



Bridge Removal Plan Requirements

Prepared for
Bureau of Structures

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Transportation Synthesis Reports are brief summaries of currently available information on topics of interest to WisDOT staff throughout the department. Online and print sources for TSRs include NCHRP and other TRB programs, AASHTO, the research and practices of other transportation agencies, and related academic and industry research. Internet hyperlinks in TSRs are active at the time of publication, but changes on the host server can make them obsolete. To request a TSR, e-mail research@dot.wi.gov or call (608) 267-6977.

Request for Report

State specifications vary on whether contractors are required to submit and follow a plan for bridge removal and demolition. WisDOT has a special provision for a bridge removal plan that it uses on some projects, but the agency would benefit from knowing national practices in this area:

- Do AASHTO or FHWA provide any recommendations for bridge removal plans?
- How many states have specifications or provisions that call for bridge removal plans?
- Where such plans are specified, for what kinds of projects and what details and requirements do the plans have to include (timelines, engineer approvals or other specifics)?

The details of other states' bridge removal plan requirements, along with any national guidance on this topic, will help inform possible changes to Wisconsin's use of its own provision and serve as input to possible language revisions.

Summary

This report provides resources that detail specifications and guidelines related to bridge removal plans across the United States. We have organized the information into three sections:

- **National Guidance**
Includes language from AASHTO specifications as well as an FHWA-funded project.
- **Railway**
Presents requirements published by a railway company to be included in its contractors' bridge removal plans.
- **States**
Identifies and organizes the specifications and provisions of the 50 states and Washington, D.C.
 - Twenty-six DOTs included bridge removal plan requirements in their standard specifications, construction manuals or special provisions.
 - For three states, language for individual construction projects provided additional direction on bridge removal plans.
 - Twenty-five DOTs do not include bridge removal plan requirements.

This report includes online references and links for all DOTs. Links are provided for bridge removal plan requirements for states that have them and for general bridge removal requirements for states that do not require plans.

National Guidance

We found guidance at a national level from the most current AASHTO bridge construction specification. In addition, an FHWA-funded project from 2002 involving rapid bridge removal also addresses requirements for a bridge removal plan.

AASHTO

LRFD Bridge Construction Specifications, third edition, AASHTO, 2010.

https://bookstore.transportation.org/Item_details.aspx?id=1583

Section 2, “Removal of Existing Structures,” specifies a bridge removal work plan on page 2-1:

2.2—Working Drawings

Working drawings showing methods and sequence of removal shall be prepared:

- when structures or portions of structures are specified to be removed and salvaged,
- when removal operations will be performed over or adjacent to public traffic or railroad property, or
- when specified in the contract documents.

The working drawings shall be submitted to the Engineer for approval at least ten days prior to the proposed start of removal operations. Removal works shall not begin until the drawings have been approved. Such approval shall not relieve the Contract of any responsibility under the contract documents for the successful completion of the work.

When salvage is required, the drawings shall clearly indicate the marking proposed to designate individual segments of the structure.

FHWA

Expedited Concrete Box Girder Bridge Removals Over the Interstate in One-Night Interstate Closures,

Anthony Bower, FHWA–Iowa Division, Aug. 5, 2002.

<http://www.fhwa.dot.gov/bridge/iowademo.pdf>

The following language detailing bridge removal plan requirements appears on page 29 of the PDF:

2. Bridge Removal

The Contractor shall submit a complete bridge removal plan to the Engineer detailing procedures and sequence for removing portions of the bridge, including all features necessary to remove the bridge in a safe and controlled manner. The removal plans, indicating detailed sequences of operations, shall be submitted to the Engineer, at least, thirty (30) calendar days prior to start of removal operations of the existing bridge. The bridge removal plan shall include the following:

- A. The bridge removal sequence for the entire structure, including staging of bridge removal;
- B. Equipment locations on the structure during removal operations;
- C. Temporary support shoring or temporary bracing if required;
- D. Locations where work is to be performed over traffic; and
- E. Details and locations of protective covers or other measures to assure that bridge removal will not endanger the public.

Railway

Several guidance documents, including the AASHTO specifications and several state specifications, provide special requirements for removing bridges that span over railway lines. These are noted in the appropriate sections throughout this report. Beyond these citations, we found additional requirement language provided by a railway company, the Union Pacific Railroad, published in a 1998 document.

Guidelines for Preparation of a Bridge Demolition and Removal Plan for Structures Over Railroad, Union Pacific Railroad, 1998.

http://www.uprr.com/reus/attachments/roadxing/demolition_guidelines.pdf

The following information detailing bridge removal plan requirements appears on pages 3-5 of the PDF:

II. Bridge Removal Plan

A. The Contractor shall submit a complete Bridge Removal Plan to the Railroad. The Bridge Removal Plan shall include details, procedures and the sequence of staged removal of the bridge, including all steps necessary to remove the bridge in a safe and controlled manner.

B. The Contractor shall submit to the Railroad: three (3) complete sets of the Bridge Removal Plan for review and comments. The Plan shall be sealed by a Civil or Structural Engineer registered in the state where the proposed demolition will take place. A minimum of three (3) weeks shall be allowed for the Railroad's review after the complete submittal is received. No removal operations will be permitted over the Railroad right of way until the submitted material has been reviewed and comments provided.

C. Review and comment of the Removal Plan by the Railroad will not relieve the Contractor of the ultimate responsibility and liability for the demolition of the structure.

