Chapter 11 Detailing Practice Contents

Chapter 11 CAD Standards and Project Data Management

11.0 Chapter Introduction

This chapter supersedes Chapter 11 Detailing Practice and is intended to bring WSDOT Bridge and Structures into conformance with the PS&E standards and symbology specified in the *Electronic Engineering Data Standards* (EEDS) manual. Any CAD project that was initiated prior to this publication may still use the standards specified in Chapter 11 Detailing Practice of the *Bridge Design Manual* (LRFD) dated September 2023.

This chapter outlines WSDOT Bridge and Structures Office CAD standards and practices. All entities within, and external to WSDOT must conform to the standards set forth in this chapter when providing bridge or related structural plans as part of a WSDOT contract.

The purpose of these standards is to enable the Bridge and Structures Office to produce consistent and effective plan sheets that will have uniformity in appearance and in the presentation of information.

Designers and detailers are responsible for ensuring that these criteria are implemented.

Limited deviations from the standards listed in this chapter, unless otherwise noted, may be approved by the Bridge Design Engineer as a specific situation requires, so long as all possible attempts to maintain the standards are made prior to authorizing a deviation. All deviations must be approved by the Bridge Design Engineer.

Definitions used in this chapter:

Should: Denotes when best practice dictates a standard is to be followed, but may be deviated from or omitted, if necessary, as approved by the design engineer.

Shall: Denotes when a standard must be followed with no deviations or omissions permitted.

11.1 General CAD Practices

The following is to provide basic information on the fundamentals of Bridge and Structures Office drafting practices. This provides a high-level specification of the makeup of a set of contract plans for a WSDOT Bridge and Structures Office contract as well as the use of WSDOT Bridge and Structures CAD resources and standards. Further information about CAD resources and standards will be specified in their relative sections and subsections.

11.1.1 General Detailing

11.1.1.A Linework and Symbology

11.1.1.A.1 Linework

All linework shall conform to the standards specified in Section 11.3.

Line styles and weights should be controlled through levels or elements as specified in Sections 11.3.4 and 11.3.5.

Breaks in lines are allowable provided that their intent is clear.

11.1.1.A.2 General Symbology

Graphic symbols shall be in accordance with the following:

Structural steel shapes: See AISC Manual of Steel Construction.

Welding symbols: See Lincoln Welding Chart.

Symbols for hatching different materials are shown in Appendix 11.4-A5.

Cells and symbols conforming to standards specified in Section 11.3 and the *Electronic Engineering Data Standards* (EEDS) manual, section Symbology 5 PS&E Standards may be used as required.

11.1.1.B Annotation

11.1.1.B.1 Text

All plan text shall be capitalized unless a specific condition or situation otherwise requires as specified by the design engineer or WSDOT region office PS&E plans review personnel.

Plan text in the drawing space shall be left justified whenever possible. Text used as titles, placed below titles, dimension text, and line labels may be center justified. For text callout justification, see Section 11.3.1.C.

All text sizes and styles shall conform to the standards specified in Section 11.3.1.A.

Text within a detail shall be placed in a manner that is organized and easy to follow. Text should be aligned horizontally and vertically with other callouts and text wherever possible to create a uniform and clean appearance.

Text shall not cover any detail geometry or dimensioning.

Avoid crossing dimension extension lines wherever possible. If it is unavoidable for text to cross dimension extension lines, the text shall use a mask to hide the extension line (extension lines should never be broken).

11.1.1.B.2 Abbreviations

Abbreviations, as a general rule, should be avoided whenever possible, however, there may be cases where abbreviations are necessary due to space requirements, industry standard naming conventions, or as otherwise required. For a list of common abbreviations used in bridge plans, see Appendix 11.4-A1.

In cases where abbreviations are used, it is important to keep in mind that multiple different words may have the same abbreviation such as “PP” (Pages or Power Pole) or “PVC” (Point of Vertical Curve or Polyvinyl Chloride). In these instances, or other instances where the meaning may be in doubt, the word being abbreviated should be spelled out in full.

Unless otherwise specified, abbreviations shall include a period at the end.

Apostrophes are not typically used in abbreviations unless specified otherwise in Appendix 11.4-A1, by industry or manufacturer standard labeling, WSDOT PS&E review, or the design engineer.

11.1.1.B.3 Callouts

Callouts shall conform to the standards specified in Section 11.3.1.C.

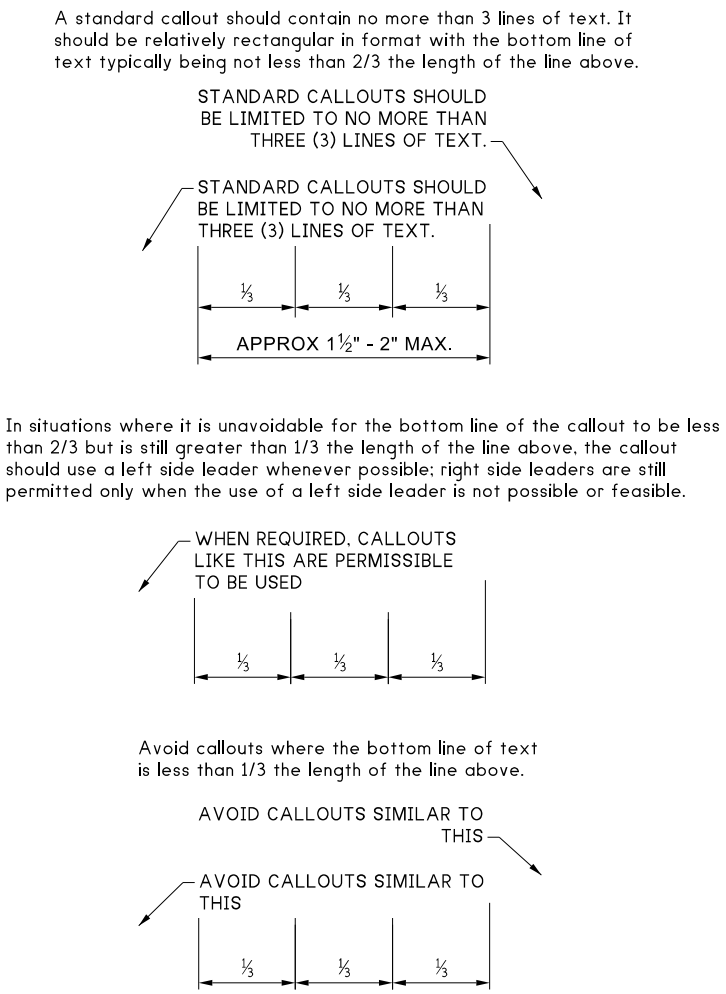
Text callouts should be specific, brief, and limited to not more than one sentence. The intent is to make the purpose clear, while reducing superfluous information that could both cloud the meaning of the content and clutter the drawing sheet.

When creating a text callout, the detailer and the design engineer should attempt to limit the callout to not more than 3 lines of text and ensure the text is formatted in a way that each line is a similar length and forms a rectangular appearance. Additionally, a callout should be limited to not more than about 1½” to 2” in width. Callouts that exceed this guidance should use a key note so as not to clutter the detail.

Callouts that specify more than one block of related information should be separated into a text callout-key note pair whenever possible (see Section 11.1.1.B.6).

See Section 11.1.1.B.6 for key note requirements. For additional formatting requirements, see Figure 11.1.1.B.3-1 below.

Figure 11.1.1.B.3-1



Dimensions shown in the above illustrations are for reference only.

Callouts should be aligned vertically and horizontally wherever possible to create a more organized and uniform appearance.

Detail callouts are used to denote the detail number the callout pertains to and what sheet number it is on. Detail numbering on any single sheet shall be sequential and shall not repeat. Best practice for detail numbering is to number details sequentially throughout a subset of grouped plan sheets and restarting from 1 for each subset of grouped sheets. For example, details 1, 2, and 3 on Girder Sheet 1, details 4, 5, and 6 on Girder Sheet 2, etc., restarting at detail 1 on Traffic Barrier Sheet 1. This allows for more flexibility when adding or removing sheets during the design, addendum, or change order process, as well as more efficient use of the Bridge Office Standard Design Drawings without the need to renumber details.

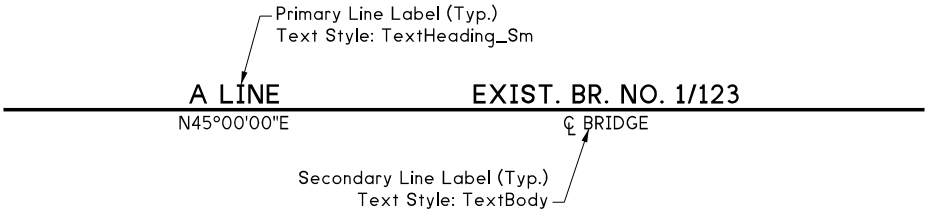
Section callouts are used to denote the section letter the callout pertains to, what sheet it is on, and what direction the section or view is taken.

Section lettering should be treated in the same fashion as detail numbering (i.e. Section A and Section B on Approach Slab Sheet 1, Section C on Approach Slab Sheet 2, and Sections A, B, and C on Traffic Barrier Sheet 1.)

11.1.1.B.4 Labeling

Primary Line Labels for alignments, highway, or bridge centerline (in Plan view), creeks/rivers, and under-crossings shall be aligned with the associated line work and placed above the line. Any Secondary Labels such as survey bearing should be placed below the line and should be centered on the primary label. See Figure 11.1.1.B.4-1.

Figure 11.1.1.B.4-1



Centerline labels shall be normal to the centerline and placed approximately 1/16 inch from the end of the line as shown in Figure 11.1.1.B.4-2.

Figure 11.1.1.B.4-2

11.1.1.B.5 Notes

Notes headings shall be in the upper left corner of the notes block and left aligned with the numbering. Notes headings shall be underlined and end with a colon (:).

Notes are used to specify processes, procedures, specifications, and both general or specific criteria and information related to the plans that is either not suitable or too complex to be labeled within the drawing area. Notes are categorized as either general notes or key notes. Key notes are further defined in Section 11.1.1.B.6.

General notes are to be general in nature and are items that are typically globally applicable to the plan set or the sheet on which they reside.

General note titles will typically be labeled in one of two ways:

1. Global to all sheets and details within a plan set or global to all unrelated details on a single sheet **"GENERAL NOTES:"** or **"NOTES:"**
2. Pertaining to a single sheet related to one single component or system and related details. This is typically formatted with the component or system name followed by the word **"NOTES"**, i.e., **"GIRDER NOTES:"** or **"BARRIER NOTES:"**

Notes on the sheet should be grouped together in the same area whenever possible, typically along the right side of the sheet. Sets of notes should be aligned horizontally and vertically whenever possible.

On a typical plan sheet, a single block of notes should not be more than 4 inches in width whenever possible. On sheets where the primary content consists of notes, notes may be formatted as required for best fit but should maintain a uniform and consistent appearance throughout the sheet.

11.1.1.B.6 Key Notes

Key notes are defined as specific notes pertaining to information or conditions within the plan sheet on which they reside. They are not to be confused with general notes, which are non-specific, or general in nature, and typically can be applied globally to the sheet or the whole plan set. Key notes should not be used to cover non-specific, or general information that would be typically specified in a general note.

Key notes should be used in situations where a callout may become too large (typically more than 3 lines or more than 1-2 sentences), a callout would clutter the sheet or detail, or in situations where that same callout would need to be shown in multiple locations (3 or more) on the same view or detail.

Key notes can be used in a text callout-key note pair. For example, a callout specifying a component (i.e., ANCHOR BOLT) followed by installation instructions, should put the installation instructions in a key note and place the key note flag at the end of the text callout specifying the component.

Key notes may be used to reference a standard plan, a note on another sheet, or even another sheet within the contract plan set that is separate from the bridge plans (i.e., roadway or illumination plans).

The same plan note may be referenced in multiple views or details so long as they are on the same plan sheet.

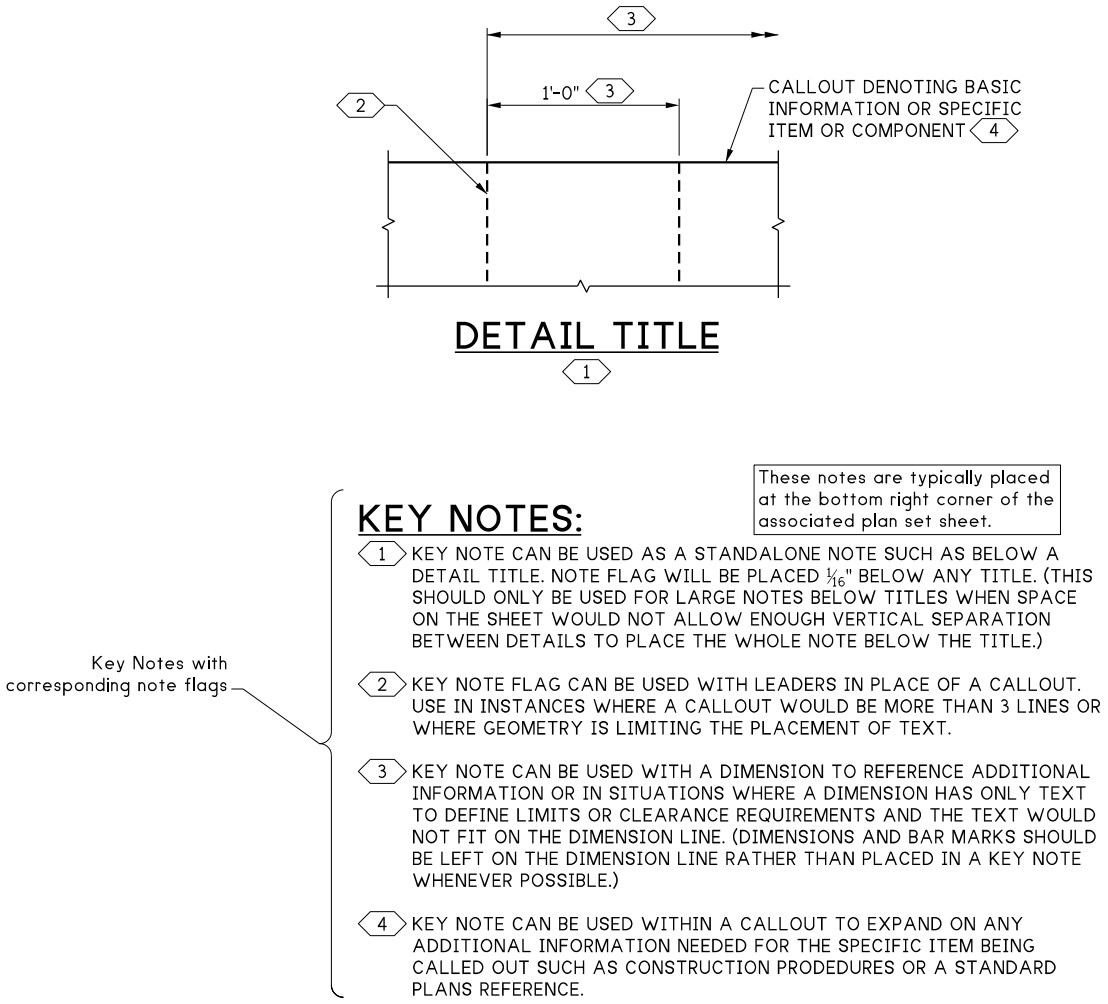
Key notes will be referenced on the sheet as **"KEY NOTES:"** and should be placed on the lower right side of the sheet whenever possible. Key notes should be placed below any general notes on the sheet (if applicable). The notes should be placed numerically and shall have a flag placed around the number.

Key note flags shall be used to reference key notes within the drawing area. Each flag will use the same symbol and corresponding number as found in the key notes.

Key note flags shall conform to the standards specified in Section 11.3.1.C.3.

See Figure 11.1.1.B.6-1 for key note usage examples.

Figure 11.1.1.B.6-1



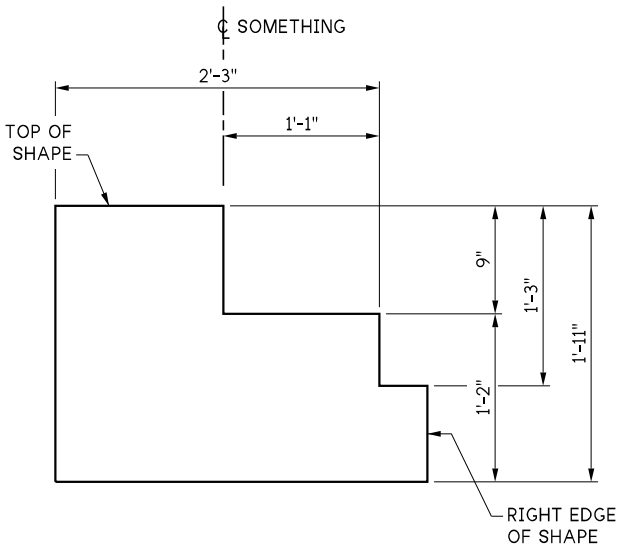
11.1.1.B.7 Dimensioning

All dimensions shall conform to the standards specified in Section 11.3.2.

Avoid crossing geometry with dimension lines whenever possible. When necessary for geometry and dimension lines to cross, the following line precedence (which pair of crossing lines are masked) shall be followed: (see Figure 11.1.1.B.7-1)

1. Dimension lines always take precedence.
2. Callout leader lines.
3. Extension lines.
4. Model/Detail geometry lines.

Figure 11.1.1.B.7-1



DIMENSION LINE PRECEDENCE DIAGRAM

THIS DIAGRAM DEMONSTRATES WHICH LINEIS TO BE BROKEN WHEN TWO LINES CROSS.

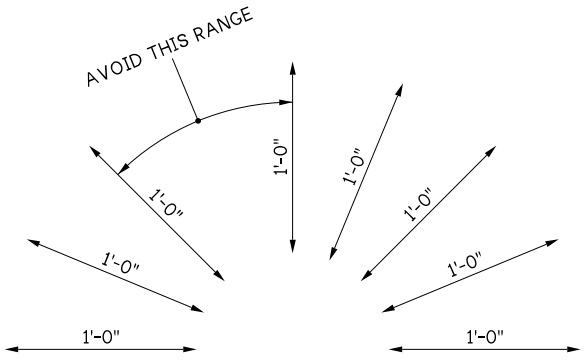
A dimension shall be shown once on a drawing. Duplication and unnecessary dimensions should be avoided to prevent errors and inconsistencies.

Dimensions should be aligned horizontally and vertically whenever possible to create a more uniform and organized appearance.

All dimensions shall be placed above the dimension line. Dimensions that contain additional text shall have the first line above the dimension line with the subsequent lines placed below the dimension line.

Dimensions shall be placed so that they may be read from the bottom, or the right edge of the sheet as shown in Figure 11.1.1.B.7-2.

Figure 11.1.1.B.7-2



When details or structural elements are complex, it is considered a best practice to utilize two drawings: one for dimensions and the other for reinforcing bar detailing.

Dimensions 12 inches or more shall be given in feet and inches unless the item dimensioned is conventionally designated in inches (i.e. 16” pipe).

Dimensions that are less than one inch over an even foot, the fraction shall be preceded by a zero (i.e. 3'-0¾")

Dimensions that are less than one inch shall be shown as a fraction only with no leading zero (i.e. ¼"). See Section 11.3.2.A for additional information.

Place dimensions outside the view, preferably to the right or below. However, in the interest of clarity and simplicity it may be necessary to place them otherwise. Examples of dimensioning placement are shown on Appendix 11.4-A2.

11.1.1.B.8 Tables, Schedules, and Diagrams

Tables and schedules that are placed on a sheet in conjunction with other views or details should be placed in the upper right or bottom left corner of the sheet whenever possible. Avoid placing in the middle of the sheet.

Diagrams should be placed in a similar fashion to tables and schedules but may be placed with the associated detail as required.

Tables, schedules, and diagrams that stand alone on a sheet, such as a girder schedule, may be centered in the drawing area, or if notes or other information are placed below, centered within the top half of the drawing area.

Table, schedule, and diagram titles should be the standard heading text style, centered within the top row. The body text should be the standard body text, justified as required. In situations where a table, schedule, or diagram is large and is unable to properly fit on the sheet, use of the small heading and small body text styles is permitted. See Section 11.3.1.A for text style specifications.

If using the small body text in tables and schedules, the heading text shall utilize the small heading style.

Diagrams are permitted to use the standard heading text with small body text as required.

11.1.2 Structural Detailing

11.1.2.A Typical Structural Detailing

This section covers the typical practices and standards used for most structural detailing efforts.

11.1.2.A.1 Plans

Typical structural plan views are taken from a top-down aerial perspective regardless of the slope of the top of the structure. There may be situations where a plan view may be shown parallel to the top surface of the structure. If a plan view is shown parallel to the top surface of the structure that is not in-plane with the typical top-down aerial view, it shall be denoted below the view title as "SHOWN PARALLEL TO TOP SURFACE".

Typical plan views are laid out with increasing stationing moving left to right on the sheet. In most cases, this means a structure is laid out West to East or South to North with West or South being on the left side of the view and East or North being on the right.

Best practice is to lay the structure out in the view so that the intersection points between each end of the structure and the alignment or centerline are in-line with each

other horizontally across the view. In instances where the structure is mostly straight but has a curved section at the beginning or end, orient the structure so that the straight section is horizontal across the view.

When creating a bridge plan based on as-built drawings, pay careful attention to the direction of the as-built plan views compared to the Bridge Preservations Office's (BPO) bridge condition reports. Often, older bridges were drawn with pier or station numbering moving East to West or North to South, whereas the BPO bridge condition report will number the piers according to the modern convention of West to East or South to North. To keep the pier or station numbering consistent with the bridge condition report, it is often required to lay the bridge out on the sheet 180° rotated from what the original as-built shows, and to renumber the piers accordingly.

Plan views should contain, at a minimum, the overall extents of the structure or segment of the structure being laid out on the sheet, an alignment or structure centerline, a station marker if applicable, and an alignment or structural centerline label.

11.1.2.A.2 Elevations

Elevations will typically show the structure or component from the outside face, viewed as it would be seen when completed. Elevations can be thought of in two main categories.

1. Primary or Main Structural Elevation Views
2. General Elevation Views

Primary or main structural elevation views are elevation views of the structure or major structural subcomponent in its entirety as it would be seen in the field. Examples of primary structural elevations would include an elevation view of a complete bridge from end to end, retaining wall elevation, sign bridge elevation, or a bridge pier or abutment elevation. Elevations of the whole structure are typically looking back at the structure from right of alignment or centerline with the starting station of the structure being on the left side of the view and the end station at the right.

Primary structure elevations shall include, at a minimum:

- The entirety of the structure or segment of the structure being shown and all of its visible components. Typically shown in a medium line weight.
- Pertinent stationing and elevation data along the structure or alignment.
- Any pertinent hydrological information such as minimum freeboard or high-water lines.
- Any pertinent right of way data such as roadway or railroad under crossings.
- Pertinent terrain or ground lines.
- Terrain elevation data.
- Architectural finishes as required, usually shown as a portion of the finish and denoted as (TYP.). These are shown using a light to medium-light line weight.

General elevation views are usually used for smaller subcomponents or to convey specific conditions or information. Examples of these types of elevations include the face of a traffic barrier to show junction box locations, the front or side elevations of a precast box culvert segment, rear elevation of an end diaphragm. These elevation views are intended to show more detailed views of structural components and may show, but are not limited to, the following items:

- Structural drainage components such as weep holes or drainpipes.
- Component layout and spacing such as junction boxes or railing posts.
- Dimensions required to build the structure or subcomponent.
- Reinforcement layout and spacing information.
- Detailed views of architectural finishes.
- Fine detail items such as dummy joints, fasteners, etc.

11.1.2.A.3 Sections

Sections are typically taken looking ahead on station, from right to left of the structural component as it is oriented along the alignment, looking to the right from within the view the cut is taken, or looking down. Where there is a skew in the bridge any sections should be taken from plan views.

Sections fall into two basic categories:

1. Structure Typical Sections
2. Callout Derived Sections

The structure typical sections are usually taken at mid-span or between intermediate spans of a structure, ahead on station, and do not typically require a corresponding section callout on the associated layout sheets unless otherwise directed by the design engineer. Multiple typical sections may be required across a set of plans to convey design intent. Typical sections will be labeled with a standard title, usually **"TYPICAL SECTION"** with a subheading below the title denoting where the section is taken, i.e., "TAKEN AT MIDSPAN", "TAKEN AT MIDPOINT BETWEEN SPANS 2 AND 3", "TAKEN AT STA. 123+45.67", etc. For section views taken back on stationing, a subheading below the title shall be placed denoting this, i.e., "SHOWN LOOKING BACK ON STATION".

Callout derived sections can be grouped into two basic categories:

1. Major or Primary Section Views
2. Minor or Secondary Section Views

Major Section Views are used to show the section view of a major structural subcomponent such as a bridge abutment, buried structure footing, retaining wall cross section, etc. Major sections do not typically include deep levels of detail and are generally used to convey the overall design intent, dimensional limits, and constraints of the structure as a whole or major structural subcomponents. Finer detail elements such as, but not limited to, welds, fastening hardware, material patterns and hatching, anchor or bolt threads, etc. are not typically shown. Major section views shall, at a minimum, show the following:

- The outline of the structure in a medium line weight
- A vertical representation of the Alignment in a heavy line weight (if applicable) or a structure centerline in a heavy line-weight.
- An overall dimension of the design extents (i.e., between curb lines, or from outer edge to the opposite outer edge as required).
- Dimensions between each end of the design extent to the vertical alignment line or centerline as required.
- Centerlines of each subcomponent (i.e., girders, columns, etc.) as required in a medium-light line weight.

