength and serviceability requirements for the intended use.
- Structural steel members with notches, gouges, flame cuts, welds that have been repaired according to AWS D1.5, or holes meeting the requirements of AWS D1.5 that still meet the structural design and fatigue requirements for the intended use.

(b) New Material - Furnish new material for diversion bridges according to the applicable Sections of Part 00500.

(c) Used Material - Used materials are defined as materials that:

- Are reclaimed from previous projects.
- Performed satisfactorily on previous projects.
- Have no damage that affects the strength or serviceability required for the application intended.
- The Design Engineer of Record can certify for use as a part of the diversion bridge according to 00250.44.

(1) Precast Prestressed Concrete Members - Furnish precast prestressed concrete members that:

- Meet the requirements of Section 00550.
- Are permanently marked, in a location that is visible after assembly, with the manufacture's initials, cast date, job number, piece number, bridge number, and contract number.

Provide copies of the original shop drawings.

(2) Structural Steel Members - Furnish primary and secondary members that meet one of the following criteria:

Documented Steel:

- Meet the requirements of AASHTO M 160 (ASTM A6).
- All existing welds were tested for discontinuities using magnetic particle, ultrasonic, or radiographic testing as appropriate according to AWS D1.5. Evaluate all full penetration welds using tension criteria. Submit copies of all nondestructive testing (NDT) test reports to the Engineer.

- Meet the requirements of Section 02530. Verify by providing original material test reports or test reports on samples tested for yield and tensile strength, elongation, and Charpy Impact strength (zone 2).

Undocumented Steel:

- Meet the requirements of AASHTO M 160 (ASTM A6).
- For the purpose of this Section, all design calculations for undocumented steel are limited to the minimum requirements of ASTM A36 steel.
- All existing welds were tested for discontinuities using magnetic particle, ultrasonic, or radiographic testing as appropriate according to AWS D1.5. Evaluate all full penetration welds using tension criteria. Submit copies of all NDT test reports to the Engineer.

(3) Timber Members - Furnish timber members that:

- Meet the requirements of Section 02130.
- Do not contain rot, physical damage, or undue distortion.

(4) Piling:

a. Steel Piles - Furnish steel piles meeting the requirements of Section 02520.

Verify the grade of steel piles by providing original material test reports or test reports on samples tested for yield and tensile strength, and elongation.

For the purpose of this Section, all design calculations for undocumented steel are limited to the minimum requirements of ASTM A252, Grade 1 steel for pipe piles and ASTM A36 steel for H-Piles.

b. Timber Piles - Used timber piles are not allowed.

Construction

00250.41 Design - Design diversion bridges according to the "Bridge Temporary Works" section of the ODOT *Bridge Design Manual*. Use the ODOT *Bridge Design Manual* edition that is current on the date of Advertisement.

Project geotechnical and hydraulic specific reports are available for viewing at the office of the Engineer. Prints of these reports are available upon request.

(Use the following subsection (a) when spread footings are allowed, otherwise delete. Check with the Geotechnical and Hydraulic designers.)

(a) Spread Footings - For diversion bridges supported on spread footings, provide the following information:

- Soil or rock properties, ground water levels and all assumptions used to characterize the subsurface conditions for footing design.

- Estimated scour depths used in the analysis.
- Bearing capacity design calculations and recommendations.
- Recommended footing elevations.
- Estimated footing settlements and differential settlement, if applicable, based on the service conditions.
- Global stability analysis of spread footing locations.
- Method of providing adequate footing scour protection.

(b) Driven Piles - For diversion bridges supported on driven piles:

- Include the following information on the drawings:
 - Pile type, size, and steel grade.
 - Pile layout and spacing.
 - Required ultimate bearing capacity (nominal resistance).
 - Method for field determination of ultimate (nominal) bearing capacity (dynamic formula, wave equation, or dynamic load test).
 - Minimum pile tip elevations.
- Provide the following information and calculations:
 - Subsurface material properties, ground water levels and all assumptions used to characterize the subsurface conditions for pile design.
 - Estimated scour depths used in the analysis.
 - Pile bearing capacity design calculations and recommendations.
- Provide the following analysis and recommendations when applicable:
 - Lateral pile load analysis.
 - Pile tip protection.
 - Pile uplift capacity.

