

Colorado Department of Transportation Staff Bridge Bridge Detail Manual	Chapter: 6 Effective: June 30, 2024 Supersedes: November 20, 2018
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## General Layout

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### 6.1 Purpose

This drawing is to be a general layout in plan, longitudinal section, and typical transverse section of the structure, showing the physical aspects and features of the structure and surrounding terrain.

For General Layouts of walls, see Chapter 15.1. See Chapter 16 for General Layout requirements for repairs.

### 6.2 Responsibility

This drawing shall be prepared and checked in the design unit. The graphic presentation of information on this drawing shall be the responsibility of the individual preparing the drawing.

### 6.3 Scales

Standard Architectural and Civil scales shall be used that are suitable to make the plan view, elevation and typical section legible on a standard sheet. For additional information see Chapter 2.3.

Plan view & Elevation should match. Scale for Typical Section is generally larger.

### 6.4 Orientation of Details

The PLAN shall be placed, if possible, at the upper left of the sheet with the layout line parallel to the border. The ELEVATION shall be projected below the PLAN when possible. Elevations should include vertical scales. The PLAN and ELEVATION shall be oriented to match roadway plans, with stationing increasing from left to right. Sections shall be placed to the right of the PLAN and ELEVATION. Generally, sections should be taken from the PLAN and ELEVATION rather than from secondary views or other sections. If space is limited, the sections or additional details may be shown on another sheet. The preference is to show all details on one sheet if scale of details is readable.

### 6.5 Plan

All items underneath the proposed bridge shall not be shown unless it is critical to construction and not shown elsewhere in the plan set.

Listed below are items to be shown in the plan view of this drawing (as applicable):

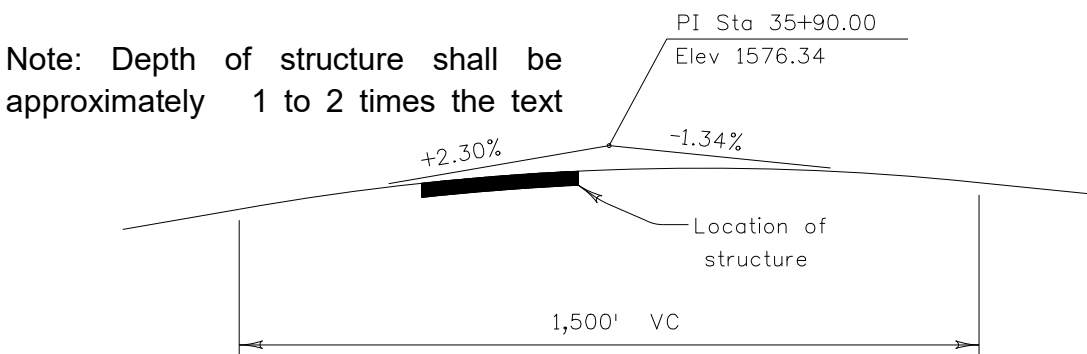
- A) Horizontal Control Line: Projected Line, Survey Line, Centerline Roadway, Centerline Median, Centerline Structure, or others.
- B) Profile Grade Line or Lines; label and dimension to Horizontal Control Line.
- C) Alignment Information: Horizontal Curve Data, bearings, and station marks at 100 feet of upper and lower roadways. Give the station tie at centerline intersection.
- D) Bent angle of bridge.
- E) Label the Back Face of Abutments and Centerline of Piers.
- F) Stations at Back Face of Abutments and Centerline of Piers along Horizontal Control Line.
- G) Horizontal roadway dimensions of upper and lower roadways including traveled lane widths, shoulder widths, ditches, toe of slope, sidewalks, etc. for the current and future alignments.
- H) For structures over Railroads, give the minimum horizontal clearance measured perpendicular from centerline of railroad tracks to piers and retaining walls adjacent to the tracks in English units.
- I) The direction and name of the nearest town(s). They should be placed outside of the bridge. This may be optional where in urban areas.
- J) The name and direction of flow for streams and canals. Use standard directional arrow for water flow.
- K) Show channel improvement dimension (Net Channel Width), per the Hydraulics Report.
- L) Label each proposed structure that shows in the general layout with its final structure number or ID.
- M) Show approach slabs & sleeper headers, if required.
- N) Location of minimum vertical clearance over Roadways, Railroads and Pathways.
- O) Show existing and proposed contour lines, when they are available. 1' or 2' contour intervals should be used depending on the scale and congestion of the drawing. Existing contours may be eliminated if it is too confusing or congested.
- P) Show abutment subdrain outlet. If special details are required, they can be shown elsewhere.
- Q) Show shoring at preliminary FIR level plans. Shoring should be removed from final plans to reduce clutter.
- R) Standard North Arrow.
- S) All known utilities.
- T) Show type of slope protection. If slope paving is used, show outline and define limits. If riprap is used, partial limits may be shown if the hydraulic sheets provide details. Make reference to appropriate sheet numbers.
- U) Direction and rate of fill or cut slopes. Show approximate location of toe and top of slopes.

- V) Show existing structures (dashed), label with structure number, and note if the existing structure is to be removed.
- W) Title the General Layout plan view "PLAN".
- X) Show guardrail and transitions.
- Y) Show ROW (right of way) limits, if available. It is not necessary to change scale or limits of plan in order to show.

## 6.6 Longitudinal Section / Elevation

Listed below are items to be shown in the Longitudinal Section/Elevation of this drawing. (as applicable)

- A) Show elevation lines at 2 feet intervals along each side and identify the elevations at 20 feet intervals. Smaller intervals may be used.
- B) Label stations across the bottom at 100 feet.
- C) Show span lengths and total overall length and where measured if located away from where section is taken.
- D) Label Back Face Abutments, Centerline Piers, and Centerline Bearings.
- E) Show Finished Grade Elevations at the back face of abutments and at centerline of piers and note where located, if other than where section is taken.
- F) If the bridge is on a straight grade, show grade and the station and elevation of the nearest PI.
- G) If the bridge is on a vertical curve, use a profile grade diagram showing the grade back, grade ahead, the station and elevation of the PI, the length of the vertical curve, and the location of the structure. This diagram shall be titled "PROFILE GRADE". Refer to Fig. 6.5-1.



