

TABLE OF CONTENTS – GENERAL DRAFTING PROCEDURES

CHAPTER 1

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* Indicates 11 x 17 sheet; all others are 8½ x 11.

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01.17	Intentionally Left Blank	
01.18	Intentionally Left Blank	

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CELL LIBRARY: BDETAILS1.CEL

01.20-1	Cells AADF – AASF	06Feb2012
01.20-2	Cells BORD – BRCK5.....	06Feb2012
01.20-3	Cells BRKL2 – BRKL5.....	06Feb2012
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* Indicates 11 x 17 sheet; all others are 8½ x 11.

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01.20-19	Cells SBC1 – SBC2.....	12Sep2014
01.20-20	Cells SBC3 – SBF1	12Sep2014
01.20-21	Cells SBF2 – SBF3	12Sep2014
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01.20-24	Cell SP – SPP14	06Feb2012
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CELL LIBRARY: SYMBOLS1.CEL

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01.21-3	Cells DIRSA – PI	31Mar2006
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CELL LIBRARY: TRANS1.CEL

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01.22-3	Cells BC14R – BC15R	09Jul2012
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01.22-8	Cells DRIP – FLRTS	09Jul2012
01.22-9	Cells FMB – FMBR.....	09Jul2012
01.22-10	Cells FPARL – ILRR.....	09Jul2012
01.22-11	Cells KCCL8 – KCR8	09Jul2012

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01.22-13	Cells PB5 – RMED	09Jul2012
01.22-14	Cells SWK1 – SWK3	09Jul2012
01.22-15	Cells TRNS1 – TRNS3	12Sep2014
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CELL LIBRARY: WELDS.CEL

01.23

* Indicates 11 x 17 sheet; all others are 8½ x 11

GENERAL DRAFTING PROCEDURES

The first chapter of this manual is intended to set the practices for general drafting provisions for the development of plans for the Structure and Bridge Division. It is expected that the users of this manual will adhere to the provisions stated herein.

The procedures and guidelines in this manual have been established with the VDOT in-house design staff in mind. It shall be the Consultant's responsibility to determine which procedures are applicable based on its office software. Although certain CADD procedures may not be applicable to the Consultant, the general drafting provisions outlined in this manual shall be adhered to.

There have been many written books on manual drafting procedures; however, no one textbook captured all of our needs. Therefore, the Structure and Bridge Division developed a manual to indicate its practices. Today there are no so-called authoritative texts for accepted electronic drafting practices/standards. Much of the drafting procedures is dependent on the manuals provided by the electronic drafting supplier; however, these are not intended to be standards of practice, but rather the capabilities of a particular system.

In the past, the Structure and Bridge Division developed and distributed various drafting and detailing procedures. While some of these adhered to general drafting procedures that could be found in various texts, others were those that were peculiar to structural detailing and in particular those dealing with bridge structures. Some items were requested by industry while others were particular to this Division. Many of the procedures were written down, but a large body of information was passed down by word of mouth.

It is the intent of this first chapter to place a body of general drafting and detailing information into one location and at the same time to set the practices so that there will be uniformity for plans developed for the Virginia Department of Transportation, Structure and Bridge Division.

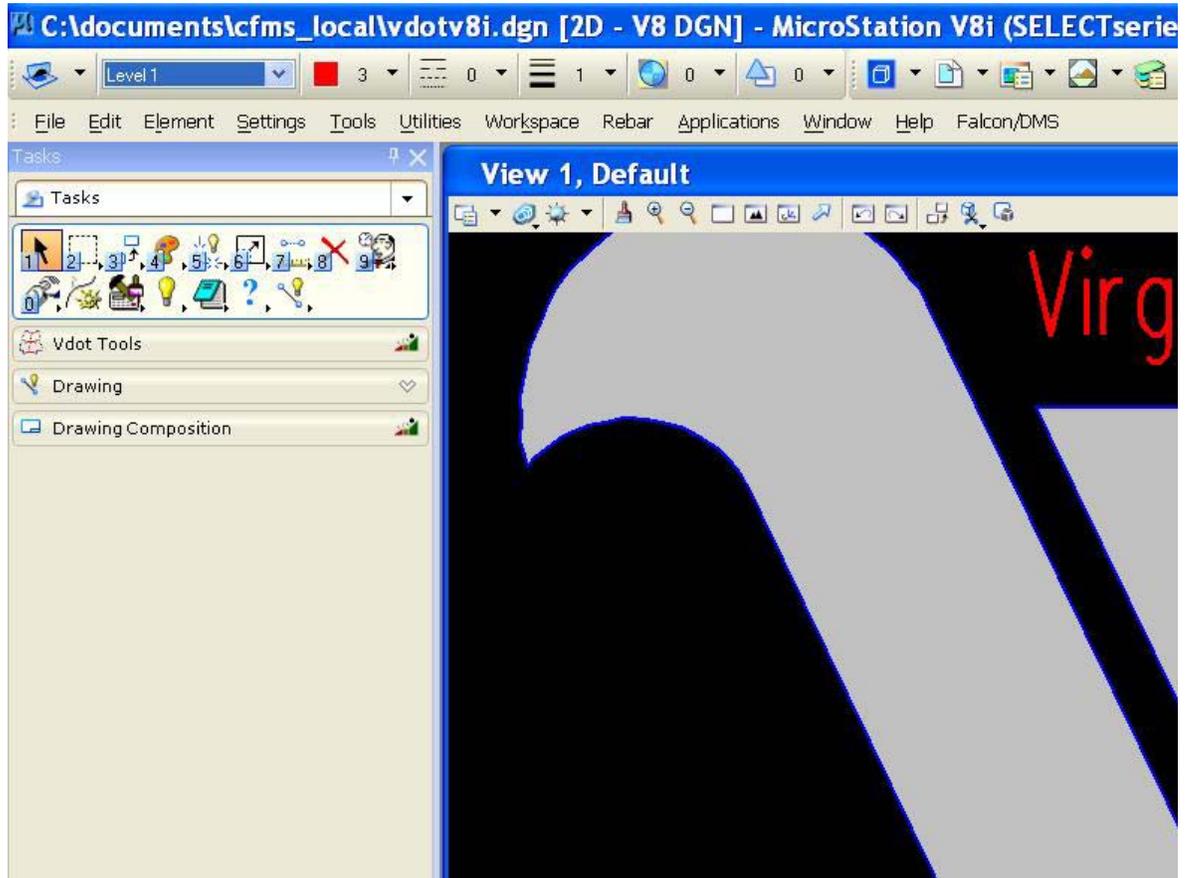
Successive chapters in this manual will detail specific requirements for drafting and detailing various specific sheets (title sheet, interior sheets, transverse section, abutment sheets, pier sheets, etc.). There is also an intent to provide more organization and structure to this manual. An example of this is to place all of the requirements for the front sheet in one location (one chapter) that would include specific drafting/detailing requirements, the General Notes, and a check list for preliminary (TS&L – type, size and location) plans and for final plans. Some of the chapters will also cross reference with other parts of this manual. Other chapters will provide design aids to assist the designer.

NOTE:

Due to various restrictions on placing files in this manual onto the Internet, portions of the drawings shown do not necessarily reflect the correct line weights, line types, fonts arrowheads, etc. Wherever discrepancies occur, the written text shall take precedence over any of the drawn views.

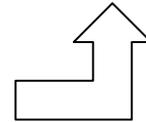
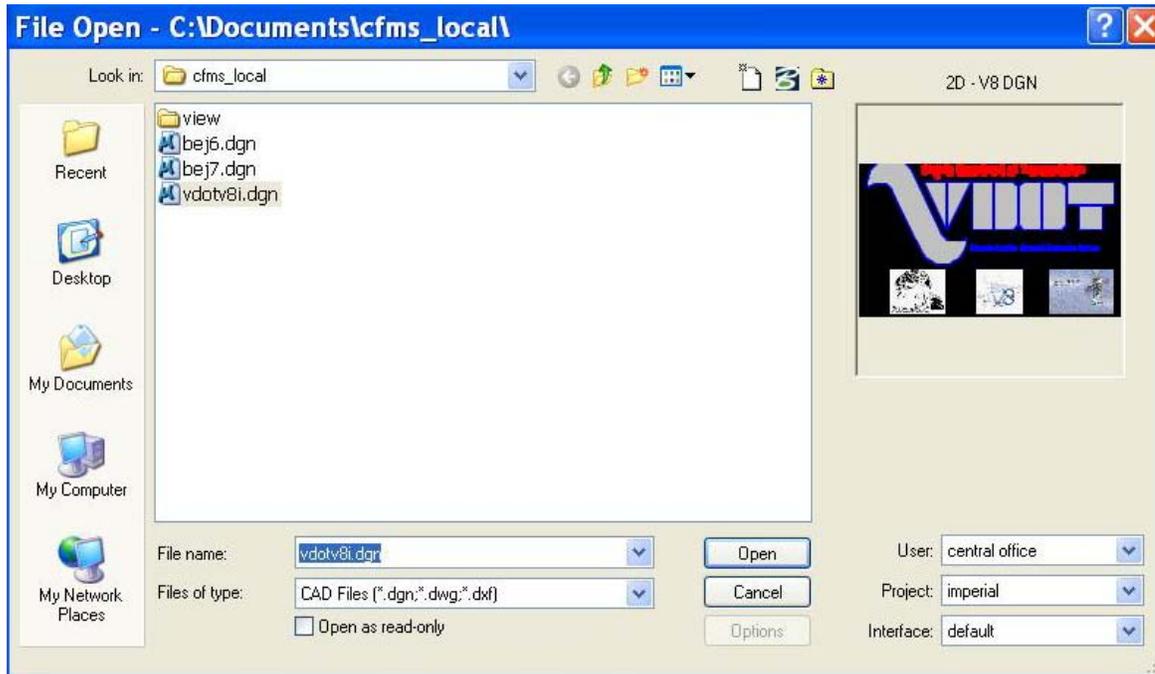
General:

Start MicroStation using the MicroStation V8i VDOT icon.



The default start-up file (vdotv8i.dgn) will be loaded along with the VDOT configuration.

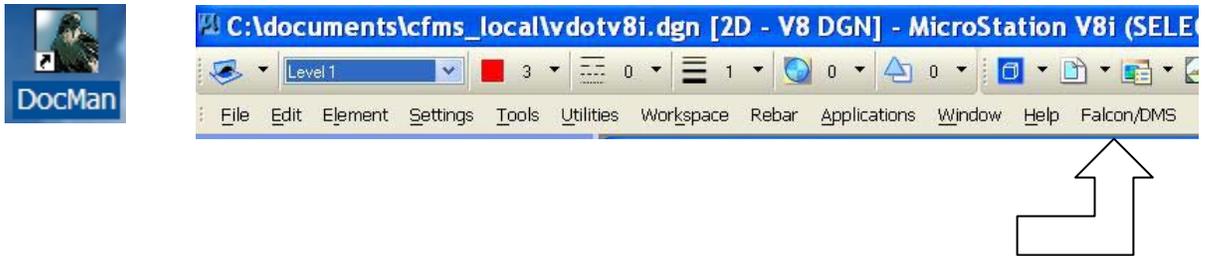
For the first time and if units or District need to be changed, select *FILE - CLOSE* to open the File Open Window.



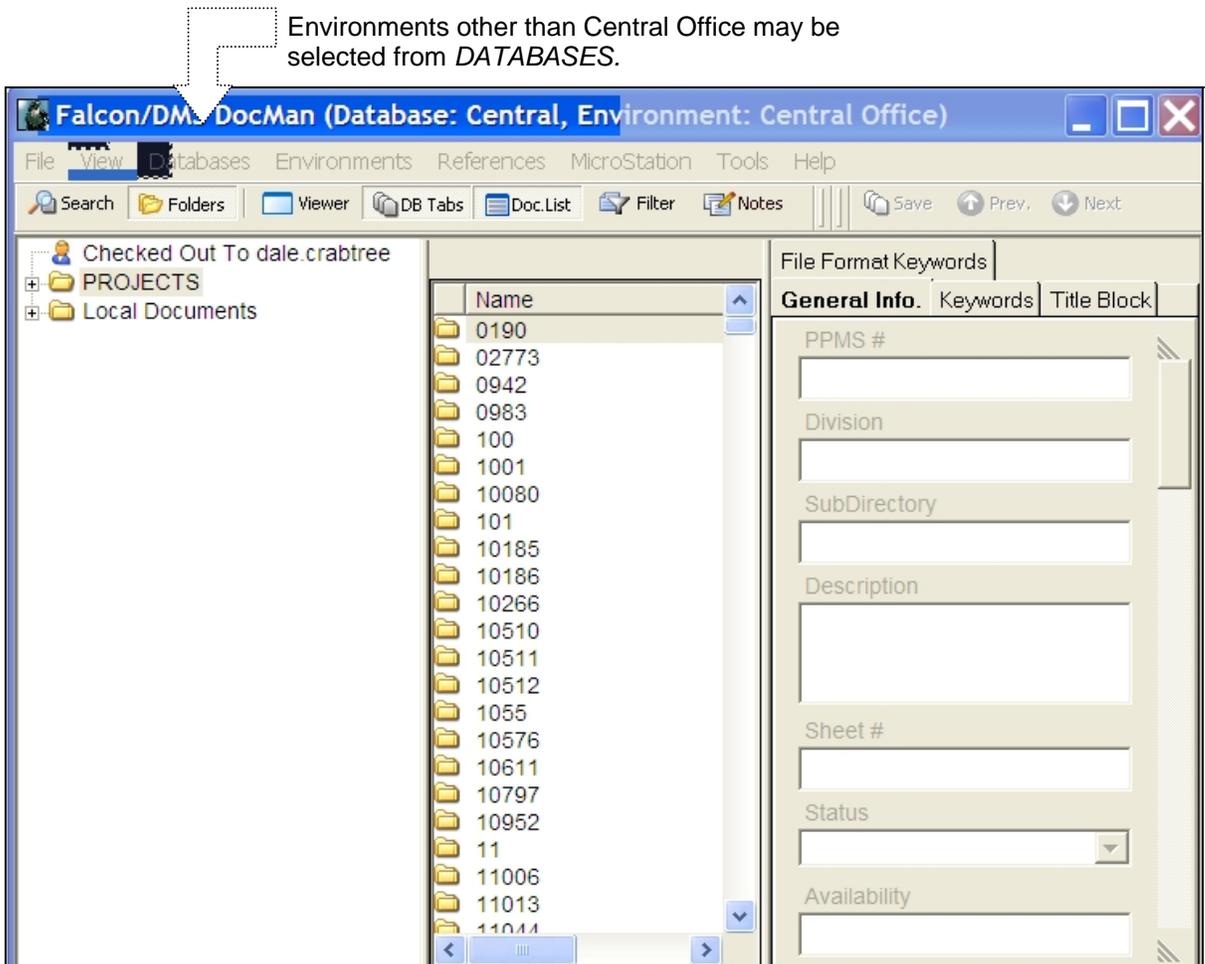
On this screen the operator defines the user and project settings for MicroStation. To set the user settings, select the  next to User: and choose the appropriate user group (Central Office, Bristol, Richmond, etc.). Next, select the  next to Project: and choose project settings either (imperial or metric). By defining these settings, V8i will have the correct settings established for printing, Geopak server locations and other system settings. After the first time, the settings set will be saved as the default settings and will only need to be changed if District or units are changed for the project under development.

Once the Falcon folder/SubDirectory has been created by the System Administrator (Use Form LD-894), the design file (.dgn) can be created. For instructions on the file structure in Falcon, see File Nos. 01.12-1 thru -5.

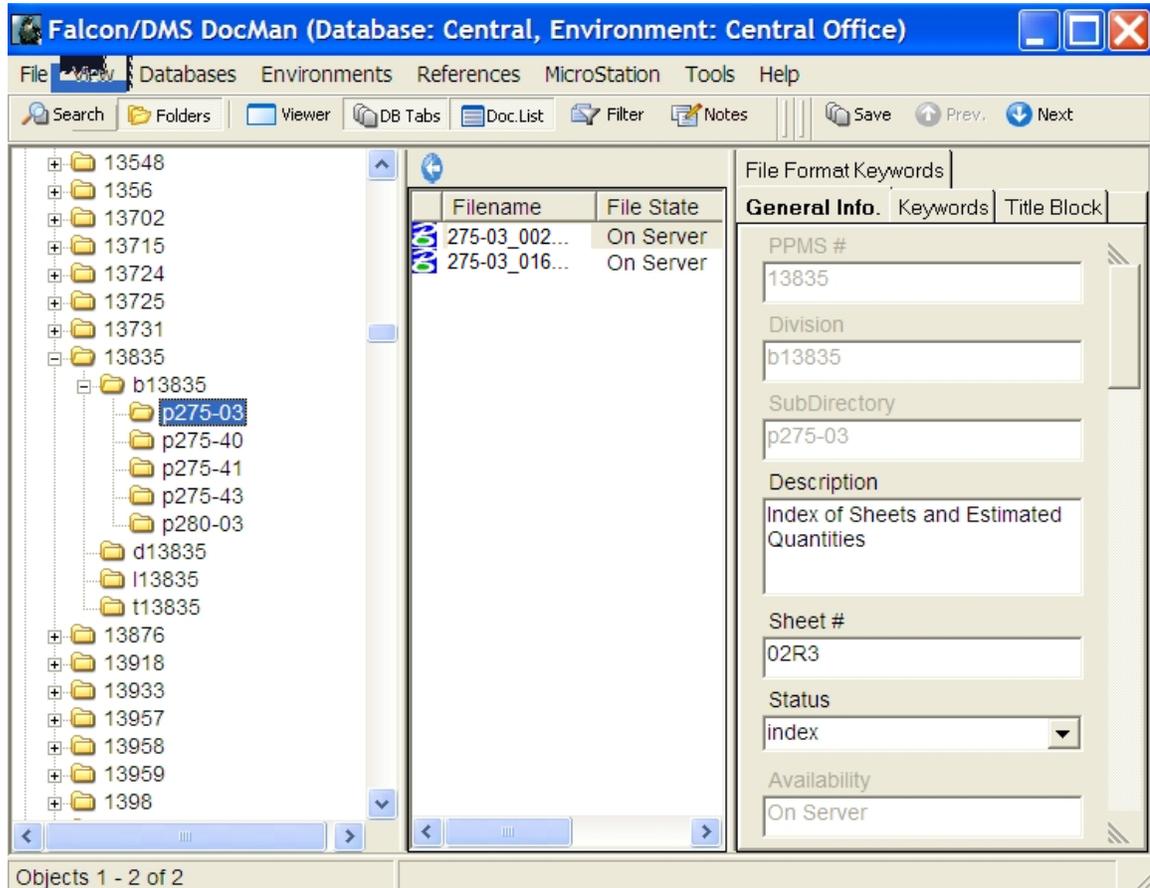
Open **Falcon/DMS**. Using either the icon or select in the menu in MicroStation.



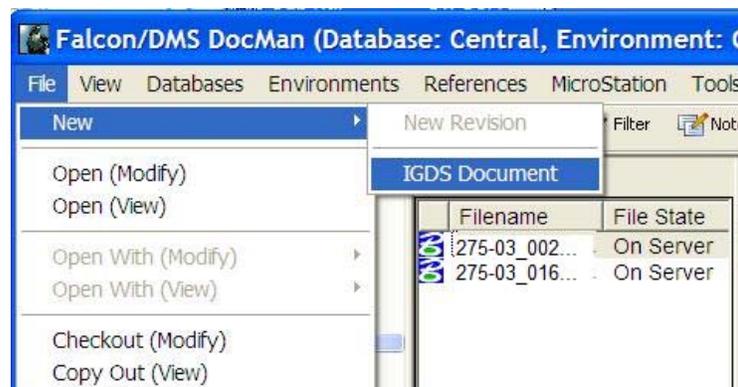
The **Falcon/DMS DocMan** palette displays.