Minor section views are typically used to detail minor structural components such as traffic barriers, expansion joints, plate connections, girder bearings, etc. Often, these sections get called out from within another detail, i.e., looking down the face of a traffic barrier detail to show an expansion joint. These sections, although still labeled and called out as sections, will show a finer level of detail and share the same requirements as a typical detail would. See Section 11.1.2.A.4 for detail requirements.

When dimensioning a section view, dimensions shall be placed horizontal along the X-axis and vertically along the Y-axis, regardless of the slope of the surface unless otherwise required by the design engineer to convey design intent. Roadway limit dimensions such as curb to curb or lane line dimensions are to be shown horizontally along the X-axis regardless of slope or superelevation shown.

For additional section callout and title requirements, see Section 11.1.1.B.3 and Section 11.3.1.C.2.

11.1.2.A.4 Details

Details are intended to show smaller portions of the main structure, structural sub-components, or minor components in a high level of detail with all information needed to build that component. Details often show elements such as reinforcement, connection hardware, welds, material patterns and hatches, and fine detail linework such as bolt threads, extents of chamfers in plan view, hidden lines, etc.

Care shall be taken to ensure that the orientation of a detail drawing is identical to that of the plan, elevation, etc., from which it is taken.

Details typically use a medium line weight for the primary outline of the structure or structural component being detailed with light to medium-light line weight for finer linework.

11.1.2.B Buried Structures Detailing

11.1.2.B.1 Plans

Plans views for buried structures vary in how they are laid out depending on structure type. Most commonly, a buried structure such as a multi-segment precast structure would be laid out along the creek or river alignment, horizontal along the X-axis in the view with increasing stationing left to right.

Other buried structure types such as a structure utilizing a split-box bottom half as the bearing structure with a prestressed voided slab superstructure, may be laid out similar to a typical bridge structure along the roadway alignment. In situations like this, consult with the design engineer to determine the best plan view orientation to best convey design intent.

All other plan view requirements as specified in Section 11.1.2.A.1 shall be applied to buried structure plans as required.

11.1.2.B.2 Elevations

Buried structure elevations generally follow two different elevation standards depending on the structure type and orientation.

Buried structure elevation views where the plan view is oriented with the creek alignment moving horizontally are typically taken from inside the structure along the alignment looking left at the inside face. Additionally, these elevations are usually shown as developed elevations; elevations shown along the alignment as if any curve in the alignment or structure had been straightened out.

Buried structure elevation views where the plan view is oriented with the primary roadway alignment oriented horizontally are typically treated the same as a bridge elevation.

All other elevation view requirements shall meet the requirements specified in Section 11.1.2.A.2.

11.1.2.B.3 Sections

Buried structure typical sections shall comply with the requirements specified in Section 11.1.2.A.3 with the following additional information:

- Terrain data and ground lines shall be shown.
- Pertinent hydrological data shall be shown such as high-water line and minimum freeboard.

11.1.2.B.4 Details

Details shall conform to the standards specified in Section 11.1.2.A.4 and other applicable standards as defined in this chapter.

11.1.2.C Wall Structure Detailing

Wall sheets within the contract plan set shall be determined and placed by the WSDOT region office responsible for the corridor project regardless of the design group responsible for drafting the wall plans. Any bridge plan sheet that includes wall geometry should do so only for reference and should only include minimal wall information as necessary to reduce redundant information.

Walls that directly support bridge loads or act as a bridge abutment, such as a geosynthetic retaining wall supporting a bridge footing or a secant pile wall acting as a bridge abutment shall be laid out and detailed entirely in the bridge plan set as these will be treated as bridge structural components.

Unless the wall meets specific criteria as mentioned previously, the wall sheets will stand alone in their own section of the plan set as determined by the WSDOT region office. Therefore, although it is important to show and reference the walls on the bridge layout sheet, the walls shall have their own separate layout sheet(s) as required.

The following specifies general minimum requirements for each wall sheet detailed by the bridge design group.

11.1.2.C.1 Plans

It is permissible for all of the walls within the plan set to be placed on a single wall layout sheet if the size and scaling permits, and only when deemed appropriate by the design engineer as a means to best convey overall design intent, otherwise each wall will have its own individual layout.

If using a single layout sheet, the wall sheets should be organized by placing all walls in the same location within the Contract Plans.

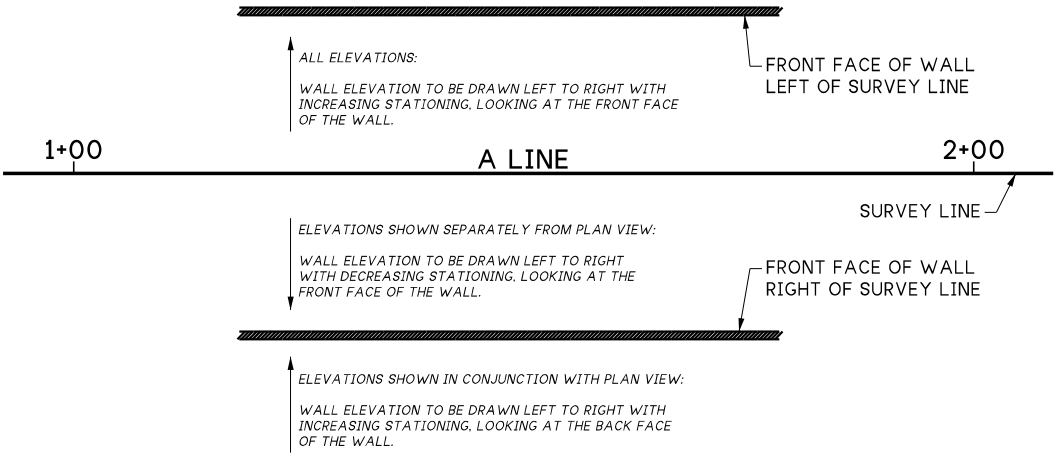
Each layout view shall include stationing and offset along the alignment for both the wall alignment and the main project construction alignment.

Each layout view shall include all utilities that will be in place (existing) at the time of wall construction and are located within the vicinity of the wall construction area.

11.1.2.C.2 Elevations

Each wall shall have a developed elevation view. This view may be placed on the layout sheet if size and scaling permits, otherwise will be placed on its own sheet. Wall elevations shown on the same sheet as the plan view shall be oriented with stationing increasing from left to right. Wall elevations shown on a sheet separate from the plan view shall be oriented to show the exposed face regardless of direction of stationing. See Figure 11.1.C.2-1 below.

Figure 11.1.2.C.2-1



Each elevation view shall be detailed using the same vertical and horizontal scale. Exaggerated horizontal or vertical scales are not permitted.

Each elevation view shall have an overall dimension of the wall along the wall alignment line.

Each elevation view shall include additional horizontal dimension lines denoting the size and total number of each wall section panels if applicable and the locations of expansion joints and or contraction joints.

The elevation view shall show the existing and proposed ground line at the top and bottom of the wall.

Each elevation view shall show, at a minimum, the top elevation and bottom elevation at the beginning of the wall and the end of the wall, as well as the elevation at any profile transition.

Each elevation view shall show all existing utilities that will intersect the face of the wall or wall alignment. New utilities intersecting the face of the wall or wall alignment that will need to be accommodated by the construction of the wall shall be shown as well.

A reference elevation may be shown in a wall elevation view if deemed necessary by the design engineer to help clarify the design intent and improve plan readability. If shown, the elevation line shall be placed below the ground line as determined by the design engineer. The reference elevation should be determined based on 20-foot increments from 0 and should be set at the previous 20-foot incremented elevation prior to the lowest elevation of the ground line. For example, a low ground elevation of 163.35' would call for a minimum reference elevation of 160.00' but for plan clarity and readability could be set at any previous 20-foot incremented elevation such as 140.00.' or 100.00', however, it is recommended to keep it as close as possible to the low ground elevation to maintain visual association with the view.

For wall height dimensioning standards refer to BDM Section 8.1.11.F.

11.1.2.C.3 Sections

Wall structural sections shall conform to the standards specified in Section 11.1.2.A.3.

11.1.2.C.4 Details

All relevant details necessary to construct all aspects of the wall shall be included in the plan set. Standard Plan retaining wall details shall not be included unless modifications to such details have been made.

For additional detailing requirements refer to BDM Section 8.1.11.F.

If a design requires specific and unique architectural finishes, a detail sheet or sheets shall be included in the wall plan set as required.

11.1.2.D Sign Structure Detailing

Sign structures shall be detailed with the standards defined in this chapter as well as Section 10.1.2.G *Detailing for Bridge mounted sign brackets* and Section 10.1.4.E *Monotube Sheet Guidelines*. Standalone sign structure plan sets are usually grouped into their own category within the contract plans. Bridge mounted sign structures may be included within the bridge plan set or detailed within their own plan subset. Bridge mounted sign brackets should be grouped within the associated bridge plan set if applicable.

11.1.2.D.1 Plans

Plan views of standalone sign structures are usually shown on WSDOT region plan sheets. Plan views of bridge mounted sign structures are shown on the associated bridge layout sheet(s).

11.1.2.D.2 Elevations

If the sign structure spans over both directions of travel, the elevation of the structure shall be shown ahead on alignment stationing. If the structure spans over a single direction of travel, the structure shall be shown from the approach side regardless of stationing. Signs shall be shown as true-to-size outlines only. Any signage graphics will be shown on the region signage plan sheets.

Additional sign structure elevation detailing requirements shall conform to Section 11.1.2.A.2 and Section 11.1.2.F for structural steel detailing requirements.

11.1.2.D.3 Sections

Sign structure section detailing requirements shall conform to Section 11.1.2.A.3 and Section 11.1.2.F for structural steel detailing requirements.

11.1.2.D.4 Details

Sign structure details shall conform to Section 11.1.2.A.4 and Section 11.1.2.F for structural steel detailing requirements.

11.1.2.E Reinforcing Detailing

This section defines how reinforcing is to be graphically represented and called out on plan sheets. Reinforcing design and specification is to be conducted in accordance with Section 5.1.2 by the design engineer.

Contract documents shall convey all necessary information for fabrication of reinforcing steel. The contract plan set shall include size, spacing, orientation, and location of reinforcing steel. In accordance with the *Standard Specifications* Section 6-02.3(24), reinforcing steel details shown in the bar list shall be verifiable in the plans and other contract documents.

Typical reinforcing type and grade is specified in the *Standard Specifications* Section 9-07 and need not be provided elsewhere in the contract documents unless it differs. Typical reinforcing is defined as the predominant type and grade of reinforcing used throughout the contract plan set. Any reinforcing that differs from the typical reinforcing shall include the type and grade as part of the callout within the contract plan set.

Reinforcing bars in most views are typically shown schematically rather than true to size or thickness. This is typically a single line, using a reinforcing bar line style to represent the bar type. Weight for reinforcing bar lines varies depending on the bar size. Below is the suggested convention for bar size-based line weights. Some situations may warrant a deviation from this convention as required. The detailer and/or design engineer should use professional judgment to determine the best approach for the specific situation.

- Bar sizes #1 through #3 utilize a light line weight.
- Bar sizes #4 through #7 utilize a medium-light line weight.
- Bar sizes #8 through #11 utilize a medium line weight.
- Bar sizes #12 and above utilize a medium-heavy line weight.

For line weight standards see Section 11.3.3.C.

Reinforcing bar cross sections shall be shown for new construction as a solid filled circle or dot, whereas existing reinforcing in existing structures shall be shown as a non-filled circle or dot.

Reinforcing bar cross sections in schematic views should not be larger than approximately 7/128" diameter or smaller than approximately 3/128" diameter when viewed on the sheet.

When laying out reinforcing bar in a view, the bars should be laid out as accurately as possible and true to actual location. For plan readability or to better convey design intent, it is permissible to adjust the location of bars. For example, a stirrup may be specified as being 3 inches from the outside edge of the structure, but due to the scale of the view, in order to be able to show the gap and properly dimension it, the drawn bar may actually end up being 6" or 8" away from the edge.

Reinforcing shall be identified by mark numbers inside a rectangle. Reinforcing bar marks shall be called out at least twice. The reinforcing steel with spacing is called out in one view (such as plan or elevation) whereas the reinforcing without spacing shall be called out in at least one other view taken from a different angle (such as a section view). See Appendix 11.4-A4 for reinforcing callout examples.

Coating or treatment for reinforcing steel shall be shown in the plans by noting the letter designator inside an inverted triangle (see Appendix 11.4-A4). The coating or treatment designator shall be placed within a callout or dimension directly after the bar mark.

Material designation for reinforcing steel, when required, shall be shown using the corresponding two (2) letter designator inside of an ellipse measuring approximately 19/128" wide by 11/128" in height. (see Appendix 11.4-A4). The material designator shall be placed in a callout or dimension directly preceding the bar size designation.

Bar size is to be shown on all reinforcing callouts and dimensions and shall be shown using a pound (**#**) preceding the numeric size designator (i.e. **#4**). Bar size shall be placed within a callout or dimension after any coating and material designator, but prior to grade designation.

Grade for reinforcing steel, when required, shall be shown using "**GR.**" and the numeric grade designator (i.e. **GR. 80**). The grade designator shall be placed within a callout or dimension directly after the bar size designator. See Appendix 11.4-A4.

Reinforcing component type (stirrup, tie, etc.) shall be placed within a callout or dimension at the end of the callout after all other reinforcing designators. Component type is not required on reinforcing bars that are considered primary bars, regardless of hook or straight ends. Primary reinforcing bars are those whose purpose is to provide the main shape and reinforcing of the associated structure and are typically straight bars but may also have a hook at one or both ends. These are typically laid out in either the longitudinal or transverse orientation relating to the structure and aren't intended to connect additional reinforcing bars together as a component such as a stirrup or tie would.

The spacing for reinforcing shall be on a dimension line with extension lines. Text callouts (see sections 11.1.1.B.3 and 11.3.1.C) are not to be used to denote spacing. Reinforcing dimensions shall include the following items:

- The number of bars at each location of the type being specified (if more than one).
- A callout or bar mark denoting the bar number as it would be found in the barlist or bending diagram (if required).
- The bar size.
- The bar coating and/or type if applicable
- Bar grade if applicable.
- Bar configuration type (bar, stirrup, tie, etc.).
- Number of spaces and spacing distance.
- Total distance (as required).

See Appendix 11.4-A4 for examples of reinforcing callouts and dimensions.

Reinforcing bar lengths, angles, or other dimensions should not be called out when they can be determined from structural member sizes, cover requirements, etc. Anchorage, embedment, and extension lengths shall be dimensioned on the plans.

Standard hooks per AASHTO LRFD Section 5.10.2.1 need not be dimensioned or called out, however, they shall be drawn with the proper angle (90°, 135°, or 180°). Seismic hooks per AASHTO LRFD Section 5.10.2.2 (used for transverse reinforcement in regions of expected plastic hinges) shall be called out on the plans whenever they are used.

Splices in reinforcing bars are required when lengths exceed the fabrication lengths in Section 5.1.2.F. They may also be necessary in other locations such as construction joints. The location, length, and stagger of lap splices shall be shown on the plan sheets. Tables of applicable lap splice lengths are acceptable with associated stagger requirements. Type, location, and stagger of mechanical and welded splices shall be shown.

Where concrete cover requirements differ from those given in the standard notes or *Standard Specifications* Section 6-02.3(24)C, they shall be shown in the plans and shall be clear as to whether the cover requirement refers to ties and stirrups, or the primary reinforcing bars.

The following subsections further define the reinforcing detailing requirements for specific view types.

Additional reinforcing detailing references include:

- ACI 315R-18 – Guide to Presenting Reinforcing Steel Design Details
- ACI 318-08 – Building Code Requirements for Structural Concrete
- CRSI – Manual of Standard Practice

11.1.2.E.1 Plans

Reinforcing plans typically start with a minimal plan view of the structure. This plan view should include the following at a minimum:

- Extents of the structure or structure portion to be detailed shown in a medium line weight.
- Alignment with stationing and alignment label shown in a medium-heavy line weight.
- Structure Centerline (this may be different than the alignment line). Shown in a medium line weight.
- Centerlines of any bearing structures below as required, shown in a medium-light line weight.
- Extents of hidden geometry below that impact reinforcing bar placement. Shown in with a hidden line style in a medium-light line weight.

Reinforcing bar is shown on these plans as a schematic representation of the reinforcing bar placement.

It is common for reinforcing plan views to only show the first pattern or two of reinforcing bars in the layout at each end and on either side of any joints or splices in the structure to keep the plan intent clear and easy to read.

Bars in the view may be broken with a squig style break line as long as the design intent is clear.

Bar splices shall be shown in at least 2 places to show alternating splice pattern.

11.1.2.E.2 Elevations

Reinforcing bar in elevation views is typically shown as a schematic representation.

Elevations of major structural components, especially elevation views that will show geometric, terrain, hydrologic, elevation, or other structural information may show minimal reinforcing as long as all required information is conveyed. If minimal reinforcing is shown, the view should show the first pattern or two of reinforcing bars across the face at each end and on either side of any joints or splices in the structure to keep the design intent clear and easy to read.

Bars in the view may be broken with a squig style break line as long as the design intent is clear.

Bar splices shall be shown in at least 2 places to show alternating splice pattern.

Examples of common elevations that follow these criteria are:

- Front or rear elevations of bridge abutments.
- Face elevations of end diaphragms.
- Intermediate diaphragm elevations.
- Shaft and Column elevations.
- Wingwall elevations.
- Crossbeam elevations.

Elevations of minor structural components, small portions of major components, or that are solely used to convey the reinforcing requirements of a structural component should show all bars, stirrups, and ties throughout the entirety of the structure whenever possible unless scaling of the view or complexity of the reinforcing would affect plan readability or conveyance of the design intent.

Examples of common elevations that follow these criteria are:

- Front or rear elevations of buried structure footing and stem wall.
- Face elevations of traffic barriers.
- Shaft Cap end views.
- Front or side elevation views of girder stops.

11.1.2.E.3 Sections

Reinforcing section views shall show all reinforcing bar locations and spacing. Reinforcing section views are typically shown schematically, however, some situations may require reinforcing to be drawn true to size and thickness using a solid line with a medium-light line weight. This is often done to show bar clearances or overlap requirements.

Examples of common section views showing bars in schematic form are:

- Bridge deck reinforcing typical section.
- Abutment cross section.
- Precast buried structure segment section.
- Sign structure footing section.

Examples of common section views showing true size and thickness of reinforcing bar are:

- Traffic barrier section.
- Crossbeam top-down section showing bar clearances between crossbeam reinforcing and vertical column reinforcing.

Dimensioning of reinforcement in section views is typically done horizontally along the X-axis or vertically along the Y-axis regardless of the slope or angle of the surface. The design engineer may require dimensioning along the surface, if necessary, to convey design intent.

11.1.2.E.4 Details

Details shall conform to the standards specified in Section 11.1.2.A.4 and other applicable standards as defined in this chapter.

Reinforcing bars shown in details are typically drawn true to size and thickness using a solid line with a medium-light line weight.

11.1.2.F Structural Steel Detailing

Steel detailing shall conform to the general standards as defined within this chapter as well as to the following:

- *Bridge Design Manual* (LRFD) Chapter 6.4 – Plan Details
- G 1.2 – 2003 - Design Drawing Presentation Guidelines (aisc.org)
- G 1.3 – 2002 - Shop Detail Drawing Presentation Guidelines (aisc.org)
- G 1.4 – 2006 - Guidelines for Design Details (aisc.org)

11.1.3 CAD File and Model Management

The current CAD file format used by WSDOT is the MicroStation DGN file. All CAD files coming to WSDOT should be in the DGN format. The following section defines standard practices managing CAD files and models within a WSDOT Bridge and Structures Office project.

11.1.3.A Managing the CAD File

CAD files are generally separated into two categories:

1. Master Model Files
2. Sheet Files

The Master Model file category is used to house all the primary model geometry for the structure. This works for both 3D and 2D drafting and modeling. In 3D drafting, this is the model that contains the 3D bridge or structure from foundation through the superstructure. In 2D this can be a single file with multiple models, or multiple separate files for each component. It will house primary geometry such as the foundation, bridge deck layouts. the typical section, abutment plan, elevation views, as well as common geometry that would be referenced throughout multiple sheets. This file will also be where terrain, contour and alignment data shall be referenced into. This creates a centrally managed master model of the structure that, when changes are made, will dynamically update any sheet in which the model is referenced into. Best practice is to separate larger projects into separate master models for each component category (i.e., Foundation, Substructure, and Superstructure). These can all be referenced together into a single master model if desired.

The Sheet file category is used for the creation of all sheets within a project. This file will contain a sheet model that all pertinent views shall be referenced into. This file will also contain any detail models, references, and annotations required to complete the sheet. Typically, there will be one DGN file per project sheet.

11.1.3.B CAD Models

Each DGN file contains three types of models, of which there can be as many of each as required:

- Design Model
- Drawing Model
- Sheet Model

This is similar in concept to the Model Space and Paper Space concept used by Autodesk but with the added benefit of the drawing model. Each model type will be further explained in the following.

11.1.3.B.1 Design Model

The design model is used for the primary geometry of the structure. This model will have little annotation and could be considered the virtual equivalent of the physical structure.

This model will have coordinate correct geometry along the alignment at the correct bearing. The view may be rotated horizontally to aid in modeling, however the geometry should never be physically altered in any way that moves it from the correct coordinate location.

When drafting and modeling is to be done in 3D, the design model will house the 3D geometry of the structure or subcomponents such as bridge abutments, Piers, or superstructure assembly.

When drafting is to be done in 2D, the design model shall be used primarily to create the physical geometry for layouts, elevations, and primary sections such as the Bridge Deck Typical Section.

Keeping these models relatively clear of annotations and detail symbology allows the CAD operator to reference these into other models as needed without requiring them to turn off multiple levels. This keeps the process clean, efficient, and simple to manage.

Some annotation is permissible in the design models as needed; however, best practice dictates that only the following annotations be used in the design model:

- Alignment labels and stationing.
- Bearing or Heading labels for alignments and structural components.
- Contour labels.
- Structure Labels.
- SR Labels.
- Major Centerlines (i.e., centerline of bridge, centerlines of footings, etc.).
- The North arrow may also be placed in the design model and referenced to the sheet in order to show the proper orientation in relation to the model geometry or alignment.
- Any annotation or symbology that is to be present throughout multiple views within the plan set.

All modeling and CAD work in this model shall be done in a 1:1 drawing scale. Annotation scales are permitted to properly show any alignment or structure labeling and to scale line styles as needed.

11.1.3.B.2 Drawing Model

The drawing model is intended to be the annotation and detailing space. This model will contain all of the text, callouts, symbols, dimensions, and detail lines related to the view. There are two basic uses for drawing models as described below:

Detailing a view or section from a design model.

This is commonly used in 3D modeling. Generally, a camera would be placed to generate a plan view, section view, or break-out / detail view which would then export to an intermediate, or drawing, model. This model allows annotation, symbology, view or level overrides, detail linework, and various other annotation, detail, and view control tools to be used without cluttering or affecting the design model.

Although this method is commonly a 3D drafting methodology, it has been adopted in the WSDOT Bridge 2D drafting environment as well. The intent is to keep the design model clean and simple, as well as have only one model that controls the design geometry. For example, a bridge deck layout, deck reinforcing plan, and a framing plan all use the deck layout geometry. Therefore, the primary bridge deck design model would have all of the required geometry to make each of these plans, and then be referenced into a drawing model for each plan type required. Each drawing model will have the appropriate display

style or level controls applied to only show pertinent geometry and information as needed to annotate and generate the view.

Creating a standalone detail without any design model reference.

Any detail that's not directly reliant on primary model geometry would be created as a standalone drawing model, not connected to a design model. Examples of details that would be considered standalone, would-be items like expansion joint header details, connection details, schematic and standard generic details (i.e., the Bridge and Structures Standard Design Drawings.) These details, although related to the structure, aren't directly pulled from the structural geometry found in the design model. These items may also be commonly applied throughout the structure and aren't necessarily specific to one area.

When working in the Drawing Model, the annotation scale should be set to the scale at which the view will be sent to the sheet. The Drawing model is the model that ultimately gets sent to the sheet model at a specified drawing scale.

11.1.3.B.3 Sheet Model

Sheet models represent the plan set sheet. This is the model that houses the title block, general notes and Key notes, schedules, and all drawing/detail views. These are the models that create the print set and to which project tags and attributes are applied. These shall be a true to scale 11x17 ANSI B size sheet with all views referenced at a drawing scale in accordance with Section 11.1.4.D.

11.1.4 Sheet Development and Deliverables Production

11.1.4.A Title Block

The project title is displayed in the contract plan sheet title block. The title consists of Line 1 specifying the highway route number(s), Line 2 and possibly Line 3 specifying the title verbiage. Bridge structures use a fourth line, in a smaller font, to specify the bridge name and number in accordance with the *Bridge List* and BDM Sections 2.3.1.A and 2.3.2.A.