**Figure 6.5-1 Typical Profile Grade Diagram**

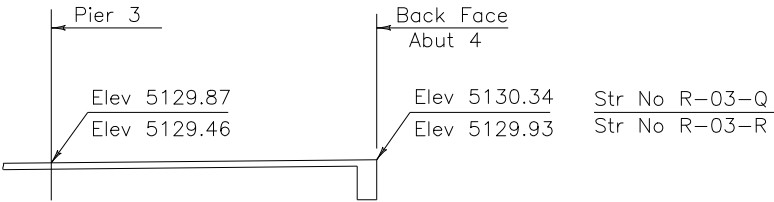
- H) Show the pile, caisson, or spread footing drawn to the correct elevation, when applicable. Breaklines are acceptable.
- I) Show the slope protection.

- J) Show the "Existing Ground Line" (dashed) and indicate where located if other than where section is taken.
- K) Note "fixed" or "expansion" bearings (F or E) at Piers and Abutments.
- L) Show minimum actual vertical clearance to roadway or railroad below.
- M) Show design high water elevation and verify from Hydraulics report.
- N) On stream crossings, show the drainage area and design discharge if the Hydraulics section does not supply a "BRIDGE HYDRAULIC INFORMATION" drawing.
- O) Channel changes and Roadway improvements shall be crosshatched and noted as "Unclassified Excavation (Included in Roadway Quantities)".
- P) Show approximate limits of scour.
- Q) Title the longitudinal section "SECTION" with a note immediately below giving the line where the section was taken; such as "Taken at Horizontal Control Line" or "Taken at Profile Line". If the section is outside of the bridge, label the view as "ELEVATION".
- R) For parallel structures of the same type, a single longitudinal section will suffice. This section, titled "SECTION" is taken for one structure with a note giving the line where the section was taken and the structure number. Also note that the parallel structure is similar.

Example: "Taken at Profile Line Str No R-03-Q, Str No R-03-R is similar except as noted."

Span lengths, elevations, and other features which differ will be shown and labeled for each structure.

- S) When fencing limits or other aesthetics need to be shown, an elevation of the bridge may be preferred over a section.



Parallel structures of differing types will require a separate longitudinal section for each structure. The structure number will be included as part of the title such as "SECTION STR NO R-03-Q".

## 6.7 Typical Section

Typical section is not required for CBC's, unless it is non-standard or it needs to show additional details (waterproof membrane limits, side inlets, etc.). Showing the typical section is preferred.

Listed below are items to be shown in the Typical Section of this drawing (as applicable):

- A) Width of curbs, sidewalks, traveled lanes, shoulders, etc. and total width out to out.
- B) Label Projected Line or Horizontal Control Line.
- C) Location of Profile Line.
- D) Roadway slope or superelevation.
- E) Show bridge rails or rub rail and indicate type. Show height of rub rail above traveled way.
- F) Type of girder.
- G) Structure depth.
  - 1) Prestressed girders and rolled beams; give depth of girder.
  - 2) Cast-in-place T-beams and box beams; give depth from top of concrete deck to bottom of beam.
  - 3) Welded plate girders; give depth of web.
  - 4) Parabolic girders of all types, give maximum and minimum depth.
- H) Show portion of typical pier above the finished ground line, when applicable. Do not show abutment or pier dimensions.
  - I) For parallel structures, show a section for each structure.
- J) Show Conduits and Utilities. Identify which conduits are for future use.
- K) Show limits of Structural Concrete Coating, Stains or other aesthetics.
- L) Show Fence Chain Link or pedestrian railing, with height.
- M) Show Hot Mix Asphalt and Waterproofing Membrane, or Polyester Concrete overlay as appropriate.
- N) Title "TYPICAL SECTION".

## 6.8 Title Block

The title block shall be titled "GENERAL LAYOUT". The primary structure number or numbers and the first initial and last name of the designer and detailer shall be filled in on each sheet, i.e. structures with general layouts of their own need not be included in the border list.

If two sheets are used, the first sheet shall be called "GENERAL LAYOUT" and the second sheet shall be titled as appropriate, e.g. "TYPICAL SECTION".