(c) Stream Crossings - For stream crossings, provide vertical and horizontal clearances as required by the applicable permitting agencies, but not less than a 5-year flood. Provide scour calculations to support the estimated scour depth used in the foundation design.

(d) Roadway and Railroad Crossings - For Roadway and Railroad crossings, provide the vertical and horizontal clearances as shown and the following:

(1) Bents Adjacent to Highways - For bents located adjacent to highway traffic openings, furnish:

- Temporarily pinned, pin and loop concrete barrier to protect the Structure from damage by adjacent traffic. Provide at least 1.5 feet clearance between the barrier and the bent.
- Posts designed for 150 percent of the calculated vertical loading.
- Mechanical connections (2,000 pounds minimum capacity) between the bottom of post and footing.

- Mechanical connections (1,000 pounds minimum capacity) between the top of post and cap.
- Connections (500 pounds minimum capacity) between the beams and cap.
- 5/8-inch diameter minimum bolts at timber bracing connections.

(2) Bents Adjacent to Railroads - For bents located adjacent to railroad traffic openings, in addition to the requirements of (d)(1) above, furnish the following:

- Collision posts as shown.
- For bents located within 20 feet of the centerline of track, solid sheathing 3 feet and 16 feet above top of rail with 5/8-inch-thick minimum plywood, properly blocked at the edges.
- For bents located within 20 feet of the centerline of the track, bracing adequate to resist the required horizontal design loading or a minimum 5,000 pounds horizontal loading.

(e) Width - Design diversion bridges to match the temporary roadway width and vertical and horizontal alignment as shown.

(f) Surfacing - Except for concrete decks, furnish the Structure with a minimum 2-inch asphalt concrete or equivalent wearing surface. Immediately prior to placing the asphalt concrete:

- Clean and dry the surface to be covered.
- Apply a hot asphalt prime coat at a uniform rate of 0.20 to 0.25 gallons per square yard of deck surface or as directed by the Engineer.
- Apply a spread of aggregate, 1/4 inch to 1/2 inch in size, to give the appearance of 50 percent coverage.
- Roll the surface to secure the maximum embedment of the aggregate into the prime coat and surface.

(g) Roadway Openings - At roadway openings, provide 25-watt amber lights at 3-foot centers around the perimeter of each side of the diversion bridge opening. Illuminate the lights from 30 minutes before sunset to 30 minutes after sunrise.

(h) Bridge Rail - Design diversion bridge rail systems meeting MASH TL-3 performance criteria.

(i) Drainage – Design and detail temporary bridge deck drainage according to *AASHTO Drainage Manual Appendix 17A* and restrict spread to the shoulder width.

00250.43 Construction - Construct diversion bridges according to the applicable Sections of Part 00500 and the requirements of applicable permitting agencies.

Perform structural steel welding according to 00560.26(a) and steel piling welding according to 00520.43(g). Do not begin welding until all of the following have been approved:

- WPS-Welding Procedure Specification

- PQR-Procedure Qualification Records
- WQTR-Welder Qualification Test Records
- MTR-Material Test Report
- CWI-AWS Certified Welding Inspector

Field welding to girders, beams, stringers, crossbeams, and floor beams is not allowed.

00250.44 Opening to Traffic:

(a) Before Opening to Traffic - Before opening diversion bridges to traffic, have the Design Engineer of Record perform the following:

- Inspect the soils to confirm that bearing capacity equals or exceeds design assumptions.
- Accompany the Engineer on an inspection of the Structure to confirm the Structure and Materials conform to the Plans and Specifications.
- Provide a written statement that the Structure and the Materials used will serve the intended use and that they comply with the Design Engineer of Record's submitted Plans and drawings.