The exact wording of Lines 1, 2, and 3 of the project title, including line arrangement, abbreviations, and punctuation, is controlled by the project definition as specified by legislative title and the Capital Program Management System (CPMS) database.

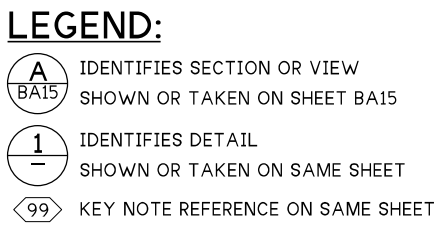
The highway route number(s) in Line 1 shall be consistent with WSDOT naming practice. Interstate routes (5, 82, 90, 182, 205, 405, and 705) shall be specified as I-(number). US routes (2, 12, 97, 97A, 101, 195, 197, 395, and 730) shall be specified as US (number). All other routes shall be specified as SR (number). Projects including two highway routes shall include both route numbers in Line 1, as in "US 2 AND I-5". Projects including three or more highway routes shall be specified with the lowest numbered route, followed by "ET AL", as in "SR 14 ET AL".

The job number block just to the left of the middle of the title block shall display the PS&E Job Number assigned to the project by the Region Plans Office. The PS&E Job Number consists of six characters. The first two characters correspond to the last two digits of the calendar year. The third character corresponds to the letter designation assigned to the specific Region (NWR - A, NCR - B, OR - C, WSF and selected UCO projects - W, SWR - X, SCR - Y, and ER - Z). The final three characters correspond to the three-digit number assigned to the specific project by the Region Plans Office.

11.1.4.B Legend

A primary legend shall be placed on the first sheet of the plan set. At a minimum this will include a Section Callout reference, followed by a Detail Callout reference, and finally a Plan Note reference. Anything else that is to be added to the legend shall be placed after these 3 items. See Figure 11.1.4.B-1.

Figure 11.1.4.B-1



Secondary legends may be used on individual sheets as required for clarification of plans and details. Secondary legends shall not repeat anything already covered by the primary legend. These legends should be placed in a similar fashion to the primary legend whenever possible.

11.1.4.C Drawing Orientation and Layout Control

North arrow shall be placed on layouts and footing/foundation layouts. The North arrow should be placed in the upper right corner of the sheet whenever possible.

The Plan view layout of structures and retaining walls should be oriented from left to right in the direction of increasing state route mileposts. For layouts of existing bridges undergoing widening, expansion joint or thrie beam retrofit, or other structural modification, this orientation requirement may result in the bridge layout being opposite from what is shown in the original plans. In such cases, the designer and detailer shall review the Bridge Preservation Office inspection records for the bridge, and the bridge layout orientation and pier identification should be laid out to be consistent with the Bridge Preservation Office inspection records.

A section cuts through the structure, a view is from outside the structure and a detail shows a structural element in more detail – usually a larger scale.

The default is to be looking ahead on stationing. The only mention of view orientation shall be when the view is looking back on stationing.

Do not detail a bridge element in more than one location. If the element is changed there is a potential for errors and inconsistencies caused by the necessity to update the element in multiple locations.

Do not crowd the drawing with details.

When organizing the contents of a sheet, the following guidelines should be followed whenever possible:

- When plan views and related elevation views are shown on the same sheet, the elevation view should be placed below the plan view and aligned vertically.
- When elevation views and related section views are placed on the same sheet, the section view should be placed on the correct side of the elevation view based on view direction whenever possible (typically on the right side) and should be aligned horizontally.
- On plan and elevation drawings where there is insufficient space to show cut sections and details, the section and detail drawing should be on the plan sheet immediately following the plan and elevation drawing unless there are a series of related plans. If it is impractical to show details on a section drawing, a detail sheet should immediately follow the section drawing.
- Related details shall be grouped together in an orderly arrangement: lined up horizontally and vertically and drawn at the same scale.
- Non-related details shall be placed on the sheet in an orderly arrangement: lined up horizontally and vertically as much as possible, typically by aligning either the detail titles or the centers of the detail itself. The scales of these details do not need to match.

11.1.4.D Scaling

CAD models shall be drawn true to size in a 1:1 scale factor. These models will be annotated and placed on a sheet at a specified scale utilizing a view port or equivalent mechanism within the CAD software. This is done to prevent scaling inefficiencies and discrepancies between multiple views relating to the same drawing. It also provides a more rapid ability to scale a view up or down as necessary.

When selecting a scale, it should be kept in mind that the 11x17 drawing sheet is half the size of the traditional sheet format that has historically been used within the WSDOT Bridge and Structures CAD environment. This will require selecting a scale that is generally half the size of what would traditionally be used (i.e., for instances typically requiring the use of ¼" = 1'-0" scale will now require the use of ⅛" = 1'-0" scale.). Generally, the minimum scale for a section detail with rebar is 3⁄16" = 1'-0". The minimum scale to be used on steel details should be no less than ⅜" = 1'-0". The scales chosen shall be the architectural or engineering scales specified in Tables 11.1.4.D-T1 and 11.1.4.D-T2 below.

Table 11.1.4.D-T1

Architectural Scales			
Scale	**Factor**	**Decimal**	
1’ = 1’-0”	1:1	1.0	Full Size
6” = 1’-0”	1:2	0.5	Half Scale
3” = 1’-0”	1:4	0.25	Quarter Scale
1-½” = 1’-0”	1:8	0.125	
1” = 1’-0”	1:12	0.083333	
¾” = 1’-0”	1:16	0.0625	
½” = 1’-0”	1:24	0.041667	
⅜” = 1’-0”	1:32	0.031250	
¼” = 1’-0”	1:48	0.020833	
3/16” = 1’-0”	1:64	0.015625	
⅛” = 1’-0”	1:96	0.010417	
3/32” = 1’-0”	1:128	0.007813	
1/16” = 1’-0”	1:192	0.005208	
3/64” = 1’-0”	1:256	0.003907	Use sparingly or avoid if possible
1/32” = 1’-0”	1:384	0.002604	Use sparingly or avoid if possible
1/64” = 1’-0”	1:768	0.000651	Use sparingly or avoid if possible

Table 11.1.4.D-T2

Engineering and Civil Scales			
Scale	**Factor**	**Decimal**	
1” = 5’	1:60	0.016667	
1” = 10’	1:120	0.008333	
1” = 15’	1:180	0.005556	
1” = 20’	1:240	0.004167	
1” = 25’	1:300	0.003333	
1” = 30’	1:360	0.002778	
1” = 35’	1:420	0.002381	
1” = 40’	1:480	0.002083	
1” = 50’	1:600	0.001667	
1” = 60’	1:720	0.001389	
1” = 70’	1:840	0.001190	
1” = 80’	1:960	0.001042	
1” = 90’	1:1080	0.000926	
1” = 100’	1:1200	0.000833	
1” = 150’	1:1800	0.000555	
1” = 200’	1:2400	0.000416	
1” = 300’	1:3600	0.000277	Use sparingly or avoid if possible
1” = 400’	1:4800	0.000208	Use sparingly or avoid if possible
1” = 500’	1:6000	0.000166	Use sparingly or avoid if possible
1” = 1000’	1:12000	0.000083	Use sparingly or avoid if possible

It is important to note that some of the scales may not be found on a standard Architect's or Engineer's scale as they were sized down by half to accommodate the 11x17 sheet deliverable requirement. For this reason, scales are not to be shown in the plans, and therefore the contract plan sheets are not to be used to take measurements in the field.

Care shall be taken to ensure that all structural elements are accurately drawn, and that views and annotations have been scaled and displayed properly.

Sections and views may be enlarged to show more detail, but the number of different scales used on any one sheet should be kept to a minimum.

11.1.4.E Typical Plan Sheets and Plan Sheet Contents

This section discusses typical structural plan sheet types and their contents.

11.1.4.E.1 Layout

The Layout sheet shall contain, but is not limited to:

- Plan View with ascending stations from left to right.
- Elevation View shown as an outside view of the bridge and should be visually aligned with the plan view.
- The original preliminary plan will be used to continue designing the final layout. Views, data, and notes may be repositioned to improve the final product.
- Items on the preliminary plan, which should not appear on the final layout are as follows:
  - Typical roadway sections.
  - Vertical curve, superelevation and curve data for other than the main line.
  - Other information that was preliminary or that will be found elsewhere in the plans.
- Items not normally found on the preliminary plan, which should be added:
  - Test hole or bore hole locations added to plan view when necessary.
  - Elevation view of footings, seals, piles, etc. Show elevation at Bottom of footing and, if applicable, the type and size of piling.
  - General notes above legend on right hand side, usually in place of the typical section.
  - Title "LAYOUT" in the title block and sheet number in the space provided.
  - Other features, such as lighting, conduit, signs, excavation, riprap, etc. as determined by the designer.

The preliminary plan checklist in Appendix 2.2-A4 can be used for reference.

11.1.4.E.2 General Notes and Construction Sequence

The General notes shall contain the following information:

- Reference to the current edition of the WSDOT *Standard Specifications*.
- Reference to the current edition of the AASHTO LRFD design specifications.
- Reference to the current AASHTO Seismic design specifications and seismic design category information.
- The types of concrete allowed on the project.
- Abutment backfill requirements.
- Concrete cover requirements.
- Concrete foundation seal information.
- Pile or shaft information.
- Material requirements.

Additionally, if possible, the construction sequence should be placed on this sheet. If there is not room on the General Notes sheet, the construction sequence shall be its own sheet immediately following the General Notes sheet.

11.1.4.E.3 Foundation

An abutment with a spread footing has a Footing Plan. An abutment with piles and pile cap has a Foundation Layout.

The Footing Layout is a plan of the bridge whose details are limited to those needed to locate the footings. The intent of the footing layout is to minimize the possibility of error at this initial stage of construction.

The Foundation Layout is a plan of the bridge whose details are limited to those needed to locate the shafts or piles. The intent of the Foundation layout is to minimize the possibility of error at this initial stage of construction.

Other related information and/or details such as pedestal sizes, and column sizes are considered part of the pier drawing and should not be included in the footing layout.

The Footing Layout should be shown on the layout sheet if space allows. It need not be in the same scale. When the general notes and footing layout cannot be included on the first (layout) sheet, the footing layout should be included on the second sheet.

Longitudinally, footings should be located using the survey line to reference such items as the footing, centerline pier, centerline column, or centerline bearing, etc.

When seals are required, their locations and sizes should be clearly indicated on the footing layout. Seal depth and elevations should be shown on abutment and pier sheets as required. The Footing Layout should have references to the pertinent information on those sheets.

The Wall Foundation Plan for retaining walls is similar to the Footing Plan for bridges except that it also shows dimensions to the front face of wall.

11.1.4.E.4 Piles and Shafts

Pile and shaft details will be associated with a Foundation Layout or a Footing Layout (if the footing is to have piles below, acting as a pile cap more so than a spread footing).

These detail sheets will come immediately after the Foundation Layout or Footing Layout if they are to be used to support an Abutment or directly after the abutment sheets if used to support Intermediate Piers.

Best practice is to have a set of shaft or pile details for each pier, however, the design engineer may choose to use one set of details for the whole bridge plan set, as long as all variables and conditions are addressed and would be clear to the contractor reading the plans.

Typically, when showing items below ground, they would be detailed using a hidden line style. However, because the shaft "elevation" is detailed more like a section, it is not necessary, and in fact, discouraged to show the below ground portions as hidden.

Bridge elements that have not yet been built should not be shown, unless it is to add clarification to the condition being detailed. For example, a shaft cap may be shown to highlight the penetration depth of the shaft into the cap.

Any future element (elements that will be built but have not been built at the current point within the plan set) shall be shown using a FUTURE line style in accordance with Figure 11.3.3.B-1.

11.1.4.E.5 Abutment

Abutment piers shall be detailed separately due to the elevation views being opposite directions in relation to stationing. This will mitigate any chance for confusion in the field due to asymmetrical profiles or grades, and any differences in skew.

Bridge elements that have not yet been built will not be shown. For example, the superstructure is not to be shown, dashed or not, on any substructure details.

Elevation information for seals and piles or shafts may be shown on the abutment or pier sheets. Seal depth and elevations may be shown on abutment or pier elevation views and may also be shown on section views only if required for additional clarification.

Seals should be shown on Abutment or Pier sheets as necessary but should not include dimensions already specified on the Footing Layout.

Views are to be oriented so that they represent what the contractor or inspector would most likely see on the ground.

Pier 1 elevation is often shown looking back on stationing. A note should be added under the Elevation Pier 1 title stating, "SHOWN LOOKING BACK ON STATIONING".

11.1.4.E.6 Wingwall Details

Wingwall detail sheets shall be placed directly after each set of Abutment detail sheets.

These sheets are permitted to show superstructure components, even though they would not be built at the time the wingwalls are being built. This is to show relational data, such as open joint dimensions and top slope of wall in relation to deck haunch. The future substructure components shown shall be detailed in a FUTURE line style in accordance with Figure 11.3.3.B-1 to represent a future component to be built.

Each abutment should have its own set of wingwall detail sheets, however, each wingwall for that particular abutment pier may be represented concurrently by a single set of details using elevation tables and other multi- data representations to differentiate between each wall. Additionally, the design engineer may permit the use of a single set of wingwall sheets for all wingwalls within the project so long as all the information requirements are met and would be clear to the contractor.

11.1.4.E.7 Intermediate Piers

Best practice dictates that each pier should be detailed separately.

If the intermediate piers are identical except for height, then they may be shown together at the discretion of the design engineer, so long as the design intent and the information pertaining to each pier is clear and easily understood.

11.1.4.E.8 Bearing Details

Typically shown after all substructure details directly before the girder framing plan.

Only one bearing detail sheet is needed in the plan set. If multiple are required, they should be directly placed after all detail sheets for each abutment pier and their attached structures (i.e. wingwall sheets)

11.1.4.E.9 Framing Plan

Girder Lines must be identified in the plan view (Gir. A, Gir. B, etc.).

For adjacent deck girder bridges, such as slab girders and wide flange thin deck girders, the framing plan shall be based on the girder centerline or centerline work point rather than the gap width between adjacent girders.

Girder spacing shall be measured and dimensioned normal to the alignment line in the following situations:

- All bridge types where all girders are parallel to the alignment line and parallel to each other, whether straight or curved, regardless of pier orientation.
- Straight bridges with splayed girders and piers normal to the alignment

Girder spacing shall be measured and dimensioned along the centerline of bearings in the following situations:

- Straight bridges with splayed girders and skewed piers
- Curved bridges with splayed or chorded girders regardless of pier orientation

Framing plans shall show the centerline of bearing offset from pier centerlines and back of pavement seat.

Framing plans shall show a spacing offset dimension to one of the girders nearest to the alignment line.

Overhang dimensions should not be shown where the dimension varies along the bridge.

11.1.4.E.10 Typical Section

Typical Section views shall show, at a minimum, the following information:

- Girder spacing, which is tied to the bridge construction baseline.
- Roadway slab thickness, as well as web and bottom slab thicknesses for box girders.
- "A" dimension.
- Limits of pigmented sealer.
- Profile grade and pivot point and cross slopes.
- Utility locations.
- Curb to curb roadway width.
- Soffit and drip groove geometry.

11.1.4.E.11 Girder Details

Prestressed girder sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

11.1.4.E.12 Diaphragms

End diaphragm sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

Only one set of End Diaphragm details is required, however, specific conditions may warrant a separate set of details for each End Diaphragm. This will be at the discretion of the Design Engineer.

Intermediate diaphragm sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

Only one set of Intermediate Diaphragm details is required if there are multiple diaphragms, however, specific conditions may warrant a separate set of details for each Intermediate Diaphragm. This will be at the discretion of the Design Engineer.

11.1.4.E.13 Deck Reinforcing

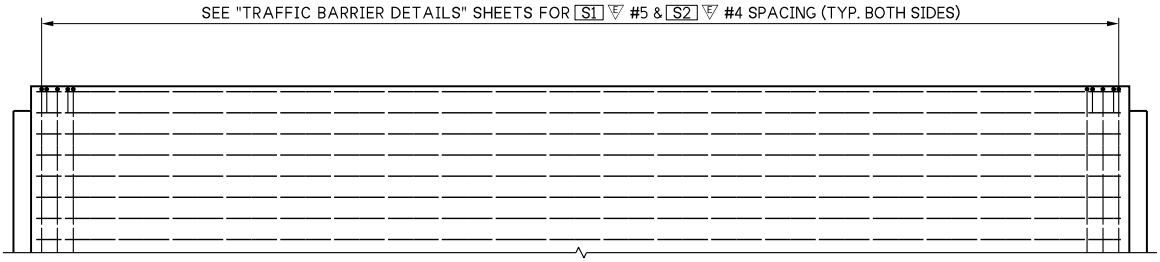
This section covers requirements for both the reinforcing plans and transverse section views.

On bridge deck reinforcing plans, it is permissible to show the top mat reinforcing on one half of the deck and the bottom mat reinforcing on the other half of the deck rather than create two separate plan sheets. This can either be done using the centerline of the structure to divide the deck vertically or a vertical centerline, transverse to the alignment, to divide the deck horizontally. In order to show both top and bottom mat plans in the same plan view, three conditions shall be met.

- Plan readability is not compromised.
- The design intent remains clear.
- Each half of the bridge deck is clearly marked as to which bar mat is shown (typically with a long style dimension with a double arrow at the far end).

Traffic barrier reinforcing bars shall be called out on the Bridge Deck Reinforcement Plan sheet by using an overall dimension as shown in Figure 11.1.4.E.13-1. The S1 and S2 bars are to be detailed, dimensioned, and their spacing shall be shown only on the Traffic Barrier Details 1 sheet.

Figure 11.1.4.E.13-1



11.1.4.E.14 Expansion Joints

Expansion joint details are typically on a stand-alone sheet group that comes after the superstructure deck sheets. The expansion joint details at the approach slab may be shown on the approach slab sheets if the plan set is to include approach slab sheets.

Expansion joint sheets can be copied from the Bridge Office Library, but they must be modified to match the project requirements.

11.1.4.E.15 Traffic Barrier

Traffic barrier sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

11.1.4.E.16 Railing or Fence

Railing or Fence sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

11.1.4.E.17 Approach Slabs

Approach slabs are typically shown and dimensioned on the Layout sheet and denoted with a reference to Std. Plan A-40.50-03.

If the approach slab falls outside of the design parameters established by standard plan A-40.50-03, then a set of approach slab detail sheets shall be included in the plan set.

Existing bridge approach slab sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

11.1.4.E.18 Signs and Sign Structures

Sign and Sign Structure sheets can be copied from the Bridge Office library, but they must be modified to match the project requirements.

These only pertain to signage that will be attached to the bridge or supporting bridge structure.

11.1.4.E.19 Architectural Treatment

The Bridge Office Architect is responsible for designing and approving much of the architectural treatment to be used. Detailers will work with the Bridge Office Architect to incorporate the treatment and associated details into the plan set.

If a standard drawing exists in the Bridge Office library, it is permissible to copy these and modify them as necessary.

If there are no standard drawings in the Bridge Office library, the Bridge Office Architect may approve the use of a similar set of details from an existing plan set, as long as the details used are modified to meet the requirements of the current plan set.

If no standards or examples exist, the Bridge Office Architect is responsible for the design and requirements of the Architectural Treatment.

Basic treatments that are commonly used (i.e. Fractured Fin finish) may be incorporated into the detail or plan sheets it pertains to, such as traffic barrier or wingwall sheets, and have standard details that already exist for use without the need of the Bridge Office Architect to design or approve the use of.

More complex instances may require Architectural treatment to be its own set of plan sheets.

11.1.4.E.20 Bar List

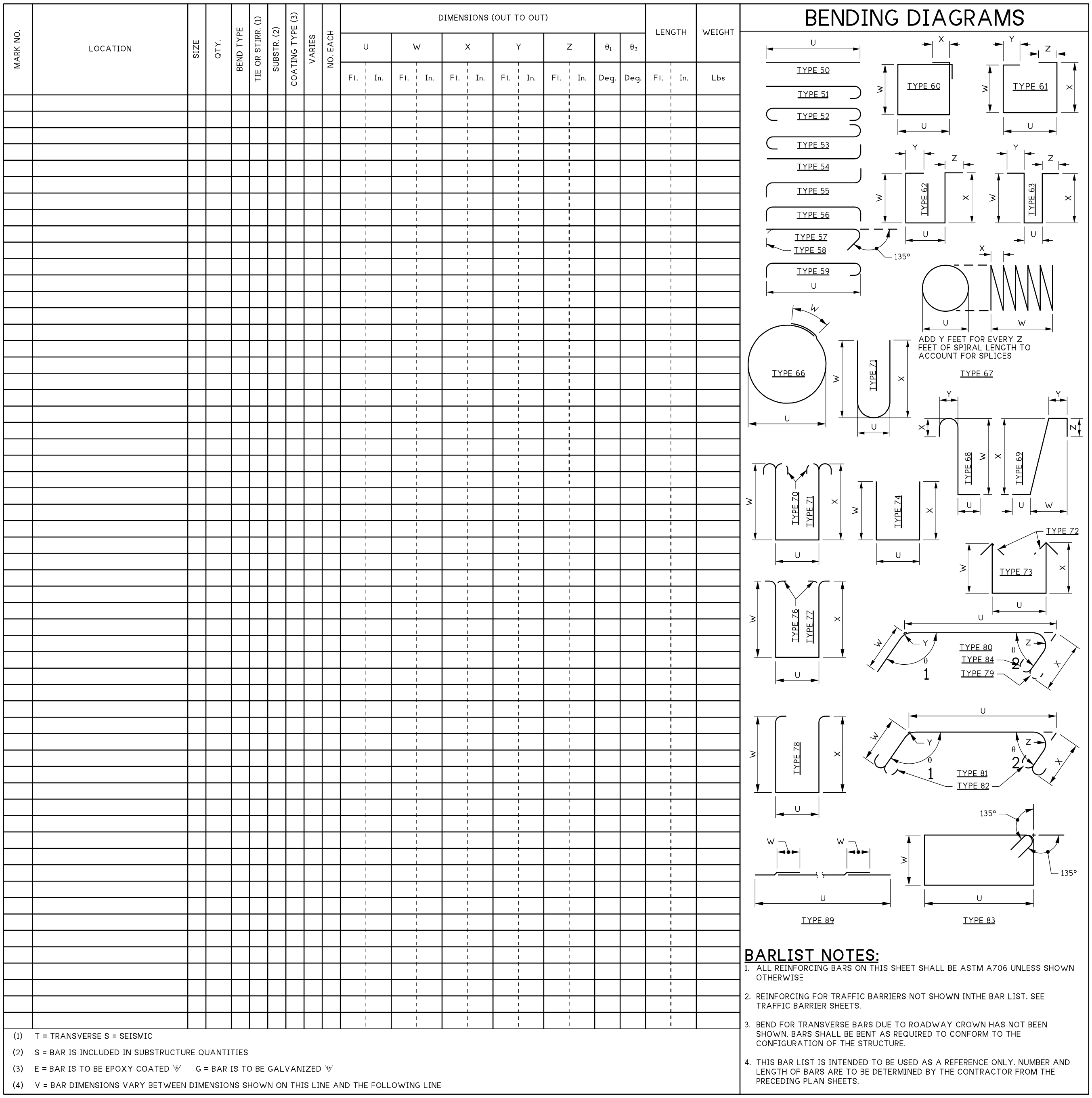
Bar list sheets shall be prepared for bridge plan sets and shall be placed at the end of each bridge plan set.

Bar list sheets are not to be stamped.

Bar list sheets are provided as a convenience to the contractor and are to be used at the contractor's own risk and discretion. Despite this warning, it has been noted that the bar list has been used directly to fabricate the reinforcing bars without confirming details from the plan. To mitigate the risks posed by this issue, designers should strive for accuracy in the bar list. An accurate bar list also serves as a checking mechanism and a way to calculate reinforcing quantities.