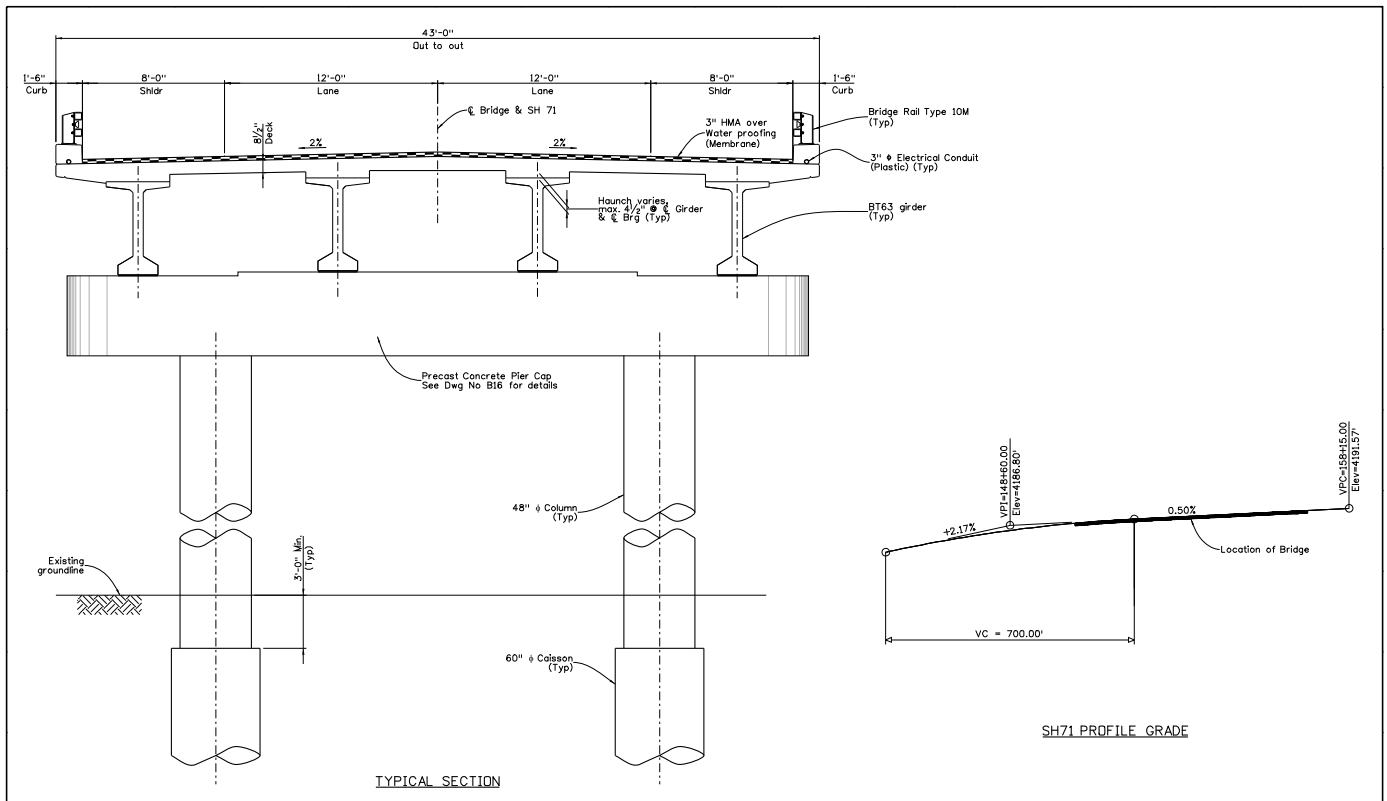
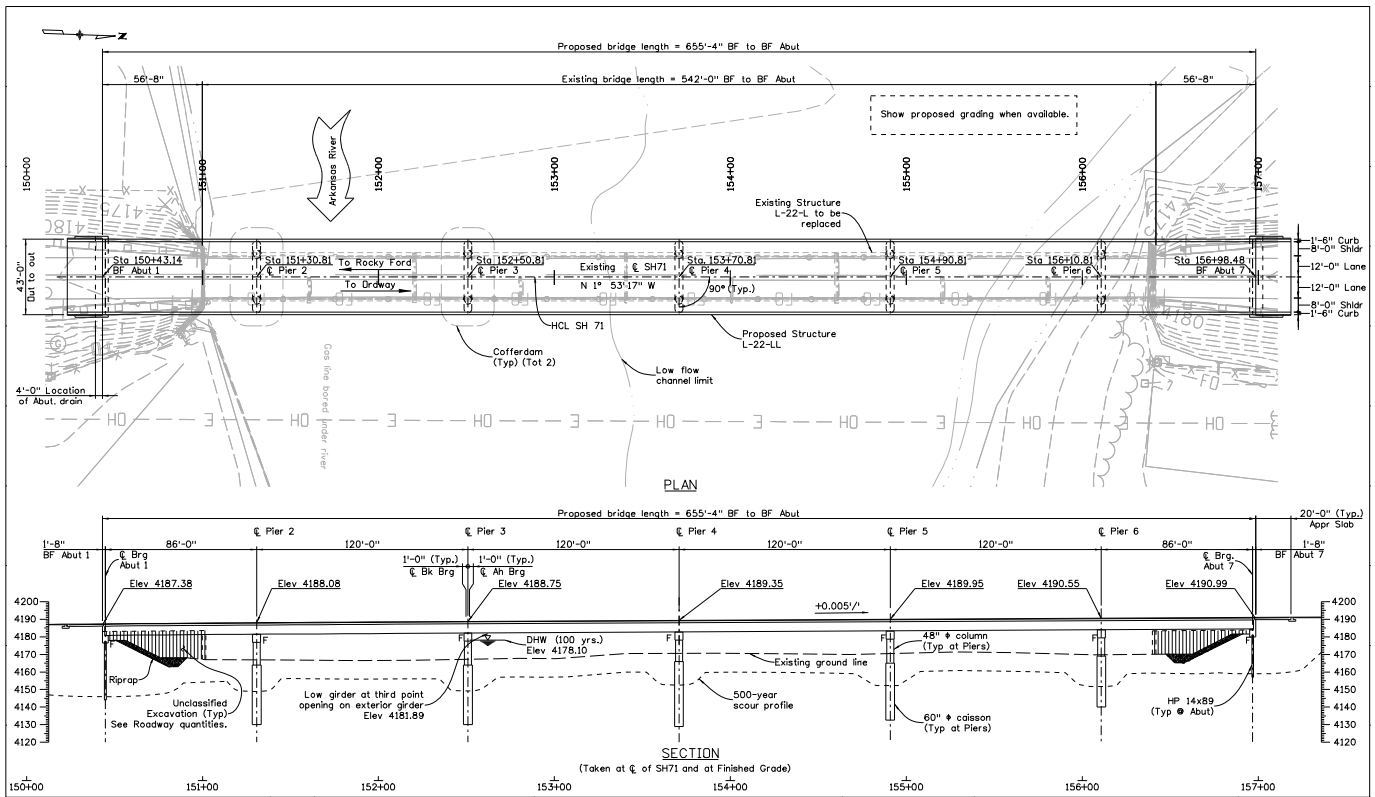