D. The Removal Plan shall including the following:

- 1) Plan, elevation and location of the bridge, and the locations of any access roads needed for movement of the equipment. The as-built drawings may be used for the submittal provided the removal steps are clearly marked and legible.
- 2) Indicate the position of all railroad tracks below the bridge and identify each track as mainline, siding, spur, etc.
- 3) Bridge removal sequences and procedures for entire bridge including the staging for removal of the superstructure and substructure.
- 4) List type and number of equipment required and their locations during demolition operations.
- 5) Locations and types of temporary supports, shoring or bracing required. These members shall be designed to meet Union Pacific Railroad current standard drawing 106613 "General Shoring Requirements", "Guidelines for Design and Construction of Falsework for Structures Over Union Pacific Railroad", "Guidelines for Design and Construction of Shoring Adjacent to Active Railroad Tracks", and the appropriate local and national building and design code requirements.
- 6) The proposed vertical and horizontal clearance from all tracks to the temporary and permanent supports. The minimum vertical and horizontal clearances shall be as per attached frame protection details.
- 7) If any temporary supports interfere with the natural drainage along the Railroad right-of-way, a temporary drainage plan shall be submitted for review and comment prior to constructing temporary supports. The proposed drainage plan shall route all drainage away from the railroad tracks.

- 8) Details, limits, and locations of protective covers or other measures proposed to be used to protect the tracks. This includes any shields or other measures that will protect the tracks from falling debris during removal of the overhead bridge and from any debris rolling down the side slopes or otherwise coming into the area around the tracks which could affect the train operations. Design loads, including impact loads, shall be noted. In addition equipment should be on site capable of removing debris and track shield from operational tracks.
- 9) All procedures necessary to remove the bridge in a safe and controlled manner. The estimate time for complete removal over the tracks shall be noted.
- 10) All overhead and underground utilities in the area affected by removal of the bridge shall be located on the drawings, including any fiber optic, railroad signal, and communication lines.
- 11) The location and details of track crossings required for moving of the equipment across the railroad tracks.
- 12) Limits of demolition of substructures.
- 13) Details of on-site fire suppression.

States

We reviewed standard specifications, construction manuals and special provisions for all 50 states and Washington, D.C. More than half of the state DOTs—26 in all—include some language addressing bridge removal plans. For three states—California, Nebraska and Texas—we found requirements for individual projects that called out additional requirements for bridge removal plans. We did not find requirements for bridge removal plans for the 25 remaining DOTs.

As a reference, FHWA provides online resources aggregating information from the individual DOTs:

- Search engine of state standard specifications
- <https://fhwapap04.fhwa.dot.gov/nhswp/searchSpecifications.jsp>
- Search engine of state construction manuals
- <https://fhwapap04.fhwa.dot.gov/nhswp/searchConstructionManuals.jsp>
- Links to state standard specifications
- <https://fhwapap04.fhwa.dot.gov/nhswp/stateSpecificationWebsites.jsp>
- Links of state construction manuals
- <https://fhwapap04.fhwa.dot.gov/nhswp/stateConstructionManualWebsites.jsp>

Most but not all links on the FHWA Web site are up-to-date.

DOTs with Bridge Removal Plan Requirements

Alabama

Bridge Construction Hip Pocket Guide, second edition, Alabama Department of Transportation, March 2008.
<http://www.dot.state.al.us/conweb/doc/Bridge/2ndBridgeConstPocket.pdf>

Bridge removal plan requirements are addressed in the table on pages 10-12 of the PDF:

2. Required submittals that relate to Bridge Construction

Footnote 9: CSX RR projects require a bridge demolition plan to be submitted well in advance of the point in time when the work will be performed. The demolition plan requires approval of the railroad company before the work will be allowed to begin. See the railroad agreement for specific submittal requirements.

Arizona

Standard Specifications, Arizona Department of Transportation, 2000.

<http://www.azdot.gov/highways/ConstGrp/Contractors/StandardSpecifications.asp>.

Bridge removal plan requirements are addressed on page 6 of the following PDF:

http://www.azdot.gov/highways/ConstGrp/Contractors/PDF/2000_Standard_Spec/Sec201_208.pdf

202-3.05—Removal of Bridges

The removal of existing bridges, either wholly or in part, shall be as shown on the project plans or as described in the Special Provisions. Bridge removal operations shall be conducted in such a manner as to cause the least interference to public traffic.

At least ten days before beginning bridge removal over or adjacent to public traffic or railroad property, the contractor shall submit to the Engineer details of the removal operations showing the methods and sequence of removal and equipment to be used.

Arkansas

Standard Specification for Highway Construction, Arkansas State Highway and Transportation Department, 2003.

http://www.arkansashighways.com/standard_spec_2003.aspx

Bridge removal plan requirements are addressed on page 15 of the following PDF:

http://www.arkansashighways.com/standard_spec/2003/final200.pdf

205.02—Construction Requirements

The method of demolition and removal shall be approved by the Engineer. The Contractor shall comply with all applicable requirements of Section 110.

“Section 110” referenced above is titled “Protection of Water Quality and Wetlands” and is available on page 117 of the PDF http://www.arkansashighways.com/standard_spec/2003/final100.pdf. It does not reference bridge removal in any further detail.

California

Standard Specifications, California Department of Transportation, May 2006.

http://www.dot.ca.gov/hq/esc/oe/specifications/std_specs/2006_StdSpecs/2006_StdSpecs.pdf.

Bridge removal plan requirements are addressed on page 144 of the PDF:

15-4.02 Removal Methods

At least 10 days before beginning bridge removal over or adjacent to public traffic or railroad property, the Contractor shall submit to the Engineer details of the removal operations showing the methods and sequence of removal and equipment to be used.

Colorado

Specifications Book, Colorado Department of Transportation, 2000.

<http://www.coloradodot.info/business/designsupport/construction-specifications/2011-Specs/2011-specs-book>

General language on bridge removal appears in the Section 202, “Removal of Structures and Obstructions,” on page 163 of the following PDF:

http://www.coloradodot.info/business/designsupport/construction-specifications/2011-Specs/2011-specs-book/section-200.pdf/at_download/file

Additional language to include removal plans appears in the optional special provisions to Section 202 on page 2 of the following PDF:

http://www.coloradodot.info/library/bridge/specifications/project-special-provisions-pdfs/202removalofportionsofpresentstructure.pdf/at_download/file:

Subsection 202.02 shall include the following:

At least 10 days before beginning bridge removal the Contractor shall submit to the Engineer details of the removal operations showing the methods and sequence of removal and equipment to be used.