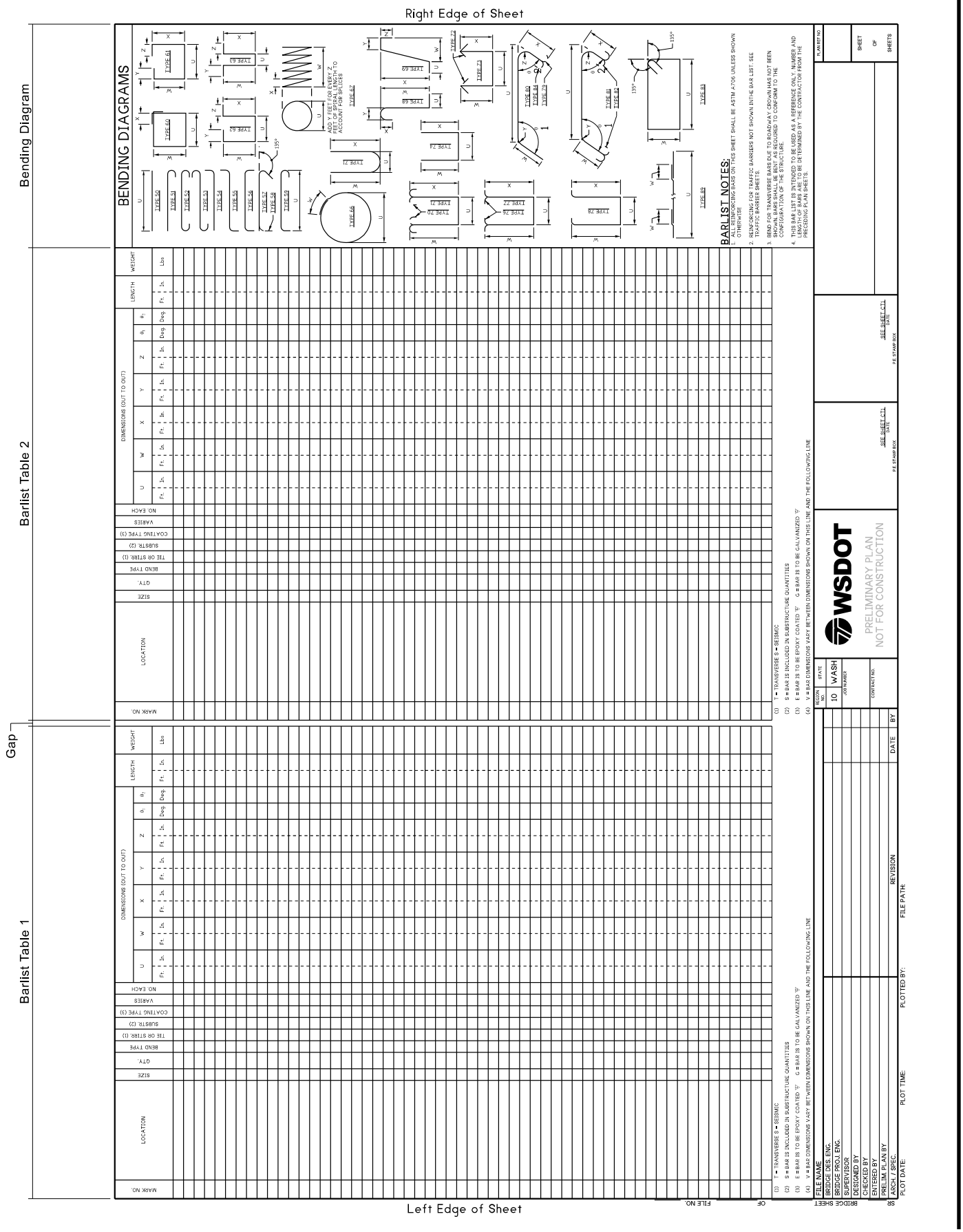
Each bar list sheet shall consist of at least one bar list table but may include two tables placed adjacent to one another depending on the project requirements, and a bending diagram. See Figure 11.1.4.E.20-1 for the bar list table with bending diagram.

Figure 11.1.4.E.20-1



The sheet shall be formatted with the bending diagram placed along the right edge of the sheet and the bar list table(s) placed to the left of the diagram. If one table is used, it may be placed in the center of the drawing area, otherwise should be placed directly adjacent to the bending diagram for ease of reference. If two bar list tables are needed (this is the typical condition for most projects) the tables shall be placed adjacent to one another, left to right, in ascending order. The first table shall be placed along the left edge of the sheet while the second table shall be placed along the left edge of the bending diagram. This creates a small gap between the two tables which allows for graphical separation and provides an easier to read format. See Figure 11.1.4.E.20-2.

Figure 11.1.4.E.20-2



Reinforcing for some structural members such as approach slabs, traffic barriers, or retaining walls (ultimately determined by the design engineer) are not shown in the bar list sheet(s) but may include their own bar list and bending diagrams on their respective plan sheet(s). These components typically have shop plans, include reinforcing within their unit costs and/or are constructed by separate sub-contractors.

11.1.4.F Plan Sheet Organization

Plan sheets should be assembled in the order of construction and be clear and logical when moving from one sheet to the next.

Bridge and other structural plans can be broken into Plan Groups. A Plan Group is a grouping of all the corresponding plan sheets for one particular bridge or structure within a project, to include all primary and auxiliary structures and structural components.

Sheet numbering shall start with the letter designator for the discipline followed by the letter designator for the plan group location within the project (i.e. A is the first structure, or plan group, in the project, B is the second structure, and so on). Plan group designators follow alphabetical order and are to be assigned to each bridge as it appears in the project along stationing. See Table 11.1.4.F-T1 below.

An example would look like “BA1”. “B” represents the Bridge discipline, “A” denotes this is the first bridge in the project and “1” denotes the plan group sheet number, in this case, the first sheet in the plan group.

As a general rule, plan group designators should avoid using the letters “I” and “O” as they may become confused with a one “1” or zero “0”.

If there is only one bridge or structure plan group in the project plan set, the plan group letter designator should use the 2-letter plan designator as defined in the WSDOT *Electronic Engineering Data Standards* (EEDS) manual (i.e. BG for bridges, WA for walls, etc.).

Table 11.1.4.F-T1

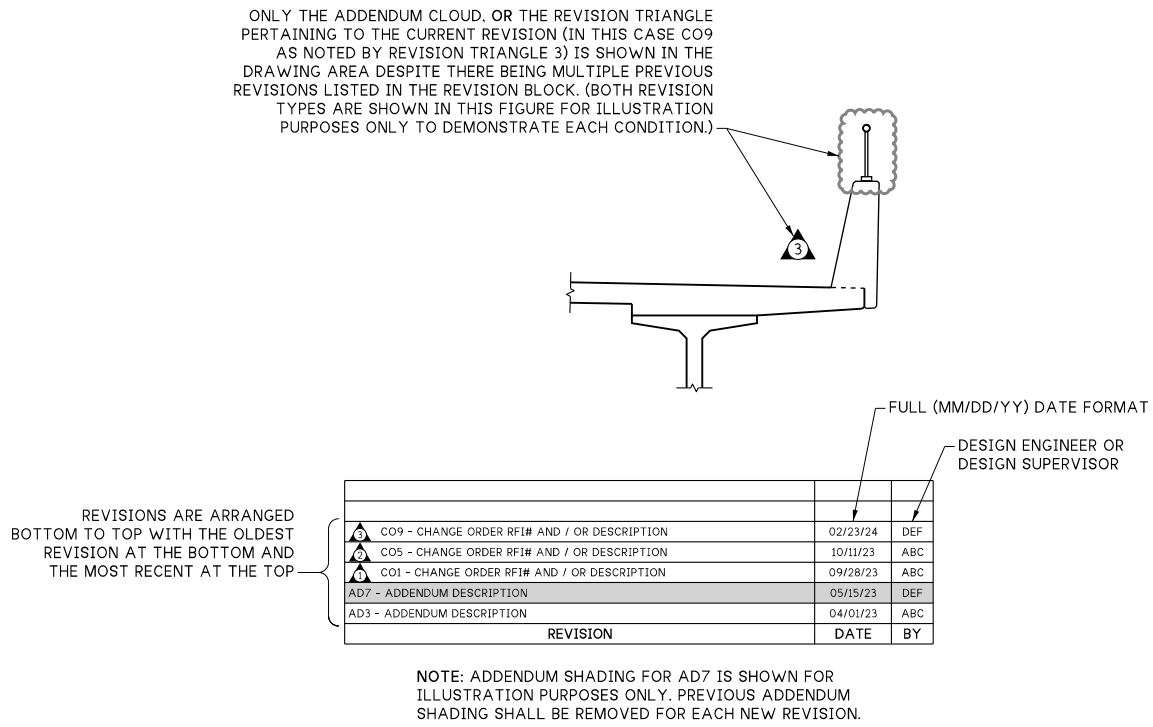
Structural Plan Discipline Designators	
Discipline Designator	**Definition**
B	Bridge
S	Sign Structure
W	Wall

If one of the listed disciplines in Table 11.1.4.F-T1 are part of a bridge plan group (i.e. a sign structure attached to a bridge in conjunction with other rehab or retrofit plans occurring on that bridge, or wingwalls on a bridge abutment) their associated sheets would fall under the Bridge discipline and would not fall under their stand- alone discipline such as “S” or “W”.

11.1.5 Plan Revisions

All addendums and change orders will be noted in the revision block at the bottom of the sheet. For the purpose of this section, change orders and addendums will be referred to collectively as revisions unless otherwise necessary.

Figure 11.1.5-1



Best practice dictates that any time a revision occurs, a new sheet should be generated by copying the desired sheet and related details to be modified and making the revisions on the copied sheet and details. This ensures the original sheet and associated data exists in an unmodified state that can be referred or reverted back to at a later time as necessary. It is best to leave the original details as they are and make any revisions in a copy of that detail.

11.1.5.A Addenda

Addenda are made after general distribution and project ad but before the contract is awarded. Changes made to the plan sheets during this time shall be shaded or clouded in accordance with the *Plans Preparation Manual* Appendix 5 (note that all table entry revisions shall be shaded). Subsequent addendums are shaded and the shading from previous addendums is removed. Additionally, addenda shall be noted in the revision block as “AD#” followed by a dash and the addendum description. For example, “AD1 – CHANGE TB F-SHAPE TO SINGLE SLOPE 42 TB” denotes addendum number 1 and describes the main purpose of the revision on the particular sheet. Addenda will be numbered according to the assigned addendum number from the region office and may skip numbers on the bridge plans, as certain addenda may only pertain to other contract documents, such as roadway plans or special provisions. For example, it would not be uncommon to see addenda listed in the revision block numbered in a fashion such as “AD1, AD3, AD7, etc.” See Figure 11.1.5-1.

11.1.5.B Change Orders

Change orders are made after the contract has been awarded. Changes will be marked with a revision number inside a circle within a triangle, commonly referred to as a revision triangle. Revision triangles shall appear in a standard numerical sequence (1, 2, 3 etc.) within the revision block. Immediately following the revision triangle should be the official change order number provided by the regional PEO in accordance with the WSDOT *Construction Manual* Section SS 1-04.4. Directly after the change order number will be a dash separating the number and the description, followed by the revision RFI number and/or the revision description. For example: "△2△ CO9 – AA123 WIDEN BRIDGE FOR NEW LANE". Note that the plan revision triangle number and the change order may not match, as shown in the above example. For additional examples, see Figure 11.1.5-1.

The date block of the revision table should contain the date of the revision request, but if not provided by the regional office, may be substituted by the date the revision design work was completed.

The "BY" field should contain the designer's initials.

In the event there are multiple revisions on a given sheet, the previous revision information shall remain in the revision block. Revisions shall appear chronologically in the order received, starting with the oldest revision at the bottom. The revision shall be placed on the next available line above the revisions, however, only the current iteration shall be shaded, clouded, or referenced in the drawing area. See Figure 11.1.5-1.

11.1.6 Use and Management of Standards

The Standards and practices defined in this chapter for CAD resources are the responsibility of the WSDOT Bridge and Structures Office CAD Applications Engineer.

Any request to update, correct, or add standards and resources shall be addressed to the WSDOT Bridge and Structures CAD Applications Engineer. The following are the procedures for a Standards Update Request:

Request is received by the CAD Application Engineer.

The request is reviewed by the CAD Applications Engineer and/or WSDOT CAE to determine viability and feasibility of the requested service.

If after review the update is rejected, a written explanation of the reason for rejection will be sent to the original requestor and no update will be performed.

If the service requested is accepted it will be prioritized as low, medium, high, or critical based on the impact to production and in relation to other requests in the queue.

Once the requested service is completed, the CAD resources will be updated and pushed out to all parties. This should also include a written correspondence to, at a minimum, the initial requesting party.

11.1.6.A General

The WSDOT Bridge and Structures Office is responsible for defining and maintaining the standards set within this manual only. All other manuals referenced within this section are the responsibility of their respective groups or the WSDOT Computer Aided Engineering (CAE) support group.

WSDOT Bridge and Structures uses standard practices and resources as specified in this manual as well as standard design drawings and example sheets of various common bridge elements to standardize and streamline the sheet development process.

11.1.6.B Use of Standards

Standards as defined in this section shall be followed as specified unless otherwise allowed. The intent is to ensure all entities, both internal and external to WSDOT, designing a structure within the scope of the Bridge Design Manual meet the same graphical, data, and deliverable requirements in a uniform and consistent manner.

Although the use of standards is required, the Standard Design Drawings provided by the WSDOT Bridge and Structures Office are to be considered as nothing more than examples of items like girders or traffic barriers which are often used and are very similar from job to job. These are intended to create a starting point with all applicable standards (i.e., levels, line styles, display styles, etc.) applied, which will help streamline drafting and design efforts.

They are to be copied to a structure project and modified to fit the particular aspects of the structure. They are not intended to be included in a contract plan set without close scrutiny for applicability to the job.

11.1.6.C Maintenance of and Changes to Standards

New Standard Design Drawings and revisions to existing drawings shall be approved by the Bridge Design Engineer and shall be made according to the same office practices as contract plan sheets.

Ownership and maintenance of Bridge Standard Drawings is the responsibility of the drawing owner. Drawings are owned by the engineer responsible for the corresponding BDM chapter or section within the chapter in which they appear. The CAD Applications Engineer role is to ensure CAD standards are followed in accordance with this chapter as well as the WSDOT *Electronic Engineering Data Standards* (EEDS) Division 3-S5 PS&E Standards for any standard symbology not defined in a Bridge and Structures Office Standard library or the Bridge Design Manual. The CAD Applications Engineer will also ensure the folders containing the Standard Drawings are properly updated and that the Standard Drawings are published to the WSDOT Bridge and Structures Website.

The procedure for updating existing Bridge Standard Design Drawings or developing new Standard Design Drawings is:

1. The drawing owner receives a request to update or correct a drawing. The drawing owner may also initiate updates on their own as required.
2. Drawing owner will mark up drawings.

3. The drawing owner will first work within their assigned design team to have an available detailer revise the drawings. Assistance can be provided by the CAD Applications Engineer as needed.
4. Modifications shall be made to a copy of the Standard Drawing. The current standard shall not be altered. This is to ensure previous designs are archived and the ability to roll back to a previous version, if necessary, is preserved.
5. The completed Standard Drawing will be reviewed by the drawing owner to ensure changes have been made correctly and by the CAD Applications Engineer for conformance with the CAD Standards.
6. The drawing owner will send the updated Standard Drawing to the Bridge Design Engineer.
7. Once the completed drawing is approved for use, the CAD Applications Engineer will update the standard drawing library, publish the drawing to the Bridge Office website, and notify the Bridge Design Office of the updates.

11.2 CAD Project Management

Managing the CAD project should be regarded with the same importance as completing the CAD work itself. This section outlines how WSDOT Bridge and Structures, as well as any other agency or consultant group utilizing the WSDOT Bridge and Structures CAD environment and resources will manage WSDOT bridge project CAD work within the WSDOT Bridge ProjectWise environment.

The Bridge and Structures Office utilizes Bentley Systems® ProjectWise™ to manage CAD projects both internally to WSDOT, and externally with consultant firms. The intent of ProjectWise is to provide a centrally managed location that provides a standardized folder structure, file attributes, and CAD resources via Managed Workspaces. The goal is to promote more consistent planning, communication, and design between multiple different offices and agencies. This section will discuss the WSDOT Bridge and Structures ProjectWise environment, Managed WorkSpaces, and folder and file level attributes and tags. The standards contained within this section shall be utilized by WSDOT Bridge Office users and any consultant performing work on a WSDOT Bridge contract who has opted to use WSDOT's CAD platform and resources.

11.2.1 WSDOT Bridge Project Environment

11.2.1.A Directory and Folder Structure

The **Bridge Design** root directory has three main folders:

_Design Projects

This folder contains a directory of each State and Federal highway. Within each State route is a list of structures that exist along that route.

Under each structure folder exists project folders. These project folders represent the various efforts enacted on the structure over time.

Within the project folders are designated folders to place CAD files, output files such as PDF plan sets, project documentation, and project specific standards (i.e., specific cells, line styles, seed files, etc.) that may be required.

_Design Standards

This folder contains the WSDOT Bridge and Structures Office Standard Design Drawings

Each component type will have its own subfolder under the _Design Standards root folder (i.e., Traffic Barriers, Girders, etc.).

Within each component type subfolder there may be additional subfolders for variations of the component (i.e., WF Girders, Single Slope Traffic Barriers, etc.).

Each component type subfolder (or variation folder if applicable) will have a CAD folder and an output folder.

_Tools and Resources

This folder contains various tools, technotes, and resources to aid in CAD production and project management.

The contents of this folder are only available to the Bridge Office and therefore will not be further detailed in this section.

11.2.1.B User Access Control

The Bridge Office ProjectWise structure is intended to provide project management and coordination in a uniform and standardized approach. In order to accomplish this, user access controls are utilized to limit who can access, modify, create, delete, and manage permissions within files and folders. Access controls can be assigned to specific individuals, groups, roles, or everyone. These limitations ensure that each project structure is relatively the same regardless of what project directory it is in.

User Groups help simplify access control management by applying the access level permissions to the group, then assigning users to be members of the group. The following is a list of user groups and their basic access permissions and roles.

Administrator

The administrator is the overall ProjectWise Administrator assigned by the WSDOT CAE group. This group is limited to very few specific individuals and has full control of all groups, access, folders, and files within ProjectWise.

CAE_Coordinators

This group contains each CAE project coordinator. This group typically has read and write access and can create or delete folders and projects within all plans production and project directories. This group is part of the WSDOT CAE Helpdesk and is intended to provide production support as needed. This group is not intended to be the primary point of contact for WSDOT Bridge and Structures projects.

HQ_Bridge_ProjectWise_Coordinator

This group is the Bridge and Structures ProjectWise administrator. This group typically has full control permissions to all files and folders within the BridgeDesign folder. This group is the primary point of contact for Bridge Office project creation and directory management.

HQ_304030_BridgeDesignConstSection

This is the group for typical Bridge and Structures Design Office CAD users. This group has the ability to work within the project directories that have been set up. This group has access rights to read, write, modify, add, and delete files, but cannot modify, create, or delete folders nor change access permissions.

HQ_304030_BridgePreservationSection

This group is comprised of typical Bridge Preservation Office users. Their access is typically limited to read-only within the Bridge Design Projects directory.

Consultant Groups

Each consultant firm who is utilizing the WSDOT Bridge Office's CAD platform will have a user group made with their specified users. The permission levels will generally act the same as the HQ_304030_BridgeDesignConstSection user group, but only within that specific project.

Everyone

This group applies to all users within ProjectWise. This group typically has view only access to directories and folders and read only access to documents in select folders. This group typically has the most restrictive access privileges.

Individual Users

Though not technically a group, individual users can be granted specific permissions as necessary to directories, folders, and documents. This is not a preferred methodology of access control, rather, a single user who needs a specific level of control should be placed in the appropriate user group.

11.2.2 Project Setup

Project WorkSpace creation, is limited to ProjectWise administrator and WSDOT CAE coordinator groups. All project requests for Bridge and Structures Office projects must go through the Bridge and Structures Design Technology Unit or the WSDOT CAE Help Desk. Once this step is done, the project WorkSpace folder will be created, appropriate permissions and group access policies will be applied and the project location link within ProjectWise will be sent to the appropriate design unit and/or consultant group. The subsections below further define the 3 major processes during the project creation step.

11.2.2.A Project Request

The Project Request will be submitted by the requesting design group using the Project Request Form in Appendix 11.4-A6. All information should be filled out as completely as possible as this will be used to create the project Work Area and apply any pertinent project information to the project CAD files.

Within the Project Request Form, the lower section regarding group access control, the Bridge, Construction, and Design (region) offices will always be included. There are other options to include as needed. If utilizing outside consultants for design and/or production of bridge plans, include the consultant firm's name in one of the "Firm:_" boxes, along with pertinent user information in the field to the right of the check box for that row.

11.2.2.B WorkSpace and Folder Creation

The first thing to be done upon project request is that a Bridge Office ProjectWise Coordinator or CAE ProjectWise Coordinator or Administrator will determine whether a Work Area for the structure to be enacted upon currently exists in the appropriate State Route folder structure within ProjectWise. If it does not exist, they must first create the structure Work Area and assign all attributes and permissions to that Work Area folder as required. If it does exist, they will proceed to create the project Work Area under the structure Work Area folder using the appropriate Work Area template within ProjectWise. The procedures for creating these folders, Work Areas, and associated files are specified by WSDOT CAE internal procedures and are only authorized to be performed by ProjectWise Coordinators and Administrators designated by WSDOT CAE.

11.2.2.C Providing the Project Link

Once the project has been created in the appropriate directory, the ProjectWise link to the project location shall be sent to, at a minimum, the primary point of contact for the design unit responsible for delivering the project. If a consultant firm is providing the deliverables, a link shall be sent to both the consultant firm's primary point of contact for the project, as well as the WSDOT Bridge personnel responsible for carrying out the Quality Verification (QV) tasks in accordance with BDM Sections 1.4.4 and 1.4.5.

11.2.3 Project Naming Conventions

Standard naming conventions are important to consider when managing files and folders within a directory. Standard naming conventions help to organize, locate, and describe files and folders in a way that's easily understood by everyone operating within the directory environment. This section will discuss the naming conventions used by WSDOT Bridge and Structures within ProjectWise to manage CAD projects and assets.

11.2.3.A Route Naming

Each state route will have its own folder which contains all of that particular route's assets.

The naming of the route will be a three-digit numeric name only and will not include any prefixes such as "US", "SR" or "I". This allows the route number to display in numerical order in within the folder structure and keeps the naming uniform and as minimal as possible.

Examples:

The folder name for US2 would be **002**

The folder name for I-90 would be **090**

The folder name for SR167 would be **167**

11.2.3.B Asset Naming

For the purposes of this chapter, assets are considered any structure that is being built, maintained, is owned and/or inventoried by WSDOT.

Assets are named in ProjectWise under their respective primary route number (i.e., 002 for US2).

There are two methods for naming assets, dependent upon the asset type:

Bridges shall be named in accordance with WSDOT Bridge Preservation Office practices. These practices place the asset type of BR followed by a space, then followed by the asset number separated by a single dash (-) directly followed by the cardinal direction (N, S, E, W) relating to the structure if applicable. There is no space between the bridge number and the cardinal direction.

Example: the naming for a bridge whose number is 1/123 South would be written as **"BR 1-123S"**.

Other structures will begin with the asset type category followed by an underscore. Next will be the beginning milepost in the format **123.4** followed by an underscore. Last will be the structure descriptor or name such as "Noise Wall" or "White Pass VMS".

Example: The naming for a VMS sign structure at white pass would be written in the format **"SN_123.4_WhitePassVMS"**.

The methodology for categorizing structures based on the 2-letter structure category code followed by the structure number or milepost is intended to do two things:

First, the 2-letter structure category code organizes and groups the structures underneath a single route folder into easily identifiable categories. This enables easier management and location of individual assets and associated projects based on asset type.

Second, the structure number or milepost allows the listing of individual assets within a structure category numerically and in ascending order based on location along the route.

Table 11.2.3.B-T1 below shows a listing of structural category codes used by WSDOT Bridge and Structures to categorize assets within ProjectWise.

Table 11.2.3.B-T1

Category	Description
BR	Bridge and Buried Structures
MC	Miscellaneous Structures
SN	Sign Structures
WA	Walls

11.2.3.C Project Naming

Projects within ProjectWise will be named as simple as possible. Typically, the WSDOT region office assigns a project name to the entire corridor project which will be placed in the title block of all plan sheets. However, those project titles are usually long and subject to change. To avoid any potential issues with file path length as well as possible renaming of the project file if the project name changes on the contract, WSDOT Bridge and Structures projects are simply named in the following format:

YYYY_ProjectType_WorkOrderNumber (YYYY is the four-digit year that the project design started, The ProjectType shall be the Primary effort being enacted upon the structure, regardless of whether multiple efforts are being undertaken. The WorkOrderNumber is the project charge number assigned to the whole project for the duration of the design and PS&E phase, typically in the format XL1234, which is not to be confused with the Job Number.)

For example, a WSDOT region project office might have an overall project titled **"US-2 ET-AL X AVE TO Y STREET PAVING AND BRIDGE EXPANSION JOINT REPAIR"** with a work order number of **XL5678** starting in the year **2024**. This title is considerably long to put into a file name and would possibly cause file path issues as well as be extremely cumbersome to manage in a directory. The project title within the Bridge and Structures Office ProjectWise directory would put the year in which the project started, and then based on the scope of work to be conducted on the structure, would place the primary effort type as the project name. This would be followed by the work order number to identify what overall project this effort is part of. If in this case the bridge was being paved, regardless of joint replacement, the paving would be considered the primary effort, as it is driving the joint replacement. This project would then be named **"2024_Paving_XL5678"**.

Keeping the naming simple helps make projects within a directory easy to find and manage by type. Starting the project title with the year also puts the efforts within a single asset into chronological order, thus creating an overview of various efforts undertaken on that structure over time.

Table 11.2.3.C-T1 shows common efforts and their descriptions. This is not a complete list of all project types and efforts.

