

CHAPTER 4 PRELIMINARY DRAWINGS

4-1 Preliminary General Drawings

General The following general guide shall be used in the preparation of Preliminary General Drawings. See Figures 4-1 and 4-2.

Section Along Centerline Survey (Bents on Section at Right Angles to Bents)

- End slopes
- A berm 1'-6" (450 mm) above the bottom of cap for a level berm and a minimum of 1'-6" (450 mm) for a sloped berm
- Elevation of breaks in the ground line to the nearest foot (0.1 m) ±
- Profile grade data
- Span and bent designations (Span A, B, C, E.Bt. 1, Bent 1, 2, etc.)
- Location of fixed and expansion bearings
- Elevation at top of footings (if known)
- Size and type of piles to be used (if known)
- Begin and end stations and grade point elevations at the fill face of end bents
- Substructure

The horizontal and vertical scales used for plotting the profile along the centerline survey and the plan view shall be indicated by showing the station and elevations just outside the top and left margins. The horizontal and vertical scales should be the same.

Plan View

- Substructure (with approximate out-to-out dimensions)
- Rip_rap outlines
- Slope protection outlines
- Centerline ditch or P.I. of the vertical curve
- North arrow
- Skew angle as shown in Figure 1-5 (also angle of intersection with road or railroad below if angle is different from skew angle)
- Identification Station
 - ◇ For grade separations, the identification station is the intersection of the centerline survey with the road or railroad, regardless of whether it is on or under the bridge. The intersection station along the -Y- line or

ramp should always be shown below the identification station.

- ◇ For all bridges, show the distance to the nearest bent if the identification station is not at the centerline of a bent.
- Span lengths and the overall length from fill face to fill face of end supports (arc lengths if on horizontal curve)
- Line designations (-L-, -Y-, etc.)
- Destination arrows on road
- Work point of each substructure unit
- Approach slabs with the beginning and ending approach slab stations
- Begin and end stations at the fill face of end bents
- Horizontal curve data as shown on roadway plans
- ~~When required, show special drainage location with the identification:~~
Special drainage (Roadway Detail and Pay Item)

Long Chord Layout (where applicable) - See Section 5-1.

Location Sketch

- Orient the location sketch consistent with the plan view of the structure.
- Line designations (-L-, -Y-, etc.)
- North arrow
- Existing structures, roads, buildings and drainage pipes shown with dashed lines. Show existing wood lines, stream outlines, and other terrain features.
- Proposed structure outline
- Skew angle
- Bench Mark located directly above the location sketch
- Destination arrows on road

Other

- Show the TIP number, county and identification station in the spaces over the title block. For grade separations, show both stations, with the identification station on top.
- Unusual conditions or features
- Typical section of the bridge showing roadway width, beam spacing, barrier rail, sidewalk, bicycle lane, etc. State whether spans are continuous or simple; composite or non-composite; rolled beam; plate girder or prestressed girder; type steel; etc. Note stay-in-place forms or prestressed concrete panels if used.

- Title Block - briefly describe and locate the bridge
Example: GENERAL DRAWING FOR BRIDGE OVER CONE CREEK
ON SR 1551 BETWEEN SR 1545 AND SR 1553
- Federal Aid Project Number (if applicable) in upper right hand corner of the first sheet only.

Notes

*Assumed Live Load = **HS20 (MS18)** or Alternate Loading*

*This bridge has been designed in accordance with the requirements of the **AASHTO** Standard Specifications for Seismic Design of Highway Bridges for Seismic Performance Category A (Category B).*

For all metric projects,

All dimensions are in millimeters unless otherwise noted.

All elevations are in meters.

For structures at Corrosive Sites,

This structure contains the necessary corrosion protection required for a Corrosive Site.

Stream Crossings

Section View

- Minimum berm width at **1'-6" (450 mm)** above the bottom of the cap
- Station and grade point elevation at the beginning of the front slope of the approach fill at both ends of the bridge
- Elevations to the nearest **foot (0.1 m)** \pm of the stream bed and high water elevation with corresponding year
- Water surface elevation to the nearest **foot (0.1 m)** and the date of survey
- Estimated normal water surface elevation to the nearest **foot (0.1 m)**, if provided by the Hydraulics Unit
- Any unusual anticipated fluctuation in water level, if provided by the Hydraulics Unit (e.g., an upstream dam that routinely opens and closes its gates)

Plan View

- Width of the berm at both sides of both end bents
- Station at the beginning of the front slope of the approach fill at both ends of the bridge
- Flow direction of stream or ebb and flood in saltwater channel
- Name of river or stream

Hydraulic Data

- Design Discharge
- Frequency of Design Flood
- Design High Water Elevation
- Drainage Area
- Basic Discharge (Q100)
- Basic High Water Elevation

In addition to the above data, show the Overtopping Flood Data for all Federal Aid bridges and for other bridges when data is provided.

Overtopping Flood Data

Overtopping Discharge

Frequency of Overtopping Flood

Overtopping Flood Elevation

In case Overtopping Flood Data is not required, the Hydraulics Unit will provide a note to that effect on the Bridge Survey and Hydraulic Design Report. This note should be placed on the plans.