Florida

Standard Specifications for Road and Bridge Construction, Florida Department of Transportation, 2010.
<ftp://ftp.dot.state.fl.us/LTS/CO/Specifications/SpecBook/2010Book/2010Master.pdf>

Bridge removal plan requirements are addressed on pages 162-163 of the PDF:

110-6 Removal of Existing Structures

110-6.1 Structures to be Removed

Provide detailed schedule information to the Engineer 15 working days prior to the commencement of any demolition or renovation of any structures, even if asbestos is not found on the project, for the Engineer's use in notifying the Department of Environmental Protection (DEP) on DEP Form 62-257.900(1) "Notice of Asbestos Renovation or Demolition".

110-6.3 Partial Removal of Bridges

For all demolition methods, submit for review and approval of the Engineer, a demolition plan that describes the method of removal, equipment to be used, types of rebar splices or couplers, and method of straightening or cutting rebars. In addition, for hydro-demolition, describe the method for control of water or slurry runoff and measures for safe containment of concrete fragments that are thrown out by the hydro-demolition machine.

Hawaii

Standard Specifications, Hawaii Department of Transportation, 2005.
<http://hawaii.gov/dot/highways/specifications2005/specifications/spectble.htm>

Bridge removal planning is addressed on pages 2-3 of the following PDF:

http://hawaii.gov/dot/highways/specifications2005/specifications/specspdf/specspdf-200-399/202_Print.pdf

Section 202—Removal of Structures and Obstructions

202.03 Construction

(C) Removal of Bridges. At least 10 working days prior to beginning bridge removal over or adjacent to public traffic, submit details of bridge removal operations, showing methods and sequence of removal and equipment to be used. Do not begin bridge removal until the Engineer has accepted bridge removal plan and public traffic has been rerouted.

When accepted by the Engineer, partial bridge removal will be allowed. Conduct partial bridge removal in a manner that minimizes interference to public traffic.

Indiana

Standards and Specifications, Indiana Department of Transportation, 2010.
<http://www.in.gov/dot/div/contracts/standards/book/sep09/sep.htm>

Bridge removal plan requirements are addressed on pages 7-8 of the following PDF:

<http://www.in.gov/dot/div/contracts/standards/book/sep09/2-2010.pdf>

202.03 Removal of Bridges, Culverts, and Other Drainage Structures

(b) Portions Adequate safeguards shall be provided to prevent materials from falling below the structure when over or adjacent to traffic; when over bodies of water; as needed to protect life or property; and as needed to comply with laws, regulations, or other contract requirements. A plan shall be submitted for approval showing the proposed method of protection.

Iowa

Standard Specifications, Iowa Department of Transportation, undated.

<http://www.iowadot.gov/erl/current/GS/navigation/nav.htm>

Bridge removal plan requirements are addressed on page 1 of the following PDF:

<http://www.iowadot.gov/erl/current/GS/content/2401.pdf>

Section 2401—Removal of Existing Structures

2401.03 Construction.

A. Notification for Complete Removal of Bridges.

1. Notify the Iowa DNR by mail and the Engineer, with the “Notification of Demolition” form, no less than 10 business days prior to the start of bridge demolition.
2. If unable to begin work on the original intended start date, notify the Iowa DNR and the Engineer, by sending a revised “Notification of Demolition” form, of the new intended start date. Provide notification of the inability to commence work on the intended start date no later than 1 business day prior to the original intended start date. Failure to notify the Engineer of a change in start date 1 business day prior to the original intended start date will result in the need for a new 10 business day notification to the Iowa DNR and the Engineer.

Kansas

Standard Specifications for State Road and Bridge Construction, Kansas Department of Transportation, 2007.

<http://www.ksdot.org/burconsmain/specprov/2007SSDefault.asp>

Bridge removal plan requirements are addressed on page 1 of the following PDF:

<http://www.ksdot.org/burconsmain/specprov/2007/202.pdf>

b. Removal and Reconstruction of Existing Structures. Before removing the existing structures designated for relocation, take sufficient measurements and color photographs of the existing structures so the reconstruction duplicates the original. Provide the Engineer with copies of the measurements and photographs.

Submit for the Engineer’s approval, a written plan for the relocation and reconstruction of the existing structures, before beginning any relocation and reconstruction work. Reconstruct the structure according to the details in the Contract Document.

Maryland

Standard Specifications for Construction and Materials, Maryland State Highway Administration, 2008.

<http://www.roads.maryland.gov/OHD2/Spec2008.zip>

Bridge removal plan requirements are addressed on pages 150-151 of the PDF “part3.pdf” contained in the above zip file:

Section 405—Removal of Existing Structures

405.03 Construction. Before removal operations begin, submit a list of the proposed equipment and the removal methods for approval.

405.03.01 Removal of Bridge Deck Slabs and Parapets. Protect the public against injury and damage from demolition operations. Erect temporary protective shields to prevent any material or debris from entering roadways, railroads, or waterways. Provide the underclearance specified in TC-6.12. Refer to 405.03.02 and .03 for additional requirements. Submit protective shield working drawings per TC-4.01(b). Ensure that flooring and siding have no cracks or openings through which material particles may pass. Ensure that the shields are able to support over their entire area 150 lb/ft² in addition to their own dead weight.

Missouri

Specification Book for Highway Construction, Missouri Department of Transportation, 2004.

http://www.modot.org/business/standards_and_specs/highwayspecs.htm

Bridge removal plan requirements are addressed on page 1 of the following PDF:

http://www.modot.org/business/standards_and_specs/Sec0216.pdf

Section 216.10 Removal of Bridges

216.10.2 Removal Requirements

Notification of demolition shall be made in accordance with Sec 202.40.1.1.

Section 202.40.1.1 cited in the paragraph above appears on page 5 of the following PDF:

http://www.modot.org/business/standards_and_specs/Sec0202.pdf

Section 202.40 Demolition and Removal of Buildings

202.40.1.1 Notification of Demolition. The contractor shall provide proper notification to all appropriate federal, state and local agencies prior to demolition. Notification is necessary for the demolition of a building, bridge or bridge deck regardless of whether asbestos is present. The notification procedures and forms are available from MDNR. The contractor shall provide copies of all completed and approved forms to the engineer prior to any demolition work.