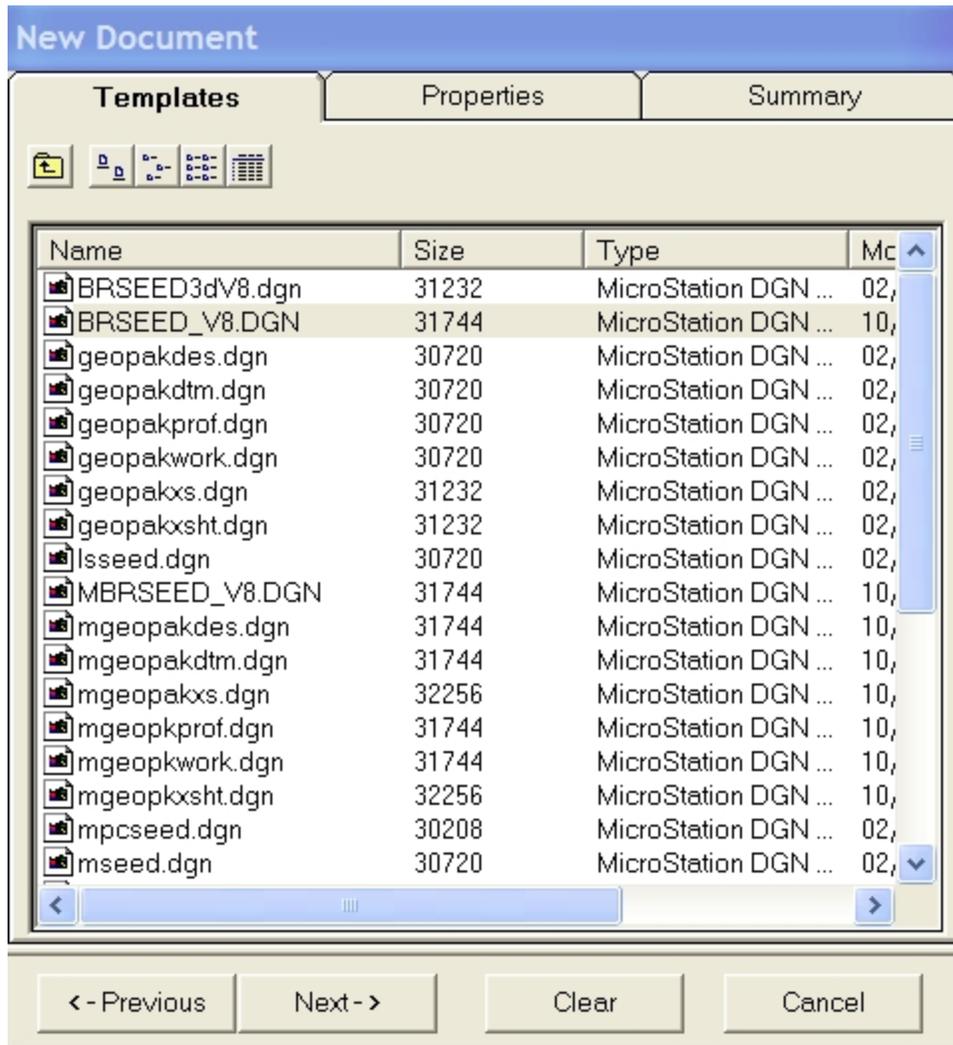
Open the Projects and scroll down to find the desired PPMS folder. Open the folder by either double-clicking on it or by clicking on the plus sign (+). Open the “b” subdirectory folder by either double-clicking on it or by clicking on the plus sign (+). The “p” folder is displayed (there may be more than one) and by double-clicking on it, the existing files of that plan number will display in the center window.



To create a new design file, select *FILE-NEW-IGDS DOCUMENT*.



The **New Document** palette displays and defaults to the Templates tab.



Select *BRSEED_V8i.DGN* (for imperial). Click on the button.

At the Properties tab, input the Filename. The file name is composed of the following: the plan number, underscore and sheet number (3 digits with leading zero(s)); for example, sheet one would be 001). It is not necessary to enter the .dgn extension as it will fill-in automatically. It is extremely important that the file name (and .dgn extension, if entered manually) are in lowercase. On the General Information sub-tab, enter the Description and Status. The description shall match the sheet's "Title Description" to the extent possible. Further information may be entered on the Keywords and Title Block sub-tabs.

The screenshot shows the 'New Document' dialog box with the 'Properties' tab selected. The 'General Info' sub-tab is active. The 'Filename' field contains '275-03_021.dgn', 'Document Number' contains '275-03_021', and 'File Format' is 'igds'. The 'General Info' sub-tab includes fields for 'PPMS #', 'Division', 'SubDirectory', 'Description' (containing 'Geology'), and 'Status' (a dropdown menu set to 'active'). At the bottom, there are four buttons: '< - Previous', 'Next - >', 'Clear', and 'Cancel'.

Click on the button.

At the Summary tab, review the information presented. If any information is incorrect, change on the appropriate tab(s).

The screenshot shows the 'New Document' dialog box with the 'Summary' tab selected. The dialog has three tabs: 'Templates', 'Properties', and 'Summary'. The 'Summary' tab contains the following information:

- Create Document Summary
- Template File: \\0501cocadd\proj\v8seedfiles\BRSEED_V8.DGN
- Filename: 275-47_039.dgn
- Document Number: 275-47_039
- File Format: igds
- Database Tabs Information:
- Description: Geology
- Status: active

Below this information is an 'Options' section with four radio buttons and one checkbox:

- Create Document
- Create/Checkout Document
- Create/Open Document
- Keep New Document form open

At the bottom of the dialog are four buttons: '< - Previous', 'Finish', 'Clear', and 'Cancel'.

Under *Options*, there are three radio buttons from which to choose:

- Create Document – creates document but does not open it
- Create/Checkout Document – creates document and checks it out for use
- Create/Open Document – creates document and immediately opens on workstation

After selecting the desired radio button, the *Keep New Document form open* box may be checked, if desired. This option will keep the **New Document** palette active in order to create the next file.

After making the selection(s), click on the  button.

The use of *BRSEED_V8i.DGN* and the **VDOT BRIDGE MDL's** will standardize the .dgn files. For more information on the **VDOT BRIDGE MDL's**, see File Nos. 01.03-1.

To place the appropriate sheet border in the drawing file, select *bsht* from the **VDOT BRIDGE MDL** task bar (see below).



Select Sheet type (*interior or front*). At the New/Existing field, select *New*. Additional information shown below can be filled in at this time. When all information that is desired at the present time is entered, select **EXECUTE** and place a data point in the design file. If all the information is not available or entered at this time, it can be inserted later. To add additional information, open the design file and select *bsht* from the **VDOT BRIDGE MDL** task bar. Select Sheet type (*interior or front*) and select *Existing* at the New/Existing field. Fill in only the information that was omitted before, select **EXECUTE** and place a data point in the design file.

The image shows a 'Sheet Settings' dialog box with the following sections and fields:

- Button Settings:** 'Sheet type' dropdown set to 'Front', 'New/Existing' dropdown set to 'New'.
- Project Block:** 'Proj. no.' text box, 'Route' text box, 'L & D no.' text box, 'UPC no.' text box, 'Fed Aid no.' text box, 'NBIS no.' text box, 'Fed Oversight Code' dropdown set to 'N/A'.
- Title Block:** 'Plan no.' text box, 'Sheet no.' text box, 'Date' text box, 'Drawn by' text box, 'Design by' text box, 'Supervised by' text box, 'Coordinated by' text box, 'Checked by' text box, 'Plans By' text box, 'CADD no.' text box, 'FHWA/Scour no.' text box.
- Title Description:** 'Title description no. lines' text box set to '3', 'Desc. 1' text box, 'Desc. 2' text box, 'Desc. 3' text box, 'Desc. 4' text box.
- Buttons:** 'EXECUTE' and 'CANCEL' buttons at the bottom.

Note: Using the new border, the CADD no. is automatically generated during printing using a text substitution so no input in the CADD No. field is required.

By using the *bsht* program, the bottom left-hand corner of the sheet border is placed at coordinates 0.0000, 0.0000. To check the coordinates, snap with a tentative point on the bottom left-hand corner of the sheet border (as shown below). The coordinates will be shown in the bottom menu bar. When the scaled drawing(s) is/are placed inside the sheet border and the sheet is finished, all other drawing(s) in the file shall be deleted. The finished .dgn file shall contain only one plan sheet. The design file should be saved so that when the file is opened, the sheet fills the screen. Fit view should not have to be done.

Remember that the lower left corner of the sheet border shall be left at coordinates 0.0000, 0.0000.

By utilizing the *BRSEED V8i.DGN*, *bsht* and *b/s* programs, the settings in the design files are standardized.

1. The fields for the name of standard sheet and date standard drawing issued only contain information on Structure and Bridge standards sheets (Volume V – Part 3 thru 8).
2. Process for entering CADD number on side of sheet is now automated in the printing process. The data entered in the CADD number will follow the naming convention of the DGN files discussed earlier with the DGN extension.
2. Enter dates for each subsequent correction above initial date by stacking dates (snap points are provided on the sheets). All dates shall be removed prior to sealing and signing of plans.

PLAN SHEET MEDIUM:

Mylar or paper plan sheets are no longer submitted to the S&B Division File Room. All plans are submitted to the Structure and Bridge Division electronically. Consultants shall coordinate this submission with the Structure and Bridge Project Manager. For instructions on electronic submissions refer to the links contained in the Electronic Plan Submission Process Flow Chart located at the following Location and Design web site:

http://www.extranet.vdot.state.va.us/locdes/reference-guides/ElectronicPlan_Submission.pdf.

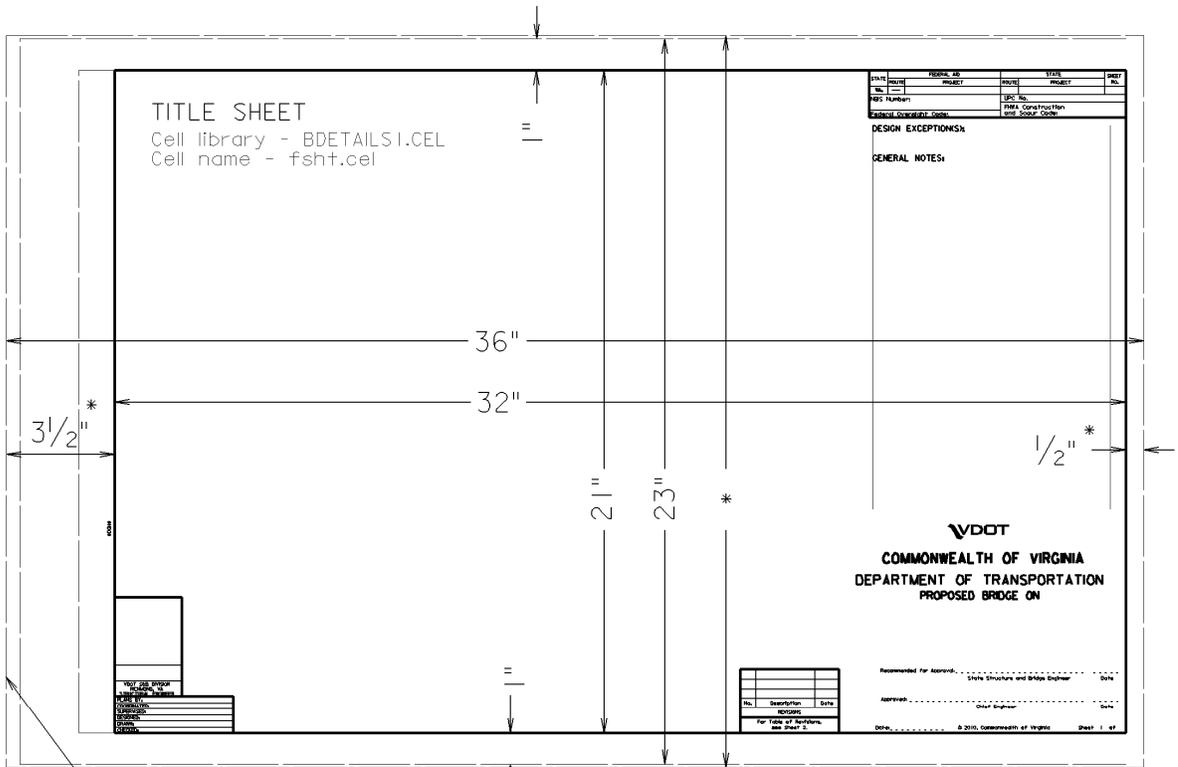
PLAN SHEET SIZE:

The standard plan sheet size (24 inch x 36 inch) is noted on File No. 01.02-2. The maximum PDF sheet size, when utilizing the plot lines indicated on File No. 01.02-3 for full size sheets, shall be 23 inches x 35 inches as indicated on the document found at:

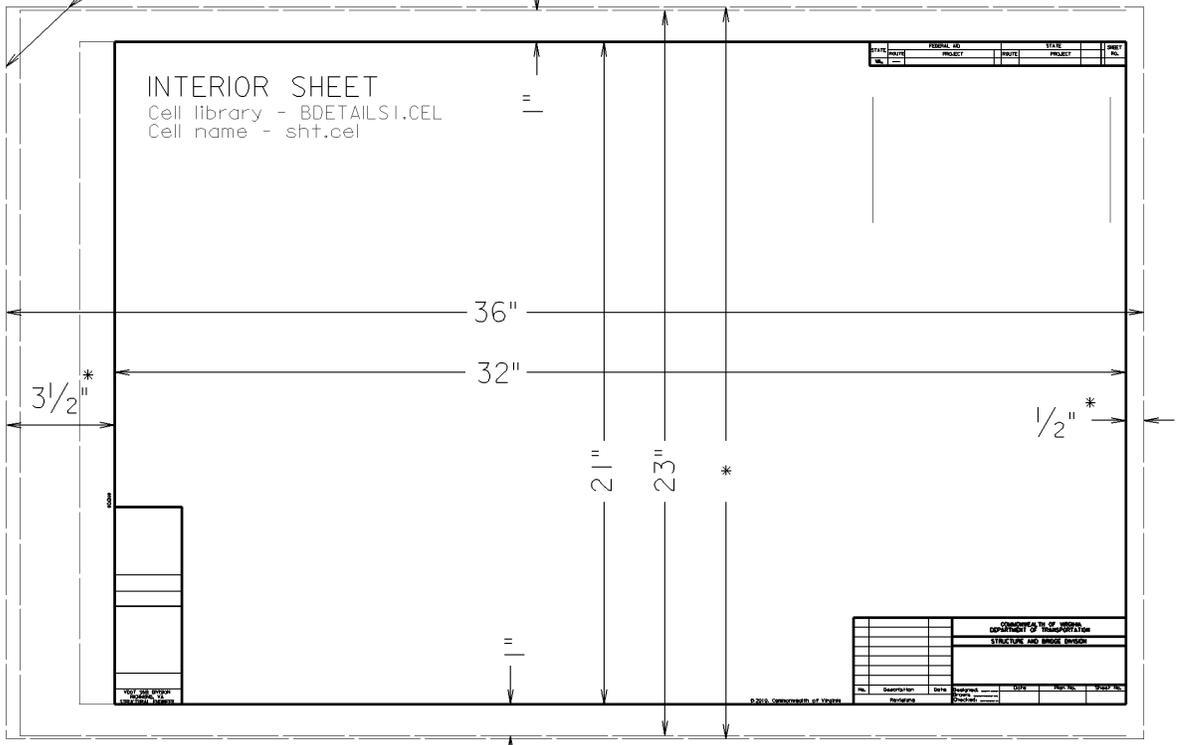
<http://www.virginiadot.org/business/locdes/e-plan-submittal-for-consultants.asp>.

PLOTTING:

The location of plot lines for plotting full and half-size sheets is noted on File No. 01.02-3. Plotting of the half-size sheet should result in a border of ¼ inch all around except for the left border which should have a border of ¾ inch for binding. The half-size sheet is a “true” half-size sheet but not a photographic reduction; that is, the half-size plot with selection of the appropriate pen table adjust fonts and line weights to make the sheet more legible.



Paper edge (No trim lines with new sheet)



* Note: These dimensions will vary slightly based on the plotter used.

**GENERAL DRAFTING PROCEDURES
 PLAN SHEETS
 SHEET SIZES**

VOL. V - PART 2
 DATE: 14Jun2010
 SHEET 2 of 4
 FILE NO. 01.02-2

PLOTTING FULL SIZE SHEETS

To plot set the following settings:

PEN TABLE:
bfull.tbl

SCALE: 0.0833

PLOTTING HALF SIZE SHEETS

To plot set the following settings:

PEN TABLE:
bhalf.tbl

SCALE: 0.1667

STATE	PROJECT	STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT
NO.		NO.	
REF. NUMBER		SPEC. NO.	
Federal Overlay/CD Code		FEMA Construction and Safety Codes	

DESIGN EXCEPTIONS:

GENERAL NOTES:

VDOT
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
PROPOSED BRIDGE ON

Virginia Dept. of Transportation
Office of the Chief Engineer
Office of the State Engineer
Office of the State Architect
Office of the State Geologist
Office of the State Historian
Office of the State Librarian
Office of the State Museum
Office of the State Parks and Recreation
Office of the State Police
Office of the State Treasurer
Office of the State Auditor
Office of the State Comptroller
Office of the State Counsel
Office of the State Information Systems
Office of the State Planning and Policy
Office of the State Procurement
Office of the State Records and Information Management
Office of the State Safety Council
Office of the State Secretary
Office of the State Transportation Planning Board
Office of the State Transportation Trust Fund
Office of the State Transportation Trust Fund Board
Office of the State Transportation Trust Fund Board of Directors
Office of the State Transportation Trust Fund Board of Directors

No.	Description	Date

Recommended for Approval: _____ State Structure and Bridge Engineer _____ Date _____

Approved: _____ Chief Engineer _____ Date _____

For Title of Functions, see sheet 2.

DATE: _____ © 2010 Commonwealth of Virginia Sheet 1 of 4

In general, a set of bridge plans should have sheets arranged in the following order :

Title Sheet: Plan, profile and general notes

Estimated quantities table(s), index of sheets and table of revisions

Bridge layout, substructure layout, slope protection and sequence of construction

Abutment(s)

Pier(s) / Bent(s)

Bearings

Transverse section

Framing plan (erection diagram), girder/beam details, camber diagram, dead load deflections, cross-frames, diaphragms, lateral bracing, girder/beam elevation, etc.

Deck plan

Integral backwall

Joint(s), expansion dam(s), tooth joint(s)

Parapet(s) / median barrier(s) / rail(s), etc.

Utility details / conduits / fencing, etc.

Pile sheet (for prestressed concrete piles)

Reinforcing steel schedules, bending diagram

Engineering geology sheet(s)

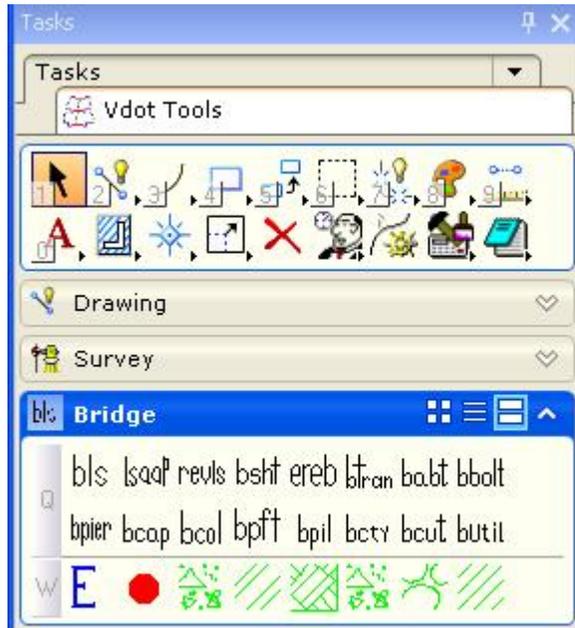
Approach slab(s)

MSE retaining walls, etc. (only if in bridge contract)

Road and Bridge Standards (for bridge-only projects)

General:

The S&B program palette has now been incorporated into the MicroStation task bar (shown below). Select VDOT Tools – Bridge. The following **VDOT Bridge MDL** task bar will be available.