Figure 6-2 Example

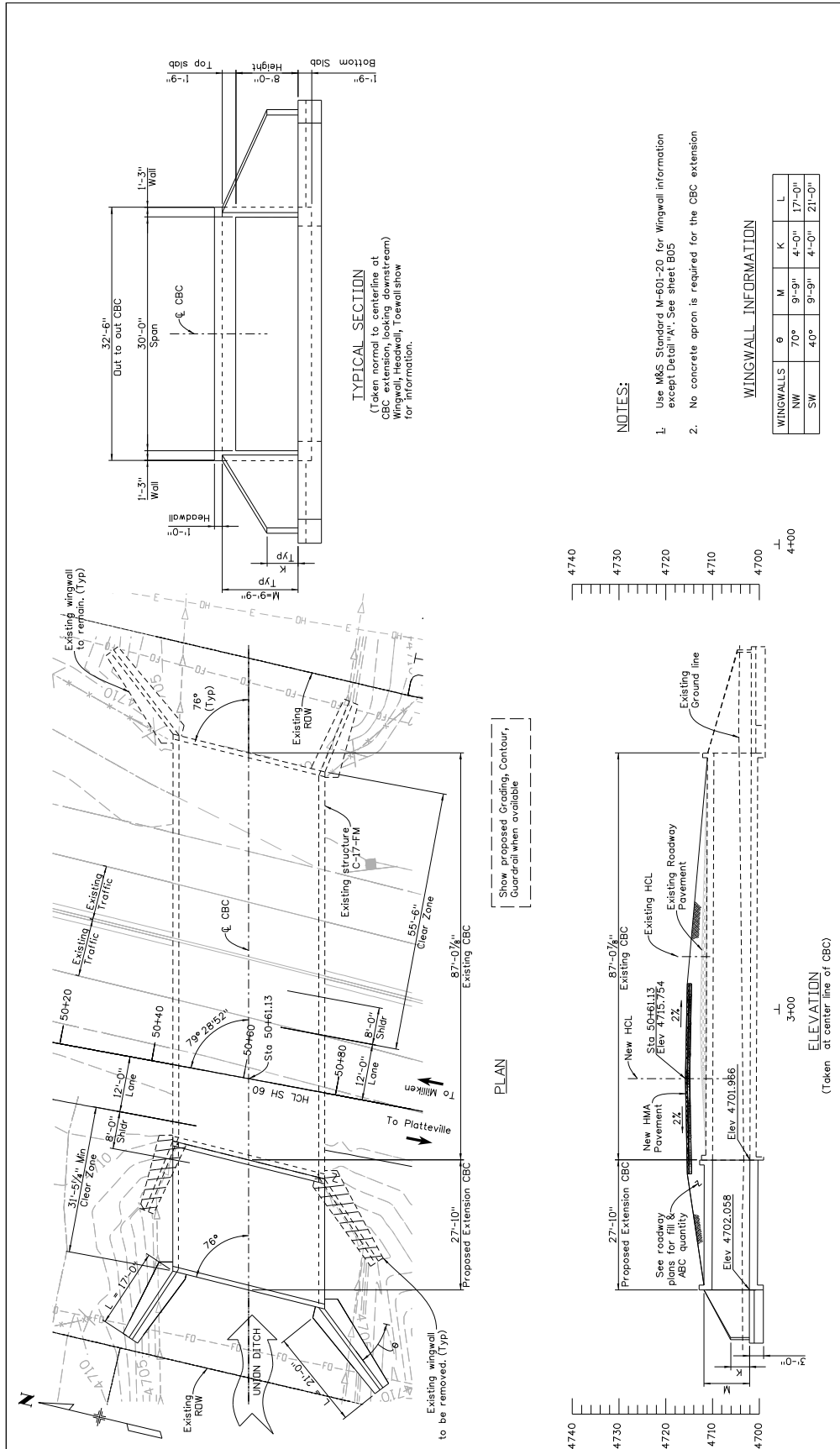


Figure 6-3 Example