Montana

Standard Specifications for Road and Bridge Construction, Montana Department of Transportation, 2006.

http://www.mdt.mt.gov/other/contract/external/standard_specbook/2006/2006_stand_specs.pdf

Section 202.03.1, “Removal of Bridges and Major Drainage Structures,” which begins on page 91 of the PDF, does not specifically address a bridge removal plan. However, Section 208.03.4, “Stream Protection,” on page 113 of the PDF (in Section 208, “Water Pollution Control and Stream Preservation”) does present specific language:

C. Existing Bridge Removal. Furnish a plan and written description detailing how the existing bridge(s) are to be removed. Include in the description what methods and equipment are to be used to remove the bridge deck, superstructure, piers, footings, and end bents.

Provide the anticipated start date of removal work and estimated time to complete the work.

Include details of erosion control measures used during end bent removal.

Remove all work debris from the waterway within 48 hours of completing the removal work.

Maintain constant progress on all in-stream work until completed.

Nevada

Standard Specifications for Road and Bridge Construction, Nevada Department of Transportation, 2001.
<http://www.nevadadot.com/uploadedFiles/2001StandardSpecifications.pdf>

Bridge removal plan requirements are addressed on page 84 of the PDF:

Section 202—Removal of Structures and Obstructions

202.03.02 Removal. For removal of bridges, submit 5 sets of complete demolition plans, as working drawings, according to Subsection 105.02. Include all methods and equipment outlining the details of removal operations.

New Hampshire

Standard Specifications for Road and Bridge Construction, New Hampshire Department of Transportation, August 2010.
http://www.nh.gov/dot/org/projectdevelopment/highwaydesign/specifications/documents/2010_Spec_Book.pdf

Bridge removal plan requirements are first addressed on page 32 of the PDF:

105.02—Plans and Working Drawings

Working Drawings for Documentation.

Working drawings submitted for documentation shall include, but are not limited to the following:
... temporary bridge plans, removal of existing bridge structure plans.

Requirements are addressed in further detail on page 170 of the PDF:

Section 502—Removal of Existing Bridge Structure

Construction Requirements

3.1.1 Detailed plans showing the size, arrangement and quality of materials to be used in the removal of existing bridge structures and the construction of protective structures shall be submitted for documentation in accordance with 105.02. Plans shall show the proposed method(s) of removal, all required falsework, protective structures and equipment needed to accomplish the structure removal safely.

New Jersey

Standard Specifications for Road and Bridge Construction, New Jersey Department of Transportation, 2007.
<http://www.state.nj.us/transportation/eng/documents/BDC/pdf/attachmentbdc07s03.pdf>

Information on bridge removal planning appears on page 130 of the PDF:

Section 201—Clearing Site

201.03.02 Clearing Site, Bridge and Clearing Site, Structure

Submit a demolition plan detailing the methods and equipment to be used to the [department's field representative] for approval 30 days before demolition operations. Remove the substructures of existing structures to at least 3 feet below the natural stream bottom, and remove those parts outside of the stream to at least 2 feet below natural ground surface. Where such portions of existing structures lie wholly or in part within the limits of a new structure, remove them to accommodate the construction of the proposed structure.

New Mexico

Standard Specifications for Highway and Bridge Construction, New Mexico State Department of Transportation, 2007.

http://nmshtd.state.nm.us/upload/images/Contracts_Unit/2007_Specs_for_Highway_and_Bridge_Construction.pdf

Information on structure removal plan requirements, applicable to bridges and other structures, appears on page 399 of the above PDF:

Section 601—Removal of Structures and Obstructions

601.3 Construction Requirements

601.3.1 General

Provide a list of removals to the Project Manager at the preconstruction conference, with the following information for each:

1. A percent of the pay item amount; and
2. A monetary value.

New York

Bridge Manual, fourth edition, New York State Department of Transportation, updated January 2008.

https://www.nysdot.gov/divisions/engineering/structures/manuals/bridge_manual_4th_ed

Information on bridge removal plan requirements appears in Appendix 17A, “Bridge Removal,” on page 50 of the following PDF:

https://www.nysdot.gov/divisions/engineering/structures/repository/manuals/brman_4th_edition/Section_17_M_2008_add_1.pdf:

PE Requirement Guidelines for Bridge Removal Plan

Standard Specifications require the Contractor to submit a removal plan, prepared by a Professional Engineer, to the Engineer thirty (30) days prior to the commencement of demolition. In some cases this may not be needed and the Department can waive the requirement for a PE prepared removal plan. The following project-specific information shall be considered by the designer to determine whether the PE prepared removal plan requirement can be waived when a bridge removal is required:

1. Bridge type
2. Bridge complexity/geometry
3. Under bridge features (traffic, navigable stream, pedestrian movement, parking)
4. Site conditions, accessibility, urban/rural
5. Condition of existing structure
6. Required equipment and placement on bridge

General Policy

Bridges that may qualify for waiver of the PE removal plan requirement are short (<15m) span bridges over non-navigable waterways or unoccupied open space that can easily be barricaded. All exceptions shall be reviewed on a project specific basis by the Regional Structures Engineer.

Regardless of removal plan requirements, general removal notes shall be placed in the contract documents indicating the availability of record plans and the removal plan requirements. “Removal Notes” are provided in section 17 of this manual.

North Carolina

Standard Specifications, North Carolina Department of Transportation, 2002.

<http://www.ncdot.org/doh/preconstruct/ps/specifications/dual/>

Bridge removal plan requirements are addressed on page 2 of the following PDF:

<http://www.ncdot.org/doh/preconstruct/ps/specifications/dual/Division4.pdf>.

Section 402—Removal of Existing Structures

402-2 Removal of Existing Structure.

(A) General

Submit, and await approval for, a plan for bridge demolition for these bridges prior to beginning removal.