Listed below are the available MDL programs:

babt	Generates abutment section
bbolt	Generates anchor bolt layout
bcap	Generates pier cap section
bcol	Generates column section
bcut	Breaks line and places a cut symbol on line
bctr	Breaks line to depict centerline
bls	Sets line and standard text parameters
bpft	Generates pile and footing plan
bpier	Generates pier plan and elevation
bpil	Places tie bar around piles
ereb	Generates reinforcing steel schedule
bsht	Places sheet and fills in sheet information
btran	Generates transverse section
revls	Sets line and text parameters for revision
butil	Breaks line and inserts utility designation
lsaap	Sets line and standard text parameters for 8 ½" x 11" plans

The MDL programs should be used to the maximum extent possible as they provide for consistency and productivity.

General:

All drawings should be drawn to scale. There are instances when "Not to scale" may be used, for example: substructure and bridge layout, deck elevations, dead load deflection, camber, anchor bolt layout, etc. If "Not to scale" is used, the proper proportioning will be adhered to. Exaggeration may be needed to show joints, rebar spacing, wash for abutment seats, etc.

The scale may be shown at the bottom of the sheet to the left of the copyright date if all views/sections/details are the same scale. If the majority of the sheet is drawn to the same scale, but a few items are drawn to a different scale, then the words *unless otherwise shown* are indicated.

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
			STRUCTURE AND BRIDGE DIVISION			
			ABUTMENT A			
			Designed: SJP	Date	Plan No.	Sheet No.
			Drawn: SJP	June 2004	279-99	4 of 85
			Checked: JAH			
			Revisions			

Scale: $\frac{3}{8}" = 1'-0"$ © 2004, Commonwealth of Virginia

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
			STRUCTURE AND BRIDGE DIVISION			
			PIER I			
			Designed: SJP	Date	Plan No.	Sheet No.
			Drawn: SJP	June 2004	279-99	8 of 85
			Checked: JAH			
			Revisions			

Scale: $\frac{3}{8}" = 1'-0"$, unless otherwise shown © 2004, Commonwealth of Virginia

**GENERAL DRAFTING PROCEDURES
DRAWING SCALES**

VOL. V - PART 2
DATE: 01Feb2005
SHEET 1 of 2
FILE NO. 01.04-1

Title sheets/Superstructure sheets: When drawing the plan and elevation of a typical bridge, keep in mind that space for the General Notes is needed. For larger bridges with complicated geometry, more than one sheet may be required to show the plan and elevation. In all cases, clarity should be the determining factor when selecting a scale.

ARCHITECTURAL SCALES	
Scale	Scale Factor
3" = 1'-0"	0.2500
1 1/2" = 1'-0"	0.1250
1" = 1'-0"	0.0833
3/4" = 1'-0"	0.0625
1/2" = 1'-0"	0.0417
3/8" = 1'-0"	0.0313
1/4" = 1'-0"	0.0208
3/16" = 1'-0"	0.0156
1/8" = 1'-0"	0.0104
3/32" = 1'-0"	0.0078
1/16" = 1'-0"	0.0052

ENGINEERING SCALES	
Scale	Scale Factor
1" = 10'	0.0083
1" = 15' *	0.0056
1" = 20'	0.0042
1" = 25' *	0.0033
1" = 30'	0.0028
1" = 40'	0.0021
1" = 50'	0.0017
1" = 60'	0.0014

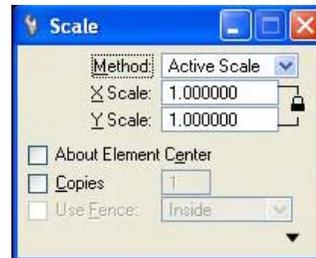
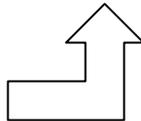
* Not preferred

FRONT SHEETS ONLY

Engineering scales are noted as written above; not as, for example, 1" = 60'-0".

Substructure sheets: The preferred scale for abutment and pier elevation and plan views is 3/8" = 1'-0". A scale of 1/4" = 1'-0" may be used when space dictates and the details do not get crowded. Sections should be drawn at either 1/2" = 1'-0" or 3/4" = 1'-0". In general, all drawings should be drawn to scale.

The Scale Factor (Xscale and Yscale) is used to set the scale of the full size drawing to the desired scale for the sheet. This factor is entered in the **Scale** dialog box as shown below. To retrieve the **Scale** dialog box from *MAIN*, select *MANIPULATE* toolbar, and go to *SCALE*.



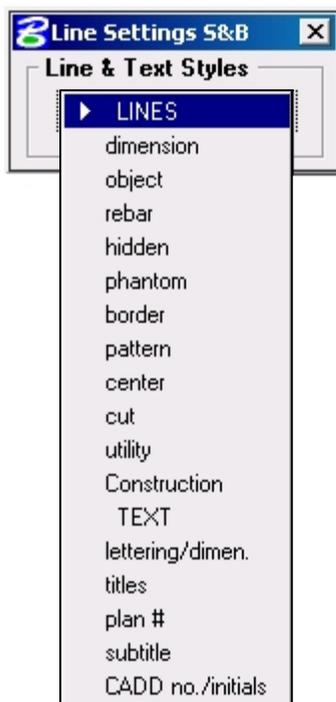
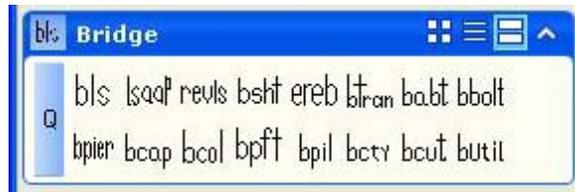
When scaling down a drawing for placement on a plan sheet, be sure the *Copies* box is checked in the **Scale** dialog box. If this box is checked, the user preserves the original drawing intact for future full-size manipulation while also generating the scaled-down copy. Should the user later need to make extensive corrections to the drawing, the user still has the original drawing. If the box is not checked and the only copy of the drawing is scaled-down, then later if the details are scaled-up (back to full-size), a loss of accuracy will occur.

GENERAL DRAFTING PROCEDURES DRAWING SCALES

VOL. V - PART 2
DATE: 08Oct2010
SHEET 2 of 2
FILE NO. 01.04-2

General:

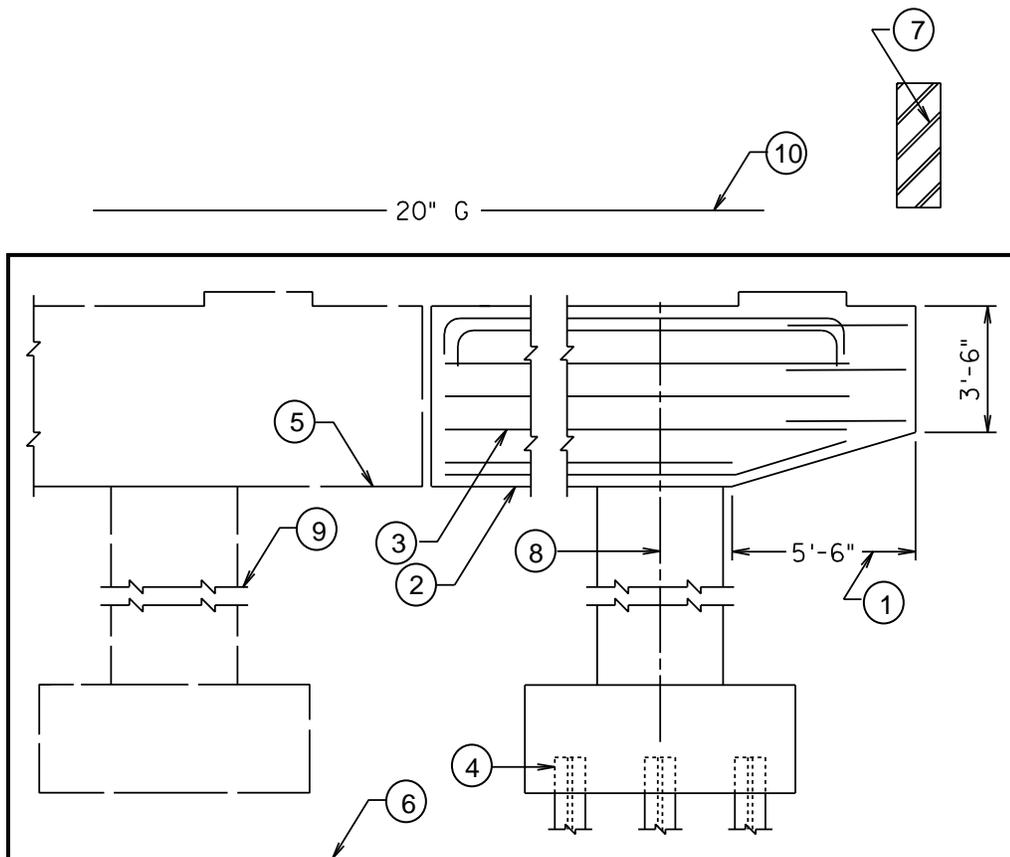
Lines of various weights, styles, and colors are used for bridge/structure drawings. Select *bls* from the **VDOT BRIDGE MDL** task bar (shown below). Select line type from the **Line Settings S&B** sub-palette and **LINES** sub-palette will appear. Select the type line desired and this will automatically set the LEVEL, COLOR, STYLE and WEIGHT.



1. DIMENSION LINES are used to indicate a length, or label a line or object and are terminated at either end with an arrowhead. See File No. 01.08.
2. OBJECT LINES are outlines or visible edges of a view.
3. REBAR LINES are used to draw reinforcing steel. See File No. 01.11.
4. HIDDEN LINES are used to show concealed edges.
5. PHANTOM LINES are used to indicate the working area of the drawing and existing structure(s).
6. BORDER LINES are used to indicate the working area of the drawing.
7. PATTERN LINES are used to indicate the type of material in the cross section view of an object. See File No. 01.07.
8. CENTER LINES are generally used to indicate a line of symmetry in an object except for survey baseline, etc. See File No. 01.05-5.
9. CUT LINES are used to remove part of a drawing. See File No. 01.05-6.
10. UTILITY LINES are used to show underground and overhead utilities. See File No. 01.05-4.
11. CONSTRUCTION LINES are reference lines which may be displayed through the *SETTINGS-VIEW ATTRIBUTES* palette. (Future programs may be using these lines.)
12. Plot Lines are used to determine the geometric extent of the border for generating plots or PDF's.

LINE SYMBOLOGY					
	TYPE	LEVEL	COLOR	STYLE	WEIGHT
①	Dimension Line	23	Yellow (4)	0	3
②	Object Line	25	Green (2)	0	6
③	Rebar	22	Blue (53)	0	8
④	Hidden Line	24	Purple (5)	5	4
⑤	Phantom Line	25	Green (2)	3	4
⑥	Border Line	20	White (0)	0	12
⑦	Patterning	26	Green (2)	0	0
⑧	Centerline	23	Yellow (4)	0	3
⑨	Cut Line	23	Yellow (4)	0	3
⑩	Utility Line	35	Blue (53)	0	0
⑪	Construction Line	63	Fuchsia (85)	0	1
⑫	Plot Line	63	White (0)	3	0

Note: Level 63 and Level 0 (Default) are both set-up as non-plotable levels in MicroStation. No elements placed on these levels will be plotted when the new seed file is used. For older DGN files, the designer will need to turn off plotting on these levels.

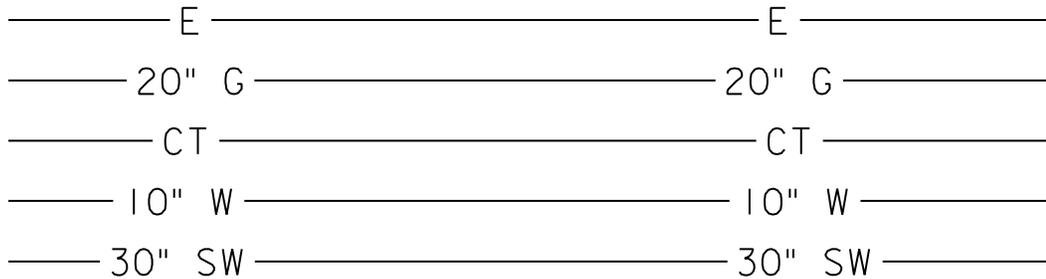


Note: This drawing is not a guide for drawing piers but only a sample of line styles.

GENERAL DRAFTING PROCEDURES
LINES
LINE SYMBOLOGY

VOL. V - PART 2
 DATE: 08Oct2010
 SHEET 3 of 10
 FILE NO. 01.05-3

UTILITY LINES - EXAMPLES



Utility lines may be placed on full-size or scaled down drawings. The text shall be placed on the scaled down drawing.

To place utility lines:

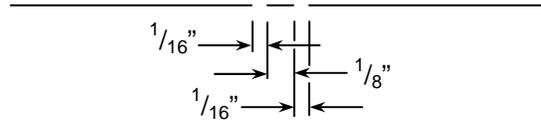
1. On the **VDOT BRIDGE MDL** task bar, select *b/s*.
2. Select line type from the **Line Settings S&B** sub-palette.
3. Select *UTILITY*.
4. Place line on drawing.

To place text on utility lines:

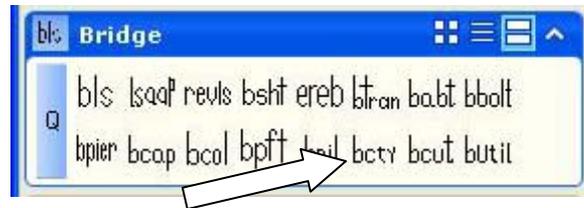
5. On the **VDOT BRIDGE MDL** task bar, select *butil*.
6. Open the key-in window if not already open by selecting *Utilities – Key-in*.
7. Type appropriate text, i.e., 20" G, 30" SW, 10" W, in key-in window and [ENTER].
Note: Due to Microstation constraints, the character *E* cannot be used in this program; it is reserved for special purposes. Therefore, when designating an electric line, type another letter, such as *X*. After the text is placed, it can be edited to an *E*.
8. Identify point on line where utility designation needs to be placed and accept with a second data point.
9. Continue with data points at each location requiring the utility designation.
10. To change text for a different utility line, repeat steps 6 through 8.

The utility description may be found on the situation plan or road plans.

Centerlines are fine solid lines with a break of $\frac{1}{16}$ " break followed by a $\frac{1}{8}$ " line with another $\frac{1}{16}$ " break, then a longer line.

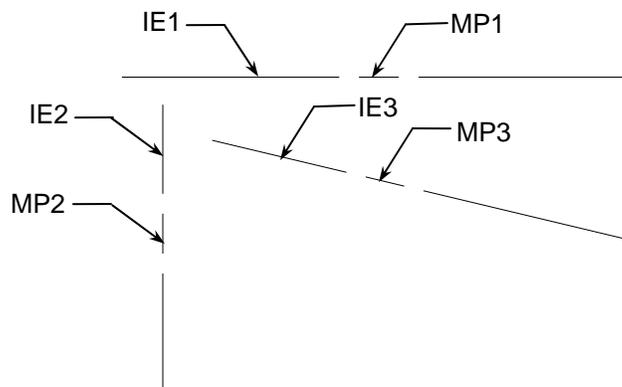


The centerline breaks are generated by selecting the *bctr* program from the **VDOT BRIDGE MDL** task bar.



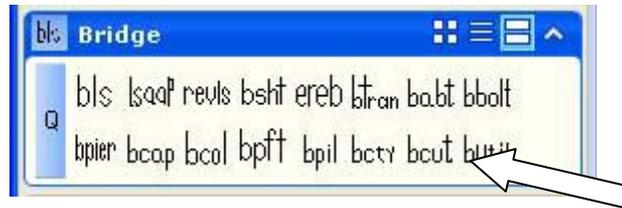
Centerlines are drawn using a solid unbroken line (style 0, weight 3) at the time the full-size drawing is done. After the view has been scaled down, the centerline breaks shall be placed using the new *bctr* program. The *bctr* program gives the user control over where the breaks are to be placed on the line. The program instructs the user to identify the line and then to put a break at the mouse point. The user may skip from a horizontal line, to a vertical line, to a line on an angle with ease, continuing to place data points for breaks along each line. The following drawing shows the cursor movement when breaking three lines. The program can be unloaded with a right click of the mouse.

IE = Identify element to cut
MP = Put break at mouse point



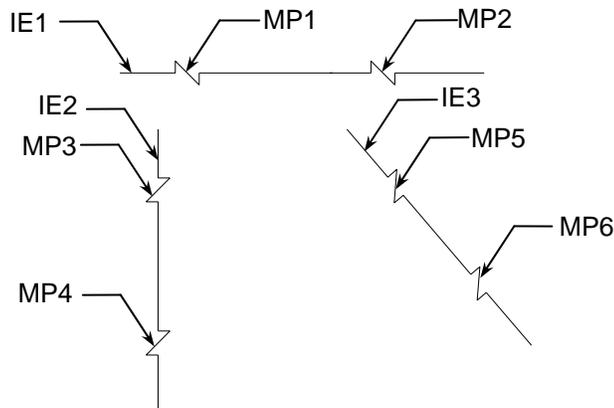
Cut lines are used to indicate that a portion of a drawing is deleted. Cut lines can be used to save space on a plan sheet by eliminating areas of a view not needed; however, they should be used sparingly and should not eliminate vital drawing elements. Proper planning should eliminate the need for most cut lines.

Cut lines are generated by selecting the *bcut* program from the **VDOT BRIDGE MDL** task bar



Cut lines are drawn using a solid unbroken line (style 0, weight 3) at the time the full-size drawing is done. After the view has been scaled down, the cuts shall be placed using the new *bcut* program. The *bcut* program gives the user control over where the cuts are to be placed on the line. The program instructs the user to identify the line and then to put a cut at the mouse point. The user may skip from a horizontal line, to a vertical line, to a line on an angle with ease, continuing to place data points for cuts along each line. The following drawing shows the cursor movement when cutting three lines. The program can be unloaded with a right click of the mouse.

IE = Identify element to cut
MP = Put cut at mouse point

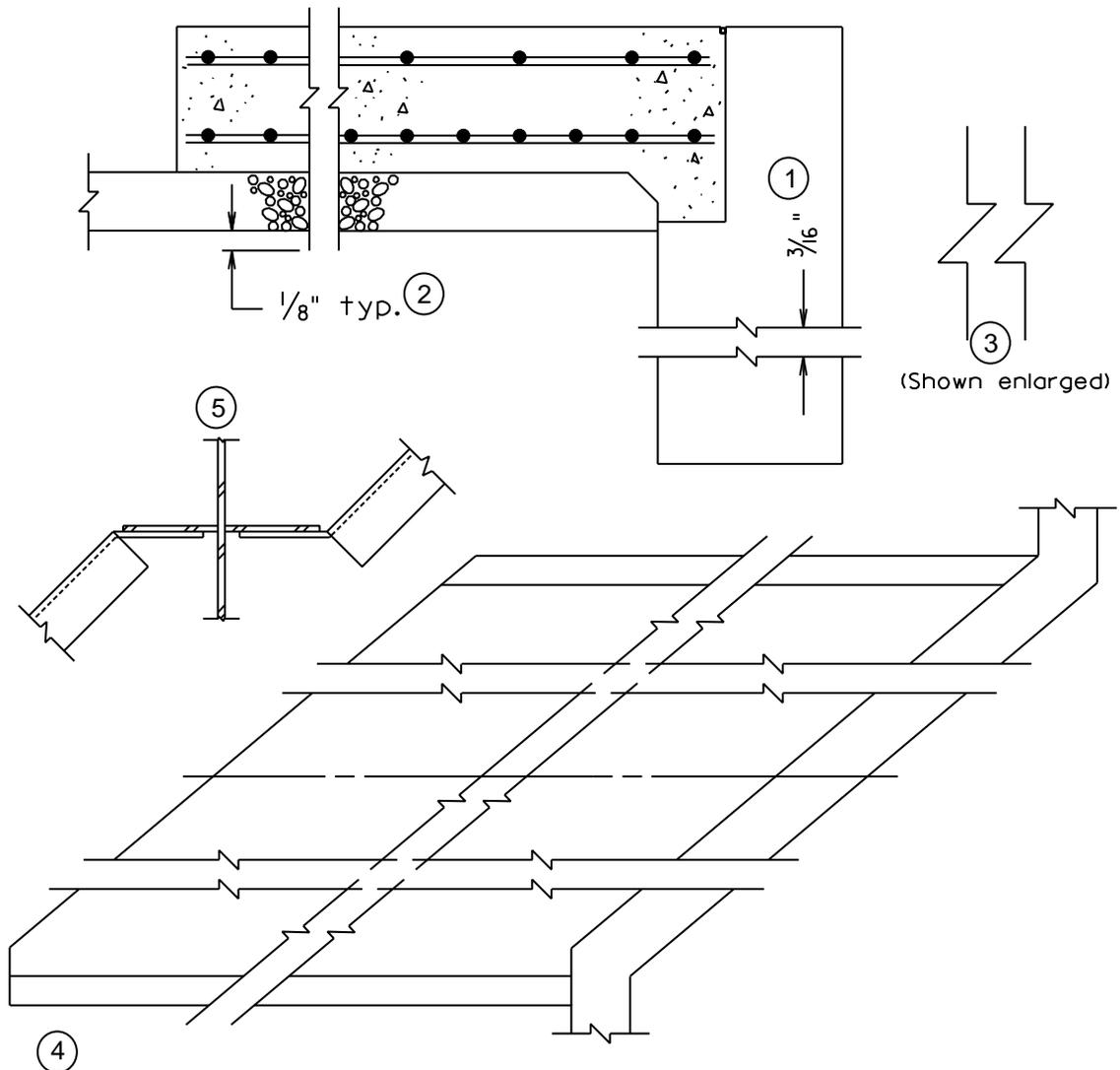


Proper cut line usage is given in the examples shown on the following sheets. As a general rule, cut lines should be horizontal or vertical. There are instances, however, when a skewed cut line is necessary to avoid losing important design details.