(b) After Opening to Traffic - On diversion bridges that are open to traffic for more than one year, do the following:

- On or before each anniversary of the opening of the diversion structure, have the Design Engineer of Record inspect the Structure and certify that a hands-on inspection of the Structure has been performed and a determination has been made that the Structure is consistent with the approved design and is currently adequate for its design loads.
- Provide a signed and stamped report of the inspection results and certification within 30 Calendar Days of the inspection.

(Use the following heading and subsection .50 when "diversions" are required.)

Temporary

00250.50 Diversion - Furnish temporary Roadbed and Surfacing according to Section 00230.

Maintenance

00250.60 Structure Maintenance - Maintain diversion bridges, including wearing surfaces, in a safe and functional condition. Keep bracing and connections tight and immediately replace any damaged members, as directed or approved by the Engineer. For stream crossings, remove all debris or drift from the Structure.

Finishing and Clean Up

00250.70 Structure Removal - When diversion bridges are no longer needed, remove them according to Section 00310. Unless otherwise shown or specified, all diversion bridge materials will remain the property of the Contractor.

Satisfy all requirements of applicable permitting agencies during bridge removal.

Restore all areas occupied by the diversion bridges to original condition or as shown.

Measurement

00250.80 Measurement - No measurement of quantities will be made for Work performed under this Section.

Payment

00250.90 Payment - The accepted quantities of Work performed under this Section will be paid for at the Contract lump sum amount for the item "Diversion Bridges".

Payment will be payment in full for furnishing and placing all Materials, and for providing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

No separate or additional payment will be made for designing, constructing, maintaining, inspecting, or removing the diversion bridges.

(Use the following paragraph when "diversions" are required.)

Temporary Roadbed and Surfacing will be paid for according to 00230.90.

DIVERSION BRIDGE DESIGN CHECKLIST

Instructions - This checklist was developed to facilitate the design, review, and erection of diversion bridges. It is intended to remind the Design Engineer of Record to design and to check for specific aspects of construction. It is not a substitute for plan and design criteria or specification requirements.

The checklist is to be completed and signed by the diversion bridge Design Engineer of Record. Answer every question. Attach explanations of all negative responses to this checklist. Submit this checklist with the submittals.

	YES	NO	N/A
A. Contract Plans, Specifications, and Permits			
1. Are the diversion bridge's plans prepared, stamped and signed by an engineer registered to practice in Oregon?	_____	_____	_____
2. Are the design calculations signed by both the designer and the checker, and stamped by the designer and included in the submittal?	_____	_____	_____
3. Have three complete sets (five if railroad approval is required) of the design calculations been included with the diversion bridge drawings submittal?	_____	_____	_____
4. Are diversion bridge plans in compliance with the requirements of the construction plans and specifications?	_____	_____	_____
5. Are diversion bridge plans in compliance with the requirements of the Oregon Standard Specifications for Construction, subsection 00150.35?	_____	_____	_____
6. Are all existing, adjusted or new utilities in proximity with the proposed diversion bridge shown on the diversion bridge plans and is protection of these utilities addressed?	_____	_____	_____
7. Are clearance requirements satisfied and shown on the diversion bridge plans?	_____	_____	_____
8. For construction in or over navigable waters, have all requirements for construction of the diversion bridge that are called for in the Coast Guard Permit been incorporated?	_____	_____	_____
9. Has possible damage from traffic been considered?	_____	_____	_____
10. Has damage from stream drift been considered?	_____	_____	_____