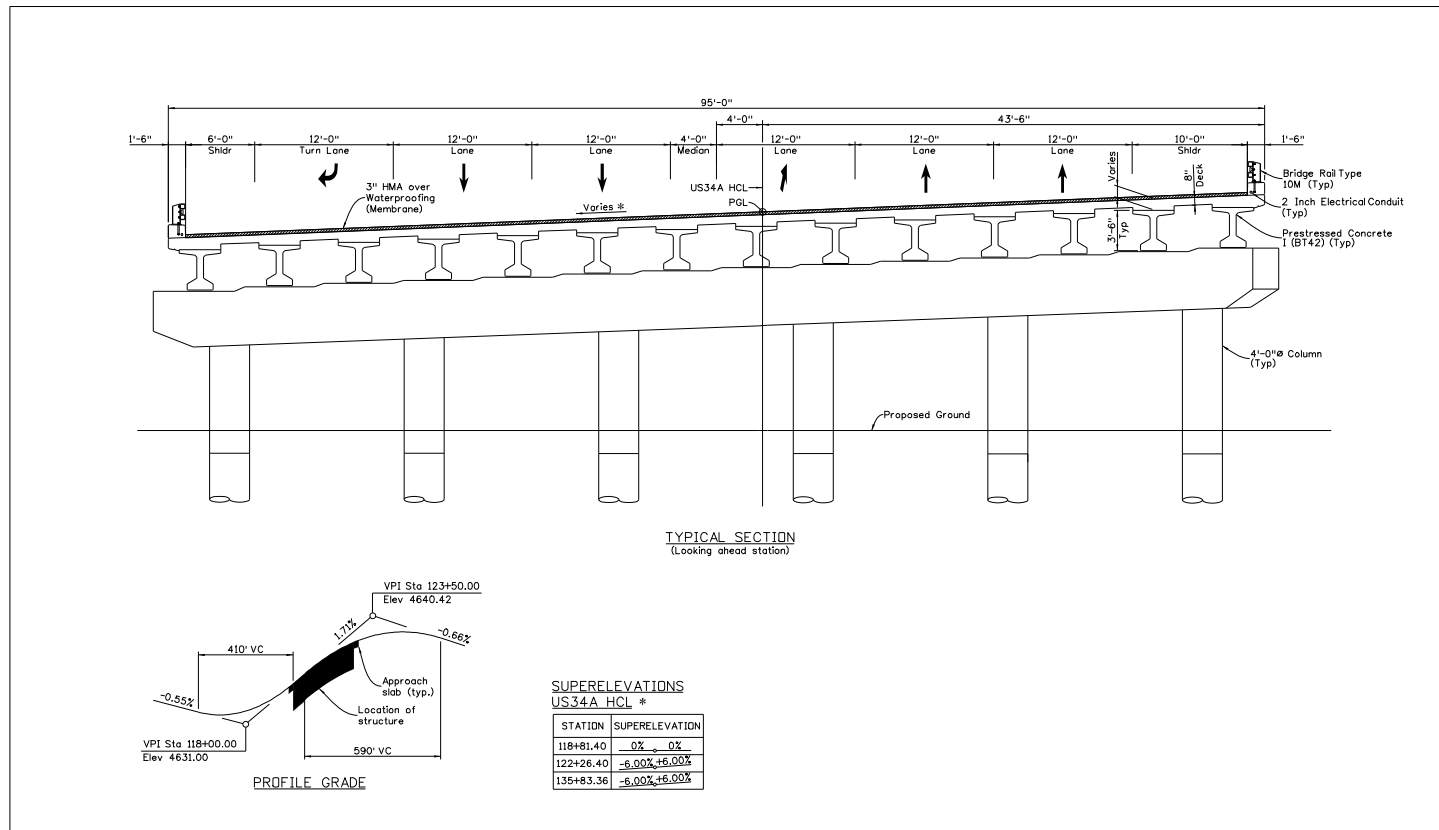
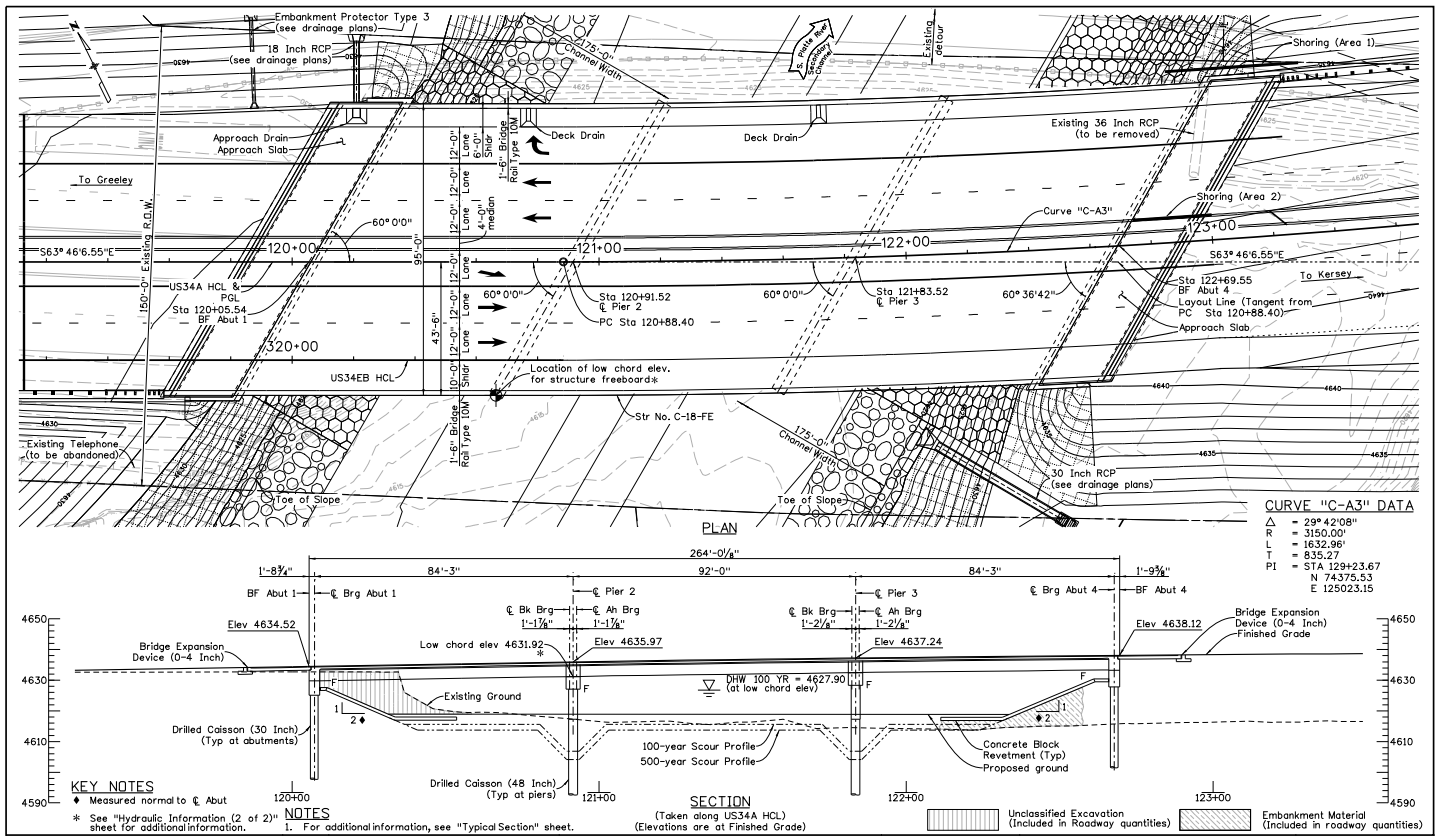