EXAMPLES OF DRAFTING TECHNIQUES:

ACCEPTABLE

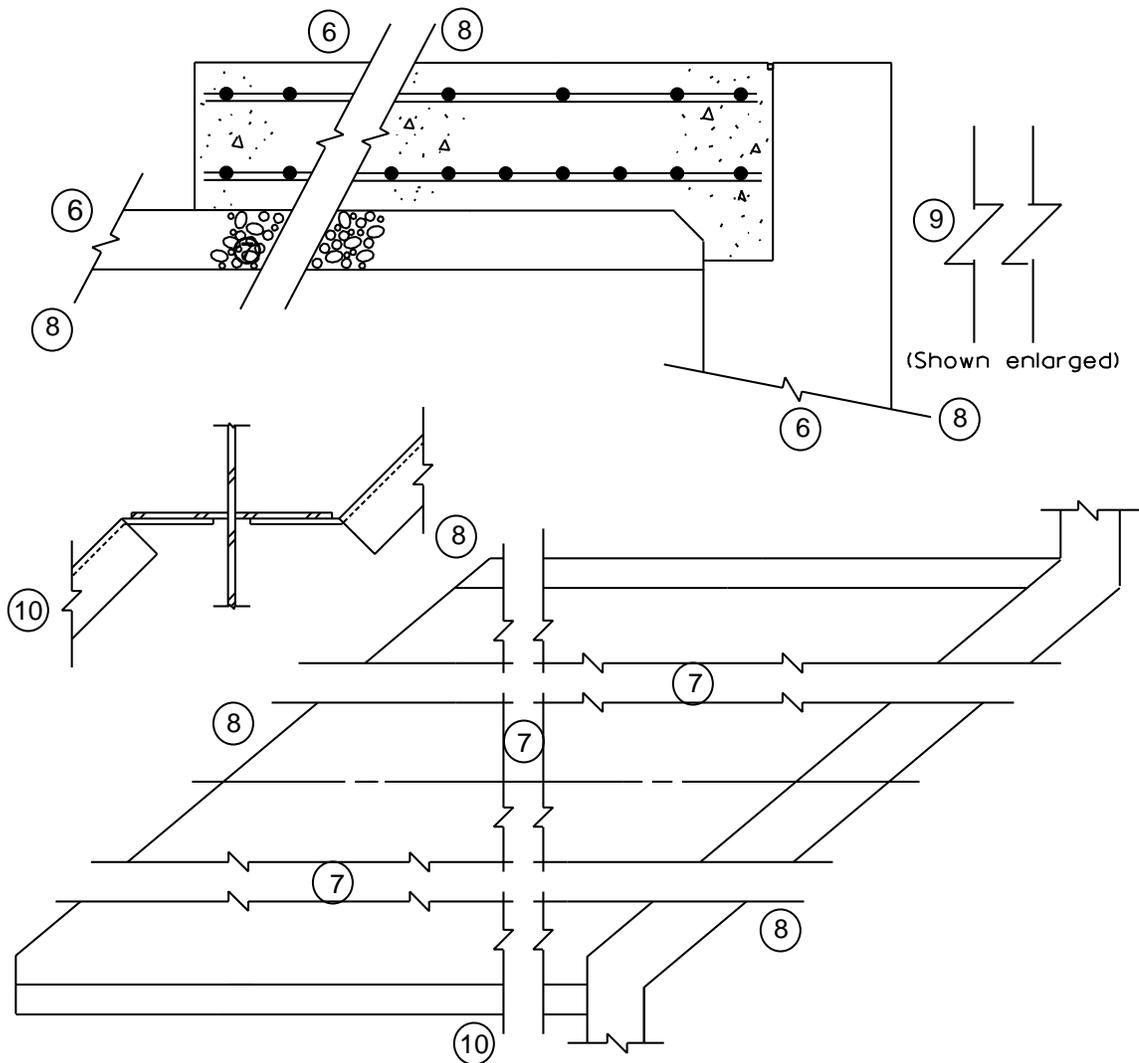
- ① The opening between two parallel cut lines shall be $\frac{3}{16}$ " when scaled down.
- ② The cut line shall extend past the object line $\frac{1}{8}$ " when scaled down.
- ③ Cut line corners shall be closed and shall not overlap the line.
- ④ In some instances, for example large skews, it may not be practical to have horizontal or vertical cut lines.
- ⑤ For skewed objects, skew the cut lines so they are 90° to the object.



EXAMPLES OF DRAFTING TECHNIQUES:

UNACCEPTABLE

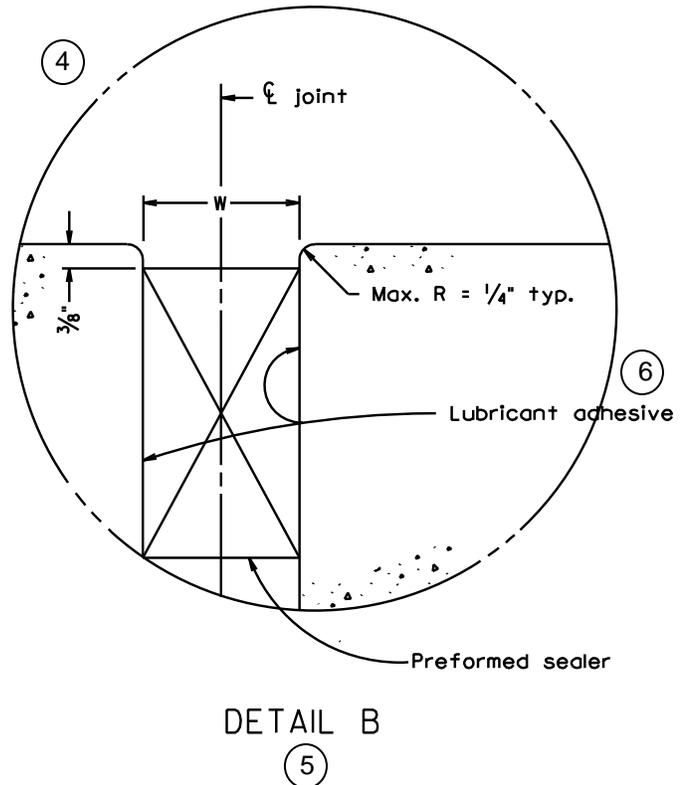
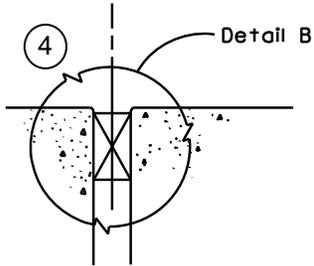
- ⑥ Use vertical or horizontal lines where possible. A skewed cut should not have been used at this location.
- ⑦ Width between the two parallel cut lines is too wide.
- ⑧ The cut line is extending too far past the object line.
- ⑨ Corners of the cut lines are not closed.
- ⑩ Avoid cut lines skewed to object.



EXAMPLES OF DRAFTING TECHNIQUES:

UNACCEPTABLE

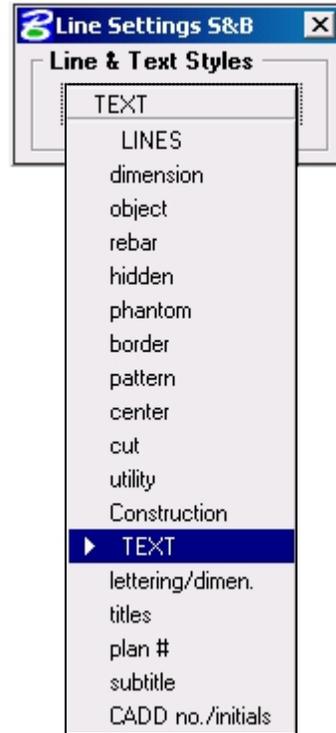
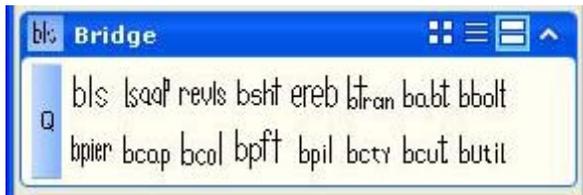
- ④ Do not use any type of cut symbol on the circle. Line should be solid (style 0).
- ⑤ The schematic inside DETAIL B is not a proper representation of the cut. It is offset.
- ⑥ Text is crossing the circle. Circle should be broken where text crosses.



General:

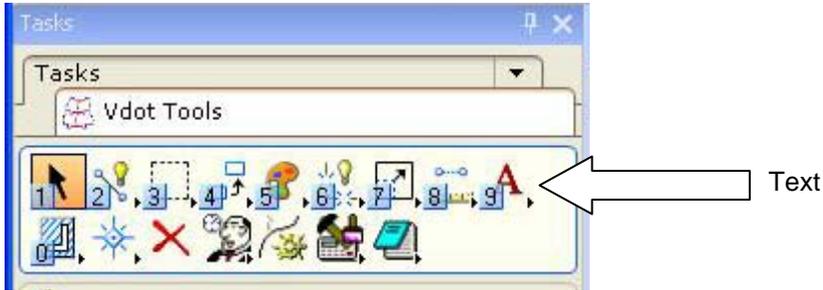
All lettering including dimension(s) is to be done after the drawing has been scaled down and placed on the sheet. All text shall be vertical (not slanted). All text shall be Font 25 with the exception of Font 181 which is used on geology sheets.

1. From **VDOT BRIDGE MDL** task bar, select *b/s*. From **Line Settings S&B** sub-palette under text styles, select the type of text to be used. This will automatically set the LEVEL, COLOR, STYLE, WEIGHT, SIZE and FONT.

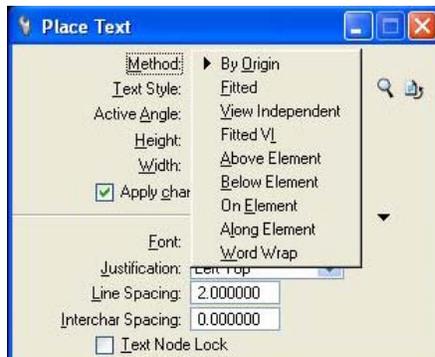


TEXT SYMBOLOGY						
	LEVEL	COLOR	STYLE	WEIGHT	SIZE	FONT
CADD number/initials	21	Red (3)	0	3	:.10	25
Lettering/dimensions	21	Red (3)	0	4	:.12	25
Subtitle	21	Red (3)	0	8	:.18	25
Title	21	Red (3)	0	10	:.20	25
Plan number	21	Red (3)	0	10	:.23	25

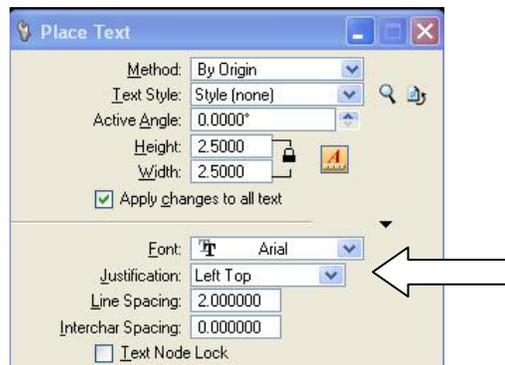
2. Under *TOOLS-MAIN-TEXT*, select *PLACE TEXT*.



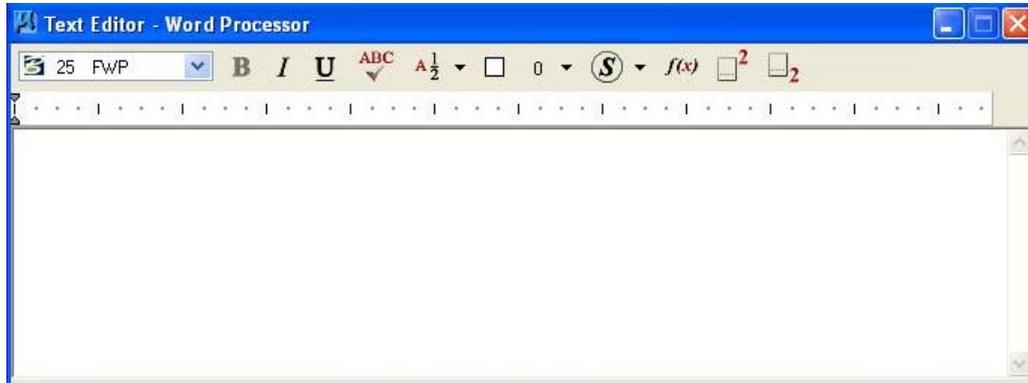
3. The *PLACE TEXT* sub-palette displays. At the Method drop-down menu, select one (*by origin, fitted, above element, etc.*)



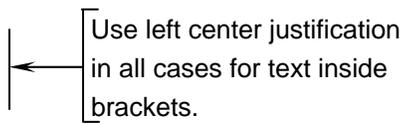
4. Justification for the text, may be modified from the default set by bls using the lower panel.



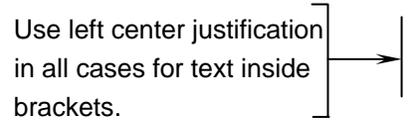
5. Text can now be typed in the Text Editor – Word Processor window.



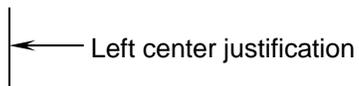
Examples of justifications:



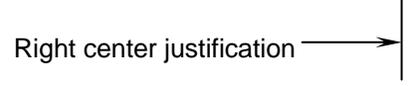
Use left center justification
in all cases for text inside
brackets.



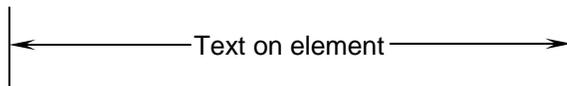
Use left center justification
in all cases for text inside
brackets.



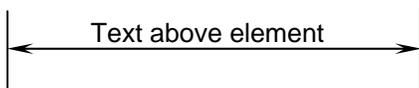
Left center justification



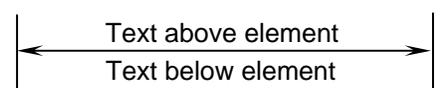
Right center justification



Text on element



Text above element



Text above element
Text below element

Notes:

Use left top justification when placing text with multi-lines of information such as general notes.

When two or more lines of text are used, place text inside brackets.

Cells for brackets are located in *bdetails1.cel*.

Notes shall be lettered horizontally on the sheet.

CAPITALIZATION:

Capitalizing text normally follows grammar rules. Capitalize only the first word of a sentence or phrase, except when referencing proper nouns or something specific.

Examples:

Not to scale

Face of backwall

Face of backwall at Abutment A (Abutment is capitalized because it is a specific abutment)

☉ joint

☉ Rte. 609

☉ Pier 2 (Pier is capitalized because it is a specific pier)

☉ pier (pier is not capitalized because it does not refer to a specific pier)

Ordinary high water elev. 227.4

8 1/2" min. typ.

3" typ.

PARENTHESES:

The use of parentheses should be limited.

Examples:

8 1/2" min. typ.

6" at pier

FOOTING PLAN
Piles not shown

PREFERRED

8 1/2" (min.) (typ.)

6" (at pier)

FOOTING PLAN
(Piles Not Shown)

UNACCEPTABLE

AMPERSANDS:

An ampersand shall not be used as an abbreviation for the word 'and'.

Examples:

AH0401 and AH0402

NBL and SBL Rte. 29

See notes 2 and 3

PREFERRED

AH0401 & AH0402

NBL & SBL Rte. 29

See notes 2 & 3

UNACCEPTABLE

THE @ SYMBOL:

The @ symbol shall not be used as an abbreviation for the word 'at'. The only exception is in the case of bar spacings.

Examples:

Face of backwall at abutment

Two at each end of void

7 spa. @ 4" = 2'-4"

PREFERRED

Face of backwall @ abutment

Two @ each end of void

7 spa. at 4" = 2'-4"

UNACCEPTABLE

ABBREVIATIONS:

Some of the abbreviations commonly used in structure plans are shown below.

NBL	Northbound lane
SBL	Southbound lane
EBL	Eastbound lane
WBL	Westbound lane
NF	Near face
FF	Far face
EF	Each face
Elev.	Elevation
vert.	vertical
horiz.	horizontal
cl.	clearance, class (for riprap)
exist.	existing
Sta.	Station
Rt.	Right
Lt.	Left
Constr.	Construction
min.	minimum
max.	maximum
typ.	typical
Rte.	Route
symm.	symmetrical
thru	through
bott.	bottom
Exp.	Expansion
approx.	approximate
No.	Number
temp.	temporary, temperature
eq.	equal
int.	interior
ext.	exterior
spa.	spaces
prestr.	prestressed
conc.	concrete

6. Using the choices given on the *PATTERN AREA* sub-palette, select the desired method to pattern (pattern an element, pattern fence contents, etc.)



PATTERNING SYMBOLOGY								
	NAME	STYLE	LEVEL	WEIGHT	COLOR	SCALE	ANGLE	ROW SPA.
Concrete	CONCRT		26	0	Green (2)	.003	----	----
Steel	ANSI32		26	0	Green (2)	.0005	45	0:1
Earth	EARTH		26	0	Green (2)	.0015	45	----
Porous Backfill	POROUS		26	0	Green (2)	.0015	----	----
Riprap	STONWL		26	0	Green (2)	.01*	----	----
Hatch	ANSI31		26	0	Green(2)		---	---

All patterning is to be done **AFTER** drawing has been placed on the sheet.

* Scale may need to be adjusted. Try .05 for Riprap Detail sheet and .004 for front sheets.

An alternate method of patterning is offered on the Bridge taskbar.



Click on the 1st button to Load the Macro Library.

The following patterns are available on the taskbar:

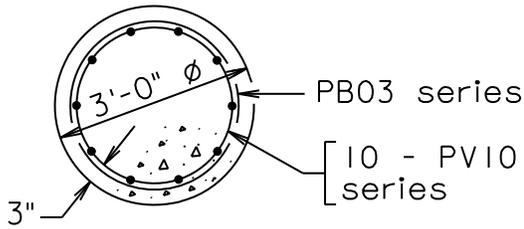
- Rebar cell
- Concrete
- Earth
- Steel
- Riprap
- Porous backfill
- Hatch fenced area

7. This palette is preset to automatically enter the required information for each patterning symbology. After selecting the desired pattern, use the choices given on the *PATTERN AREA* sub-palette to select the desired method to pattern (pattern an element, pattern fence contents, etc.).