Oklahoma

Standard Specifications, Oklahoma Department of Transportation, 2009.

http://www.okladot.state.ok.us/c_manuals/specbook/2009specbook.pdf

Information on structure removal plan requirements, applicable to bridges and other structures, appears on page 511 of the above PDF:

Section 619—Removal of Buildings, Structures, and Obstructions

610.04 Construction Methods

A. General

Inform the Resident Engineer of the proposed methods before removing buildings, structures or obstructions.

Pennsylvania

Specifications, Publication 408, Pennsylvania Department of Transportation, 2007.

<ftp://ftp.dot.state.pa.us/public/Bureaus/design/Pub408/Pub%20408-2007.pdf>

Bridge removal plan requirements are addressed on page 1 of the following PDF:

<ftp://ftp.dot.state.pa.us/public/Bureaus/design/Pub408/Pub%20408%202007%20IE/Sections/1018.pdf>

Section 1018—Removal of Existing Bridges or Culverts

1018.3 Construction

(a) General. Submit a plan to the District Executive showing or describing the demolition and removal methods to be used for the removal of an existing bridge or culvert, as indicated. Do not proceed with this demolition work until the plan has been reviewed and accepted. Within the plan, provide methods for the protection and safety of the general public and public utilities.

If the structure to be removed is over or under a railroad, submit the accepted demolition plan to the railroad company's Area Engineer. Do not proceed with the demolition work until written acceptance is received from the railroad company. Provide a copy of this written acceptance to the Department. Notify the railroad company 10 days before starting demolition work. Failure to obtain the railroad company's acceptance will require an alternate plan submittal to the Department and the railroad company for review and acceptance.

South Carolina

Standard Specifications for Highway Construction, South Carolina Department of Transportation, 2007.

http://www.dot.state.sc.us/doing/StandardSpecifications/pdfs/2007_full_specbook.pdf

Bridge removal plan requirements are addressed on page 154 of the PDF:

Section 202—Removal of Structures and Obstructions

202.4.2 Removal and Disposal of Bridges, Culverts, and Other Drainage Structures

2. Before demolition of any bridge structure, coordinate with the RCE (Resident Construction Engineer) to complete [South Carolina Department of Health and Environmental Control] form entitled: Notification of Demolition and Renovation. After the RCE and the Contractor have signed the completed form, attach a

copy of the Asbestos Investigation Report and submit the completed form and report at least 10 working days before demolition begins to the following address:

Manager, Asbestos Section
SC Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

3. Also, at least 10 working days before work begins, submit a Demolition Plan prepared by a Professional Engineer registered in South Carolina to the RCE for review and acceptance for structures over or adjacent to highways, navigable waters, railroads, and other public areas.

Texas

Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Texas

Department of Transportation, June 2004.

<ftp://ftp.dot.state.tx.us/pub/txdot-info/des/specs/specbook.pdf>

“100 Items — Earth Work and Landscape,” which addresses general issues related to structure removal, begins on page 87 of the PDF.

Texas DOT’s Federal Railroad Grade Separation Program further addresses bridge removal planning in “Railroad Grade Separations, Exhibit A, Preparation Guide.” See page 2 of the following PDF:

ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/rail/rr_grade.pdf

10. The following notes should be added to the Exhibit “A” as applicable:

a. Demolition of existing structures will be in accordance with the <Railroad Name> Demolition Guidelines. The Contractor shall submit a complete Bridge Removal Plan for review and comment by the Railroad. No removal operations will be permitted until the plan has been reviewed and comments provided.

West Virginia

Standard Specifications: Roads and Bridges, West Virginia Department of Transportation, 2000.

<http://www.transportation.wv.gov/highways/engineering/Specifications/2003/Y2KSpecB.pdf>

Bridge removal plan requirements are addressed on page 105 of the PDF:

Section 203—Dismantling Structures

203.1 Description

This work shall consist of dismantling such structure or structures specifically designated on the Plans for removal, and matchmarking handling and storage if called for, or disposal if required.

The Contractor is responsible for determining the current condition of the structure (s) and shall use methods and procedures for dismantling the structures in a safe and efficient manner.

Bridge inspection reports are available for informational purposes and may be viewed at the following location:

West Virginia Division of Highways
1900 Kanawha Boulevard East
Building 5, Room A-350,
Highway Operations Division
Charleston, West Virginia 25305-0430

The work shall also include the preparation of a demolition/dismantling plan by the contractor. The plan shall be prepared and sealed by a Professional Engineer registered in the State of West Virginia, experienced in structural analysis of bridges.

The plan shall include a complete structural analysis for all phases of the demolition/dismantling with due regard to the existing condition of the structure at the time the work is performed. Additionally, the analysis shall show that the structure meets the design criteria of the latest edition, including all Interims, of the *AASHTO Standard Specifications for Highway Bridges*, or the *AASHTO LRFD Bridge Design Specifications* during all phases of demolition/dismantling. The design loads shall match those applied to the structure by the contractor's "means and methods" of demolition/dismantling.

The demolition/dismantling plan shall be provided to the Division's Project Supervisor at least seven calendar days prior to the beginning of any demolition/dismantling work. Receipt of the demolition/dismantling plan does not constitute review or approval or relieve the Contractor of his/her responsibility to satisfactorily demolish/dismantle the structure specified.

Wisconsin

Standard Specifications, Wisconsin Department of Transportation, 2011.

<http://roadwaystandards.dot.wi.gov/standards/stndspec/index.htm>

"Section 203, Removing Old Culverts and Bridges," begins on page 1 of the following PDF:

<http://roadwaystandards.dot.wi.gov/standards/stndspec/Sect203.pdf>

As provided by the agency, WisDOT's special provisions for bridge removal plan requirements are attached as [Appendix 1](#) to this Transportation Synthesis Report.

Wyoming

Standard Specifications for Road and Bridge Construction, Wyoming Department of Transportation, 2010.