Table 11.2.3.C-T1

Common Bridge and Structures Project Titles	
Title	**Description**
Bridge Replacement	Complete replacement of an existing bridge
Deck Modification	Widening projects, removal of sidewalks to expand traffic lanes, etc.
Deck Repair	Deck patch and repair jobs. May include overlay or paving as part of the effort.
Deck Replacement	Complete replacement of all or most of an existing bridge deck.
Joint Replacement	All major expansion joint and header replacements, or replacement of RCS or compression seal joints that are not part of a larger paving project
New Bridge	Installation of a new bridge, typically part of a highway realignment effort
Noise Wall	Installation of a new noise wall structure
Paving	Paving and paving with simple expansion joint replacement work. Includes HMA, Bituminous overlay, and concrete.
Retaining Wall	Installation of a new retaining wall structure
Seismic Retrofit	Any effort on a structure to strengthen it to meet current seismic load requirements
Sign Bracket	Installation of a sign bracket on an existing structure
Sign Bridge	Installation of a new sign bridge
Sign Structure Mod	Modification of any existing sign structure
Sign Structure Repair	Repair of any existing sign structure
Wall Modification	Modification of any existing wall structure
Wall Repair	Repair of any existing wall structure

11.2.4 Coordination and Communication

11.2.4.A Inter-Office Project Coordination

Communication and coordination are key elements of any successful project. It is important to establish and maintain clear, concise, and consistent lines of communication between all parties involved in the design and delivery of Bridge Office plans. Each group has a responsibility to submit requests for required data, CAD Files, and other necessary information to the appropriate group. Each group also has a responsibility to provide updates and alerts to all affected parties when any CAD or Project file is changed, for example, terrain and alignment files that have been changed in a way that alter the geometry or requirements of the bridge design.

In addition to general communication among offices, initial coordination during project setup is crucial. Some of the critical coordination events that need to happen are:

Initial agreement and scope of work provided.

Establish chain of communication with appropriate parties that will be undertaking the project work.

ProjectWise Work Area request submittal to Bridge ProjectWise coordinator or CAE group.

Request for appropriate CAD files and folder locations from the region project office in charge of the project through appropriate channels.

Providing the Bridge Office's project folder location in Project Wise to the appropriate region project office.

11.2.4.B Electronic File Sharing Policy

CAD files will be shared as part of contract advertisement in accordance with the WSDOT *Plans Preparation Manual* Section 700.01(4) Reference Information.

When sharing CAD files, all title block information shall be removed from the plan sheet for each file that is shared. Any disclaimers regarding content or accuracy shall be covered by the WSDOT *Plans Preparation Manual* Section 700.01(4) Reference Information and any documents, specifications, or provisions referenced therein.

For files that are shared after the initial AD submittal shall meet the conditions specified above as well as include a letter of disclaimer as a cover or an attachment to the plan sheet(s), indicating that attached plans are for information only and that WSDOT has no responsibility for accuracy of the contents. This letter of disclaimer shall also include a list of each file included in the file package being shared.

Bridge Office plan sheets may also be electronically shared if requested in PDF format. PDF files need to only include a letter of disclaimer as mentioned above. Time spent modifying and submitting electronic plan sheets shall be charged to the job or work order number provided by the construction PE's office.

This policy applies only to current projects under design or under contract. Historical or as-built plan sheets may only be shared in PDF format and shall include a letter of disclaimer as mentioned above.

11.3 Symbology Standards

This section is intended to specify the symbology standards and how certain CAD environment features are defined such as dimension styles, text styles, and levels. For information on how the symbology elements and features are utilized, please see Section 11.1 General CAD Practices.

11.3.1 Text, Notes, and Annotations

11.3.1.A Text Styles

Text styles are used to pre-define the size, font, color, and multiple other attributes of standard text within a CAD file. Text styles are used for all text within the CAD environment, including but not limited to:

- Standard Text
- Notes
- Callouts
- Text in Cells
- Note Flags
- Dimensions
- Tables and Schedules

Text is broken up into two primary categories, Body Text and Heading Text. Each of these categories may be further broken down into individual styles as necessary.

WSDOT Bridge and Structures uses the following text styles with the following requirements (all units are in Text Height Units unless noted otherwise):

TextBody

Used as the standard text style for notes, callouts, and annotations.

Text Size:	0.0058’ (approximately 9/128”)	
Font:	WSDOT CAE	
Justification:	Left Bottom	
Line Spacing:	1.62 (from line top)	
Intercharacter:	0.06	
Text Offset:	X = 0.00	Y = 0.12
Underline:	None	Offset = N/A
Mask:	None	
Mask Size:	X offset = N/A	Y offset = N/A
Mask Color:	N/A	

TextBody_Masked

Standard text style with a mask applied. Used for notes, callouts, and annotations that need to mask background elements.

Text Size:	0.0058' (approximately 9/128")	
Font:	WSDOT CAE	
Justification:	Left Bottom	
Line Spacing:	1.62 (from line top)	
Intercharacter:	0.06	
Text Offset:	X = 0.00	Y = 0.12
Underline:	None	Offset = N/A
Mask:	Yes	
Mask Size:	X offset = 0.62	Y offset = 0.62
Mask Color:	Border = 255 (RGB 0, 0, 0)	Background = 255 (RGB 0, 0, 0)

TextDims

Standard dimension text style based off of the TextBody_Masked style.

Text Size:	0.0058' (approximately 9/128")	
Font:	WSDOT CAE	
Justification:	Left Bottom	
Line Spacing:	0.50 (Exact)	
Intercharacter:	0.06	
Text Offset:	X = 0.00	Y = 0.00
Underline:	None	Offset = N/A
Mask:	Yes	
Mask Size:	X offset = 0.62	Y offset = 0.62
Mask Color:	Border = 255 (RGB 0, 0, 0)	Background = 255 (RGB 0, 0, 0)

TextBody_Sm

Used as an alternate text style where smaller size text is needed, such as in tables and schedules, or within the title block revision table.

Text Size:	0.0042' (approximately 13/256")	
Font:	WSDOT CAE	
Justification:	Left Bottom	
Line Spacing:	1.62 (from line top)	
Intercharacter:	0.06	
Text Offset:	X = 0.00	Y = 0.12
Underline:	None	Offset = N/A
Mask:	None	
Mask Size:	X offset = N/A	Y offset = N/A
Mask Color:	N/A	

TextHeading

Used as the primary heading and title text for Plans, Views, Sections, Details and Notes.

Text Size:	0.0117' (approximately 7/64")	
Font:	WSDOT CAE	
Attributes:	**Bold**	
Justification:	Center Bottom	
Line Spacing:	0.50 (Exact)	
Intercharacter:	0.06	
Text Offset:	X = 0.00	Y = 0.12
Underline (UL):	None by default. Attributes are set to allow text editor toggle.	
UL Attributes:	Offset = 0.12	Weight = 2 Color = 0 (255, 255, 255)
Mask:	None	
Mask Size:	X offset = N/A	Y offset = N/A
Mask Color:	N/A	

TextHeading_Masked

TextHeading style with a mask applied. Used as the primary heading and title text for Plans, Views, Sections, Details and Notes where any background elements need to be masked.

Text Size:	0.0117' (approximately 7/64")	
Font:	WSDOT CAE	
Attributes:	**Bold**	
Justification:	Center Bottom	
Line Spacing:	0.50 (Exact)	
Intercharacter:	0.06	
Text Offset:	X = 0.00	Y = 0.12
Underline (UL):	None by default. Attributes are set to allow text editor toggle.	
UL Attributes:	Offset = 0.12	Weight = 2 Color = 0 (255, 255, 255)
Mask:	Yes	
Mask Size:	X offset = 0.62	Y offset = 0.62
Mask Color:	Border = 255 (RGB 0, 0, 0)	Background = 255 (RGB 0, 0, 0)

TextHeading_Sm

Used as secondary title and headings or when a smaller heading or title is needed.

Text Size:	0.0083' (approximately 13⁄128")
Font:	WSDOT CAE
Attributes:	**Bold**
Justification:	Center Top
Line Spacing:	0.50 (Exact)
Intercharacter:	0.06
Text Offset:	X = 0.00 Y = 0.12
Underline (UL):	None by default. Attributes are set to allow text editor toggle.
UL Attributes:	Offset = 0.12 Weight = 2 Color = 0 (255, 255, 255)
Mask:	Yes
Mask Size:	X offset = N/A Y offset = N/A
Mask Color:	N/A

TextHeading_Sm_Masked

TextHeading_Sm with a mask applied. Used as secondary title, headings, or labels, or when a smaller heading, title, or label is needed. Allows for masking of background elements.

Text Size:	0.0083' (approximately 13⁄128")
Font:	WSDOT CAE
Attributes:	**Bold**
Justification:	Center Top
Line Spacing:	0.50 (Exact)
Intercharacter:	0.06
Text Offset:	X = 0.00 Y = 0.12
Underline (UL):	None by default. Attributes are set to allow text editor toggle.
UL Attributes:	Offset = 0.12 Weight = 2 Color = 0 (255, 255, 255)
Mask:	Yes
Mask Size:	X offset = 0.62 Y offset = 0.62
Mask Color:	Border = 255 (RGB 0, 0, 0) Background = 255 (RGB 0, 0, 0)

It is important to note that text sizes shall be set using the decimal feet specification given within the text style requirements. The fractional inch shown is not an exact match for the physical text size but will be the number displayed in the size field within the text editor if the working / drawing units for the file are set to architectural unit standards rather than engineering unit standards.

The preferred font for all WSDOT contract plans is WSDOT CAE. The WSDOT CAE font has some similar characteristics of the Arial font, however, the WSDOT CAE font includes custom glyphs or symbols that are often used in notes, callouts, and dimensioning that are not present in Arial or other fonts. Additionally, the WSDOT CAE font has a few customizations to basic character appearance, sizing and spacing which could result in some graphical inconsistencies within a plan set if the Arial font or other fonts are used.

If utilizing the same CAD platform as WSDOT and the WSDOT provided resources, these styles and fonts will be preloaded into the environment and will be immediately available for use, however, if not utilizing the WSDOT CAD environment and resources, it is important to contact the WSDOT Bridge and Structures Bridge Design Technology Unit or WSDOT CAE to obtain the proper font file.

11.3.1.B Notes

11.3.1.B.1 Standard Notes and Symbology

Note Heading

Text Style:	TextHeading
Attributes:	**Bold**, Underline
Justification:	Bottom Left

Body text

Text Style:	TextBody
Attributes:	N/A
Justification:	Top Left

Note heading shall be placed left aligned with, and 1/16" above, the note body. The note body numbers shall start along the left edge of the note block. The note body text shall start 5/32" to the right of the left edge of the note block. This allows enough space for double-digit note numbering while maintaining an appropriately sized space between the note body and the number.

11.3.1.B.2 Key Notes and Symbology

Note Heading

Text Style:	TextHeading
Attributes:	**Bold**, Underline
Justification:	Bottom Left

Body Text

Text Style:	TextBody
Attributes:	N/A
Justification:	Top Left

Key note heading shall be placed left aligned with, and 1/16" above, the note body. The key note body text shall start 9/32" to the right of the left edge of the note block to make room for the key note flag labels. The key note flags shall be placed left aligned with the note heading and centered on the first line of each note. For use and standards of key note flags, see Sections 11.1.1.B.6 and 11.3.1.C.3.

11.3.1.C Callouts

Callouts fall into two categories: Text-based callouts and Symbology-based callouts. Text-based callouts are simply a text field with at least one attached leader. Symbology-based callouts are items like note flags, section or view callouts, or detail references. This section will cover these two categories.

11.3.1.C.1 Text-Based Callouts – General Requirements

All text callouts are to be left justified whenever possible with the leader extending from the top left vertically centered on the first line of text, or the bottom right vertically centered on the last line of text. Right side leaders must extend to the last text character on the bottom line. If the CAD software being utilized does not allow for the functionality to extend the leader to the last text character, it is permissible to use dynamic text justification to allow for right justification of the text when the leader extends from the right side.

The following specifications apply to all text-based callouts unless noted otherwise:

Text style:	TextBody_Masked or TextBody
In-line leader(IL):	0.8750 “Text Height Units” or approximately 0.005’
Horiz. Attachment L:	Middle of Top Line of text
Horiz. Attachment R:	Middle of Bottom Line of text
Color:	0 (RGB 255, 255, 255)
Line style:	0 (Solid / continuous line)
Line weight:	0 (Light)

11.3.1.C.2 Text-Based Callouts – Styles and Symbology

All of the following callout styles shall follow the base requirements specified in Section 11.3.1.C.1. Each of the following styles define additional requirements and symbology.

Note_Standard

Terminator (T):	Default (system default arrowhead)
T-Width (W):	1.0 “Text Height Units” or approximately 0.0058’
T-Height (H):	0.445 “Text Height Units” or approximately 0.0013’

Note_Call1

Terminator (T):	Terminator_Call1
T-Width (W):	0.785 “Text Height Units” or approximately 0.0046’
T-Height (H):	0.785 “Text Height Units” or approximately 0.0046’

Note_Call2

Terminator (T):	Terminator_Call2
T-Width (W):	1.576 “Text Height Units” or approximately 0.0091’
T-Height (H):	1.576 “Text Height Units” or approximately 0.0091’

Note_Call3

Terminator (T):	Terminator_Call3
T-Width (W):	3.154 “Text Height Units” or approximately 0.0182’
T-Height (H):	3.154 “Text Height Units” or approximately 0.0182’

Note_Dot

Terminator (T):	Terminator_Call3
T-Width (W):	3.154 “Text Height Units” or approximately 0.0182’
T-Height (H):	3.154 “Text Height Units” or approximately 0.0182’

Note_NoArrow

Terminator: None

Note_Squig

Terminator (T): Terminator_Call3
T-Width (W): 3.154 “Text Height Units” or approximately 0.0182’
T-Height (H): 3.154 “Text Height Units” or approximately 0.0182’

Note_Underline

Terminator(T): None
Horiz. Attachment L: Underline
Horiz. Attachment R: Underline

Note_Underline_Arrow

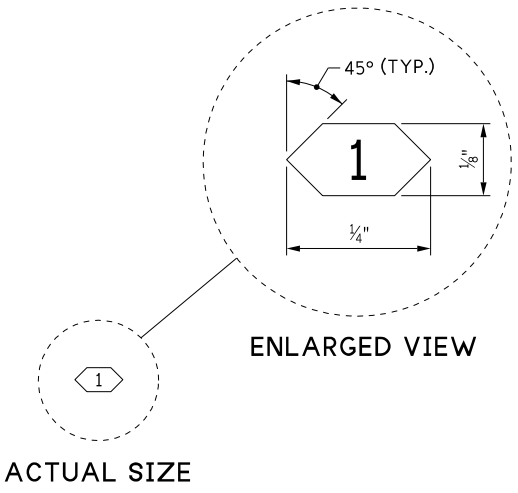
Terminator (T): Default (system default arrowhead)
T-Width (W): 1.0 “Text Height Units” or approximately 0.0058’
T-Height (H): 0.445 “Text Height Units” or approximately 0.0013’
Horiz. Attachment L: Underline
Horiz. Attachment R: Underline

11.3.1.C.3 Symbology-Based Callouts

Key Note Flags

Note flags are an elongated hexagon in shape with a number centered inside. The dimensions that make the hexagon shape are ⅛” in height and ¼” in length with each corner chamfered at 45° tapering to a single point at each end. The number shall be centered horizontally and vertically within. See Figure 11.3.1.C-1.

Figure 11.3.1.C-1



Note flags shall use the text style TextBody but will be set to Center Justified.

Note Flags can be used with a leader as a standalone callout or as part of a text callout, title, or as part of a dimension.

Note flags will correspond with a plan note as specified by the number within (see Section 11.1.1.B.6)

Detail Reference Callouts

A detail reference denotes an area that is to be further detailed in a separate model view. This specifies the detail number and what sheet it can be found on.

The geometry of this reference consists of a 5/16" diameter circle (also called a bubble) that is divided in half by a horizontal line.

In the top half of the circle there shall be a numeric detail identifier. This will be centered horizontally within the circle and aligned vertically with the text to the left of the circle. This shall also use text style TextBody.

In the bottom half of the circle will be the sheet identifier. This text will use text style TextBody_Sm. This will either display the sheet the detail is found on or if the detail is on the same sheet, will be a single long dash (—).

This callout is typically connected, by a leader, to a shape (typically a circle) that encompasses the area to be detailed.

Section and View Callouts

Section and view callouts are used to denote both the area that the section or view is being taken from and the direction or orientation of the section or view. It also references what sheet the section or view can be found on.

The geometry of this reference consists of two main parts: The Head and the Tail

The head of the callout is comprised of a 5/16" diameter circle (also called a bubble) that is divided in half by a horizontal line. The top half of the circle contains the Section or View reference, typically a single letter such as "A". The bottom half will either be a sheet reference number or if the section or view is on the same sheet, a single long dash (—). Finally, attached to the outside of the circle is a directional arrow that extends 0.0058' beyond both sides of the circle, perpendicular to the direction of the view and joining at a point extending .0058' from the circle in the direction of the view. This arrow shall be solid filled and shall not extend through the circle.

The tail of the callout is comprised of a solid-filled flag and an extension line. The tail extension line shall be aligned with the center of the head circle, perpendicular to the direction of the section or view at a length of 5/16". The flag shall be perpendicular to the extension line and point in the same direction as the directional arrow on the head. The flag shall be attached to the end of the extension line farthest away from the head of the callout with the bottom edge extending perpendicular to the extension line. The flag shall extend to align with the end of the directional arrow on the head and the base of the flag shall be 0.0058' in height.

11.3.2 Dimension Styles

11.3.2.A General

Dimension styles are used to standardize how all dimensions are shown based on the conditions being represented. All WSDOT Bridge and Structures dimension styles within the bridge CAD environment are set using architectural dimensioning standards utilizing the foot and inch tic marks and fractional inches when necessary (i.e., 1'-0" or 1'-2¼").

Dimension styles should be configured so that when displaying dimensions that are less than 1 inch, it will show the fractional inch without any leading zero (i.e., ¼"). There may be some CAD platforms that do not allow the leading zero to be dropped, therefore, in these cases it is permissible to override the dimension text manually to reflect the design intent.

All dimension styles shall conform to the following criteria:

Text Style:	TextDims
Accuracy:	1/64" (ensures minimal error)
Level:	SH_GI_DimensionLines

11.3.2.B WSDOT Bridge Dimension Styles

Dim_Standard

Line Style:	0
Terminator (T):	Default (system default arrowhead)
T-Width (W):	1.0 "Text Height Units" or approximately 0.0058'
T-Height (H):	0.445 "Text Height Units" or approximately 0.0013'
Extension:	0.5 "Text Height Units" or approximately 0.0029'
Offset:	0.5 "Text Height Units" or approximately 0.0029'

Dim_Break

Line Style:	BREAK_DIM
Terminator (T):	Default (system default arrowhead)
T-Width (W):	1.0 "Text Height Units" or approximately 0.0058'
T-Height (H):	0.445 "Text Height Units" or approximately 0.0013'
Extension:	0.5 "Text Height Units" or approximately 0.0029'
Offset:	0.5 "Text Height Units" or approximately 0.0029'

Dim_Long

Line Style:	DIMENSION_LONG
Terminator (T):	None (handled by line style)
T-Width (W):	0.00
T-Height (H):	0.00
Extension:	0.5 "Text Height Units" or approximately 0.0029'
Offset:	0.5 "Text Height Units" or approximately 0.0029'

Dim_LongDouble

Line Style:	0
Terminator (T):	Terminator_Arrow_Double
T-Width (W):	2.0 “Text Height Units” or approximately 0.0116’
T-Height (H):	0.445 “Text Height Units” or approximately 0.0013’
Extension:	0.5 “Text Height Units” or approximately 0.0029’
Offset:	0.5 “Text Height Units” or approximately 0.0029’

Dim_NoArrow

Line Style:	0
Terminator (T):	None
T-Width (W):	0.00
T-Height (H):	0.00
Extension:	0.5 “Text Height Units” or approximately 0.0029’
Offset:	0.5 “Text Height Units” or approximately 0.0029’

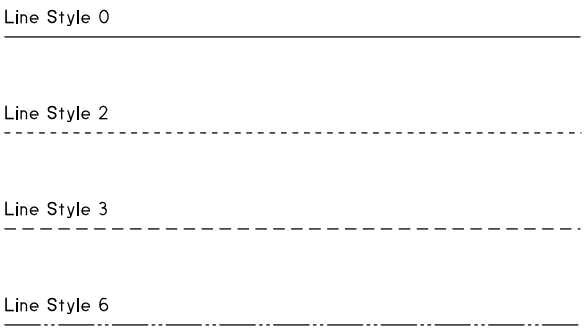
11.3.3 Line Styles and Weights

11.3.3.A Standard Line Styles

Standard line styles are the ones that are pre-built into the CAD system by the vendor. These typically include basics such as solid, dashed, phantom, and centerlines. The way these lines are represented when plotted are controlled through plot configuration files as defined below. For standard line styles not typically used by WSDOT Bridge and structures, see the WSDOT *Electronic Engineering Data Standards* (EEDS) manual, section Symbology5 PS&E Standards, subsection S5.03 Standard Weights & Styles.

There are 8 standard line styles (styles 0-7), of which, WSDOT Bridge and Structures utilizes 4. See Figure 11.3.3.A-1 for a graphical representation of each style utilized by WSDOT Bridge.

Figure 11.3.3.A-1



In the descriptions below, dash-skip spacing will be denoted with bold numbers representing dashes (solid segments) and [bracketed numbers] representing skips (open segments). All spacing is in inches.

Line Style 0

This line style is the typical line style used for most elements and is a basic solid continuous line.

Line Style 2

This line style is a small dashed line often used for hidden minor elements and construction joint representation.

Plotted dash-skip spacing: **0.03** [0.0305]

Line Style 3

This line style is a standard dashed line typically used for hidden elements.

Plotted dash-skip spacing: **0.0595** [0.0325]

Line Style 6

This line style is a phantom line style typically used to represent existing elements.

Plotted dash-skip spacing: **0.1875** [0.01875] **0.01875** [0.01875] **0.01875** [0.01875]

11.3.3.B Custom Line Styles

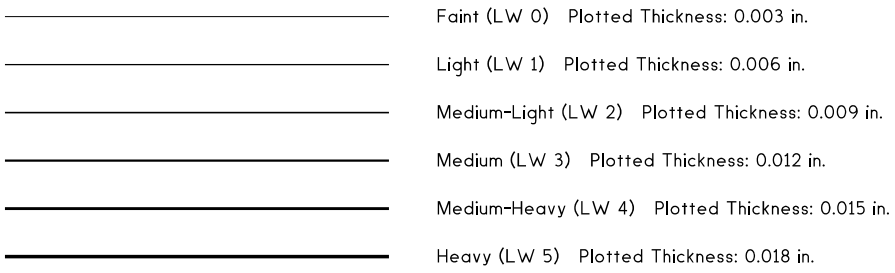
Custom line styles are those created by the WSDOT Bridge and Structures Office to portray specific elements no covered by the standard line styles such as reinforcing bar, utilities, ground lines, break lines, welds, etc. See Figure 11.3.3.B-1 below for a complete listing of WSDOT Bridge custom line styles.

Figure 11.3.3.B-1

11.3.3.C Line Weights

Line weights are used for graphical separation and highlighting important or primary geometry and features. These control the width of the line on the printed sheet. See Figure 11.3.3.C-1 for WSDOT Bridge standard line weights. For additional line weight requirements see WSDOT *Electronic Engineering Data Standards* (EEDS) manual, section Symbology5 PS&E Standards, subsection S5.03 Standard Weights & Styles.

Figure 11.3.3.C-1



11.3.4 Levels

For a complete list of levels, see Appendix 11.4-A7.

11.3.4.A General

Levels are used to manage and differentiate between different objects and elements in the WSDOT Bridge Office's CAD environment. These levels provide graphical representation standards and controls that would otherwise not be possible. Strict adherence to the proper levels and standards set by each level is imperative in order to provide the highest level of efficiency, functionality, and control within the CAD environment.

11.3.4.B Naming Conventions

Level naming conventions are used to categorize and manage levels. Levels are organized by a level category, followed by a sub-category, followed by the level name.

Format: **AB_XY_LevelName**

Levels are further categorized by either New or Existing elements. Level names that end with the term "New" are used for new elements, whereas level names that don't have an identifying term at the end typically are used for existing elements. See the following example:

New Element: **AB_XY_LevelNameNew**
Existing Element: **AB_XY_LevelName**

The following Categories and Sub-Categories are used in the WSDOT Bridge environment. All others not listed here are found in the WSDOT *Electronic Engineering Data Standards* (EEDS) Manual, Section Symbology 1 Requirements, Section S1.02.

11.3.5 Element Templates

11.3.5.A General

Elements are used in the WSDOT Bridge and Structures CAD environment to further define bridge, detailing, and sheet features or components. In MicroStation, these are called Element Templates which also get tied in with other functions such as Feature Definitions, Item Types, etc. However, as it currently stands, the current WSDOT Bridge environment only supports basic element templates at the time of writing.

The basic function Elements provide is adherence to standards. Element templates are created for specific components which can then have the proper levels set, as well as any line styles, colors, weights, priorities, and transparencies that differ from the styles set within the level definition. Along with graphical settings, elements can also assign default text styles, dimension styles, and active cells that will be applied while using that element template. By utilizing this functionality, WSDOT Bridge and Structures has developed a CAD environment that can more efficiently manage standards and ensure that each drawing produced by any one individual will function the same.

11.3.5.B Element Categories

Element Templates are divided into 4 main categories:

- Civil Elements
- Structural Elements
- Mechanical, Electrical, Drainage, and Utilities
- Detailing and Sheet Production.