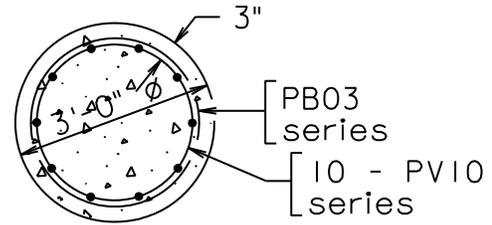


EXAMPLES OF PATTERNING TECHNIQUES:

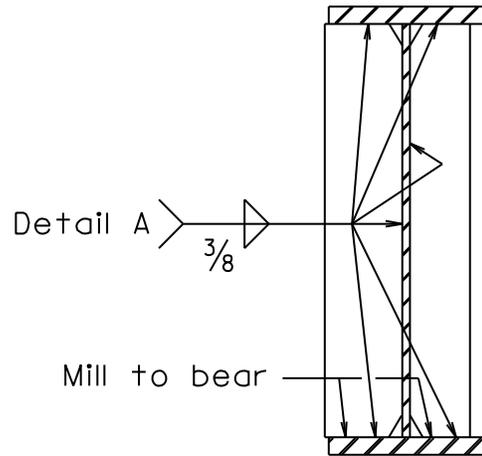
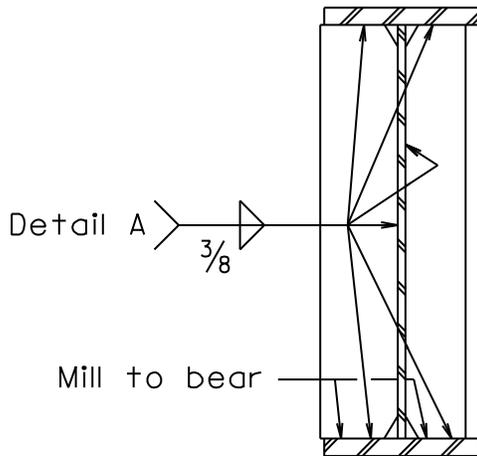
ACCEPTABLE



UNACCEPTABLE



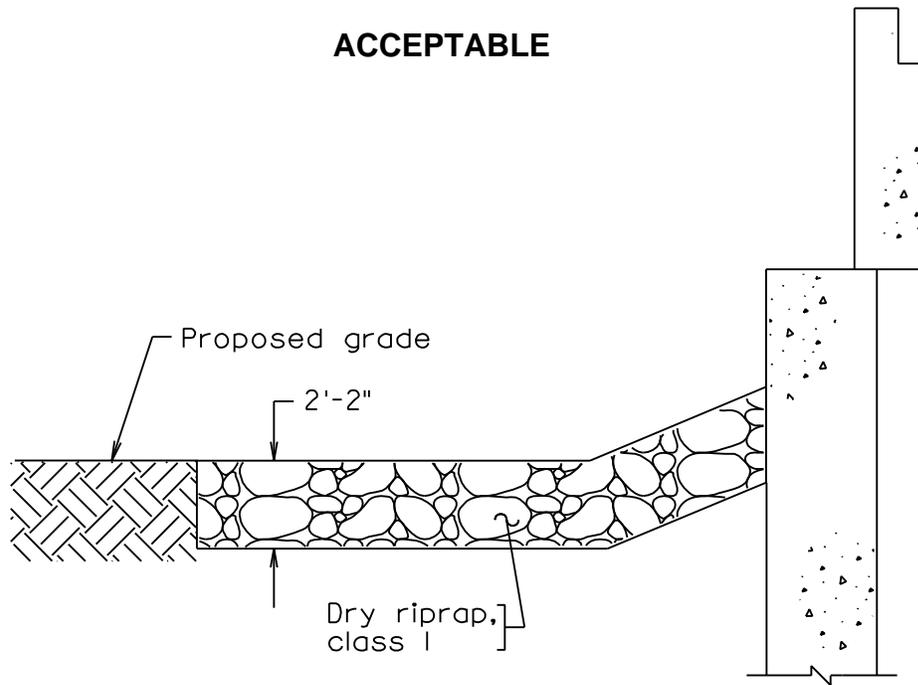
Too much sectioning and sectioning interfering with text.



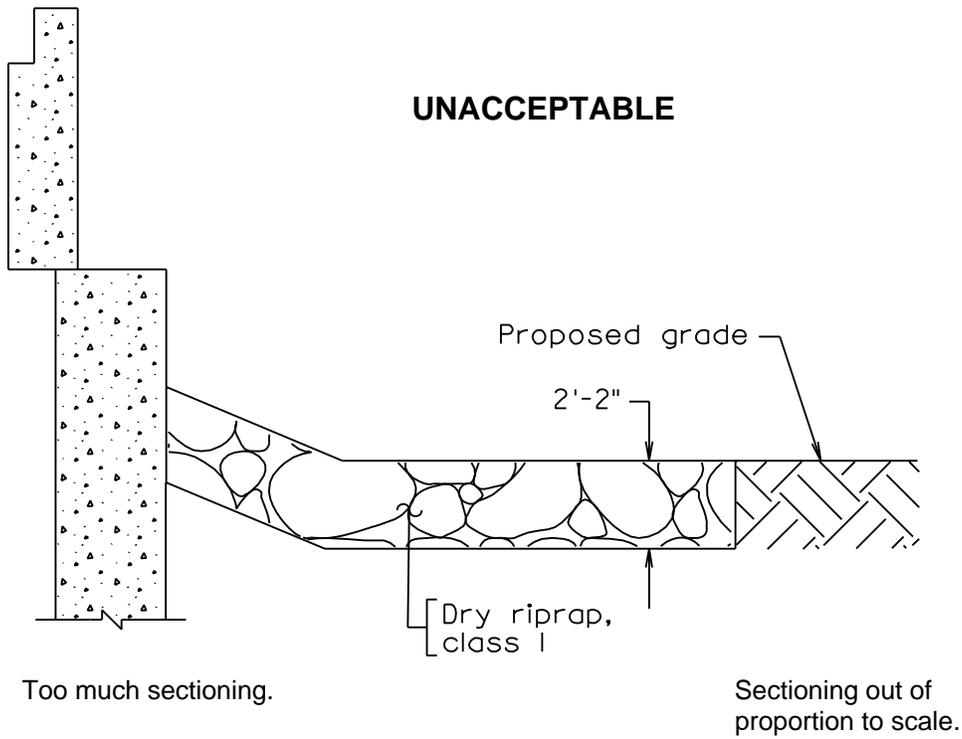
Steel sectioning set too close and different plate sectioning should be placed in opposite direction.

EXAMPLES OF PATTERNING TECHNIQUES:

ACCEPTABLE



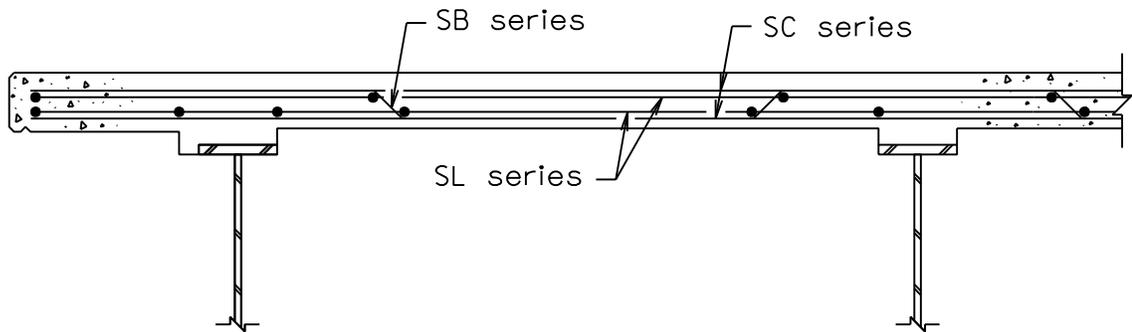
UNACCEPTABLE



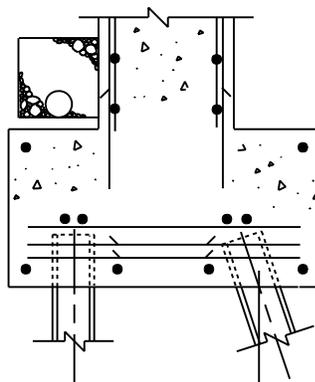
EXAMPLES OF PATTERNING TECHNIQUES:

ACCEPTABLE

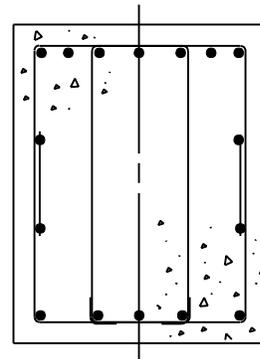
Patterning is a trial and error method. The scale, angle and row spacing may need to be adjusted. Fence a minimal area as opposed to the entire object to avoid a cluttered effect. Examples below show good application of patterning.



PART SECTION



SECTION F-F

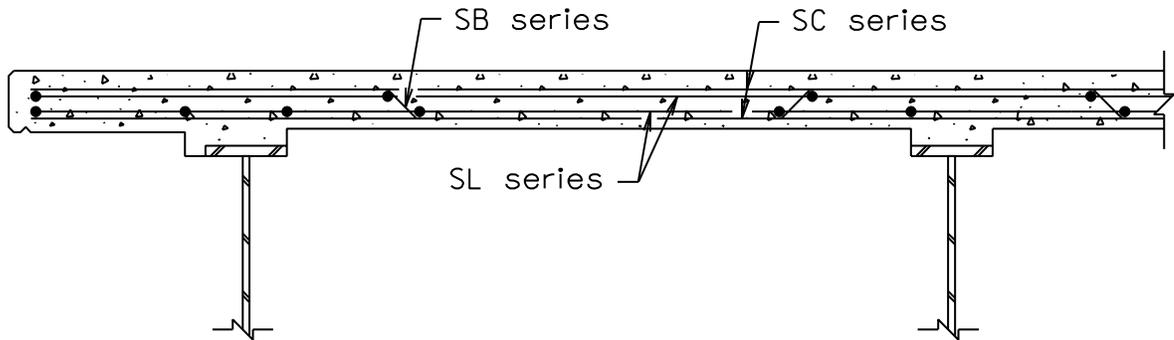


SECTION C-C

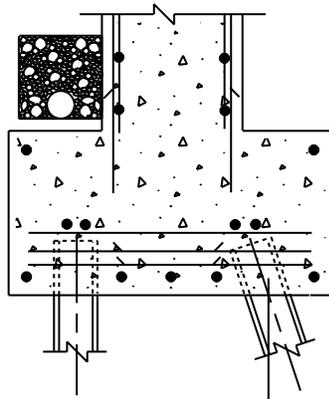
EXAMPLES OF PATTERNING TECHNIQUES:

UNACCEPTABLE

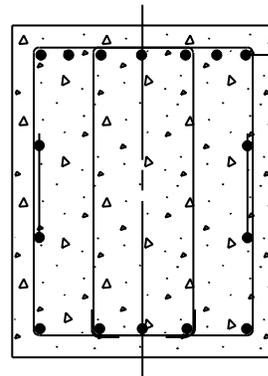
Examples below show excessive patterning and the aggregate is too large. Patterning that is excessively small will sometimes generate an "alert box". This provides the opportunity to cancel the patterning before executing it.



PART SECTION



SECTION F-F



SECTION C-C

General:

This section specifies the guidelines for the lines, text and arrowheads associated with dimensioning.

Dimensioning shall be placed **AFTER** the drawing has been scaled down.

The CAD system (MicroStation) utilized by the Department has the capability for the operator to “automatically dimension” full-size drawings; however, our practices require the operator to dimension drawings after they are drawn, reduced to the final scale and placed on the standard sized sheet. The automatic dimensioning produces a product that is inconsistent with the desired drafting procedures set forth by the Division. Placing “automatic dimensioning” on full-size drawings and then reducing the drawing to the proper scale for placement on a standard drawing sheet produces problems. The major concern is that the dimensions will also be reduced to the actual dimension of the reduced drawing. This will create another opportunity for plan errors and require additional time for the operator to edit all the dimensions to reflect the proper dimensions. **Therefore the “automatic dimensioning” provided by MicroStation is not to be used.**

Dimensioning nomenclature: Lines and elements used in dimensioning are dimension(s), extension(s), centerline(s) arrowhead(s) and leader(s).

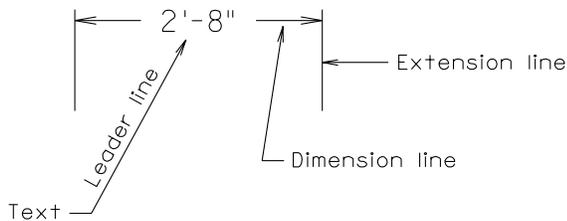
Dimension Lines: A dimension line is a fine solid line terminated by arrowheads. The dimension line nearest the object should be approximately $\frac{1}{2}$ ” from the object. All other parallel dimension lines should be at least $\frac{3}{8}$ ” apart. The spacing of dimension lines should be uniform throughout the drawing.

Extension Lines: An extension line is a fine solid line that extends from a point on the drawing to which a dimension refers. The dimension line meets the extension lines at right angles except for unusual cases. A gap of approximately $\frac{1}{16}$ ” should be left where the extension line joins the object line. The extension line should extend about $\frac{1}{16}$ ” beyond the dimension line.

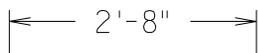
Centerlines: A centerline is a fine line composed of a long line with $\frac{1}{16}$ ” break followed by a $\frac{1}{8}$ ” line with a $\frac{1}{16}$ ” break, then a longer line. A centerline should always end in a long line, not the short dash. A *bctr* MDL exists which enables the user to break the line with the proper gaps and at the location of choice.

Arrowheads: Arrowheads indicate the extent of dimensions. The general rule on arrowheads is the length is three times the width. The arrowhead length is approximately $\frac{1}{8}$ ”.

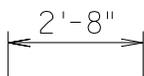
Leader Lines: A leader line is a fine solid line leading from a note or dimension and terminated by an arrowhead touching the object. A leader line should be an inclined straight line with a short horizontal line approximately $\frac{1}{8}$ ” in length. A leader line to a circle should be radial, so that if extended it would pass through the center of the circle. If leader lines are near each other, the leader lines should be drawn parallel for a more appealing drawing. Leader lines should cross as few lines as possible and should never cross each other. Leader lines should not be drawn parallel to nearby object/hidden lines or pass through a corner of an object. Leader lines should not be drawn at small angles to the object if possible.



The preferred method for dimensioning is to place the text within the dimension line when space permits;



otherwise, place the text above the line.



If the space inside the extension lines is smaller than $\frac{3}{8}$ ", place the dimension lines and the text outside the extension lines. Do not extend dimension line across the open space between the extension lines.



Dimensions should be lined up and grouped together as much as possible. Dimension lines are normally drawn at right angles to the extension lines, but an exception may be made in the interest of clarity. In general, avoid dimensioning to hidden lines. Legibility should never be sacrificed by crowding dimensions into a limited space. Dimensions should not be repeated on the same view or on different views, nor should the same dimension be given in two different ways. Each dimension should be given clearly, so that it can be interpreted in only one way. Dimensions should be given so that it will not be necessary to calculate, scale, or assume any dimension.

Dimensions of one foot and under are expressed in inches. Dimensions over one foot are expressed in feet and inches. The width and thickness for steel plates are given in inches even if they are wider than one foot. The length of the steel plate is given in feet and inches.

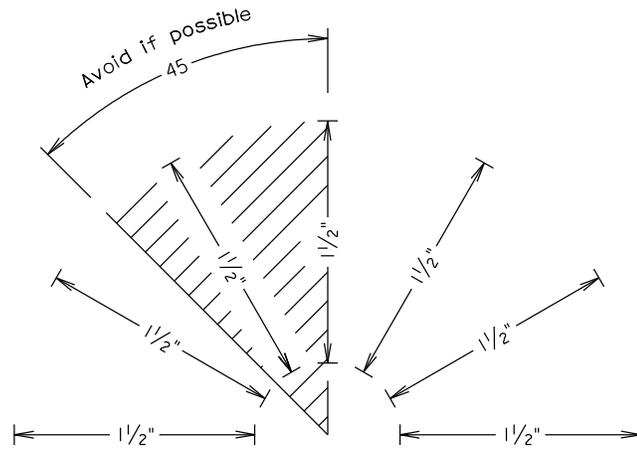
Keep text and dimensions outside the element as much as possible.

When dimensioning an angle, separate the degrees, minutes and seconds with a dash.

Example: 37°-15'-45"

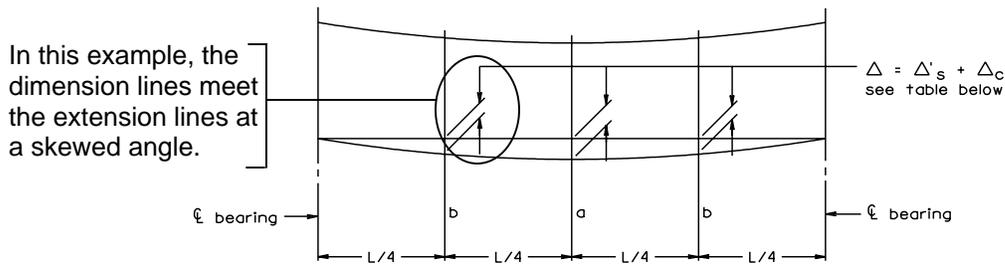
Extension lines and centerlines at times may cross object lines. When this occurs, gaps should not be left in the extension line or centerline when it crosses the object line. Extension lines may be broken when they cross other extension lines for clarity. In crowded conditions, gaps in dimension lines near arrowheads may be left in order to clarify the dimensions.

Example A: All dimension figures are aligned with the dimension lines so that they may be read from the bottom or from the right side of the sheet. Dimension lines should not run in the directions included in the shaded area shown below. Notes should be lettered horizontally on the sheet.

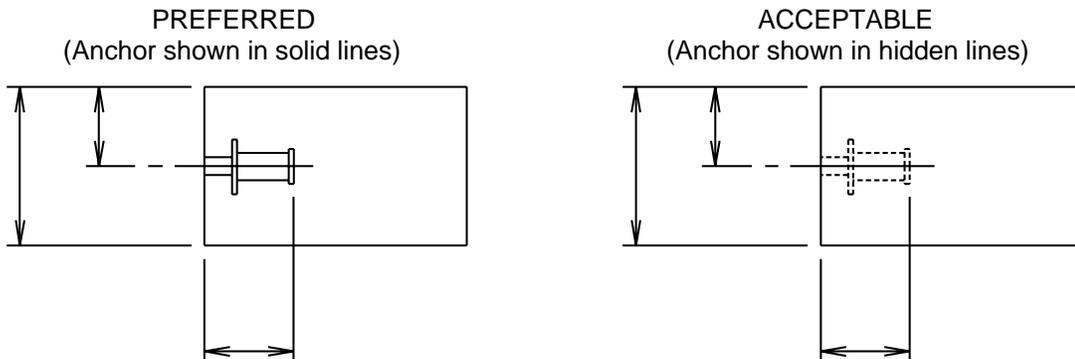


Directions of Dimensions

Example B: The example shown below demonstrates an unusual case where the dimension line does not meet the extension line at a right angle.

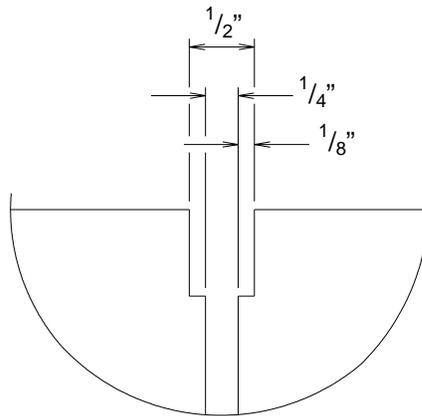


Example C: The two drawings shown below demonstrate that it is preferred that dimensioning to hidden lines be avoided.