<http://www.dot.state.wy.us/webdav/site/wydot/shared/Construction/2010%20Standard%20Specifications/2010%20Standard%20Specifications.pdf>

Bridge removal plan requirements are addressed on page 157 of the PDF:

Section 202—Removal

202.4.2 Removal of Structures

7. Remove existing structures or obstructions without damaging new work, appurtenances, or existing roadway that is to remain in place. If blasting is necessary, give the engineer the following information at least 14 calendar days before blasting begins:

1. A blasting plan that includes the credentials of the person doing the blasting.
2. Provisions for protecting appurtenances that are to remain in place.
3. Provisions for protecting property and the public from damage.

Individual Projects with Bridge Removal Plan Requirements

Specific construction projects in California, Nebraska and Texas provide additional language on bridge removal plan requirements.

California

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/05/05-0M14U4/ad1/05-0M14U4ad1.pdf

A number of specific bridge projects in California include addenda with language further detailing bridge removal plan requirements. The language appears to be identical in all of these documents. One example is the addendum to a 1999 bridge project in Santa Barbara. See page 3 of the PDF:

The bridge removal plan shall include, but not be limited to the following:

- A. The removal sequence, including staging of removal operations.
- B. Equipment locations on the structure during removal operations.
- C. Temporary support shoring or temporary bracing.
- D. Locations where work is to be performed over traffic, utilities, or railroad property.
- E. Details, locations, and types of protective covers to be used.
- F. Measures to assure that people, property, utilities, and improvements will not be endangered.
- G. Details and measures for preventing material, equipment, and debris from falling onto public traffic or railroad property.

Nebraska

<http://www.dor.state.ne.us/letting/c-let-100408/410INFAPR10.pdf>

An informational proposal for 2010 project near Genoa, Neb., includes detailed language related to bridge removal near Union Pacific Railroad tracks. See page 62 of the PDF:

V. Written Notice to UPRR

The Contractor shall give written notice to UPRR's Manager Industry and Public Projects, Mike Benjamin (816) 399-1703; to his or her authorized representative, at least fifteen (15) days in advance of the date on which it expects to begin any work under or adjacent to any of the tracks of UPRR or it expects to begin any construction work on the right of way of UPRR. The Contractor shall also give written notice to such UPRR Manager of Industry and Public Projects, no later than fifteen (15) days after completion of all work on UPRR's right of way.

VI. Bridge Removal Plans

A. If any existing bridge or portion thereof, needs to be demolished and removed, the Contractor, at its expense, shall submit to UPRR by certified mail three (3) complete sets of the Bridge Removal Plan. The Bridge Removal Plan shall include details, procedures and the sequence of staged removal of the bridge, including all steps necessary to remove the bridge in a safe and controlled manner.

B. The Contractor shall submit to UPRR: three (3) complete sets of the Contractor's Bridge Removal Plan for review and comments. The Bridge Removal Plan shall be sealed by a Civil or Structural Engineer registered in the State of Nebraska. A minimum of thirty (30) days shall be allowed for UPRR's review after the complete submittal is received and approved by UPRR. The Contractor shall not perform any bridge removal work until it has received written approval from UPRR of the Contractor's final Bridge Removal Plan. The Bridge Removal Plan and all demolition work shall conform to the requirements of the "Guidelines for Preparation of a Bridge Demolition and Removal Plan for Structures over Railroad" (Attachment XX) and "Guidelines for Temporary Shoring" (Attachment XX).

Texas

<ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/addendum/local/a3093001.pdf>

An addendum to a 2007 highway project in McLennan County, Texas, includes language on bridge removal plan requirements. The following appears on page 26 of the PDF:

The Contractor shall submit a complete bridge removal plan to the Engineer. The bridge removal plan shall include, at a minimum, details, procedures, and the sequence of staged removal of the bridge including all steps necessary to remove the bridge in a safe and controlled manner.

DOTs Without Bridge Removal Plan Requirements

For the remaining DOTs, we provided a reference to the bridge removal language in the standard specifications or construction manual.

Alaska

Standard Specifications for Highway Construction, Alaska Department of Transportation and Public Facilities, 2004.

<http://www.dot.state.ak.us/stwddes/dcsspecs/assets/pdf/hwyspecs/english/2004sshc.pdf>

Section 202-3.03, “Removal of Bridges, Culverts, and Other Drainage Structures,” begins on page 78 of the PDF.

Connecticut

Standard Specifications for Roads, Bridges and Incidental Construction, Form 815, including supplemental specifications through January 2002, Connecticut Department of Transportation, 2002.

<http://www.ct.gov/dot/cwp/view.asp?a=1385&Q=259498&dotPNavCtr=#40007>

Section 2.02, “Roadway Excavation, Formation of Embankment and Disposal of Surplus Material,” begins on page 1 of the following PDF: http://www.ct.gov/dot/LIB/dot/Documents/dform815/2_02M.pdf.

Delaware Department of Transportation

Specifications for Road and Bridge Construction, Delaware Department of Transportation, August 2001.

http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml

Section 211, “Removal of Structures and Obstructions,” begins on page 96 of the following PDF:

http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/pdf/2001StdSpecForRoadAndBridgeConstruction.pdf.

District of Columbia

Standard Specifications for Highways and Structures, District of Columbia Department of Transportation, 2009.

http://www.dc.gov/DC/DDOT/Publication%20Files/Projects%20and%20Planning/Standards%20and%20Guidelines/publication_StandardSpecifications_2009.pdf

Section 205.02, “Demolition,” begins on page 133 of the PDF.

Georgia Department of Transportation

Standard Specifications, Georgia Department of Transportation, 2010.

<http://www.dot.state.ga.us/doingbusiness/theSource/Pages/specifications.aspx>

Section 540, “Removal of Existing Bridge,” begins on page 1 of the following PDF:

<http://www.dot.state.ga.us/doingbusiness/theSource/specs/ss540.pdf>.

Idaho

Standard Specifications for Highway Construction—2004, Idaho Transportation Department, 2011.

http://itd.idaho.gov/manuals/Online_Manuals/Spec_04/Spec_04.htm

Section 203.03, “Construction Requirements: B. Removal of Bridges, Culverts, and other Drainage Structures,” appears on page 124 of the PDF.