Figure 6-4 Example

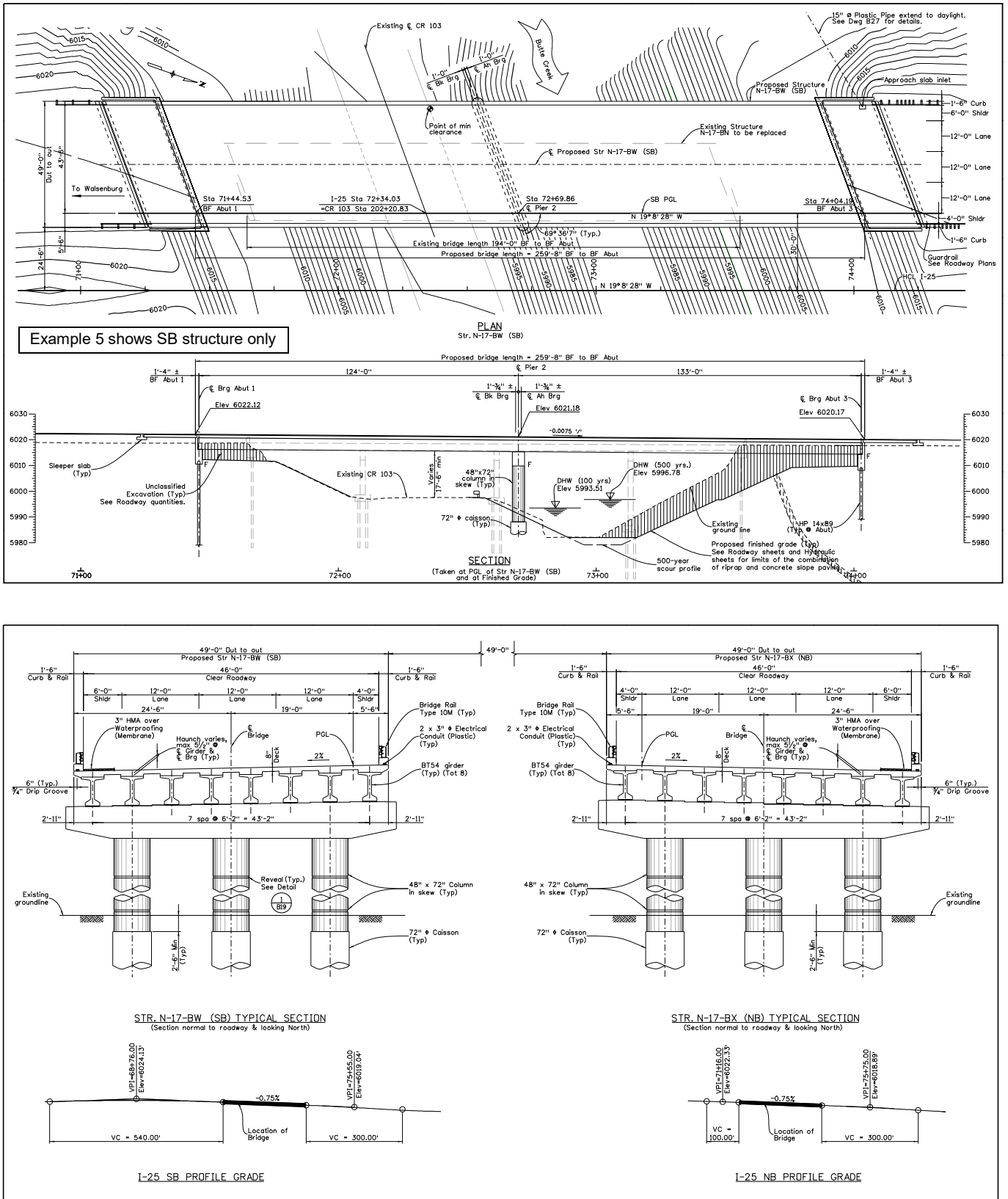


Figure 6-5 Example