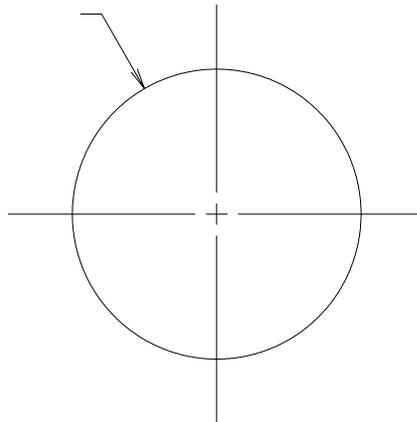


**GENERAL DRAFTING PROCEDURES
DIMENSIONING
EXAMPLES**

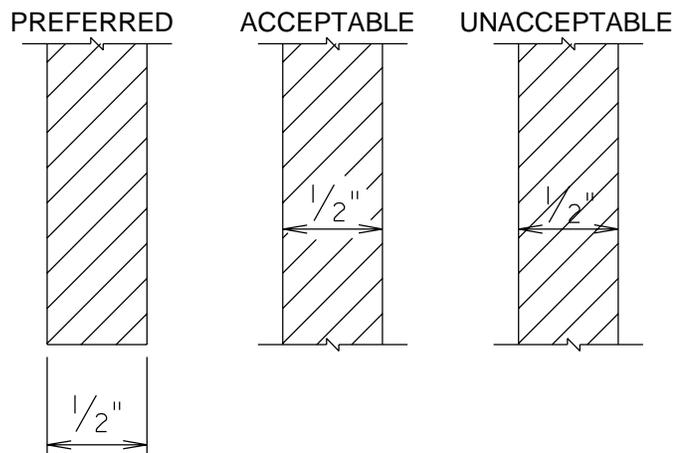
Example D: This example shows that, for clarity, extension lines may be broken when dimension lines or arrowheads cross.



Example E: This example shows that a leader line to a circle is radial so that if the line were extended, it would pass through the center of the circle.

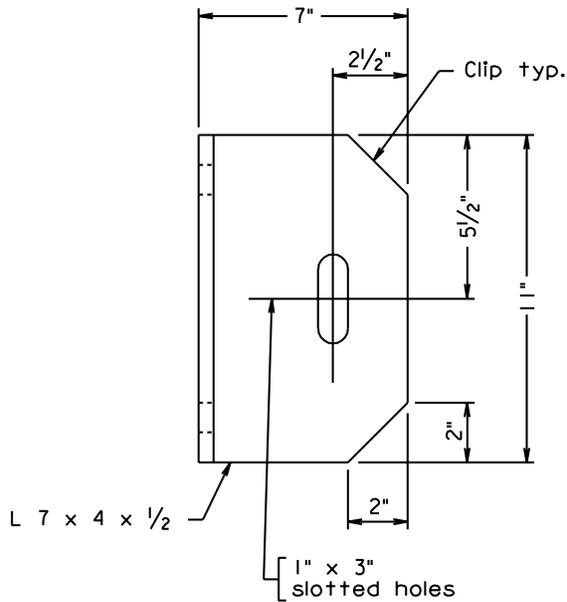


Example F: It is preferred that dimensions and text are shown outside the object. If the dimension must be shown within the object, cut the patterning for clarity.

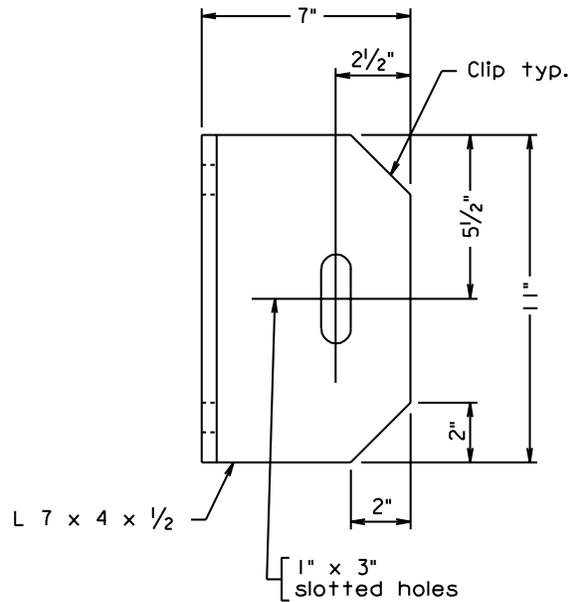


Example G: The drawing below shows that the leader line for "Clip typ." is drawn in such a way as to avoid crossing an intersection of two extension lines.

ACCEPTABLE



UNACCEPTABLE



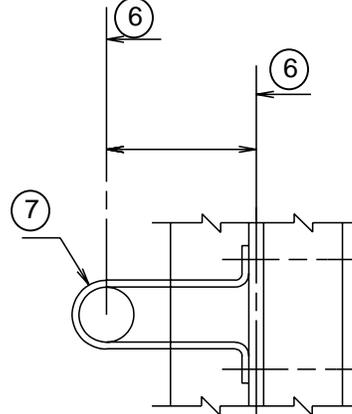
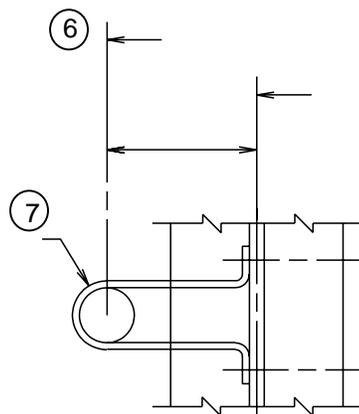
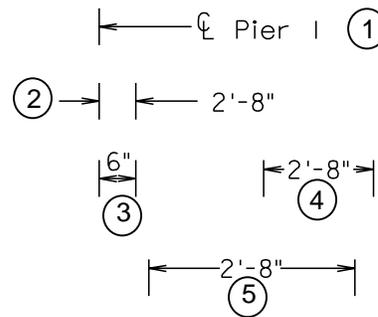
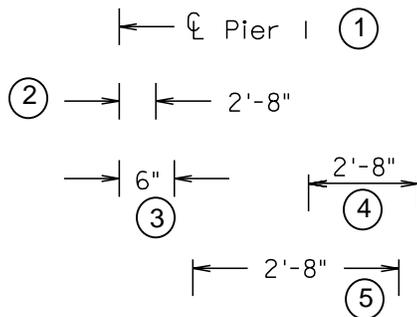
EXAMPLES OF LEADER LINES:

ACCEPTABLE

- ① Length of leader shall be $\frac{3}{8}$ ".
- ② Length of dimension lines shall be the same length when possible.
- ③ When the space between lines is too small for a reasonable fit for the text and arrowheads (less than $\frac{3}{8}$ "), dimension lines and arrowheads are placed outside.
- ④ When the space between lines is too small for text, place the text above.
- ⑤ Provide $\frac{1}{8}$ " space between the dimension line and the text.
- ⑥ Extend centerlines $\frac{1}{8}$ " past the dimension line.
- ⑦ When leader line is on an angle, the horizontal extension shall be $\frac{1}{8}$ ".

UNACCEPTABLE

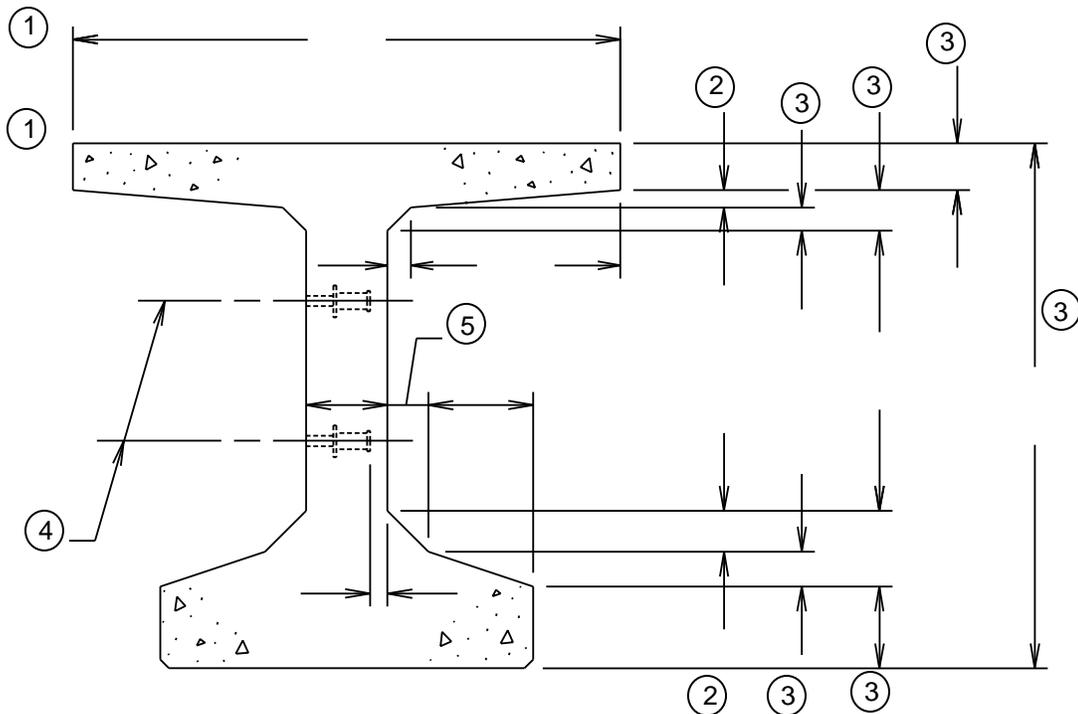
- ① Length of leader is too long.
- ② Length of dimension lines not the same length.
- ③ Arrowheads are too close to each other.
- ④ Dimension line is not long enough to insert the text. Dimension lines need to be at least $\frac{3}{8}$ " long.
- ⑤ Dimension lines are too close to text.
- ⑥ Extension of centerlines beyond dimension line is too long.
- ⑦ Horizontal extension of leader line is too long.



EXAMPLES OF DIMENSIONING TECHNIQUES:

ACCEPTABLE

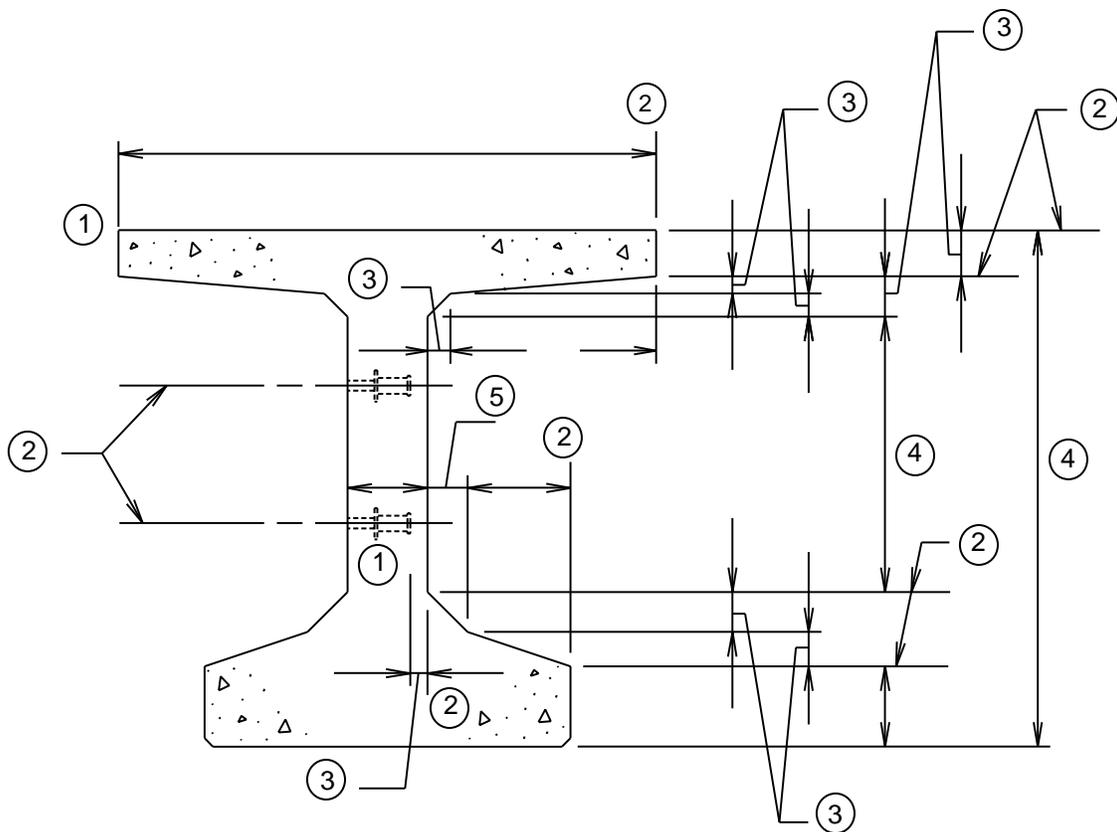
- ① Extension lines start $\frac{1}{16}$ " from object line and extend $\frac{1}{16}$ " past the dimension line.
- ② The first dimension line is located $\frac{1}{2}$ " beyond the object line.
- ③ Subsequent dimension lines are placed $\frac{3}{8}$ " apart.
- ④ Text call-outs are located on the side of the object closest to the element being described. Whenever possible, text call-outs are located outside the object.
- ⑤ For angled leader line, the horizontal extension is $\frac{1}{8}$ ".



EXAMPLES OF DIMENSIONING TECHNIQUES:

UNACCEPTABLE

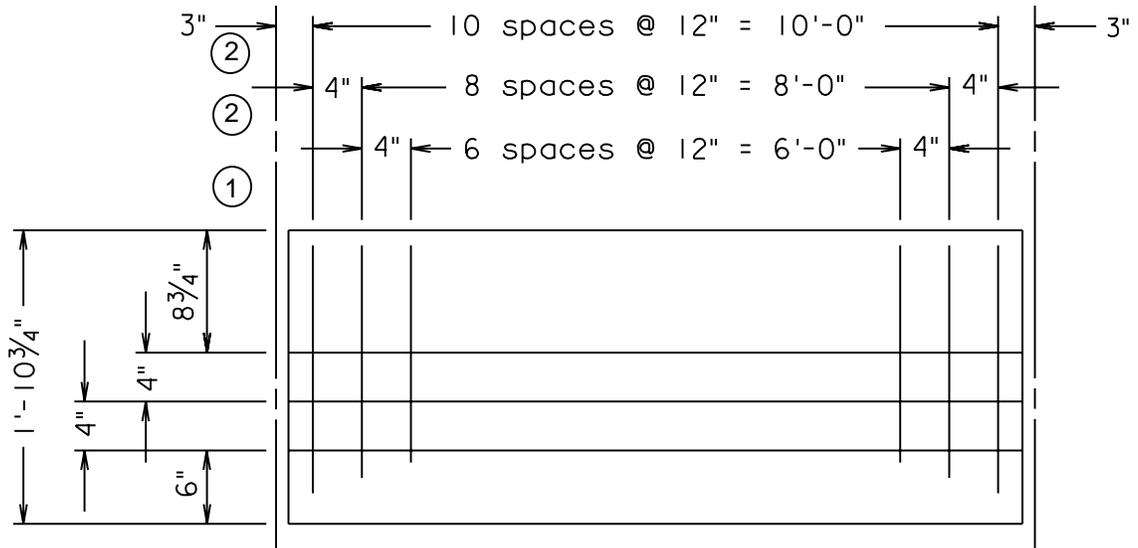
- ① Extension line is too close to, or too far from, the object line.
- ② Extension of line beyond arrowhead is too long.
- ③ Line between arrowheads is not to be shown.
- ④ Dimension line is cut and text is inserted between the lines.
- ⑤ Horizontal extension of leader line is too long.



EXAMPLES OF TEXT IN SERIES OF DIMENSION LINES:

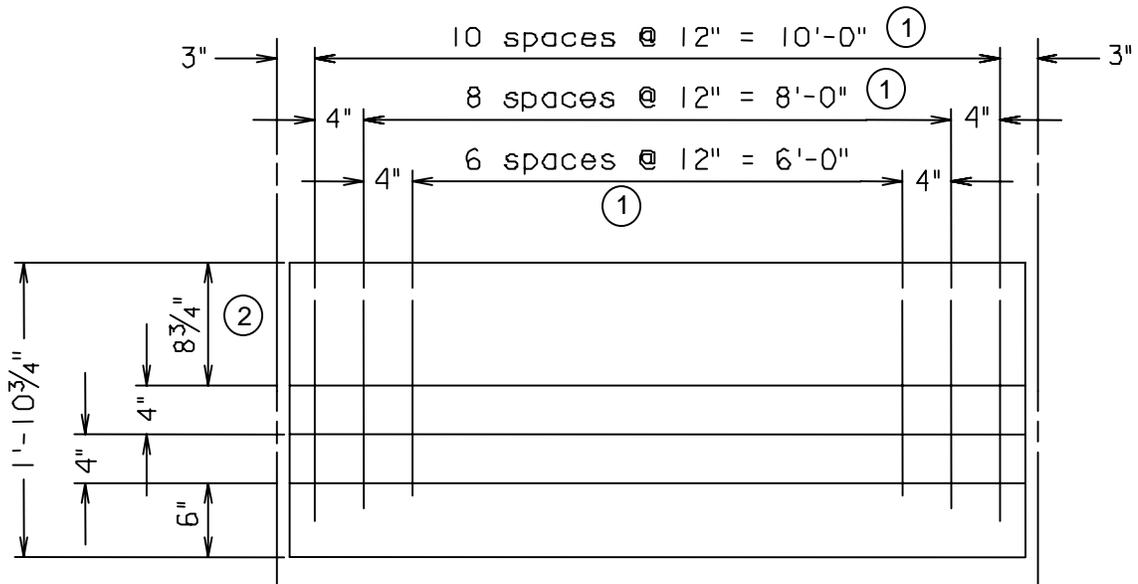
ACCEPTABLE

- ① For single line text placed in series of dimension lines, the first dimension line is placed $\frac{1}{2}$ " from the object.
- ② Subsequent lines are spaced $\frac{3}{8}$ " thereafter.



UNACCEPTABLE

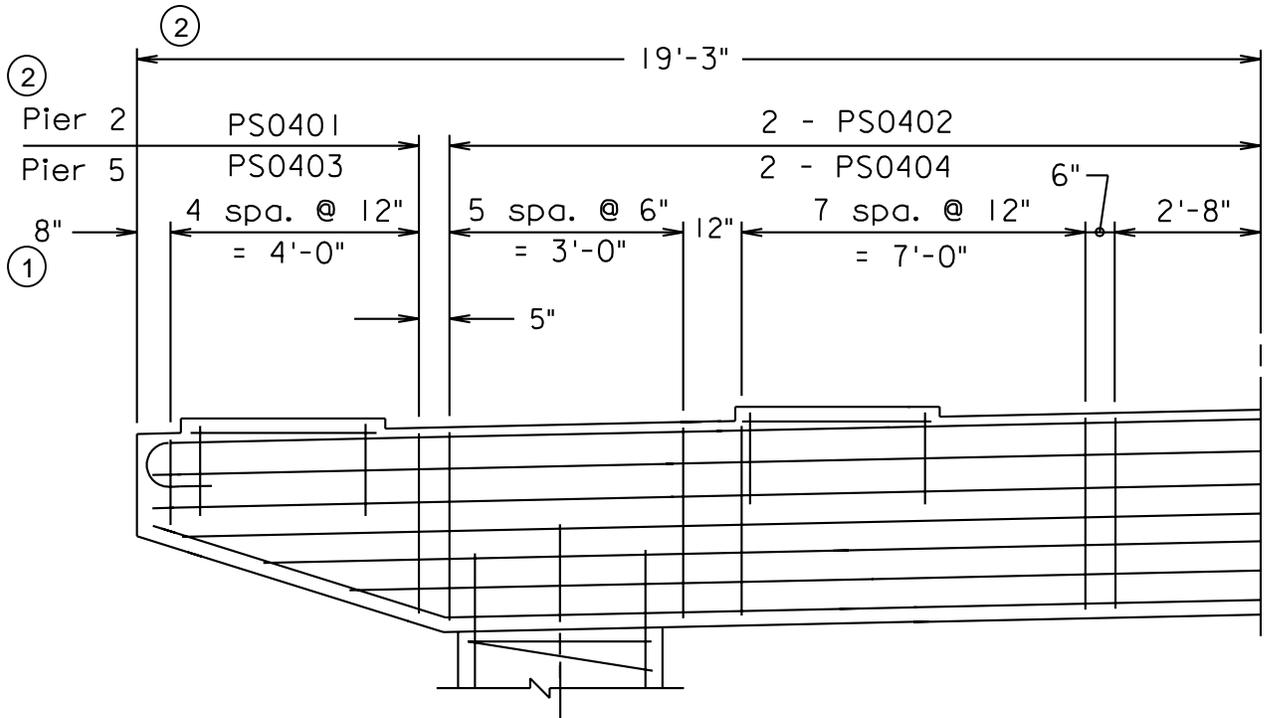
- ① Cut dimension line and move text between the lines.
- ② In general dimension line should not touch or cross centerline.