Illinois

Standard Specifications for Road and Bridge Construction, Illinois Department of Transportation, January 2007.

<http://www.dot.state.il.us/desenv/stdspecs07.html>

Section 501, “Removal of Existing Structure,” begins on page 1 of the following PDF:

<http://www.dot.state.il.us/desenv/spec2007/div500.pdf>.

Kentucky

Standard Specifications, Kentucky Department of Transportation, 2008.

<http://transportation.ky.gov/construction/spec/spec08.htm>

Section 203.03.01, "Existing Bridges," begins on page 5 of the following PDF:

<http://transportation.ky.gov/construction/spec/2008/2008%20Division%20200.pdf>.

Louisiana

Standard Specifications for Roads and Bridges, Louisiana Department of Transportation and Development, 2006.

<http://www.dotd.la.gov/highways/specifications/DirListing.aspx?txtPath=/highways/specifications/documents/2006%20Standard%20Specifications%20for%20Roads%20and%20Bridges%20Manual>

Section 202.03, "Removing Structures," begins on page 6 of the PDF.

<http://www.dotd.la.gov/highways/specifications/documents/2006%20Standard%20Specifications%20for%20Roads%20and%20Bridges%20Manual/06%20-%202006%20-%20Part%20II%20-%20Earthwork.pdf>

Maine

Standard Specifications, Maine Department of Transportation, 2002.

http://www.state.me.us/mdot/contractor-consultant-information/ss_standard_specification_2002.php

Section 202.03, "Removing Existing Superstructure, Structural Concrete, Railings, Curbs, Sidewalks and Bridges," begins on page 7 of the following PDF:

http://www.state.me.us/mdot/contractor-consultant-information/ss_division_200.pdf.

Massachusetts

Standard Specifications for Highways and Bridges, Massachusetts Department of Transportation, 1988.

<http://www.mhd.state.ma.us/default.asp?pgid=content/88specs&sid=about>

Section 112, "Demolition of Buildings, Structures and Bridges," begins on page 6 of the following PDF:

<http://www.mhd.state.ma.us/downloads/manuals/88specs/division2.pdf>.

Michigan

Standard Specifications for Construction, Michigan Department of Transportation, 2003.

<http://mdotwas1.mdot.state.mi.us/public/specbook/>

Section 204, "Removing Miscellaneous Structures and Materials," begins on page 1 of the following PDF:

<http://mdotwas1.mdot.state.mi.us/public/specbook/files/2003/204%20Rem%20Misc%20Str,%20Matls.pdf>.

Minnesota

Standard Specifications for Construction, Minnesota Department of Transportation, 2005.

<http://www.dot.state.mn.us/pre-letting/spec/>

Section 2442, "Removal of Existing Bridges," begins on page 87 of the following PDF:

<http://www.dot.state.mn.us/pre-letting/spec/2005/2401-2481.pdf>.

Mississippi

Standard Specifications for Road and Bridge Construction, Mississippi Department of Transportation, 2004.

<http://www.gomdot.com/Divisions/Highways/Resources/Construction/pdf/2004StandardSpecs/specbook.pdf>

Section 202.03.3, "Removal of Bridges, Culverts and Other Structures," begins on page 122 of the PDF.

Nebraska

Standard Specifications for Highway Construction, Nebraska Department of Roads, 2007.

<http://www.dor.state.ne.us/ref-man/specbook-2007.pdf>

Section 203.02, "Construction Methods, 8. Contractor Removal of Bridges, Culverts, and Other Drainage Structures," begins on page 116 of the PDF.

North Dakota

Standard Specifications Manual, North Dakota Department of Transportation, 2008.

<http://www.dot.nd.gov/dotnet/supplspecs/StandardSpecs.aspx>

Section 202, "Removal of Structures, Obstructions, Surfacing, and Miscellaneous Items," begins on page 141 of the PDF.

Ohio

Construction and Material Specifications, Ohio Department of Transportation, 2008.

<http://www.dot.state.oh.us/Divisions/ConstructionMgt/OnlineDocs/Pages/2008OnlineSpecBook.aspx>

Item 202, "Removal of Structures and Obstructions," appears on the Web page

http://www.dot.state.oh.us/Divisions/ConstructionMgt/OnlineDocs/Specifications/2008CMS/200/202.htm#a_202_02.

Oregon

Standard Specifications for Construction, Oregon Department of Transportation, 2008.

http://www.oregon.gov/ODOT/HWY/SPECS/standard_specifications.shtml#2008_Standard_Specifications

Part 00500, Bridges, Section 00501, "Bridge Removal," begins on page 10 of the following PDF:

http://www.oregon.gov/ODOT/HWY/SPECS/docs/08book/08_00500.pdf.

Rhode Island

Standard Specifications for Road and Bridge Construction, Rhode Island Department of Transportation, 2004.

<http://www.dot.state.ri.us/documents/engineering/Proj/BlueBook/CD-Bluebook.pdf>

Section 803, "Removal of Existing Bridges," begins on page 280 of the PDF.

South Dakota

Standard Specifications for Roads & Bridges, South Dakota Department of Transportation, 2004.

<http://www.sddot.com/operations/specifications/index2004.htm>

Section 110, "Removal of Structures & Obstructions," begins on page 1 of the following PDF:

<http://www.sddot.com/operations/docs/specbook04/110.pdf>.

Tennessee

Standard Specifications for Road and Bridge Construction, Tennessee Department of Transportation, 2006.

<http://www.tdot.state.tn.us/construction/specs.htm>

Section 202.04, "Removal of Bridges, Culverts, and Other Drainage Structures," begins on page 8 of the following PDF: http://www.tdot.state.tn.us/construction/specbook/2006_Spec200.pdf.

Utah

Individual Standard Specifications, Utah Department of Transportation, 2008.

<http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:1925>

Section 02221, "Remove Structure and Obstruction," begins on page 1 of the Word document found at the link

<http://www.udot.utah.gov/main/uconowner.gf?n=492087303562291340>.