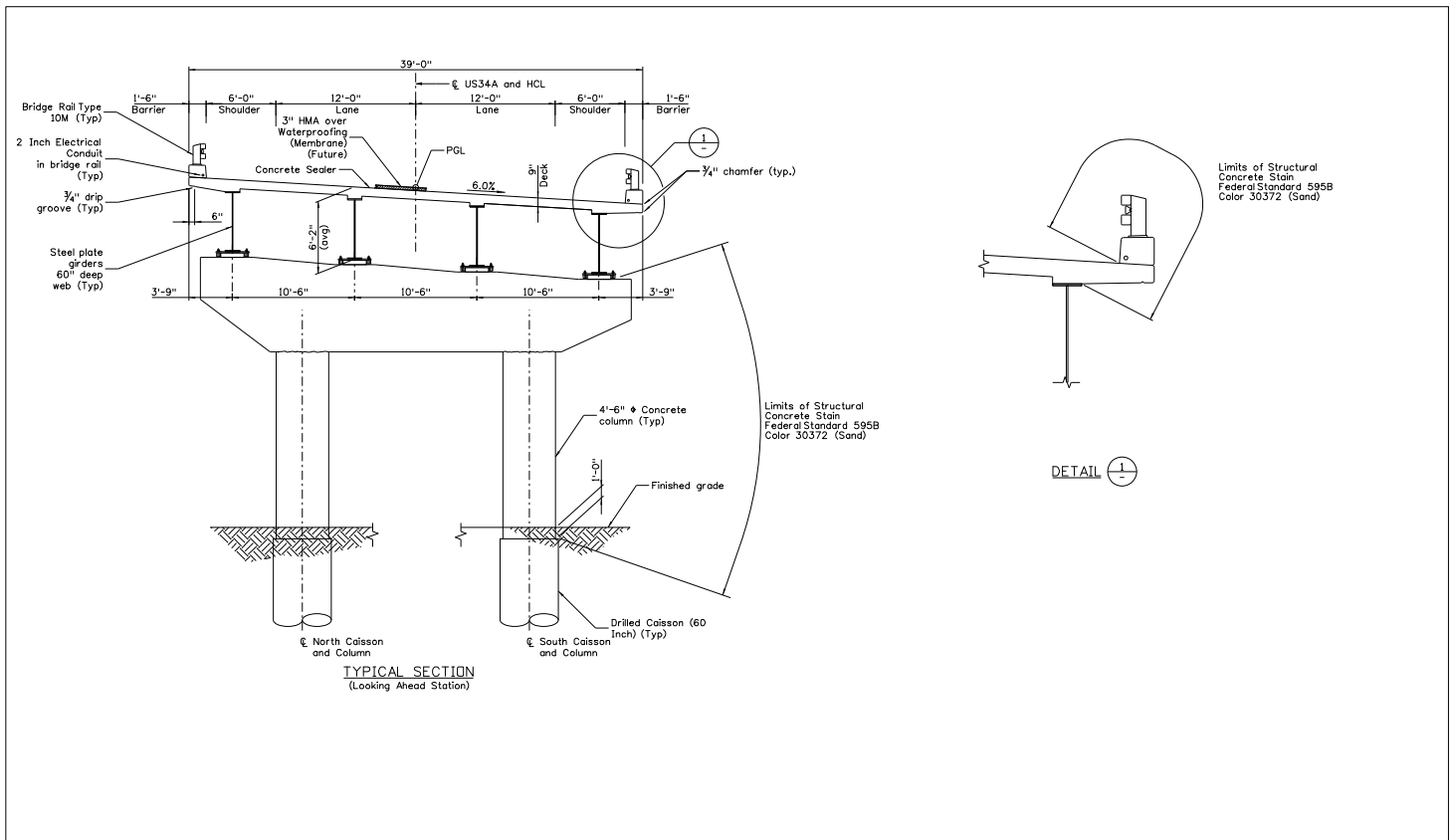
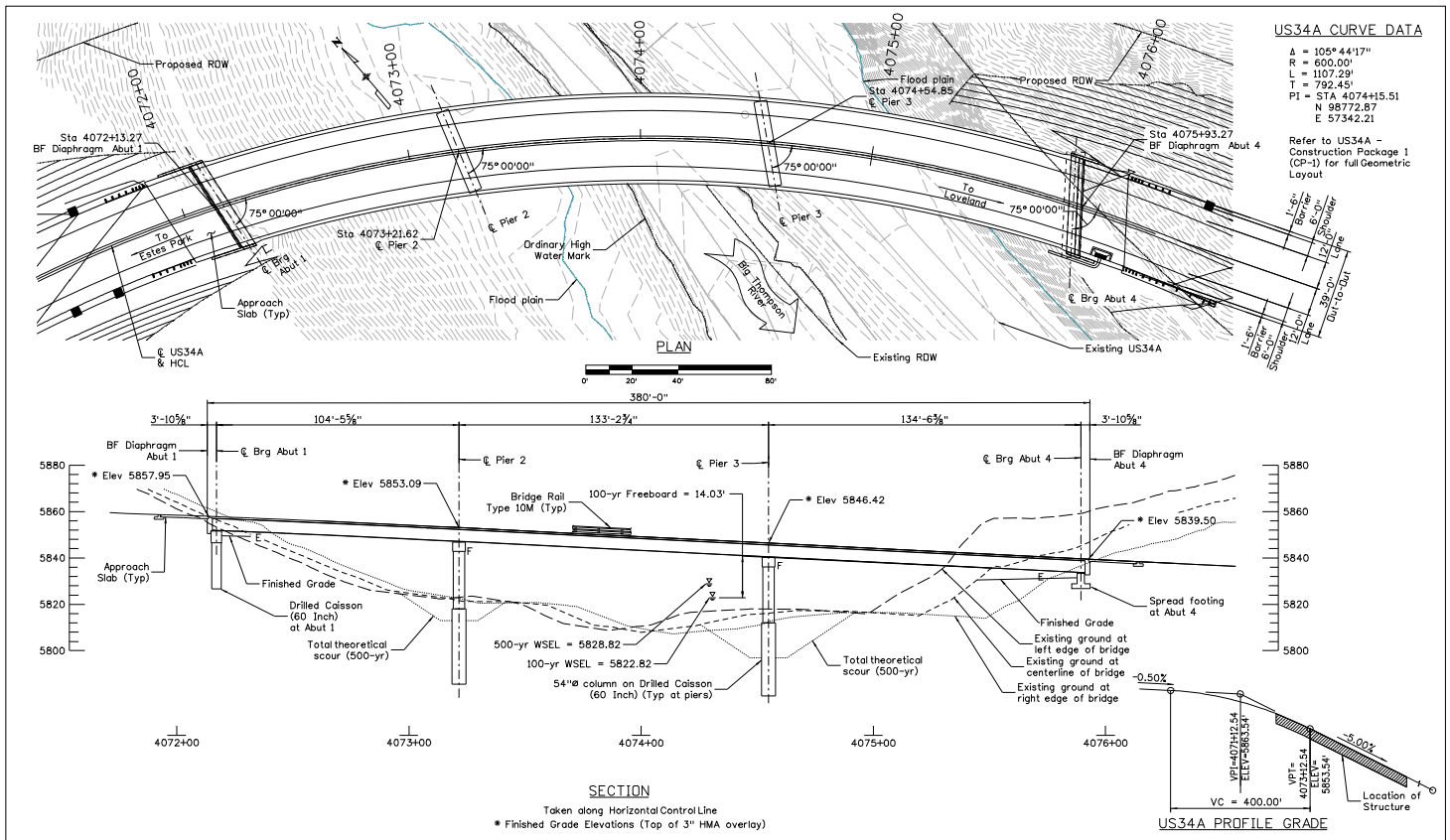