EXAMPLES OF TEXT ABOVE AND BELOW SERIES OF DIMENSION LINES:

ACCEPTABLE

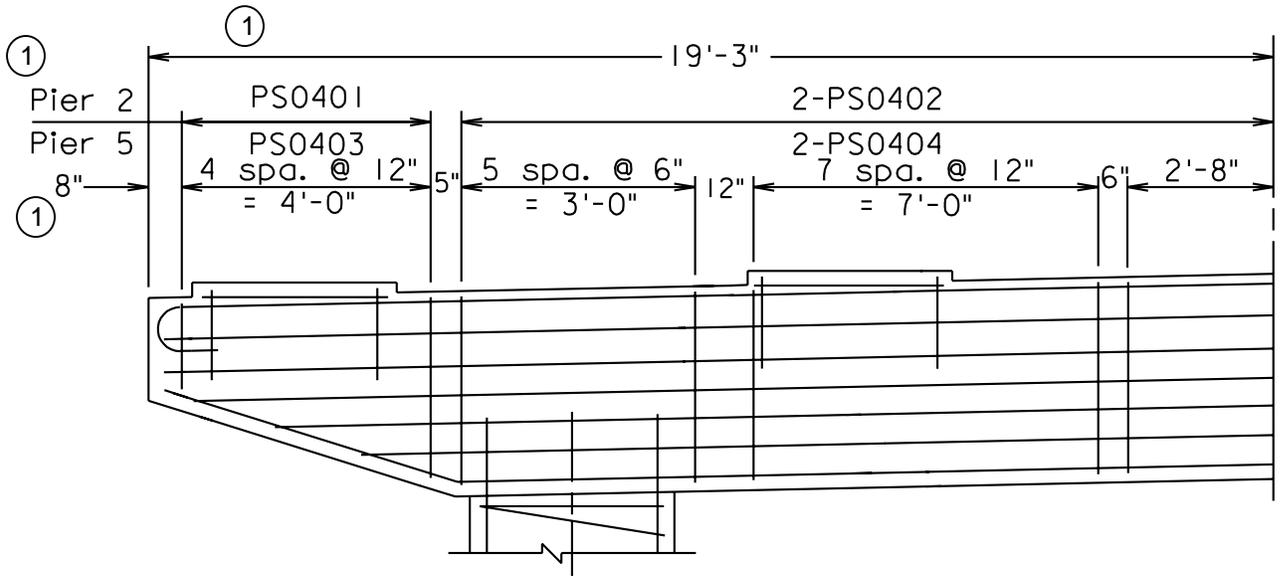
- ① When text is required above and below a series of dimension lines, the first dimension line is placed $\frac{5}{8}$ " from the object.
- ② Subsequent lines are spaced $\frac{1}{2}$ " thereafter.



EXAMPLES OF TEXT ABOVE AND BELOW SERIES OF DIMENSION LINES:

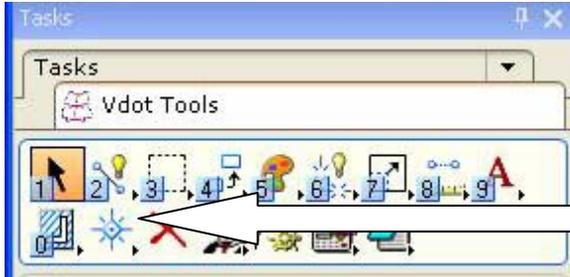
UNACCEPTABLE

- ① Dimension spacings shown are too close together to show text above and below dimension line.

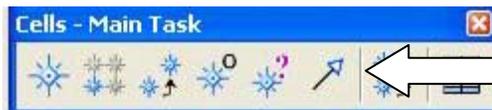


General:

Arrowheads are placed on scaled down drawings and are generated by using a line terminator cell. The arrowhead (line terminator) cell is named **TARRW** and is found in the *bdetails1.cel* library. To place arrowheads, select the *PLACE ACTIVE LINE TERMINATOR* command from the **Cells** taskbar.

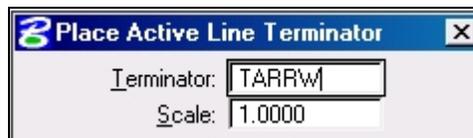


Cells portion of taskbar



Place Active Line Terminator command

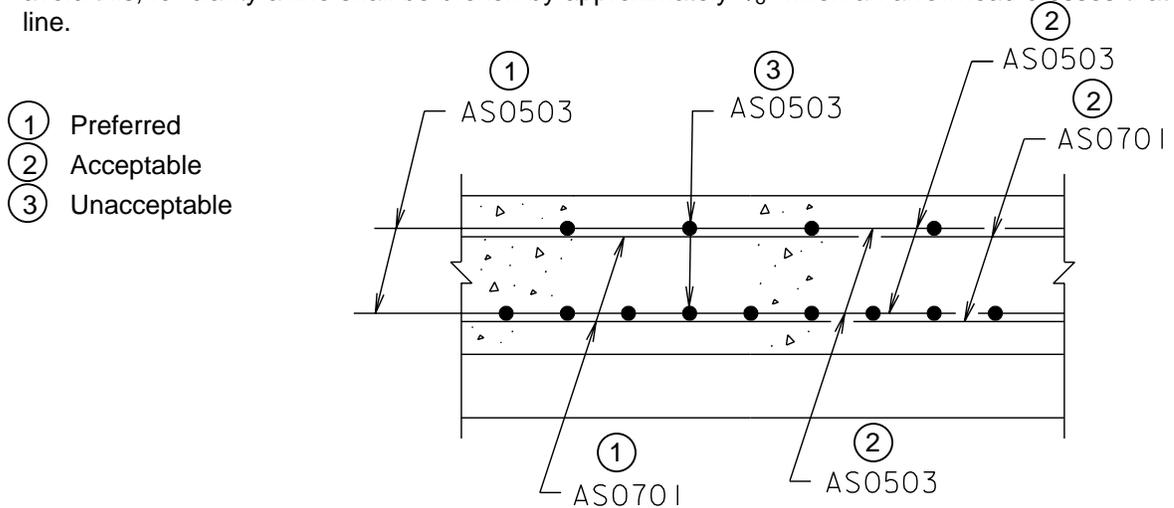
In the dialog box that appears, type *TARRW* for the name of the line terminator and set the scale to 1.0000.



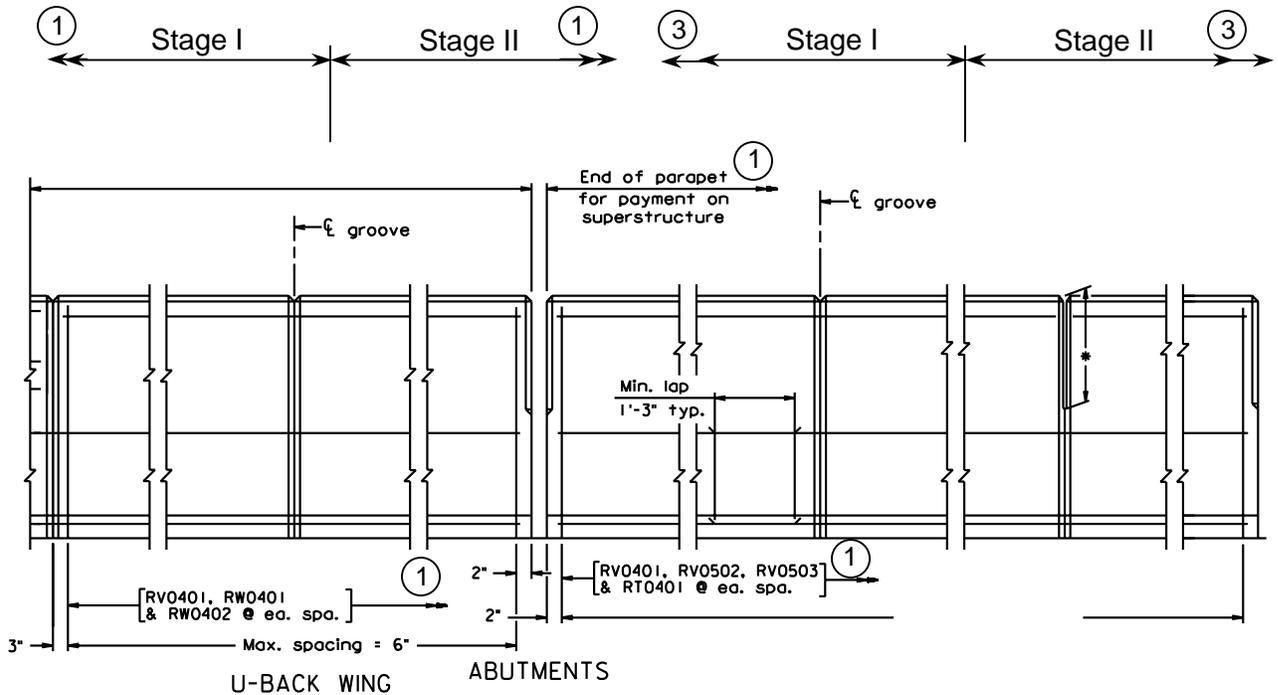
Arrowheads are placed after the drawing has been scaled down and placed on the sheet.

EXAMPLES OF PLACEMENT OF ARROWHEADS:

The drawing below illustrates preferred, acceptable and unacceptable drafting methods when arrowheads cross lines. It is preferred that labeling be done in such a manner that arrowheads do not cross and rest upon one line while pointing to another line. If, however, there is no way to avoid this, for clarity a line shall be broken by approximately $\frac{1}{8}$ " when an arrowhead crosses that line.



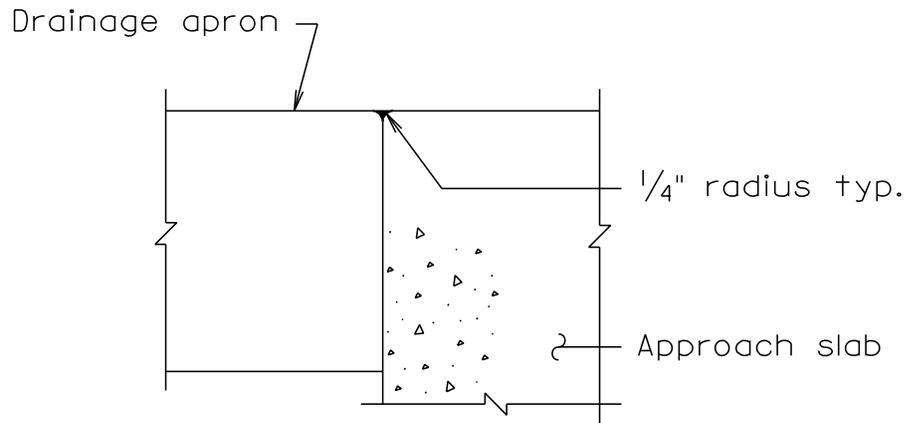
A double arrowhead is used when a series of objects is being called-out, without drawing a leader to each object. Another use of a double arrowhead is to indicate that the termini of the object or view are not being denoted from end-to-end, rather one end is being shown as terminating at a distant point. When a double arrowhead is required, the arrowheads are placed directly behind each other with no space between them. The cell for the double arrowhead is found in *bdetails1.cel* and is named **DBLAR**.



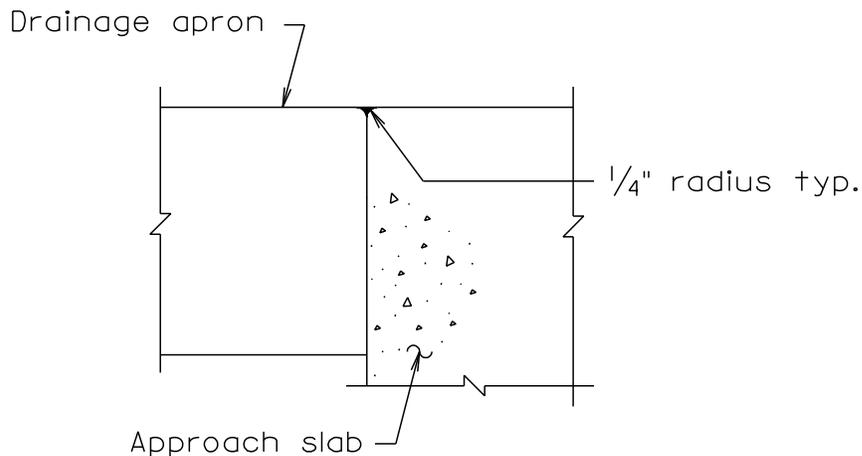
EXAMPLES OF SQUIGGLY MARKS:

When labeling a surface using a squiggly mark, there should be no arrowhead on the line meeting the squiggle. There is no specific direction indicated for the squiggly mark; however, it should be placed 90° to the leader line. The squiggly mark cell can be a line terminator, similar to the arrowhead. Refer to File No. 01.09-1 for instructions on placing a line terminator. The squiggly mark is in the *symbols1.cel* library and is named **SQUIG**.

ACCEPTABLE



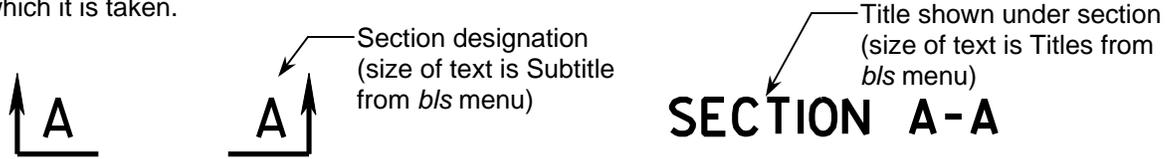
UNACCEPTABLE



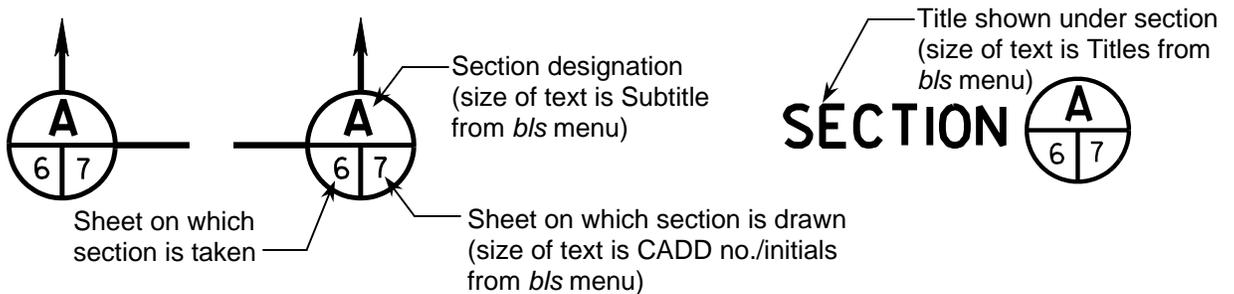
General:

Two styles of section marks are provided in the *bdetails1.cel* library.

Use the simple section mark when the section/view/detail is detailed on the same sheet from which it is taken.



The circular section mark is used for plans where sections/views/details are detailed on sheets other than where taken.



If the same section cut is taken on several different sheets and the section is detailed on one sheet, the title of the section shall be shown as in the following example.



A combination of both styles of section marks is permissible on any sheet.

Designation of Sections/Views/Details: It is recommended that a designation sequence be followed within a set of plan wherein the same letter is not reused. This does not mean that the designation sequence should start at the beginning of the plans with the letter A and follow through the entire set of plans to the letter Z. The designations may start with A at each part of the plans, i.e., abutments, piers, superstructure, etc.

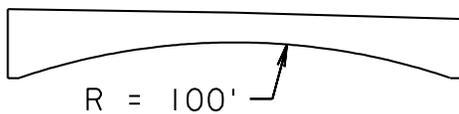
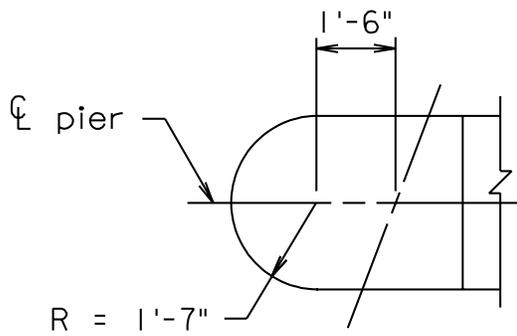
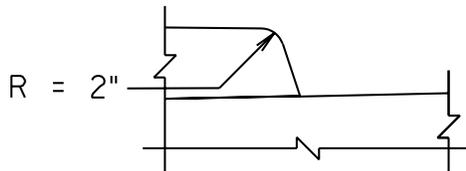
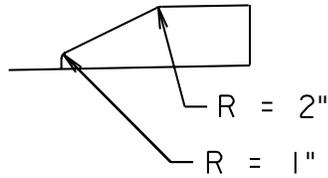
For example, within the abutment sheets, the section/view/detail designations should start with A and increment letter by letter without repeating the A. Additionally, if there is a SECTION A-A, there should not be a VIEW A-A or a DETAIL A. For the pier sheets, the designation may again start at A and advance letter by letter. For each part of the plans, the designation may re-start with the letter A.

It is understood that standard sheets contain pre-set section designations. The style of section marks and the designations shall be left unaltered as they do not need to tie-in with the rest of the plans.