B. Foundation Requirements

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|--|-------|-------|-------|
| 1. Is the diversion bridge supported on driven piling? | _____ | _____ | _____ |
| a. Are minimum pile tip elevations or penetration depths indicated on the drawings? | _____ | _____ | _____ |
| b. If timber diversion bridge piles are used, are the lengths sufficient to eliminate the possibility of pile splices? | _____ | _____ | _____ |
| c. Is a static pile capacity analysis included in the calculations? | _____ | _____ | _____ |
| d. If lateral loads are applied to the piling by equipment, dead loads, flowing water, or drift, is a detailed lateral load analysis included in the calculations? | _____ | _____ | _____ |
| e. When piling are in an active waterway, have the potential effects of scour on axial and lateral pile support been addressed in the calculations? | _____ | _____ | _____ |
| f. If the FHWA Gates Equation is used to determine bearing capacity, does the proposed pile hammer meet the minimum field energy requirements as listed in 00520.20(d)(2)? | _____ | _____ | _____ |
| g. Will a driving criteria graph, plotting blow count versus stroke for an acceptable pile hammer, be provided for the project inspector? | _____ | _____ | _____ |
| 2. Is the diversion bridge supported on spread footings? | _____ | _____ | _____ |
| a. Are the spread footing elevations shown on the drawings? | _____ | _____ | _____ |
| b. Has a rational method for determining the ultimate bearing capacity of the foundation materials been presented and described in the calculations? | _____ | _____ | _____ |
| c. Have the soil parameters used in calculating the ultimate bearing capacity been listed and confirmed by the Design Engineer of Record? | _____ | _____ | _____ |
| d. Has an appropriate Factor of Safety, or resistance factor, been used for calculating the allowable (or factored) bearing capacity of the foundation materials? | _____ | _____ | _____ |

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|----|--|-------|-------|-------|
| e. | Are spread footing settlement estimates included in the calculations? | _____ | _____ | _____ |
| f. | Have effective stresses been used in the calculations, when applicable? | _____ | _____ | _____ |
| g. | When spread footings are founded near the top of a slope or in a slope, have the ultimate bearing capacity calculations been modified accordingly? | _____ | _____ | _____ |
| h. | When spread footings may be subjected to flowing water, have the potential effects of scour on ultimate bearing capacity been addressed in the calculations? | _____ | _____ | _____ |

C. Loads

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|----|--|-------|-------|-------|
| 1. | Has the mass of the contractor's heavy equipment units crossing the diversion bridge been included in the calculations? | _____ | _____ | _____ |
| 2. | Are design loads and material properties used to determine design stresses for each different diversion bridge member shown on the diversion bridge plans? | _____ | _____ | _____ |
| 3. | Is the worst loading and member property condition, rather than the average condition, used to obtain design loads? | _____ | _____ | _____ |
| 4. | Are concentrated loads included in the analysis of supporting beams or steel beam caps? | _____ | _____ | _____ |

D. Allowable Stresses

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|----|---|-------|-------|-------|
| 1. | Has the method used for diversion bridge design of all members except for manufactured assemblies been noted in the design calculations? | _____ | _____ | _____ |
| 2. | Are manufactured assemblies identified as to manufacturer, model, rated working capacity and ultimate capacity? | _____ | _____ | _____ |
| 3. | Is the allowable stress and the calculated stress listed in the summary for each different diversion bridge member, except for manufactured assemblies? | _____ | _____ | _____ |

E. Timber Diversion bridge Construction

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|----|---|-------|-------|-------|
| 1. | Are timber grades consistent with material to be delivered to the construction site, and noted on diversion bridge drawings, and in accompanying calculations for all timber diversion bridge material? | _____ | _____ | _____ |
|----|---|-------|-------|-------|

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|----|--|-------|-------|-------|
| 2. | If "rough" lumber is used, are the actual lumber dimensions used in the calculations? | _____ | _____ | _____ |
| 3. | If timber spans are governed by the strength of the timber, are the allowable stress and the calculated stress shown in the calculations? | _____ | _____ | _____ |
| 4. | If timber spans are governed by the allowable spacing of supporting joists or beams, are the allowable and the proposed spacing shown on the diversion bridge plans? | _____ | _____ | _____ |
| 5. | Has timber been checked for bending, shear, bearing stresses, and deflection? | _____ | _____ | _____ |
| 6. | Is deck timber identified as being continuous over three or more spans when they are not analyzed as simple spans? | _____ | _____ | _____ |
| 7. | Have deck timber and cap beams been checked for bearing stresses perpendicular to the grain as well as for bending and shear stresses? | _____ | _____ | _____ |
| 8. | Have posts been checked as columns as well as for compression parallel to the grain? | _____ | _____ | _____ |