11.3.5.B.1 Civil Elements

This category contains element templates for civil and roadway elements used by civil and roadway design groups within WSDOT that are also common in WSDOT Bridge and Structures plan development. The element templates within this category are grouped into the following sub-categories:

- Alignment
- Boundaries
- Earthwork
- Easements and Permits
- Environmental
- Roadway
- Topography

These element templates are supplementary only and the primary source of these elements within a CAD file should come from the WSDOT region base files.

11.3.5.B.2 Structural Elements

This category contains all structural element templates used in the modeling of structural elements. This category is further broken down into the following sub-categories:

- Foundation and Substructure
  - Shaft_Piles
  - Footings_Caps
  - Abutments_Columns_Piers
  - Floating Structures Components
  - Bearings
- SuperStructure
  - Concrete Components and Framing
  - Steel Components and Framing
  - Deck, Paving, and Expansion Joints
- Slabs
  - General Slab
  - Bridge Approach Slab
- Barriers and Rails
  - Bridge Railings
  - GuardRail
  - Traffic Barrier
- Curb and Sidewalk
- Drains and Drainage Structures
- Walls
  - Wall Layouts
  - Wall Foundation and Anchorage
  - Wall Structural Components
- Buried Structures and Tunnels
- Sign Structures and Components
  - Foundation, Anchorage, and Sign Base
  - Support Structures
  - Signs, Signaling, and VMS
- Reinforcement, Steel, Hardware, and Wood
  - Reinforcement
    - Reinforcing Lines (Schematic View_
    - Reinforcing Cells
  - Steel
  - Hardware and Fasteners
  - Wood
- Architectural and Finishes
- Preservation and Maintenance Items

11.3.5.B.3 Mechanical, Electrical, Drainage, and Utilities

This category contains elements that are used to represent items such as conduits, mechanical assemblies, control boxes, utility lines, drain lines etc. This category is broken down into the following sub-categories:

- Utility Structures and Assemblies
- Mechanical Structures and Assemblies
- Electrical Components and Equipment
- Drainage and Utilities
  - Drainage Lines
  - Utility Lines
    - Communication
    - Gas
    - General Utility Lines
    - Multiple Types
    - Power
    - Sanitary Sewer
    - Water

Most of the element templates in the Drainage and Utilities sub-category are supplemental and element geometry should rely primarily on the elements within WSDOT region provided base files.

11.3.5.B.4 Detailing and Sheet Production

This category contains the elements that are used in general detailing and sheet development. These are items such as annotation elements, tables and schedules, generic detail linework. This category is broken down into the following sub-categories:

- Annotation
- Detail Lines and Geometry
  - Generic Linework
  - Structural Detail Linework
  - Architectural Detailing
- Detail and Sheet Cells
  - Preliminary Plan Sheet Items
- Patterns and Hatches
- Sheet and View Productions
- CO and Add

These elements are intended to provide annotations, sheet development, and basic generic detail items that work to supplement model geometry. The linework and other elements defined in this category ***shall not*** be used to provide model geometry for any structural component.

11.3.5.C Naming Conventions

Element templates are formatted in a few ways depending on context and usage. The intent is to provide logically named and categorized element templates that are easy to organize and contextualize based on what CAD project effort is being worked on (i.e., structural modeling, detailing and annotation, or sheet development)

Structural element templates are typically formatted as:

LogicalElementName_Configuration(if needed)**_New**(or **Existing**).

Examples:
ConcreteGirder_New
ConcreteGirder_Hidden_Existing

Detailing, annotation, and sheet elements can have a couple different naming formats depending on their usage or category, but the basic formats are as follows:

LogicalElementName

Examples:
Dimensions
TextCallouts
NorthArrow

LogicalElementName_Configuration (or **type)**

Examples:
SolidLine_Medium
HiddenLine_Light
ConstJoint_Heavy

ElementCategory_ElementName (or **configuration)**

Examples:
Pattern_Steel
Hatching_Generic

11.4 Appendices

Appendix 11.4-A1	Common Abbreviations
Appendix 11.4-A2	Dimensioning Examples
Appendix 11.4-A3	Typical Section and Detail Callouts
Appendix 11.4-A4	Reinforcing Callout Symbols and Examples
Appendix 11.4-A5	Patterns and Hatches
Appendix 11.4-A6	ProjectWise Bridge WorkArea Request Form

Appendix 11.4-A1 Common Abbreviations

A	
Abutment	ABUT.
Adjacent	ADJ.
Adjust	ADJ.
Aggregate	AGG.
Ahead	AHD.
Alternate	ALT.
Aluminum	AL.
American Association of State Highway and Transportation Officials	AASHTO
American Society for Testing and Materials	ASTM
And	&
Angle Point	A.P.
Approved	APPRD. or APPV'D.
Approximate	APPROX.
Asbestos Cement Pipe	ASB. CP
Asphalt Concrete	AC
Asphalt Treated Base	ATB
At	@ (for spacing only)
Avenue	AVE.
Average	AVG.

B	
Back	BK.
Back of Pavement Seat	B.P.S.
Bearing	BRG.
Begin Vertical Curve	BVC
Bench Mark	BM
Between	BTWN.
Bituminous Surface Treatment	BST
Bottom	BOT.
Boulevard	BLVD.
Bridge	BR.
Bridge Drain	BR. DR.
Building	BLDG.
Buried Cable	BC

C	
Cast Iron Pipe	(C.I.P.)
Cast-In-Place	CIP
Celsius	C
Cement Treated Base	CTB
Center	CTR.
Center of Gravity	CG
Center to Center	CTR. TO CTR. or C/C
Centerline	℄
Centers	CTRS.
Centimeter(s)	CM.
Class	CL.
Clear / Clearance	CLR.
Column	COL.
Compression	COMP.
Compressive	COMP.
Concrete	CONC.
Conduit	COND.
Construction	CONST. or CONSTR.
Continuous	CONT. or CONTIN.
Corrugated	CORR.
Corrugated Metal	CM
Corrugated Steel Pipe	CSP
Countersink	CSK.
County	CO.
Creek	CR. or CRK.
Cross Beam	X-BEAM or X-BM.
Cross Section	X-SECT.
Crossing	XING
Cubic Feet	CF or CU. FT. or FT.3
Cubic Inch	CU. IN. or IN.3
Cubic Yard	CY or CU. YD. or YD.3
Culvert	CULV.

D	
Degrees (angular)	DEG. or °
Degrees (thermal)	°C or °F
Diagonal(s)	DIAG.
Diameter	DIAM. or Ø
Diaphragm	DIAPH.
Dimension	DIM.
Double	DBL.
Drive	DR.

E	
Each	EA.
Each Face	E.F.
Easement	EASE. or ESMT.
East	E.
Edge of Pavement	EP
Edge of Shoulder	ES
Electric	ELECT. or ELEC.
Elevation	EL. or ELEV.
Embankment	EMB.
End Vertical Curve	EVC
Endwall	EW
Engineer	ENGR.
Equal(s)	EQ.
Equivalent	EQUIV.
Estimate(d)	EST.
Excavation	EXC.
Exclude or Excluding	EXCL.
Existing	EXIST.
Expanding	EXP. or EXPAN.
Expansion	EXP. or EXPAN.
Exterior	EXT.

F	
Fahrenheit	F
Far Face	F.F.
Far Side	F.S.
Feet (Foot)	FT. or ’
Feet per Foot	FT./FT or ’/’ or ’/ FT.
Field Splice	F.S.
Figure	FIG.
Figures	FIGS.
Flat Head	F.H.
Foot Kips	FT-KIPS
Foot Pounds	FT-LB
Footing	FTG.
Forward	FWD.
Foundation	FND.
Freeway	FWY.

G	
Gallon	GAL.
Galvanized	GALV.
Galvanized Steel Pipe	GSP
Gauge	GA.
General Special Provisions	GSP
Girder	GIR.
Ground	GR. or GND.
Guard Rail	GR

H	
Hanger	HGR.
Height	HT.
Height (Retaining wall)	H
Hexagonal	HEX.
High Strength	H.S.
High Water	H.W.
High Water Mark	H.W.M.
Highway	HWY.
Horizontal	HORIZ.
Hot Mix Asphalt	HMA
Hour(s)	HR.
Hundred(s)	HUND.

I	
Inch(es)	IN. or ”
Included	INCL.
Including	INCL.
Inside Diameter	I.D.
Inside Face	I.F.
Interior	INT.
Intermediate	INTERM.
Interstate	I
Invert	INV.

J	
Joint	JT.
Junction	JCT.

K	
Kilometer	KM.
Kilopounds	KIPS or K.

L	
Layout	LO
Left	LT.
Length of Curve	L.C.
Linear Feet	L.F.
Longitudinal	LONGIT.
Lump Sum	L.S.

M	
Maintenance	MAINT.
Malleable	MALL.
Manhole	MH
Manufacturer	MFR.
Manufacturing	MFG.
Maximum	MAX.
Mean High Water	MHW
Mean Higher High Water	MHHW
Mean Low Water	MLW
Mean Lower Low Water	MLLW
Meters	M.
Mile(s)	MI.
Miles Per Hour	MPH
Millimeters	MM.
Minimum	MIN.
Minute(s)	MIN. or ’
Miscellaneous	MISC.
Modified	MOD.
Monument	MON.

N	
National Geodetic Vertical Datum 1923	NGVD 29
Near Face	N.F.
Near Side	N.S.
North	N.
North American Vertical Datum 1988	NAVD 88
Northbound	NB
Not To Scale	NTS
Number(s)	#, NO. or NOS.

O	
Or	/
Original Ground	O.G.
Ounce(s)	OZ.
Out to Out	O to O
Outside Diameter	O.D.
Outside Face	O.F.
Overcrossing	O-XING
Overhead	OH

P	
Page	P.
Pages	PP.
Pavement	PAV’T
Pedestrian	PED.
Percent	%
Pivot Point	PP
Plans, Specifications and Estimates	PS&E
Plate	Ꝑ or PL
Point	PT.
Point of Compound Curve	PCC
Point of Curvature	P.C.
Point of Intersection	P.I.
Point of Reverse Curve	PRC

Point of Tangency	P.T.
Point on Horizontal Curve	POC
Point on Tangent	POT
Point on Vertical Curve	PVC
Polyvinyl Chloride	PVC
Portland Cement Concrete	PCC
Pound(s)	#, LB. or LBS.
Pounds per Square Foot	PSF or LBS/FT.2
Power Pole	PP
Precast	P.C.
Pressure	PRES.
Prestressed	P.S.
Prestressed Concrete Pipe	P.C.P.
Puget Sound Power and Light	P.S.P.&L.

Q

Quantity	QTY. or QUANT.
Quart	QT.

R

Radius	R
Railroad	RR
Railway	RWY.
Range	R.
Regulator	REG.
Reinforced	REINF.
Reinforced Concrete	RC
Reinforced Concrete Box.	RCB
Reinforced Concrete Pipe	RCP
Reinforcing	REINF.
Required	REQ'D
Retaining Wall	RET. WALL
Revised / Revision (date)	REV.
Right	RT.
Right of Way	R/W or R.O.W.
Road	RD.
Roadway	RDWY.
Route	RTE.

S

Seconds	SEC. or "
Section (map location)	SEC.
Section (of drawing)	SECT.
Sheet	SHT.
Shoulder	SHLD. or SH.
Sidewalk	SW. or SDWK
South	S.
Southbound	SB
Space(s)	SPA.
Specification	SPEC.
Splice	SPL.
Square Feet (Foot)	SQ. FT. or FT.2
Square Inch	SQ. IN. or IN.2
Square Yard	SQ. YD. or YD.2
Standard	STD.
State Route	SR
Station	STA.
Stiffener	STIFF.
Stirrup	STIRR.
Stringer	STR.
Structure / Structural	STR. or STRUCT.
Support	SUPP.
Surface / Surfacing	SURF.
Symmetrical	SYMM. or SYM.

T

Tangent	TAN. or T.
Telephone	TEL.
Temporary	TEMP.
Test Hole	T.H.
Thick(ness)	TH. or THK.
Thousand	M
Thousand (Feet) Board Measure	MBM
Thousand (Feet) Board Measure	MBM
Ton	
Total	TOT.
Township	T.
Transition	TRANS.
Transportation	TRANSP.
Transverse	TRANSV.

Treatment	TR.
Typical	TYP.

U

Ultimate	ULT.
Undercrossing	U-XING

V

Variable	VAR.
Varies	VAR.
Vertical	VERT.
Vertical Curve	V.C.
Vitrified Clay Pipe	VCP
Volume	VOL. or V

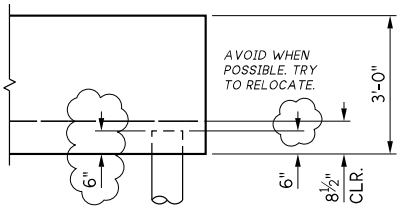
W

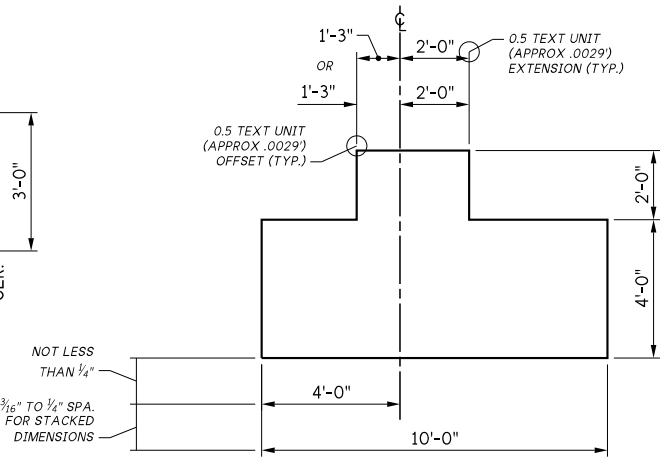
Water Surface	W.S.
Weight(S)	WT.
Welded Steel Pipe	WSP
Welded Wire Fabric	W.W.F.
West	W.
Willamette Meridian	W.M.
Wingwall	W.W.
With	W/
Without	W/O

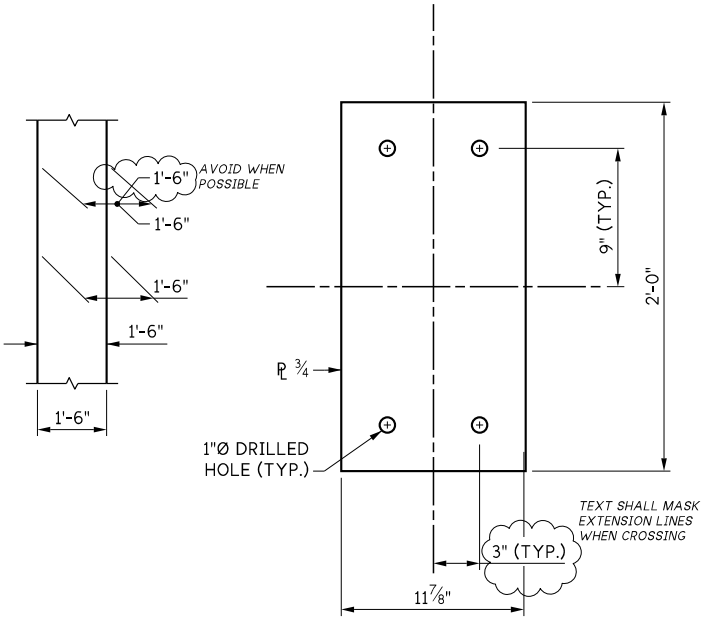
Y

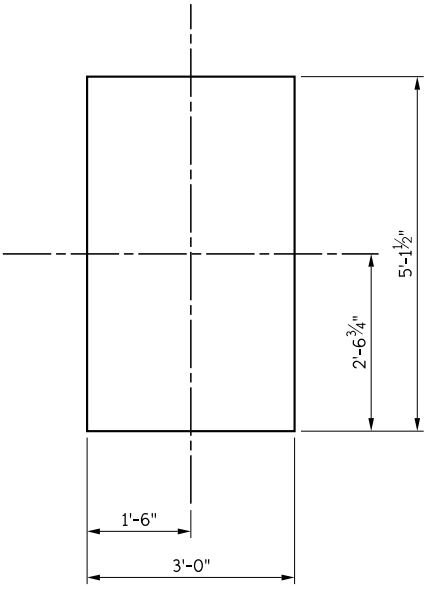
Yard(s)	YD. or YDS.
Year(s)	YR.

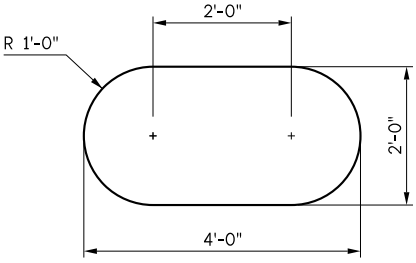
Appendix 11.4-A2 Dimensioning Examples

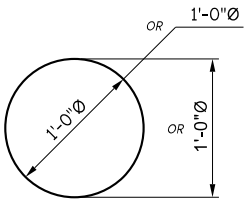


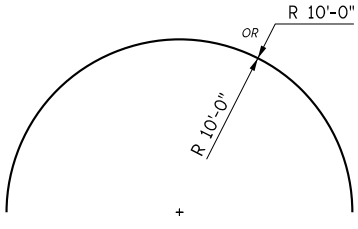




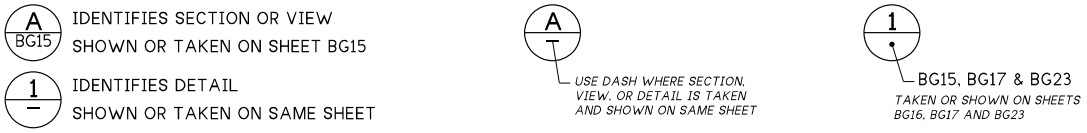


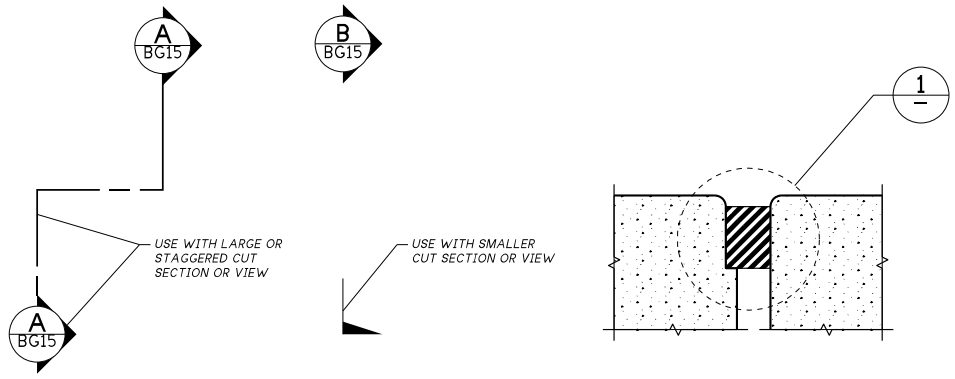


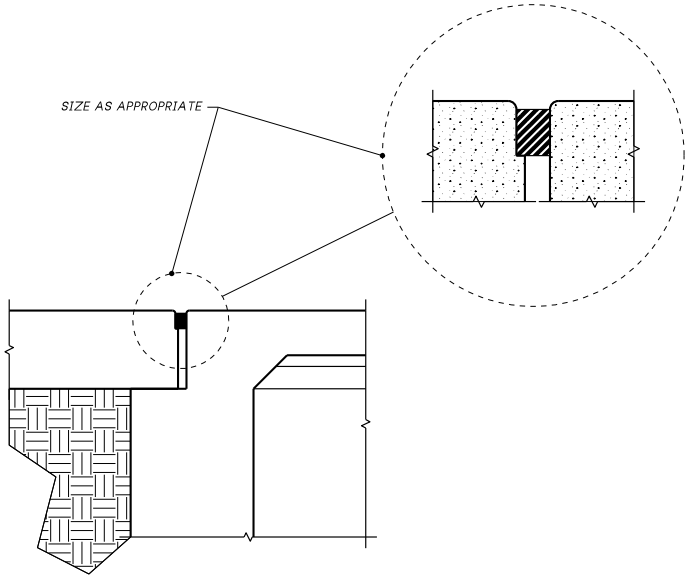




Appendix 11.4-A3 Typical Section and Detail Callouts

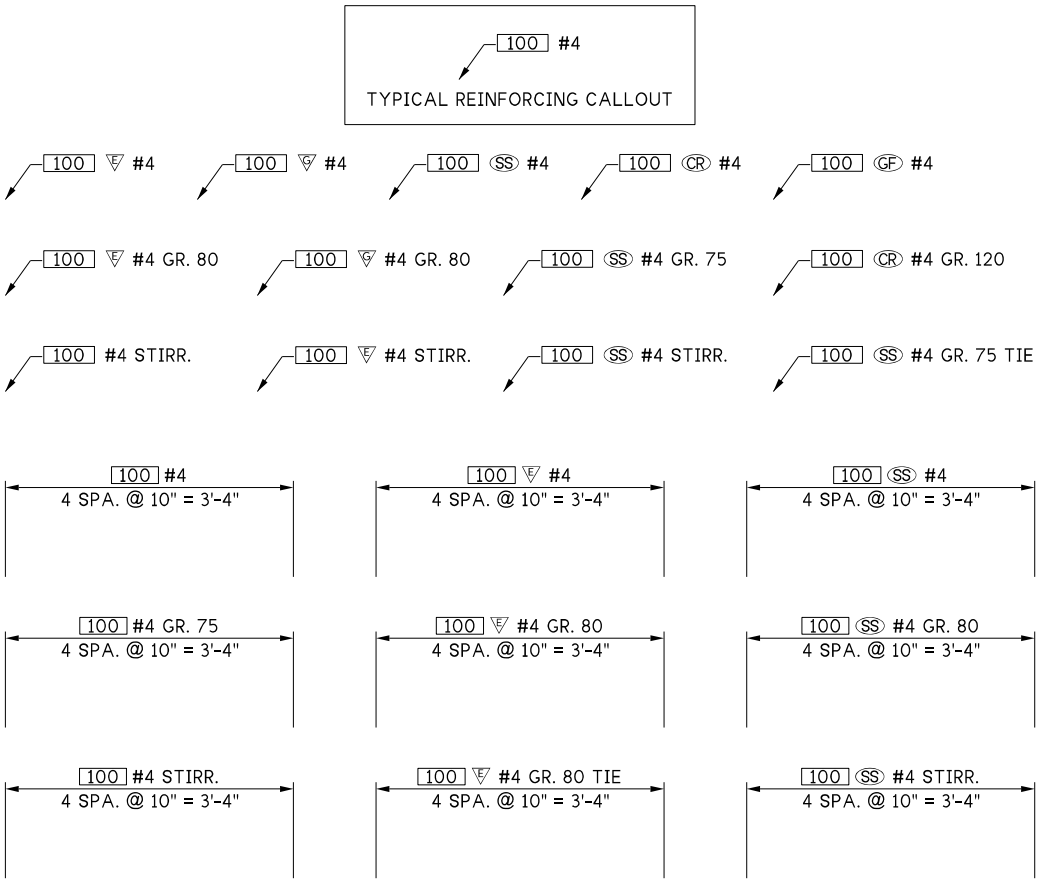




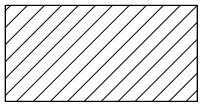


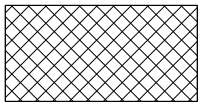
Appendix 11.4-A4 Reinforcing Callout Symbols and Examples

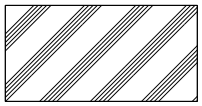
REINFORCING CALLOUT SYMBOLOGY		
COATING		
CALLOUT	BARLIST	TYPE
		UNCOATED
(E)	E	EPOXY COATED
(G)	G	GALVANIZED (A767 AND/OR A1064 BY GEN. NOTE)
MATERIAL		
CALLOUT	BARLIST	TYPE
		ASTM A706
(SS)	S or SS	ASTM A955 STAINLESS STEEL (TYPES BY SPEC.)
(CR)	C or CR	ASTM A1035 CORROSION RESISTANT ALLOY (TYPES BY SPEC.)
(GF)	GF	ASTM D7957 GLASS FIBER REINFORCED POLYMER
GRADE		
CALLOUT	BARLIST	TYPE
		GRADE 60, CR GRADE 100, GFRP (OR OTHER BY GEN. NOTE)
GR. 75	75	GRADE 75
GR. 80	80	GRADE 80
GR. 100	1X	GRADE 100 (NOT NEEDED FOR CORR. REISTANT REINF.)
GR. 120	12	GRADE 120 (CR ONLY, ADD GEN. NOTE FOR CR)