Railroad Overheads

- Horizontal clearance from the track centerline to the nearest part of the substructure pier which will control horizontal clearance.
- Vertical clearance as the minimum distance from top of rail to the bottom of the beam deflected under live load.
- Track profile elevations
- Roadway drainage in the railroad right of way.
- Milepost number over the title block
- Distance and direction from the intersection of centerline survey with the existing centerline track to the milepost
- Proposed tracks if work to be performed is part of project. Otherwise, do not show future tracks.
- A section perpendicular to centerline track depicting how the bridge length is determined. Showing the horizontal distance from centerline track to the front slope at elevation of top of track. In addition, show the natural ground line; do not show theoretical ditch sections.
- For CSX railroad overhead projects, show erosion control details and notes of Figure 4-8.
- When the tops of bent footings adjacent to a railroad track are required by the railroad to be a minimum distance below the top of rail, indicate on the plans the maximum allowable top of footing elevation.

- Grade Separations**
- Pavement width of the road below
 - Shoulder to shoulder distance of the road below
 - Minimum horizontal clearance as measured from the edge of pavement to the bent cap face or any other part of the substructure ~~which~~that controls horizontal clearance. In the event barrier rail is used for pier protection, the clearance shall also be shown from the edge of pavement to the face of the barrier rail.
 - Vertical clearance as the minimum distance from pavement, or usable shoulder if shoulder controls, to the bottom of the beam deflected under live load. For dual lanes, show the vertical clearance for each lane.
 - Distance from edge of pavement to the centerline ditch or the P.I. of the vertical curve
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Widening Projects When existing and proposed centerlines are not coincident, show both and the distance between them.

4-2 Construction Limits Sketches

General The construction limits are defined as a combination of lines that clear the extremities of the structure by a minimum of 10 feet (3 m). For bridges, these limits should be established by allowing 10 feet (3 m) outside the wings and 10 feet (3 m) outside each fill face, tip of wing, or approach slab if used. For culverts, these limits should be established by allowing 10 feet (3 m) outside the tips of the wing footings. See Figures 4-3 and 4-4.

Structure details are not important except as they relate to the construction limits. Use 10 feet (3 m) minimum as the main criteria in establishing these limits.

Refer to the Policy and Procedure Manual for format and transmittal procedures for Construction Limits Sketches.

- Detailing Instructions** Include the following information:
- Title of sketch: Construction Limits Sketch with brief description of structure under title. (Example: Double 3-7-m12' x 3-0-m10' RCBC)
 - Identification block in lower right corner showing:
 - TIP Number
 - County & Structure Number
 - Station
 - Date
 - Sketch by

Checked by

- Distance left and right of centerline roadway to construction limit line, to the nearest foot (0.1 m)
- Stations along centerline roadway of corners of construction limits, to the nearest foot (0.1 m)
- Skew angle
- North arrow
- Station of intersection of centerline structure and centerline roadway
- Line designations (centerline culvert, centerline bridge, centerline survey, -L-, -Y-, etc.)

Use 8 ½" x 11" (216 mm x 279 mm) paper for Construction Limits Sketches, and maintain a ½" (12 mm) margin on all four sides of the sketch.

4-3 Coast Guard Permit Sketches

General Coast Guard permit sketches are to be prepared for all proposed structures to be built over navigable waters. These sketches are included in the application with the U.S. Coast Guard and/or the U.S. Army Corps of Engineers for approval of construction of the bridge.

Sketches are to be prepared in accordance with the requirements of the Corps of Engineers "Bridge Permit Application Guide." It is also recommended to refer to the Unit's file of previous drawings. Size of drawings shall be 8 ½" x 11" (216 mm x 279 mm).

Each sketch shall have a title block in the lower right hand corner similar to the one in Figures 4-5 through 4-7. The title block should include the applicant, the waterway and mile point, the location of project (city, county, state), and the sheet number of the total number in the set submitted. Date shall be shown only after checker's initials.

Place the project number in the lower left margin of all sheets. All maps shall be oriented with north at the top of the sheet and indicated with a north arrow.

Refer to the Policy and Procedure Manual for transmittal procedures.

A statement shall be shown on each copy of the permit sketch if Federal funds will be used to finance the project.

Location Maps Include the following information:

- Location of the proposed bridge and a small vicinity map, with the proposed bridge location circled on both maps
 - Wildlife and waterfowl refuges, historical and archaeological sites, public parks and recreation areas
 - The scale(s) of the drawings indicated by bar graphs
 - North arrow
 - Direction of stream flow
 - Towns in project vicinity
 - Navigation clearances above the appropriate datum and the 100 year flood level
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Proposed Structure**Plan View**

- Length and width of the bridge (proposed and existing)
- Fendering system, if any, indicating the type of material
- Banks of the waterway
- Structures immediately adjacent to the proposed bridge
- Scale of the drawing indicated by bar graphs
- North arrow
- Horizontal clearance normal to the channel
- Channel axis

Elevation View (looking upstream)

- Navigational opening
- Horizontal clearance normal to the channel
- Vertical clearance above the appropriate datum
- Elevation of the waterway bottom
- Amount of fill required
- Scale of the drawing indicated by bar graph

Miscellaneous

If the bridge is to be equipped with a draw, the drawings shall show the draw in both the open and closed position. When a temporary crossing bridge is proposed, a drawing indicating the required data should be prepared for this bridge also. Use as few sheets as are necessary to show clearly what is proposed at the location. Only the structural details ~~which~~that are necessary to illustrate the effect of the proposed structure on navigation need be shown.

Show the type and location of all navigation lights on the structure.