F. Prestressed Concrete Members

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|----|---|-------|-------|-------|
| 1. | Are manufacturer initials, cast date, job number, piece number, bridge number, and contract number either permanently cast into each member or on a permanently attached stamped steel plate? | _____ | _____ | _____ |
| 2. | Are members adequate for indented use? | _____ | _____ | _____ |
| 3. | Are members free of spalls, cracks, section loss or any other distress? | _____ | _____ | _____ |
| 4. | Is location of each member marked on plans? | _____ | _____ | _____ |
| 5. | Is location of spalls or section loss of each member marked on plans? | _____ | _____ | _____ |

G. Steel Diversion Bridge Construction

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|----|---|-------|-------|-------|
| 1. | Are steel structural shapes and plates identified by ASTM number on the diversion bridge plans and in the calculations? | _____ | _____ | _____ |
|----|---|-------|-------|-------|

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|----|---|-------|-------|-------|
| 2. | Have exiting holes, notches, gouges, flame cuts, and welds been repaired according to AWS D1.5,? | _____ | _____ | _____ |
| 3. | Have exiting welds been ground flush and tested for discontinuities? | _____ | _____ | _____ |
| 4. | Have steel beams been checked for bending, shear, web crippling and buckling of the compression flange? | _____ | _____ | _____ |
| 5. | Has horizontal plane bracing been shown where required to limit compression flange buckling? | _____ | _____ | _____ |
| 6. | Are holes meeting the requirement of AWS D1.5, shown in the diversion bridge plans? | _____ | _____ | _____ |
| 7. | Are supporting calculations showing the adequacy of steel sections with existing holes included? | _____ | _____ | _____ |
| 8. | Are fatigue category D, E and E' marked on the diversion bridge plans and is supporting analysis showing adequacy for each fatigue category provided? | _____ | _____ | _____ |

H. Deflections and Settlement

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|----|---|-------|-------|-------|
| 1. | Is diversion bridge deflection for concrete dead load shown on the plans for all spans? | _____ | _____ | _____ |
| 2. | Do stringers supporting cast-in-place concrete compensate for estimated camber? | _____ | _____ | _____ |
| 3. | Are provisions shown for taking up diversion bridge settlement? | _____ | _____ | _____ |

I. Compression Members, Connections and Bracing

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|----|---|-------|-------|-------|
| 1. | Has general buckling been evaluated for all compression members? | _____ | _____ | _____ |
| 2. | Has bracing been provided at all points of assumed support for compression members? | _____ | _____ | _____ |
| 3. | Has bracing in each direction been considered in establishing the effective length used to check post capacity? | _____ | _____ | _____ |
| 4. | Is bracing strength and stiffness sufficient for the intended purpose? | _____ | _____ | _____ |

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|-----|--|-------|-------|-------|
| 5. | If temporary bracing is required during intermediate stages of diversion bridge erection, is it shown on the plans? | _____ | _____ | _____ |
| 6. | Have all connections been designed and detailed? | _____ | _____ | _____ |
| 7. | Are web stiffeners required on steel cap beams or steel beams to resist eccentric loads? | _____ | _____ | _____ |
| 8. | Are wedges required between longitudinal beams and cap beams to accommodate longitudinal slope or to reduce eccentric loading? | _____ | _____ | _____ |
| 9. | Have sloping diversion bridge members that exert horizontal forces on the diversion bridge been braced or tied to resist these loads? | _____ | _____ | _____ |
| 10. | Have timber headers set on shoring towers been checked for eccentric loads, and for shear and bending stresses produced by the eccentricity? | _____ | _____ | _____ |

J. Highway and Railroad Traffic Openings (For diversion bridge over or adjacent to highway or railroad traffic openings.)

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|----|--|-------|-------|-------|
| 1. | Does the diversion bridge have a minimum of 25 feet of horizontal clearance from center of the outside track to the bridge abutment? | _____ | _____ | _____ |
| 2. | Does the diversion bridge have a minimum of 23 feet 6 inch vertical clearance from the top of rail to the bottom of the bridge beam? | _____ | _____ | _____ |
| 3. | Does the diversion bridge meet all of the railroad permit requirements? | _____ | _____ | _____ |

Design Engineer of Record Signature

Date