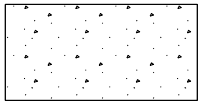


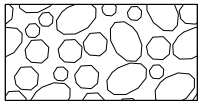
Appendix 11.4-A5 Patterns and Hatches

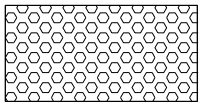

Generic Hatch Pattern - used to denote removal area or demolition

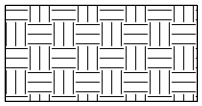

Generic Cross Hatch Pattern - used to denote removal area or demolition

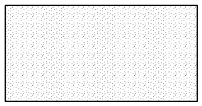

Butyl Rubber / Rubber

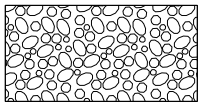

Concrete

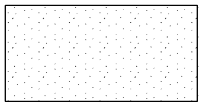

Drainage Layer - Porous Rock

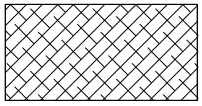

Drainage Layer - Synthetic

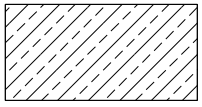

Earth / Grade

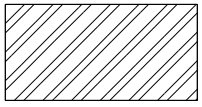

Foam - all types

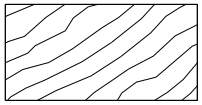

Gravel


Grout


Metal (Aluminum) - ANSI Metal38 Standard


Metal (Bronze, Brass, or Copper) - ANSI Metal33 Standard


Metal (Steel) - ANSI Metal32 Standard


Wood

Appendix 11.4-A6 ProjectWise Bridge WorkArea Request Form

New ProjectWise Work Area Folder Structure Request Form – Bridge

Fill in appropriate fields and send to the Bridge and Structures Office CAD Applications Engineer (churcc@wsdot.wa.gov) or the HQ CAE Help Desk (hqcaehelpdesk@wsdot.wa.gov)

Requestor Info			
Name:			
Contact: (Phone # or Email)		Region:	HQ
Office:	WSDOT Bridge and Structures	Org. Number:	304030

Project Status	✓	**Follow the appropriate step**
Create a new Project?	☐	Fill out **Project Properties** section AND **Groups to Include**
Modifying or adding to an existing ProjectWise project?	☐	Fill out **Project Properties** to be *changed* AND *new* **Groups to Include** **Existing Project Location Information:** (Provide existing details for the project to be changed) ProjectWise Link: SR No: Structure No. / Name: Design Work Order:

Project Properties			
Project Full Name			
Project Folder Name			
Structure Information		**Project Information**	
Structure Type		Project Title Line 1	
Structure No.		Project Title Line 2	
Structure Name		Project Title Line 3	
SR Number		Design Work Order (XL1234)	
Mile Post		Job Number	
Region Information		Contract Number	
Region		Federal Aid Number	
County			
Township(s) (T 01 N - T 41 N)			
Range(s) (R 16 W - R 47 E)			
Section(s) (1-36)			

Groups to Include	✓	**List Offices to access control for each group (default will be requestor's org number)**
Bridge Design	☑	
Bridge Preservation	☐	
Region Design	☑	
Consultant Group(s)	☐	
Firm:		
Firm:		
Firm:		

Comments:

V 2.0 April 2022

Appendix 11.4-A7 WSDOT Bridge Levels List

Name	Description	Color	Line Style	Weight
AL_ST_CLineBridge	Cline Bridge [Structure]	3	CENT	3
DR_PP_DrainLine	Drain Line	145	DR_PP_DrainLine	0
DR_PP_DrainLineDeactive	Drain Line Deactive	145	DR_PP_DrainLineDeactive	0
DR_PP_DrainLineNew	Drain Line New	129	DR_PP_DrainLineNew	0
DR_PP_DrainPipe	Drain Pipe	81	DR_PP_DrainPipe	0
DR_PP_DrainPipeBridge	Drain Pipe Bridge	82	6	1
DR_PP_DrainPipeBridgeHidden	Drain Pipe Bridge Hidden	82	2	1
DR_PP_DrainPipeBridgeHiddenNew	Drain Pipe Bridge Hidden New	66	2	2
DR_PP_DrainPipeBridgeNew	Drain Pipe Bridge New	66	0	2
DR_PP_DrainPipeDeactive	Drain Pipe Deactive	81	DR_PP_DrainPipeDeactive	0
DR_PP_DrainPipeNew	Drain Pipe New	65	DR_PP_DrainPipeNew	2
DR_PP_PipeCulvert	Pipe Style Culvert	81	6	2
DR_PP_PipeCulvertHidden	Pipe Style Culvert Hidden	81	3	2
DR_PP_PipeCulvertHiddenNew	Pipe Style Culvert Hidden New	65	3	3
DR_PP_PipeCulvertNew	Pipe Style Culvert New	65	0	3
DR_ST_BoxCulvert	Box Culvert	81	6	2
DR_ST_BoxCulvertHidden	Box Culvert Hidden	81	3	2
DR_ST_BoxCulvertHiddenNew	Box Culvert Hidden New	65	3	3
DR_ST_BoxCulvertNew	Box Culvert New	65	0	3
DR_ST_CatchBasin	Catch Basin	49	6	0
DR_ST_CatchBasinBridge	Catch Basin Bridge	113	6	0
DR_ST_CatchBasinBridgeNew	Catch Basin Bridge New	97	0	0
DR_ST_CatchBasinNew	Catch Basin New	33	0	0
DR_ST_CatchBasinTunnel	Catch Basin Tunnel	113	6	0
DR_ST_CatchBasinTunnelNew	Catch Basin Tunnel New	97	0	0
DR_ST_DrainBridge	Drain Bridge	82	6	1
DR_ST_DrainBridgeDeactive	Drain Bridge Deactive	83	6	1
DR_ST_DrainBridgeHidden	Drain Bridge Hidden	82	2	1
DR_ST_DrainBridgeHiddenNew	Drain Bridge Hidden New	66	2	2
DR_ST_DrainBridgeNew	Drain Bridge New	66	0	2
DR_ST_DrainBridgePlugged	Drain Bridge Plugged	86	2	1
DR_ST_DrainTunnel	Drain Tunnel	113	0	0
DR_ST_DrainTunnelNew	Drain Tunnel New	97	0	0
DR_ST_GrateInlet	Grate Inlet	49	6	0
DR_ST_GrateInletBridge	Grate Inlet Bridge	113	6	0
DR_ST_GrateInletBridgeNew	Grate Inlet Bridge New	97	0	0
DR_ST_GrateInletNew	Grate Inlet New	33	0	0
DR_ST_GrateInletTunnel	Grate Inlet Tunnel	113	6	0
DR_ST_GrateInletTunnelNew	Grate Inlet Tunnel New	97	0	0
DR_ST_HeadWall	Head Wall	81	6	2
DR_ST_HeadWallHidden	Head Wall Hidden	81	3	2
DR_ST_HeadWallHiddenNew	Head Wall Hidden New	65	3	3
DR_ST_HeadWallNew	Head Wall New	65	0	3
DR_ST_Inlet	Inlet	49	6	0
DR_ST_InletGeneric	Inlet Generic	49	6	0
DR_ST_InletGenericNew	Inlet Generic New	33	0	0
DR_ST_InletNew	Inlet New	33	0	0
DR_ST_Manhole	Manhole	49	6	0

Name	Description	Color	Line Style	Weight
DR_ST_ManholeBridge	Manhole Bridge	113	6	0
DR_ST_ManholeBridgeNew	Manhole Bridge New	97	0	0
DR_ST_ManholeDeactive	Manhole Deactive	49	6	0
DR_ST_ManholeNew	Manhole New	33	0	0
DR_ST_ManholeTunnel	Manhole Tunnel	113	6	0
DR_ST_ManholeTunnelNew	Manhole Tunnel New	97	0	0
DR_ST_WingWall	Drainage Structure wingwall	87	6	2
DR_ST_WingWallHidden	Drainage Structure wingwall Hidden	87	3	2
DR_ST_WingWallHiddenNew	Drainage Structure Wingwall HiddenNew	71	3	3
DR_ST_WingWallNew	Drainage Structure Wingwall New	71	0	3
RD_BR_GuardrailBridge	Guardrail Bridge	55	6	1
RD_BR_GuardrailBridgeHidden	Guardrail Bridge Hidden	55	2	1
RD_BR_GuardrailBridgeHiddenNew	Guardrail Bridge Hidden New	39	2	2
RD_BR_GuardrailBridgeNew	Guardrail Bridge New	39	0	2
RD_BR_GuardrailPost	Guard Rail Post	157	6	1
RD_BR_GuardrailPostHidden	Guard Rail Post Hidden	157	2	1
RD_BR_GuardrailPostHiddenNew	Guard Rail Post Hidden New	141	2	2
RD_BR_GuardrailPostNew	Guard Rail Post New	141	0	2
RD_CG_CurbBridge	Curb Bridge	56	6	1
RD_CG_CurbBridgeHidden	Curb Bridge Hidden	56	3	1
RD_CG_CurbBridgeHiddenNew	Curb Bridge Hidden New	40	3	2
RD_CG_CurbBridgeNew	Curb Bridge	40	0	2
RD_CG_SidewalkBridge	Sidewalk Bridge	56	6	1
RD_CG_SidewalkBridgeHidden	Sidewalk Bridge Hidden	56	3	1
RD_CG_SidewalkBridgeHiddenNew	Sidewalk Bridge Hidden New	40	3	2
RD_CG_SidewalkBridgeNew	Sidewalk Bridge New	40	0	2
RD_ED_Roadway	Roadway	145	6	2
RD_ED_RoadwayNew	Roadway New	129	0	3
RD_MK_RoadwayMarkings	Roadway Markings	80	2	0
RD_MK_RoadwayMarkingsNew	Roadway Markings New	80	0	0
SH_DT_Architectural_Hidden	Architectural Detail Hidden Line	7	3	3
SH_DT_Architectural_HiddenSm	Architectural Detail Small Hidden Line	3	2	1
SH_DT_Architectural_Solid	Architectural Detail Solid Line	1	0	3
SH_DT_ArchitecturalGeneric	Architectural Detail Solid Line	9	0	3
SH_DT_CenterLine	Detail Centerline	3	CENT	2
SH_DT_Detail_Existing	Detail Existing Line	17	6	2
SH_DT_Detail_Future	Detail Future Element Line	12	FUTURE	2
SH_DT_Detail_Hidden	Detail Hidden Line	7	3	3
SH_DT_Detail_HiddenSm	Detail Small Hidden Line	3	2	1
SH_DT_Detail_Solid	Detail Solid Line	1	0	3
SH_DT_DetailBodyText	Detail Body Text	0	0	0
SH_DT_Hatch	Detail Hatch	19	0	0
SH_DT_LineBreak	Breakline	3	BREAK	1
SH_GI_AddendumCloud	Sheet - Addendum Cloud	15	0	5
SH_GI_AddendumShading	Sheet - Addendum Shading	240	0	0
SH_GI_Anno	General Annotation	0	0	0
SH_GI_ClipLimits	Sheet - Clip Limits	0	0	0
SH_GI_DimensionLines	Dimension Lines	0	0	0
SH_GI_DrawingBoundariesTitlesViews	Drawing Boundaries and Detail Titles	0	0	1
SH_GI_GeneralBodyText	Detail Body Text	0	0	0

Name	Description	Color	Line Style	Weight
SH_GI_GeneralHeadingText	Detail Heading Text	0	0	0
SH_GI_KeyNoteFlags	Key Note Flags	0	0	0
SH_GI_Legend	Sheet - Legend Template	0	0	0
SH_GI_MatchLine	Match Line	18	0	3
SH_GI_NamedBoundary	Named Boundary	32	0	0
SH_GI_NorthArrow	Sheet - North Arrow	18	0	2
SH_GI_PlotLimits	Sheet - Plot Limits	0	0	0
SH_GI_PrelimTablesSchedules	Structural Preliminary Plan Tables and Schedules	0	0	0
SH_GI_PSEPEStamp	PSE PE Stamp	2	0	0
SH_GI_PSEStructuralEngStamp	PSE Structural Eng Stamp	2	0	0
SH_GI_RasterImage	Raster Images	0	0	0
SH_GI_RevisionAddInLine	Revision Add In Line	3	0	0
SH_GI_RevisionAddInText	Revision Add In Text	3	0	0
SH_GI_RevisionNoteFlag	Flag - Revision Note	3	0	0
SH_GI_RevisionStrikeThruSglLine	Revision Strike Thru Sgl Line	2	0	0
SH_GI_RevisionStrikeThruSquiggle	Revision Strike Thru Squiggle	2	0	0
SH_GI_ScaleBar	Scale Bar	0	0	2
SH_GI_SectionDetailCallout	Section Cut	0	0	0
SH_GI_SheetBorder	Sheet Border	0	0	3
SH_GI_SheetTextInCells	Sheet - Text In Cells	0	0	0
SH_GI_Stamp_TitleBlockLocator	Stamp Locator - Titleblock	0	0	5
SH_GI_TablesSchedules	Tables and Schedules Generic	0	0	1
SH_GI_TitleBlockNamesText	Sheet - Title Block Names Text	0	0	0
SH_GI_TitleBlockPrelimApprovalBlock	Structural Preliminary Plan Approval Block	0	0	0
SH_GI_TitleBlockPrelimMarginNotes	Structural Preliminary Plan Titleblock Margin Notes	0	0	0
SH_GI_TitleBlockPrelimText	Sheet - Title Block Prelim Text	240	0	0
SH_GI_TitleBlockProjectNameText	Sheet - Title Block Project Name Text	0	0	0
SH_GI_TitleBlockProjectNumText	Sheet - Title Block Project Num Text	0	0	0
SH_GI_TitleBlockRefNumText	Sheet - Title Block Ref Num Text	0	0	0
SH_GI_TitleBlockSheetNumberText	Sheet - Title Block Sheet Number Text	0	0	0
SH_GI_TitleBlockTagText_Sheet	Sheet - Title Block Tag Text - Sheet	0	0	0
SH_GI_TitleBlockText	Sheet - Title Block Text	0	0	0
SH_GI_TrafficMvmntArrow	Traffic Mvmnt Arrow	18	0	1
SH_GI_WSDOTAcronymLogo	WSDOT Acronym Logo	246	0	2
SH_GI_WSDOTLogo	WSDOT Logo	246	0	2
ST_BG_ApproachSlab	Approach Slab	49	6	2
ST_BG_ApproachSlabAnchor	Approach Slab Anchor	50	6	1
ST_BG_ApproachSlabAnchorHidden	Approach Slab Anchor Hidden	50	2	1
ST_BG_ ApproachSlabAnchorHiddenNew	Approach Slab Anchor Hidden New	34	2	2
ST_BG_ApproachSlabAnchorNew	Approach Slab Anchor New	34	0	2
ST_BG_ApproachSlabDowelBar	Approach Slab Dowel Bar	55	6	1
ST_BG_ApproachSlabDowelBarHidden	Approach Slab Dowel Bar Hidden	55	2	1
ST_BG_ ApproachSlabDowelBarHiddenNew	Approach Slab Dowel Bar Hidden New	39	2	2
ST_BG_ApproachSlabDowelBarNew	Approach Slab Dowel Bar New	39	0	2
ST_BG_ApproachSlabHidden	Approach Slab Hidden	49	3	2
ST_BG_ApproachSlabHiddenNew	Approach Slab Hidden New	33	3	3
ST_BG_ApproachSlabNew	Approach Slab New	33	0	3
ST_BG_ArchFinish	Architectural Finish	25	6	1

Name	Description	Color	Line Style	Weight
ST_BG_ArchFinishNew	Architectural Finish New	9	0	2
ST_BG_BarrierAnchorAssembly	Barrier Anchor Assembly	50	6	1
ST_BG_BarrierAnchorAssemblyHidden	Barrier Anchor Assembly	50	2	1
ST_BG_ BarrierAnchorAssemblyHiddenNew	Barrier Anchor Assembly Hidden New	34	2	2
ST_BG_BarrierAnchorAssemblyNew	Barrier Anchor Assembly New	34	0	2
ST_BG_BarrierBridge	Barrier Bridge	56	6	1
ST_BG_BarrierBridgeHidden	Barrier Bridge Hidden	56	3	1
ST_BG_BarrierBridgeHiddenNew	Barrier Bridge Hidden New	40	3	2
ST_BG_BarrierBridgeNew	Barrier Bridge New	40	0	2
ST_BG_BarrierCoverPlate	Barrier Cover Plate	54	6	1
ST_BG_BarrierCoverPlateHidden	Barrier Cover Plate Hidden	54	2	1
ST_BG_BarrierCoverPlateHiddenNew	Barrier Cover Plate Hidden New	38	2	2
ST_BG_BarrierCoverPlateNew	Barrier Cover Plate New	38	0	2
ST_BG_BarrierPinAssembly	Barrier Pin Assembly	54	6	1
ST_BG_BarrierPinAssemblyHidden	Barrier Pin Assembly Hidden	54	2	1
ST_BG_ BarrierPinAssemblyHiddenNew	Barrier Pin Assembly Hidden New	38	2	2
ST_BG_BarrierPinAssemblyNew	Barrier Pin Assembly New	38	0	2
ST_BG_BridgeRail	Bridge Rail	55	6	1
ST_BG_BridgeRailHidden	Bridge Rail Hidden	55	2	1
ST_BG_BridgeRailHiddenNew	Bridge Rail Hidden New	39	2	2
ST_BG_BridgeRailNew	Bridge Rail New	39	0	2
ST_BG_ConstJoint	Structure Construction Joint	3	1	1
ST_BG_ConstJointNew	Structure Construction Joint New	3	2	2
ST_BG_Hardware	Hardware	124	6	0
ST_BG_HardwareHidden	Hardware Hidden	124	2	0
ST_BG_HardwareHiddenNew	Hardware Hidden New	108	2	1
ST_BG_HardwareNew	Hardware New	108	0	1
ST_BG_Reinf	Reinforcement	59	6	1
ST_BG_Reinf2	Reinforcement 2	50	6	1
ST_BG_Reinf2Hidden	Reinforcement 2 Hidden	50	2	1
ST_BG_Reinf2HiddenNew	Reinforcement 2 Hidden New	34	2	2
ST_BG_Reinf2New	Reinforcement 2 New	34	0	2
ST_BG_Reinf3	Reinforcement 3	205	6	1
ST_BG_Reinf3Hidden	Reinforcement 3 Hidden	205	2	1
ST_BG_Reinf3HiddenNew	Reinforcement 3 Hidden New	204	2	2
ST_BG_Reinf3New	Reinforcement 3 New	204	0	2
ST_BG_ReinfHidden	Reinforcement Hidden	59	2	1
ST_BG_ReinfHiddenNew	Reinforcement Hidden New	43	2	2
ST_BG_ReinfNew	Reinforcement New	43	0	2
ST_BG_Slab	Concrete Slab	33	6	2
ST_BG_SlabAnchor	Approach Slab Anchor	50	6	1
ST_BG_SlabAnchorHidden	Approach Slab Anchor Hidden	50	2	1
ST_BG_SlabAnchorHiddenNew	Approach Slab Anchor Hidden New	34	2	2
ST_BG_SlabAnchorNew	Approach Slab Anchor New	34	0	2
ST_BG_SlabDowelBar	Approach Slab Dowel Bar	55	6	1
ST_BG_SlabDowelBarHidden	Approach Slab Dowel Bar Hidden	55	2	1
ST_BG_SlabDowelBarHiddenNew	Approach Slab Dowel Bar Hidden New	39	2	2
ST_BG_SlabDowelBarNew	Approach Slab Dowel Bar New	39	0	2

Name	Description	Color	Line Style	Weight
ST_BG_SlabHidden	Concrete Slab Hidden	33	3	2
ST_BG_SlabHiddenNew	Concrete Slab Hidden New	49	3	3
ST_BG_SlabNew	Concrete Slab New	49	0	3
ST_BG_StructSteel	Structural Steel	120	6	2
ST_BG_StructSteelHidden	Structural Steel Hidden	120	2	2
ST_BG_StructSteelHiddenNew	Structural Steel Hidden New	104	2	3
ST_BG_StructSteelNew	Structural Steel New	104	0	3
ST_BG_Tunnel	Tunnel	87	5	0
ST_BG_TunnelHidden	Tunnel Hidden	87	3	0
ST_BG_TunnelHiddenNew	Tunnel Hidden New	71	3	2
ST_BG_TunnelNew	Tunnel New	71	0	2
ST_BG_TunnelRail	Tunnel Rail	151	5	1
ST_BG_TunnelRailHidden	Tunnel Rail Hidden	151	5	1
ST_BG_TunnelRailHiddenNew	Tunnel Rail Hidden New	135	5	1
ST_BG_TunnelRailNew	Tunnel Rail New	135	5	1
ST_BG_TunnelSupportColumn	Tunnel Support Column	151	5	0
ST_BG_TunnelSupportColumnHidden	Tunnel Support Column Hidden	151	3	0
ST_BG_ TunnelSupportColumnHiddenNew	Tunnel Support Column Hidden New	135	3	0
ST_BG_TunnelSupportColumnNew	Tunnel Support Column New	135	5	0
ST_BG_UtilityHanger	Utility Hanger	55	6	1
ST_BG_UtilityHangerHardware	Utility Hanger Hardware	60	6	0
ST_BG_UtilityHangerHardwareHidden	Utility Hanger Hardware Hidden	60	2	0
ST_BG_ UtilityHangerHardwareHiddenNew	Utility Hanger Hardware Hidden New	44	2	1
ST_BG_UtilityHangerHardwareNew	Utility Hanger Hardware	44	0	1
ST_BG_UtilityHangerHidden	Utility Hanger Hidden	55	3	1
ST_BG_UtilityHangerHiddenNew	Utility Hanger Hidden New	39	3	2
ST_BG_UtilityHangerNew	Utility Hanger New	39	0	2
ST_BG_Weld	Weld	18	WELD_EXIST	0
ST_BG_WeldNew	Weld New	2	WELD	1
ST_BG_Wood	Wood	61	6	2
ST_BG_WoodHidden	Wood Hidden	61	2	2
ST_BG_WoodHiddenNew	Wood Hidden New	45	2	3
ST_BG_WoodNew	Wood New	45	0	3
ST_EW_Backfill	Backfill	30	GRND_BACKFILL	1
ST_EW_BackfillNew	Backfill New	14	GRND_BACKFILL	3
ST_EW_GndLine	GndLine	30	GRND_EXIST	2
ST_EW_GndLineNew	GndLine New	14	0	3
ST_EW_RipRap	RipRap	29	GRND_EXIST	2
ST_EW_RipRapNew	RipRap New	13	0	3
ST_EW_Shoring	Shoring	23	6	1
ST_EW_ShoringHidden	Shoring Hidden	23	3	1
ST_EW_ShoringHiddenNew	Shoring Hidden New	7	3	2
ST_EW_ShoringNew	Shoring New	7	0	2
ST_FN_AnchorAssembly	Anchor Assembly	121	6	2
ST_FN_AnchorAssemblyHidden	Anchor Assembly Hidden	121	3	2
ST_FN_AnchorAssemblyHiddenNew	Anchor Assembly Hidden New	105	3	3
ST_FN_AnchorAssemblyNew	Anchor Assembly New	105	0	3
ST_FN_AnchorCable	Anchor Cable	120	6	1

Name	Description	Color	Line Style	Weight
ST_FN_AnchorCableHidden	Anchor Cable Hidden	120	3	1
ST_FN_AnchorCableHiddenNew	Anchor Cable Hidden New	104	3	2
ST_FN_AnchorCableNew	Anchor Cable New	104	0	2
ST_FN_EyeBar	EyeBar	118	6	1
ST_FN_EyeBarHidden	EyeBar Hidden	118	2	1
ST_FN_EyeBarHiddenNew	EyeBar Hidden New	102	2	2
ST_FN_EyeBarNew	EyeBar New	102	0	2
ST_FN_FootingBridge	Footing Bridge	121	6	2
ST_FN_FootingBridgeHidden	Footing Bridge Hidden	121	3	2
ST_FN_FootingBridgeHiddenNew	Footing Bridge Hidden New	105	3	3
ST_FN_FootingBridgeNew	Footing Bridge New	105	0	3
ST_FN_FootingWall	Footing Wall	121	6	2
ST_FN_FootingWallHidden	Footing Wall Hidden	121	3	2
ST_FN_FootingWallHiddenNew	Footing Wall Hidden New	105	3	3
ST_FN_FootingWallNew	Footing Wall New	105	0	3
ST_FN_GuideBushing	Guide Bushing	114	6	1
ST_FN_GuideBushingHidden	Guide Bushing Hidden	114	2	1
ST_FN_GuideBushingHiddenNew	Guide Bushing Hidden New	98	2	2
ST_FN_GuideBushingNew	Guide Bushing New	98	0	2
ST_FN_Pile	Pile	120	6	1
ST_FN_PileHidden	Pile Hidden	120	3	1
ST_FN_PileHiddenNew	Pile Hidden New	104	3	2
ST_FN_PileNew	Pile New	104	0	2
ST_FN_Shaft	Shaft	120	6	2
ST_FN_ShaftCap	Shaft Cap	121	6	2
ST_FN_ShaftCapHidden	Shaft Cap Hidden	121	3	2
ST_FN_ShaftCapHiddenNew	Shaft Cap Hidden New	105	3	3
ST_FN_ShaftCapNew	Shaft Cap New	105	0	3
ST_FN_ShaftHidden	Shaft Hidden	120	3	2
ST_FN_ShaftHiddenNew	Shaft Hidden New	104	3	3
ST_FN_ShaftNew	Shaft New	104	0	3
ST_FN_SignFoundation	Sign Foundation	121	6	2
ST_FN_SignFoundationHiddenNew	Sign Foundation Hidden New	105	3	3
ST_FN_SignFoundationHiden	Sign Foundation	121	3	2
ST_FN_SignFoundationNew	Sign Foundation New	105	0	3
ST_FN_Socket	Socket	119	6	1
ST_FN_SocketHidden	Socket Hidden	119	2	1
ST_FN_SocketHiddenNew	Socket Hidden New	103	2	2
ST_FN_SocketNew	Socket New	103	0	2
ST_FN_StemWall	Stem Wall	113	6	2
ST_FN_StemWallHidden	Stem Wall Hidden	113	3	2
ST_FN_StemWallHiddenNew	Stem Wall Hidden New	97	3	3
ST_FN_StemWallNew	Stem Wall New	97	0	3
ST_ME_ConduitGeneric	Conduit Generic	54	6	1
ST_ME_ConduitGenericHidden	Conduit Generic Hidden	54	2	1
ST_ME_ConduitGenericHiddenNew	Conduit Generic Hidden New	38	2	2
ST_ME_ConduitGenericNew	Conduit Generic New	38	0	2
ST_ME_ControlCabinet	Control Cabinet	49	6	1
ST_ME_ControlCabinetHidden	Control Cabinet Hidden	49	2	1
ST_ME_ControlCabinetHiddenNew	Control Cabinet Hidden New	33	2	2