Figure 6-6 Example

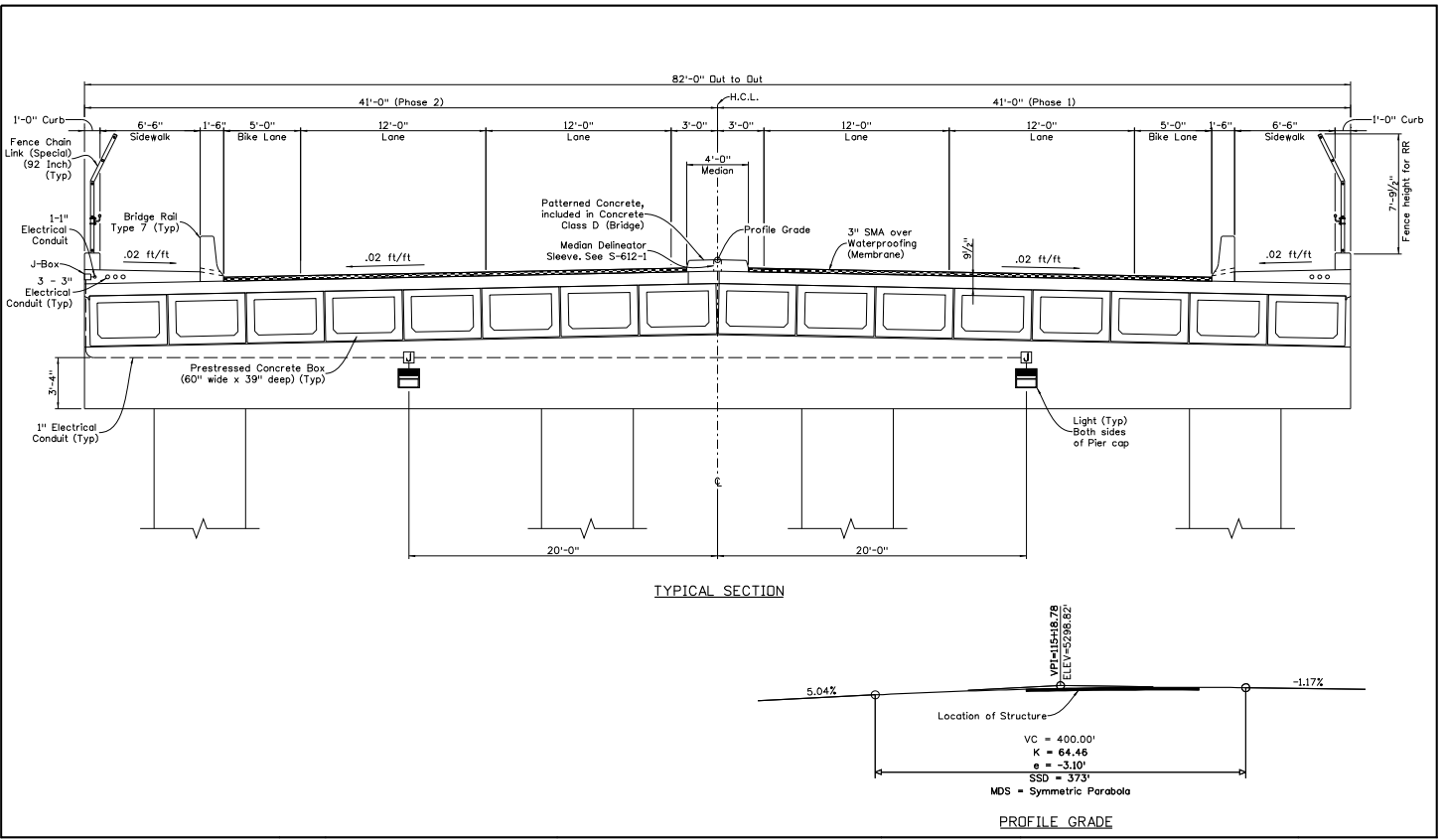
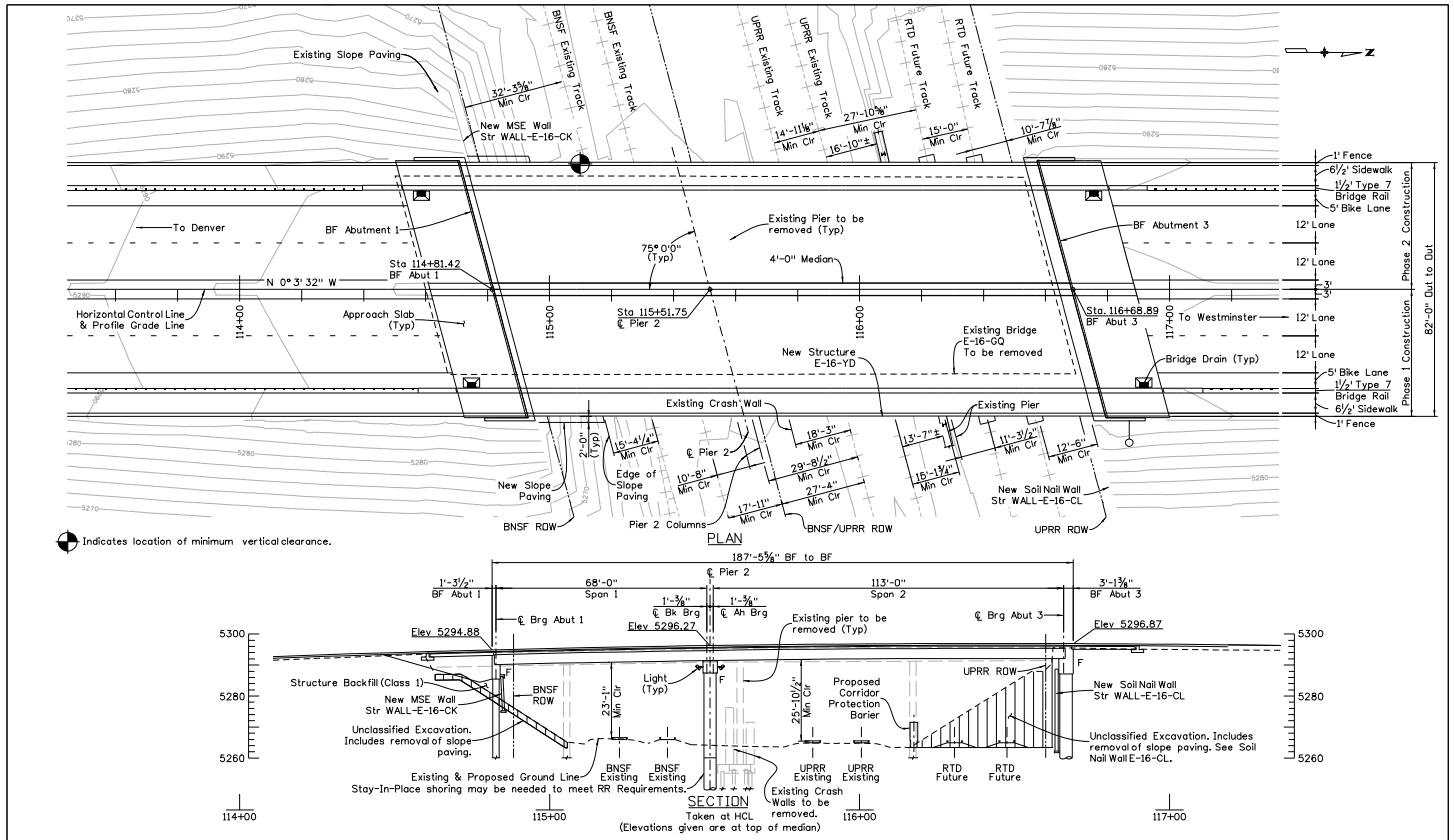


Figure 6-7 Example