Vermont

Standard Specifications for Construction, Vermont Agency of Transportation, 2001.

<http://www.aot.state.vt.us/conadmin/2001StandardSpecs.htm>

Section 529.04, "Removal of Structures," begins on page 72 of the following PDF:

<http://www.aot.state.vt.us/conadmin/Documents/2001%20Spec%20Book%20for%20Construction/2001DIV500.pdf>.

Virginia

Road and Bridge Specifications, Virginia Department of Transportation, 2007.

<http://www.virginiadot.org/business/resources/const/2007SpecBook.pdf>

Section 413, “Dismantling and Removing Existing Structures or Removing Portions of Existing Structures,” begins on page 510 of the PDF.

Washington

Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation, 2010.

<http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS2010.pdf>

Section 2-02.3(2), “Removal of Bridges, Box Culverts, and Other Drainage Structures,” begins on page 197 of the PDF.

APPENDIX 1

D Measurement

The department will measure Debris Containment (Structure) as a single lump sum unit of work for the structure acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
203.0225.S.0001	Debris Containment Structure B-40-269	LS
203.0225.S.0002	Debris Containment Structure B-40-270	LS

Payment is full compensation for furnishing, installing, maintaining, and removing a debris containment system.

203-010 (20080902)

57. Removing Old Structures.

A Description

This special provision describes removing old structures in accordance to section 203 of the standard specification and as hereinafter provided.

B (Vacant)

C Construction

The following paragraphs are added to subsection 203.3.1 of the standard specifications:

203.3.1 General

Remove existing portions of piers and remove concrete slope paving for Structures B-40-202 and B-40-203.

Structure Removal Site Safety Plan

Prepare a Structure Removal Site Safety Plan covering all structure removal work included in the contract. Maintain posted copies of the Structure Removal Site Safety Plan at the site in the project field office. Provide two copies of the Structure Removal Site Safety Plan to the engineer at least four weeks prior to beginning removal work.

Structure Removal Plans

Prepare a structure removal plan for each structure removal included in the contract indicating the methods and sequence of demolition. The contractor is strongly encouraged to examine existing structure plans and visit the site prior to preparing a structure removal plan. The contractor shall be responsible for the methods and sequence of demolition, including effects on the overall stability of each structure being removed. At a minimum, the plan shall include:

1. The name of the professional engineer, registered in the state of Wisconsin who will be on site and monitor the removal of existing structures as required in this specification.

2. The name of the contractor's on-site-employee designated in responsible charge of all removal operations.
3. The removal method and sequence of removal for each individual structure, including the staging of bridge removals.
4. Analysis of the stability of the structure based on the methods and sequence of demolition proposed, to ensure that the structure is demolished in a safe and controlled manner. The analysis computations shall be prepared, signed and sealed by a professional engineer registered in the State of Wisconsin.
5. Design and details of temporary supports, shoring or temporary bracing, if required to stabilize portions of partially remaining structures during the removal sequence or support partially remaining structures after staged removals. The removal plan shall include design computations and detail drawings for all temporary supports, shoring and bracing that indicate the exact placement of the temporary supports, shoring or bracing; verification of design loads; attachment details; and methods for the safe transfer of loads from existing structural elements to be removed to the temporary supports, shoring, or bracing. Temporary support, shoring, or bracing design computations and drawings details are to be prepared, signed and sealed by a professional engineer registered in the State of Wisconsin.
6. Design and details of temporary support foundations. Foundation design shall include evaluation of expected foundation settlement and the effect that this will have on the structure being supported. Temporary support foundation design computations and drawing details are to be prepared, signed and sealed by a professional engineer registered in the State of Wisconsin.
7. Equipment type and locations of equipment on the structure(s) or adjacent roadways during the removal operations
8. Locations and type of work to be performed directly adjacent to traffic.
9. Details and locations of protective covers and other measures to ensure that people, property and improvements will not be endangered or damaged as a result of the removal operations. This shall include methods for protecting any pavement surfaces including shoulders, concrete barriers, and other highway features.
10. Methods of removal, proposed haul route(s) and disposal, method of hauling, and proposed destination.
11. A schedule of anticipated roadway and lane closures to accommodate removal operations. Include the timing of individual lane or temporary roadway closures

and the nature of removal operations that will be performed during the lane or roadway closures.

12. Acknowledgement that the contractor and removal design engineer responsible for preparing the removal plan have visited the site and reviewed the existing structure plans in preparing the removal plan.

Provide four copies of each structure removal plan and analysis computations to the engineer at least four weeks prior to beginning removal work for review and acceptance.

It is understood that whether or not the engineer concurs in the removal plan as submitted or revised, the contractor will in no way be relieved of the responsibility of providing a safe and controlled removal operation. Nor will the contractor be relieved of the responsibility of maintaining the stability of the remaining structures or portions thereof during demolition and construction.

D (Vacant)

E Payment

Delete subsection paragraph 203.5.1(2) of the standard specifications and replace with the following:

Payment is full compensation for breaking down and removing; preparing a structure removal site safety plan; preparing structure removal plans; repairing all damage including any associated engineering costs; required salvaging, storing and disposing of all materials; and, unless the contract specifies, for furnishing and placing granular backfill for backfilling.

58. Removing Old Structure Over Waterway With Minimal Debris Station 600+00, Item 203.0600.S.0001; Station 601+00, Item 203.0600.S.0002.

Conform to section 203 of the standard specifications as modified in this special provision.

Add the following to section 203 of the standard specifications:

203.3.6 Removals Over Waterways and Wetlands

203.3.6.2 Removing Old Structure Over Waterway with Minimal Debris

- (1) Remove the existing Structures B-40-269 and B-40-270 over the Wilson Park Creek in large sections and conforming to the contractor's approved structure removal and clean-up plan. During superstructure removal, prevent all large pieces and minimize the number of small pieces from entering the waterway or wetland. Remove all reinforcing steel, all concrete, and all other debris that falls into the waterway or wetland. The contractor may leave limited amounts of small concrete pieces scattered over the waterway floor or wetland only if the engineer allows.