Name	Description	Color	Line Style	Weight
ST_ME_ControlCabinetNew	Control Cabinet New	33	0	2
ST_ME_ControlPanel	Control Panel	50	6	1
ST_ME_ControlPanelHidden	Control Panel Hidden	50	2	1
ST_ME_ControlPanelHiddenNew	Control Panel Hidden New	34	2	2
ST_ME_ControlPanelNew	Control Panel New	34	0	2
ST_ME_MechAssembly	Mech Assembly	55	6	1
ST_ME_MechAssemblyHidden	Mech Assembly Hidden	55	2	1
ST_ME_MechAssemblyHiddenNew	Mech Assembly Hidden New	39	2	2
ST_ME_MechAssemblyNew	Mech Assembly New	39	0	2
ST_ME_VentExhst	Vent Exhaust	61	6	1
ST_ME_VentExhstHidden	Vent Exhaust Hidden	61	2	1
ST_ME_VentExhstHiddenNew	Vent Exhaust Hidden New	45	2	2
ST_ME_VentExhstNew	Vent Exhaust New	45	0	2
ST_SB_Abutment	Abutment	120	6	2
ST_SB_AbutmentHidden	Abutment Hidden	120	3	2
ST_SB_AbutmentHiddenNew	Abutment Hidden New	104	3	3
ST_SB_AbutmentNew	Abutment New	104	0	3
ST_SB_Bearing	Bearing	118	6	1
ST_SB_BearingHidden	Bearing Hidden	118	2	1
ST_SB_BearingHiddenNew	Bearing Hidden New	102	2	2
ST_SB_BearingNew	Bearing New	102	0	2
ST_SB_Column	Column	119	6	1
ST_SB_ColumnHidden	Column Hidden	119	3	1
ST_SB_ColumnHiddenNew	Column Hidden New	103	3	2
ST_SB_ColumnNew	Column New	103	0	2
ST_SB_CrossBeam	CrossBeam	120	6	2
ST_SB_CrossBeamHidden	CrossBeam Hidden	120	3	2
ST_SB_CrossBeamHiddenNew	CrossBeam Hidden New	104	3	3
ST_SB_CrossBeamNew	CrossBeam New	104	0	3
ST_SB_GirderStop	Girder Stop	120	6	2
ST_SB_GirderStopHidden	Girder Stop Hidden	120	3	2
ST_SB_GirderStopHiddenNew	Girder Stop Hidden New	104	3	3
ST_SB_GirderStopNew	Girder Stop New	104	0	3
ST_SB_GroutPad	Grout Pad	119	6	1
ST_SB_GroutPadHidden	Grout Pad Hidden	119	2	1
ST_SB_GroutPadHiddenNew	Grout Pad Hidden New	103	2	2
ST_SB_GroutPadNew	Grout Pad New	103	0	2
ST_SB_PierBent	Pier or Bent	120	6	2
ST_SB_PierBentHidden	Pier or Bent Hidden	120	3	2
ST_SB_PierBentHiddenNew	Pier or Bent Hidden New	104	3	3
ST_SB_PierBentNew	Pier or Bent New	104	0	3
ST_SB_Pontoon	Pontoon	121	6	2
ST_SB_PontoonHidden	Pontoon Hidden	121	3	2
ST_SB_PontoonHiddenNew	Pontoon Hidden New	105	3	3
ST_SB_PontoonNew	Pontoon New	105	0	3
ST_SB_TimberPileBracing	Timber Pile Bracing	119	6	1
ST_SB_TimberPileBracingHidden	Timber Pile Bracing Hidden	119	3	1
ST_SB_TimberPileBracingHiddenNew	Timber Pile Bracing Hidden New	103	3	2
ST_SB_TimberPileBracingNew	Timber Pile Bracing New	103	0	2
ST_SB_WingWall	Wing Wall	119	6	2

Name	Description	Color	Line Style	Weight
ST_SB_WingWallHidden	Wing Wall Hidden	119	3	2
ST_SB_WingWallHiddenNew	Wing Wall Hidden New	103	3	3
ST_SB_WingWallNew	Wing Wall New	103	0	3
ST_SN_Bracing	Bracing	55	6	1
ST_SN_BracingHidden	Bracing Hidden	55	3	1
ST_SN_BracingHiddenNew	Bracing Hidden New	39	3	2
ST_SN_BracingNew	Bracing New	39	0	2
ST_SN_MaintWalkScaffold	Bracing	56	6	1
ST_SN_MaintWalkScaffoldHidden	Maintenance Walk Scaffold Hidden	56	2	1
ST_SN_MaintWalkScaffoldHiddenNew	Bracing Hidden New	40	2	2
ST_SN_MaintWalkScaffoldNew	Bracing New	40	0	2
ST_SN_MountingBracket	Sign Mounting Bracket	49	6	1
ST_SN_MountingBracketHidden	Sign Mounting Bracket Hidden	49	2	1
ST_SN_MountingBracketHiddenNew	Sign Mounting Bracket Hidden New	33	2	2
ST_SN_MountingBracketNew	Sign Mounting Bracket New	33	0	2
ST_SN_SignPost	Sign Post	49	6	1
ST_SN_SignPostHidden	Sign Post Hidden	49	2	1
ST_SN_SignPostHiddenNew	Sign Post Hidden New	33	2	2
ST_SN_SignPostNew	Sign Post New	33	0	2
ST_SP_BridgeDeck	Bridge Deck	145	6	2
ST_SP_BridgeDeckHidden	Bridge Deck Hidden	145	3	2
ST_SP_BridgeDeckHiddenNew	Bridge Deck Hidden New	129	3	3
ST_SP_BridgeDeckMembrane	Waterproof Deck Membrane	148	6	3
ST_SP_BridgeDeckMembraneNew	Waterproof Deck Membrane New	132	2	4
ST_SP_BridgeDeckNew	Bridge Deck New	129	0	3
ST_SP_BridgeDeckOverlay	Bridge Deck HMA or Concrete Overlay	151	6	2
ST_SP_BridgeDeckOverlayNew	Bridge Deck HMA or Concrete Overlay New	135	0	3
ST_SP_CrossFrame	Cross Frame	151	6	1
ST_SP_CrossFrameHidden	Cross Frame Hidden	151	3	1
ST_SP_CrossFrameHiddenNew	Cross Frame Hidden New	135	3	2
ST_SP_CrossFrameNew	Cross Frame New	135	0	2
ST_SP_DiaphragmEnd	Diaphragm End	145	6	2
ST_SP_DiaphragmEndHidden	Diaphragm End Hidden	145	3	2
ST_SP_DiaphragmEndHiddenNew	Diaphragm End Hidden New	129	3	3
ST_SP_DiaphragmEndNew	Diaphragm End New	129	0	3
ST_SP_DiaphragmIntermediate	Diaphragm Intermediate	152	6	2
ST_SP_DiaphragmIntermediateHidden	Diaphragm Intermediate Hidden	152	3	2
ST_SP_ DiaphragmIntermediateHiddenNew	Diaphragm Intermediate Hidden New	136	3	3
ST_SP_DiaphragmIntermediateNew	Diaphragm Intermediate New	136	0	3
ST_SP_ExpansionJoint	Expansion Joint	151	6	1
ST_SP_ExpansionJointHeader	Expansion Joint Header	150	6	2
ST_SP_ExpansionJointHeaderHidden	Expansion Joint Header Hidden	150	2	2
ST_SP_ ExpansionJointHeaderHiddenNew	Expansion Joint Header Hidden New	134	2	3
ST_SP_ExpansionJointHeaderNew	Expansion Joint Header New	134	0	3
ST_SP_ExpansionJointHidden	Expansion Joint Hidden	151	2	1
ST_SP_ExpansionJointHiddenNew	Expansion Joint Hidden New	135	2	2
ST_SP_ExpansionJointNew	Expansion Joint New	135	0	2
ST_SP_FalseWork	FalseWork	141	0	1

Name	Description	Color	Line Style	Weight
ST_SP_FloorBeamSteel	Floor Beam Steel	152	6	2
ST_SP_FloorBeamSteelHidden	Floor Beam Steel Hidden	152	3	2
ST_SP_FloorBeamSteelHiddenNew	Floor Beam Steel Hidden New	136	3	3
ST_SP_FloorBeamSteelNew	Floor Beam Steel New	136	0	3
ST_SP_FloorStringerSteel	Floor Stringer Steel	151	6	2
ST_SP_FloorStringerSteelHidden	Floor Stringer Steel Hidden	151	3	2
ST_SP_FloorStringerSteelHiddenNew	Floor Stringer Steel Hidden New	135	3	3
ST_SP_FloorStringerSteelNew	Floor Stringer Steel New	135	0	3
ST_SP_Girder	Girder	153	6	2
ST_SP_GirderConcrete	Concrete Girder	153	6	2
ST_SP_GirderConcreteHidden	Concrete Girder Hidden	153	3	2
ST_SP_GirderConcreteHiddenNew	Concrete Girder Hidden New	137	3	3
ST_SP_GirderConcreteNew	Concrete Girder New	137	0	3
ST_SP_GirderNew	Girder	137	0	3
ST_SP_GirderSteel	Steel Girder	153	6	2
ST_SP_GirderSteelHidden	Steel Girder Hidden	153	3	2
ST_SP_GirderSteelHiddenNew	Steel Girder Hidden New	137	3	3
ST_SP_GirderSteelNew	Steel Girder New	137	0	3
ST_SP_GirderTensioningStrand	Concrete Girder Tensioning Strand	156	6	1
ST_SP_GirderTensioningStrandHidden	Concrete Girder Tensioning Strand Hidden	156	2	1
ST_SP_ GirderTensioningStrandHiddenNew	Concrete Girder Tensioning Strand Hidden New	140	2	2
ST_SP_GirderTensioningStrandNew	Concrete Girder Tensioning Strand New	140	0	2
ST_SP_SteelStiffener	Steel Stiffener	156	6	1
ST_SP_SteelStiffenerHidden	Steel Stiffener Hidden	156	2	1
ST_SP_SteelStiffenerHiddenNew	Steel Stiffener Hidden New	140	2	2
ST_SP_SteelStiffenerNew	Steel Stiffener new	140	0	2
ST_SP_SteelTruss	Steel Truss	153	6	2
ST_SP_SteelTrussHidden	Steel Truss Hidden	153	3	2
ST_SP_SteelTrussHiddenNew	Steel Truss Hidden New	137	3	3
ST_SP_SteelTrussNew	Steel Truss New	137	0	3
ST_SP_StructBracing	Structure Bracing	135	6	1
ST_SP_StructBracingHidden	Structure Bracing Hidden	135	3	1
ST_SP_StructBracingHiddenNew	Structure Bracing Hidden New	151	3	2
ST_SP_StructBracingNew	Structure Bracing New	151	0	2
ST_SP_TrussWeb	Truss Web	152	6	1
ST_SP_TrussWebHidden	Truss Web Hidden	152	3	1
ST_SP_TrussWebHiddenNew	Truss Web Hidden New	136	3	2
ST_SP_TrussWebNew	Truss Web New	136	0	2
ST_WA_DrainageMat	Drainage Mat and Drain Screens	81	6	0
ST_WA_DrainageMatNew	Drainage Mat and Drain Screens New	65	0	0
ST_WA_DrainagePipesGutters	Wall Drain Pipes and Gutters	81	6	0
ST_WA_DrainagePipesGuttersHidden	Wall Drain Pipes and Gutters Hidden	81	2	0
ST_WA_ DrainagePipesGuttersHiddenNew	Wall Drain Pipes and Gutters Hidden New	97	2	0
ST_WA_DrainagePipesGuttersNew	Wall Drain Pipes and Gutters New	97	0	0
ST_WA_GeoSynLayer	GeoSynthetic Layer	87	6	1
ST_WA_GeoSynLayerHidden	GeoSynthetic Layer Hidden	87	3	1
ST_WA_GeoSynLayerHiddenNew	GeoSynthetic Layer Hidden New	71	3	2
ST_WA_GeoSynLayerNew	GeoSynthetic Layer New	71	0	2

Name	Description	Color	Line Style	Weight
ST_WA_Lagging	Lagging	88	6	1
ST_WA_LaggingHidden	Lagging Hidden	88	2	1
ST_WA_LaggingHiddenNew	Lagging Hidden New	72	2	2
ST_WA_LaggingNew	Lagging New	72	0	2
ST_WA_NoiseWall	Noise Wall	87	6	2
ST_WA_NoiseWallNew	Noise Wall New	71	0	3
ST_WA_Pile	Pile	89	6	1
ST_WA_PileHidden	Pile Hidden	89	3	1
ST_WA_PileHiddenNew	Pile Hidden New	73	3	2
ST_WA_PileNew	PileNew	73	0	2
ST_WA_RetainingWall	Retaining Wall	23	6	2
ST_WA_RetainingWallNew	Retaining Wall New	7	0	3
ST_WA_TieBackAnch	Wall Tiebacks and Anchors	92	6	1
ST_WA_TieBackAnchHidden	Wall Tiebacks and Anchors Hidden	92	2	1
ST_WA_TieBackAnchHiddenNew	Wall Tiebacks and Anchors Hidden New	76	2	2
ST_WA_TieBackAnchNew	Wall Tiebacks and Anchors New	76	0	2
ST_WA_WallFascia	WallFascia	23	6	1
ST_WA_WallFasciaHidden	Wall Fascia Hidden	23	3	1
ST_WA_WallFasciaHiddenNew	Wall Fascia New Hidden	7	3	2
ST_WA_WallFasciaNew	WallFasciaNew	7	0	2
TP_MM_MonitorWellNew	Monitor Well New	142	0	1
TP_NT_StreamRiver	Stream or River Line	170	CREEK_RIVER LINE	1
TP_NT_StreamRiverText	Stream or River Label Text	170	0	0
TR_IL_ConduitAndWiring	Conduit and Wiring	54	6	1
TR_IL_ConduitAndWiringHidden	Conduit and Wiring Hidden	54	2	1
TR_IL_ConduitAndWiringHiddenNew	Conduit and Wiring Hidden New	38	2	2
TR_IL_ConduitAndWiringNew	Conduit and Wiring New	38	0	2
TR_IL_LightStdGeneric	Light Std Generic	54	6	1
TR_IL_LightStdGenericHidden	Light Std Generic Hidden	54	2	1
TR_IL_LightStdGenericHiddenNew	Light Std Generic Hidden New	38	2	2
TR_IL_LightStdGenericNew	Light Std Generic New	38	0	2
TR_SG_ConduitAndWiring	Conduit and Wiring	54	6	1
TR_SG_ConduitAndWiringHidden	Conduit and Wiring Hidden	54	2	1
TR_SG_ConduitAndWiringHiddenNew	Conduit and Wiring Hidden New	38	2	2
TR_SG_ConduitAndWiringNew	Conduit and Wiring New	38	0	2
TR_SG_JBoxGeneric	JBox Generic	54	6	1
TR_SG_JBoxGenericHidden	JBox Generic Hidden	54	2	1
TR_SG_JBoxGenericHiddenNew	JBox Generic Hidden New	38	2	2
TR_SG_JBoxGenericNew	JBox Generic New	38	0	2
TR_SG_JBoxNEMA	JBox Nema	54	6	1
TR_SG_JBoxNEMAHidden	JBox Nema Hidden	54	2	1
TR_SG_JBoxNEMAHiddenNew	JBox Nema Hidden New	38	2	2
TR_SG_JBoxNEMANew	JBox Nema New	38	0	2
TR_SG_SignalGeneric	SignalGeneric	86	6	1
TR_SG_SignalGenericHidden	Signal Generic Hidden	86	3	1
TR_SG_SignalGenericHiddenNew	Signal Generic Hidden New	38	3	2
TR_SG_SignalGenericNew	SignalGenericNew	38	0	2
TR_SN_MonotubeSignStructure	Monotube Sign Bridge	49	6	2
TR_SN_MonotubeSignStructureHidden	Monotube Sign Bridge Hidden	49	3	2
TR_SN_ MonotubeSignStructureHiddenNew	Monotube Sign Bridge Hidden New	33	3	3

Name	Description	Color	Line Style	Weight
TR_SN_MonotubeSignStructureNew	Monotube Sign Bridge New	33	0	3
TR_SN_Sign	Sign	50	6	2
TR_SN_SignBase	SignBase	56	6	1
TR_SN_SignBaseHidden	Sign Base Hidden	56	2	1
TR_SN_SignBaseHiddenNew	Sign Base Hidden New	40	2	2
TR_SN_SignBaseNew	SignBaseNew	40	0	2
TR_SN_SignHidden	Sign Hidden	50	3	2
TR_SN_SignHiddenNew	Sign Hidden New	34	3	3
TR_SN_SignNew	Sign New	34	0	3
TR_SN_TrussSignStructure	Truss Sign Bridge	49	6	1
TR_SN_TrussSignStructureHidden	Truss Sign Bridge Hidden	49	3	1
TR_SN_TrussSignStructureHiddenNew	Truss Sign Bridge Hidden New	33	3	2
TR_SN_TrussSignStructureNew	Truss Sign Bridge New	33	0	2
TR_TS_ConduitAndWiringTS	Conduit and Wiring TS	54	6	1
TR_TS_ConduitAndWiringTSHidden	Conduit and Wiring TS Hidden	54	2	1
TR_TS_ ConduitAndWiringTSHiddenNew	Conduit and Wiring TS Hidden New	38	2	2
TR_TS_ConduitAndWiringTSNew	Conduit and Wiring TS New	38	0	2
UT_CM_AbvGndCableTV	AbvGnd Cable TV	21	UT_CM_AbvGndCableTV	0
UT_CM_AbvGndCableTVNew	AbvGnd Cable TV New	5	UT_CM_AbvGndCableTVNew	0
UT_CM_AbvGndCommLine	AbvGnd Comm Line	21	UT_CM_AbvGndCommLine	0
UT_CM_AbvGndCommLineNew	AbvGnd Comm Line New	5	UT_CM_AbvGndCommLineNew	0
UT_CM_AbvGndFiberOpticCable	AbvGnd Fiber Optic Cable	21	UT_CM_AbvGndFiberOpticCable	0
UT_CM_AbvGndFiberOpticCableNew	AbvGnd Fiber Optic Cable New	5	UT_CM_AbvGndFiberOpticCableNew	0
UT_CM_AbvGndTelephoneLine	AbvGnd Telephone Line	21	UT_CM_AbvGndTelephoneLine	0
UT_CM_AbvGndTelephoneLineNew	AbvGnd Telephone Line New	5	UT_CM_AbvGndTelephoneLineNew	0
UT_CM_UndGndCableTV	UndGnd Cable TV	21	UT_CM_UndGndCableTV	0
UT_CM_UndGndCableTVDeactive	UndGnd Cable TV Deactive	21	UT_CM_UndGndCableTVDeactive	0
UT_CM_UndGndCableTVNew	UndGnd Cable TV New	5	UT_CM_UndGndCableTVNew	0
UT_CM_UndGndCommLine	UndGnd Comm Line	21	UT_CM_UndGndCommLine	0
UT_CM_UndGndCommLineNew	UndGnd Comm Line New	5	UT_CM_UndGndCommLineNew	0
UT_CM_UndGndFiberOptic	UndGnd Fiber Optic	21	UT_CM_UndGndFiberOptic	0
UT_CM_UndGndFiberOpticDeactive	UndGnd Fiber Optic Deactive	21	UT_CM_UndGndFiberOpticDeactive	0
UT_CM_UndGndFiberOpticNew	UndGnd Fiber Optic New	5	UT_CM_UndGndFiberOpticNew	0
UT_CM_UndGndTelephoneCable	UndGnd Telephone Cable	21	UT_CM_UndGndTelephoneCable	0
UT_CM_UndGndTelephoneCableNew	UndGnd Telephone Cable New	5	UT_CM_UndGndTelephoneCableNew	0
UT_CM_UndGndTelephoneDeactive	UndGnd Telephone Deactive	21	UT_CM_UndGndTelephoneDeactive	0
UT_GS_GasLine	Gas Line	53	UT_GS_GasLine	0
UT_GS_GasLineDeactive	Gas Line Deactive	53	UT_GS_GasLineDeactive	0
UT_GS_GasLineNew	Gas Line New	37	UT_GS_GasLineNew	0
UT_GS_OilLine	Oil Line	53	UT_GS_OilLine	0
UT_GS_OilLineDeactive	Oil Line Deactive	53	UT_GS_OilLineDeactive	0
UT_GS_OilLineNew	Oil Line New	37	UT_GS_OilLineNew	0
UT_GU_UndGndUtilityLineDeactive	Und Gnd Utility Line Deactive	21	UT_GU_UndGndUtilityLineDeactive	0
UT_MT_AbvGndUtilitiesMulti	AbvGnd Utilities Multi	149	UT_MT_AbvGndUtilitiesMulti	0
UT_MT_AbvGndUtilitiesMultiNew	AbvGnd Utilities Multi New	133	UT_MT_AbvGndUtilitiesMultiNew	0
UT_MT_AbvGndUtilMultDeactive	AbvGnd Util Mult Deactive	149	UT_MT_AbvGndUtilMultDeactive	0
UT_MT_UndGndUtilitiesMulti	UndGnd Utilities Multi	149	UT_MT_UndGndUtilitiesMulti	0
UT_MT_UndGndUtilitiesMultiNew	UndGnd Utilities Multi New	133	UT_MT_UndGndUtilitiesMultiNew	0
UT_MT_UtilitiesMultiTypes1	Utilities Multi Types 1	149	UT_MT_UtilitiesMultiTypes1	0
UT_MT_UtilitiesMultiTypes2	Utilities Multi Types 2	149	UT_MT_UtilitiesMultiTypes2	0

Name	Description	Color	Line Style	Weight
UT_MT_UtilitiesMultiTypes3	Utilities Multi Types 3	149	UT_MT_UtilitiesMultiTypes3	0
UT_MT_UtilitiesMultiTypes4	Utilities Multi Types 4	149	UT_MT_UtilitiesMultiTypes4	0
UT_MT_UtilitiesMultiTypes5	Utilities Multi Types 5	149	UT_MT_UtilitiesMultiTypes5	0
UT_MT_UtilitiesMultiTypes6	Utilities Multi Types 6	149	UT_MT_UtilitiesMultiTypes6	0
UT_MT_UtilitiesMultiTypes7	Utilities Multi Types 7	149	UT_MT_UtilitiesMultiTypes7	0
UT_MT_UtilitiesMultiTypes8	Utilities Multi Types 8	149	UT_MT_UtilitiesMultiTypes8	0
UT_MT_UtilitiesMultiTypes9	Utilities Multi Types 9	149	UT_MT_UtilitiesMultiTypes9	0
UT_PW_AbvGndHiTensPowerLine	AbvGnd Hi Tens Power Line	117	UT_PW_AbvGndHiTensPowerLine	0
UT_PW_AbvGndHiTensPowerLineNew	AbvGnd Hi Tens Power Line New	101	UT_PW_AbvGndHiTensPowerLineNew	0
UT_PW_AbvGndPower	AbvGnd Power	117	UT_PW_AbvGndPower	0
UT_PW_AbvGndPowerNew	AbvGnd Power New	101	UT_PW_AbvGndPowerNew	0
UT_PW_UndGndPowerLine	UndGnd Power Line	117	UT_PW_UndGndPowerLine	0
UT_PW_UndGndPowerLineDeactive	UndGnd Power Line Deactive	117	UT_PW_UndGndPowerLineDeactive	0
UT_PW_UndGndPowerLineNew	UndGnd Power Line New	101	UT_PW_UndGndPowerLineNew	0
UT_SS_SanSewerLine	San Sewer Line	149	UT_SS_SanSewerLine	0
UT_SS_SanSewerLineDeactive	San Sewer Line Deactive	149	UT_SS_SanSewerLineDeactive	0
UT_SS_SanSewerLineNew	San Sewer Line New	133	UT_SS_SanSewerLineNew	0
UT_WT_WaterLine	Water Line	85	UT_WT_WaterLine	0
UT_WT_WaterLineDeactive	Water Line Deactive	85	UT_WT_WaterLineDeactive	0
UT_WT_WaterLineNew	Water Line New	69	UT_WT_WaterLineNew	0
z - Construction	Construction lines and cell constructors	211	0	0