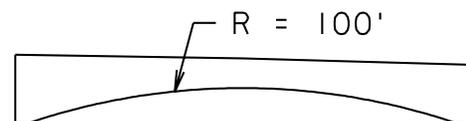
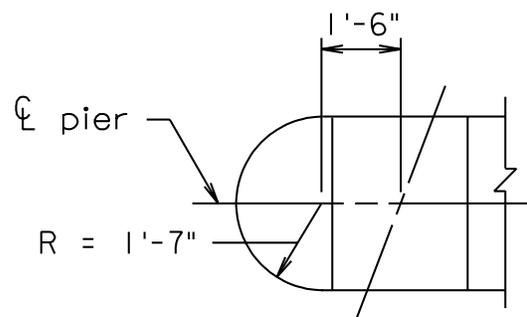
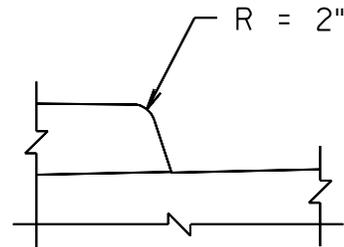
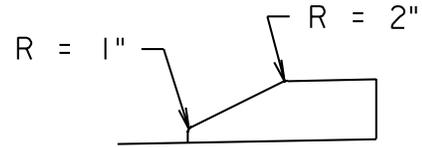
EXAMPLES FOR LABELING CIRCLES AND RADII:

The following sheets of circles and radii, etc. illustrate appropriate labeling:

PREFERRED



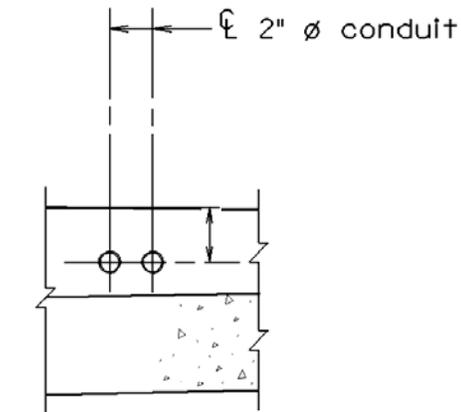
ACCEPTABLE



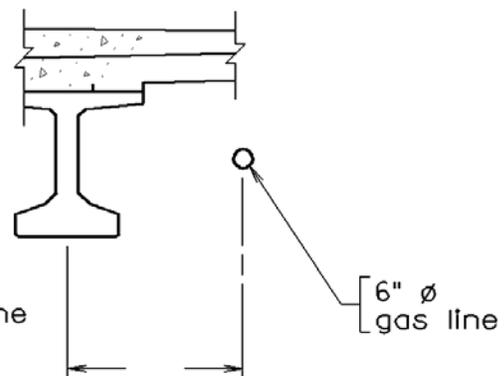
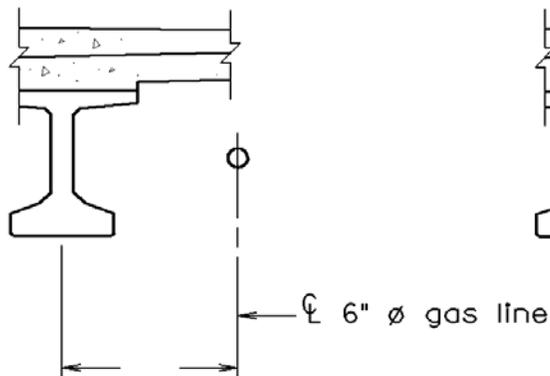
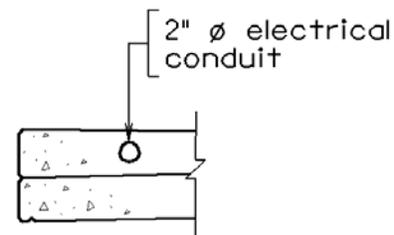
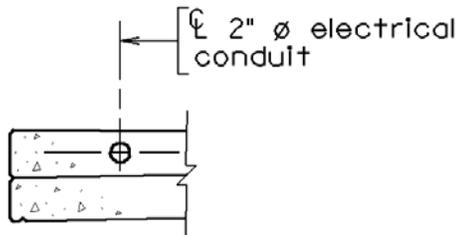
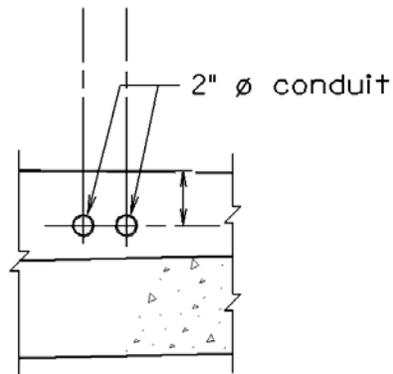
EXAMPLES FOR LABELING CIRCLES AND RADII:

The physical location of the conduit, gas line or water line, etc. is illustrated with the centerline labeling.

PREFERRED

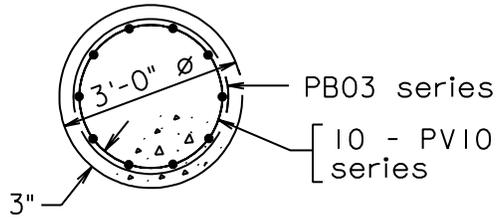


ACCEPTABLE

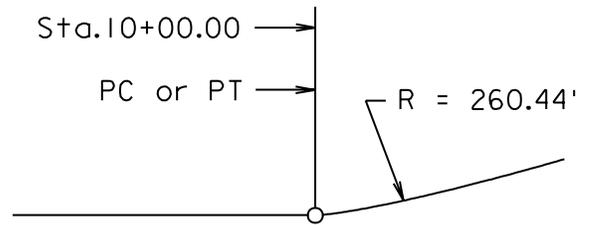
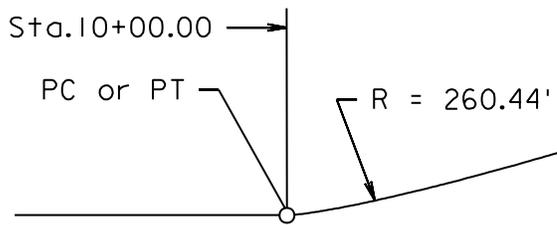
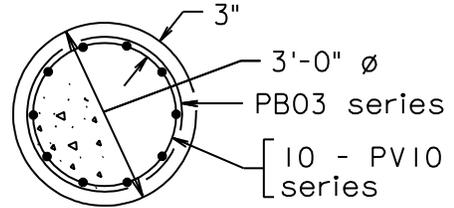


EXAMPLES FOR LABELING CIRCLES AND RADII:

PREFERRED



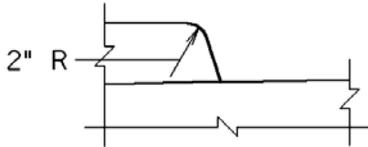
ACCEPTABLE



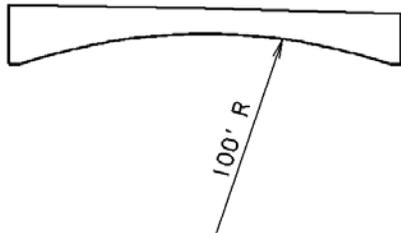
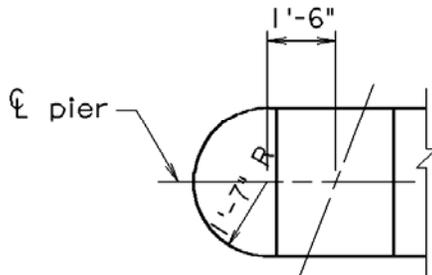
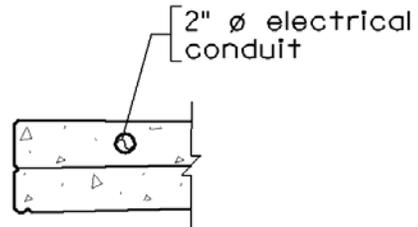
EXAMPLES FOR LABELING CIRCLES AND RADII:

UNACCEPTABLE

The labeling is incorrect. Describe the curvature first, then the size.



The labeling is incorrect because the squiggly reference is inappropriate.

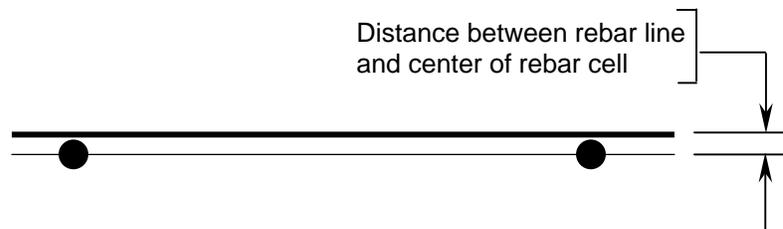


Reinforcing bars are usually placed on the full-size drawing. The cell for the reinforcing bar is found in the cell library *bdetails1.cel* and is named **REBAR**. In order for the bars to be the proper size after the drawing is scaled down and placed on the sheet, the rebar cell must be placed at the appropriate scale as shown in the chart below. For example, if the drawing is to be scaled to $\frac{3}{4}'' = 1'-0''$, the active scale for the rebar cell must be set to 1.33. Therefore, the bars would be drawn 1.33 times the size of the cell. When the drawing is scaled down by 0.0625, the bars will be the proper size for $\frac{3}{4}'' = 1'-0''$ on the scaled drawing.

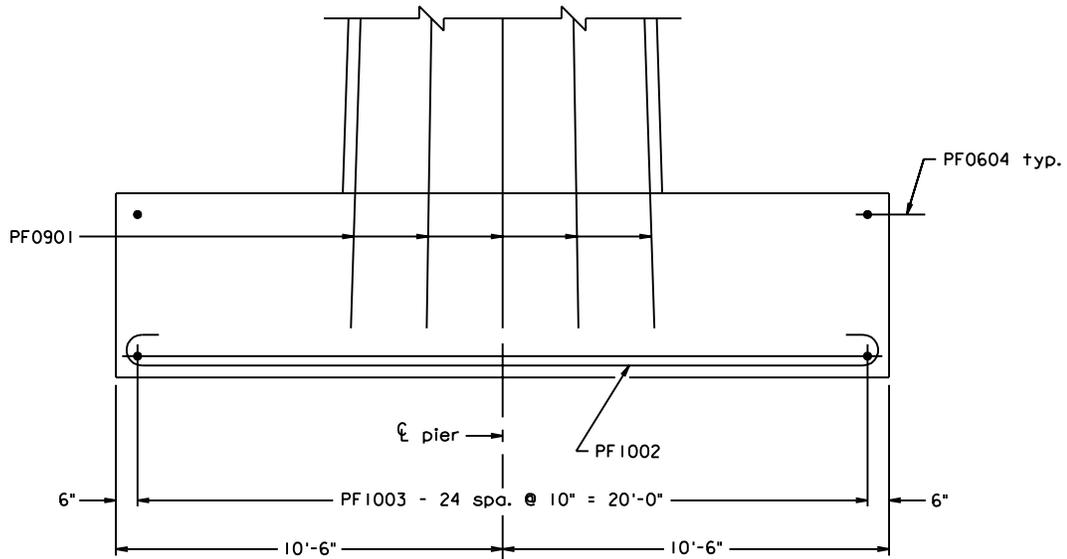
In general, the scales in the table will work for most drawings. The designer should verify that all rebars will be legible on half-size prints and make adjustments accordingly.

PLACING REBARS ON FULL-SIZE DRAWINGS		
If scaling down to	Use X and Y scale for rebar cell	Distance between rebar line and center of rebar cell
$1\frac{1}{2}'' = 1'-0''$ (0.1250)	0.66	0:0.45
$1'' = 1'-0''$ (0.0833)	1.00	0:0.68
$\frac{3}{4}'' = 1'-0''$ (0.0625)	1.33	0:0.92
$\frac{1}{2}'' = 1'-0''$ (0.0417)	2.00	0:1.38
$\frac{3}{8}'' = 1'-0''$ (0.0313)	2.66	0:1.83
$\frac{1}{4}'' = 1'-0''$ (0.0208)	4.00	0:2.75

In cases where rebars are to be placed on a drawing which has already been scaled down, the active scale for the rebar cell is 0.0833. The distance between the rebar line and center of the rebar cell is 0:0.057. These sizes will maintain consistency with rebars which have been placed on full-size drawing and scaled down.



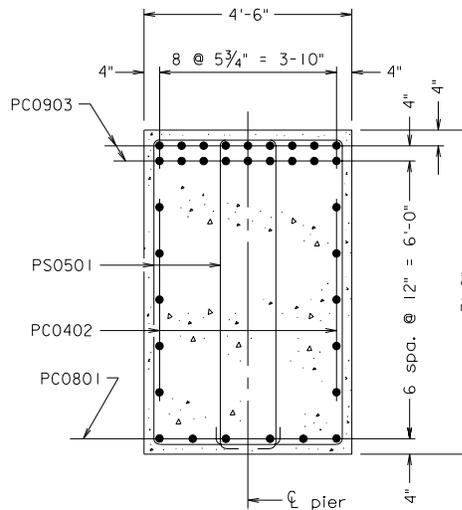
EXAMPLES OF PLACEMENT AND LABELING REBARS:



END VIEW

Scale : $\frac{3}{8}$ " = 1'-0"

The rebars between dimensions are not needed on drawing.



SECTION OF PIER CAP

Scale : $\frac{1}{2}$ " = 1'-0"

The rebars between dimensions may be needed to detail location of stirrup bars, check clearance of anchor bolts, etc.

GENERAL DRAFTING PROCEDURES
REBARS
SCALES

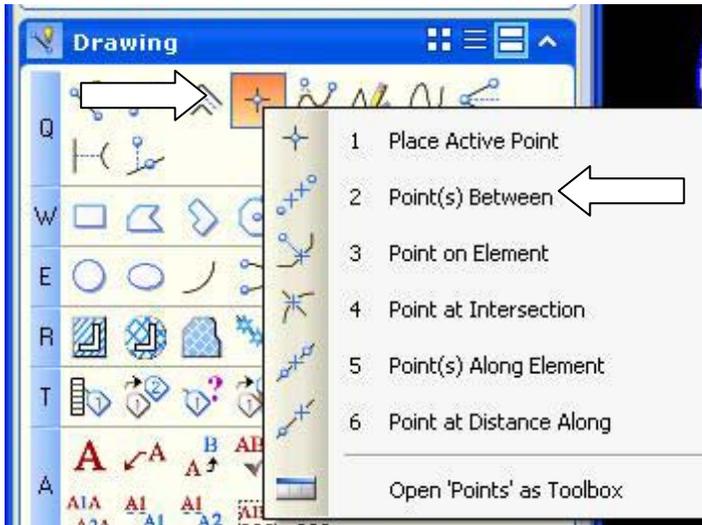
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 FILE NO. 01.11-2

The *Construct Points Between Data Points* command is helpful in placing a line of evenly spaced rebars.

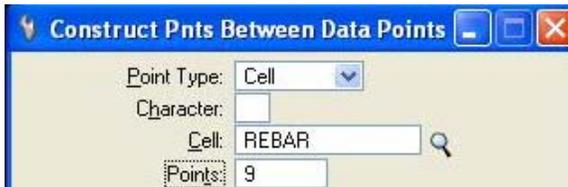
Example: In the pier cap shown on File No. 01.11-2, a row of 9 rebar cells needs to be placed on a line 3'-10" long. First, draw the line.

3'-10" line → _____

From the **Drawing** taskbar, click on the **Points** icon to bring up the points sub-palette onto the drawing file and select the *Points Between* command.



On the sub-palette which displays, give the name of the cell **REBAR**, set the Point Type as *Cell* and enter the number of points: 9 in this case.



Place the first data point at the end of the line. This will be the origin of the first **REBAR** cell. Place the second data point at the other end of the line. The **REBAR** cells will be placed automatically, evenly spaced along the line.



The Department uses Falcon to manage MicroStation (.DGN Files) and PDF/Tiff files for projects.

Active Database

Active Environment (Central Database only)

Falcon/DMS DocMan (Database: Central, Environment: Central Office)

File View Databases Environments References MicroStation AutoCAD Tools Help

Search Folders Viewer DB Tabs Doc.List Filter Notes View

PROJECTS\67953\67953\p286-24

Filename	File State	Description
3dbgsgeom.dgn	On Server	Bruce's file for Geopak...
archs site.dgn	On Server	
286-24_001.dgn	On Server	Title sheet: Plan, profil...
286-24_001r1.dgn	On Server	Title sheet: Plan, profil...
286-24_001r5.dgn	On Server	Title sheet: Plan, profil...
286-24_002.dgn	On Server	Estimated quantities an...
286-24_002r1.dgn	On Server	Estimated quantities an...
286-24_002r2.dgn	On Server	Estimated quantities an...
286-24_002r3.dgn	On Server	Estimated quantities an...
286-24_002r4.dgn	On Server	Estimated quantities an...
286-24_002r5.dgn	On Server	Estimated quantities an...
286-24_002r6.dgn	On Server	Estimated quantities an...
286-24_002r7.dgn	On Server	Estimated quantities an...
286-24_003.dgn	On Server	Estimated quantities
286-24_004.dgn	On Server	Substructure layout an

Folder Listing

Filename/File State/Description Listing

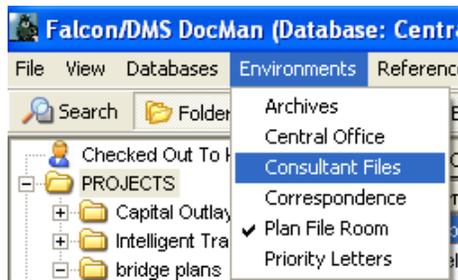
There are 10 databases (servers) where a project may be located.

Falcon/DMS Databases

Name	Description
Bristol	Bristol - District Office
Central	Central Office
Culpeper	Culpeper - District Office
Fredericksburg	Fredericksburg - District Office
Hampton Roads	Hampton Roads - District Office
Lynchburg	Lynchburg - District Office
Nova	Nova - District Office
Richmond	Richmond - District Office
Salem	Salem - District Office
Staunton	Staunton - District Office

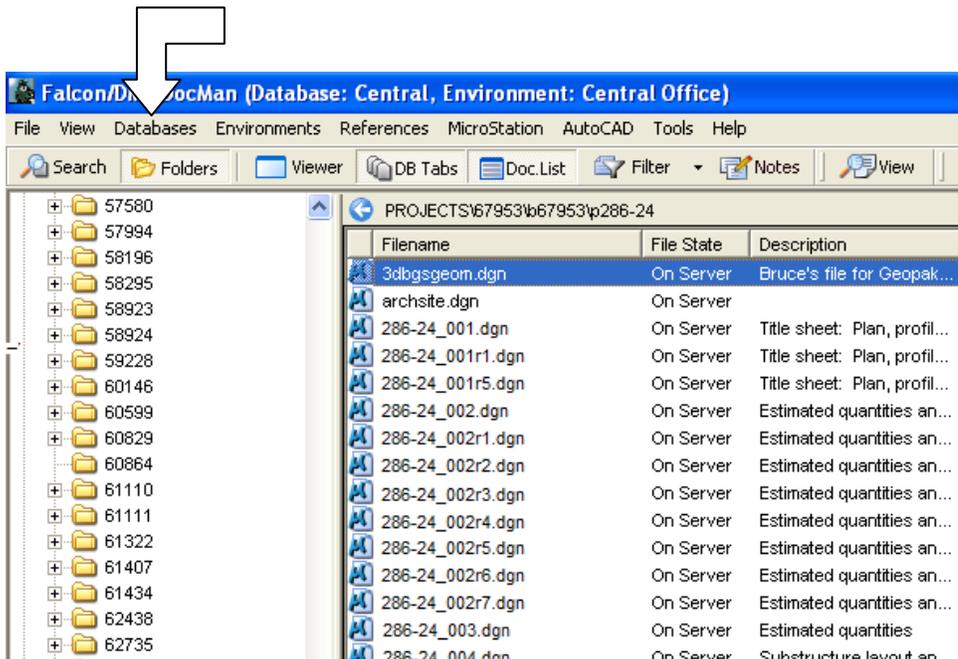
Open Close

In the central database, an additional option is available to set the environment variable.

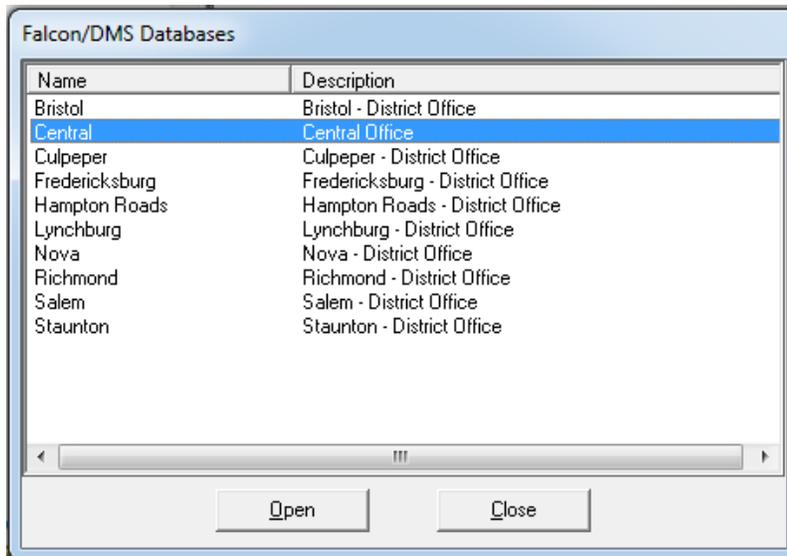


ENVIRONMENT	Description
Archives	Archive for DGN files during the life of the project (See File No. 01.12-4)
Central Office	Location of DGN files for projects in the Central Office (See File No. 01.12-2 thru -3)
Consultant Files	Location of DGN files for consultant projects
Correspondence	Not used by Structure and Bridge
Plan File Room	Location of PDF and Tiff files for all projects (See File No. 01.12-5)
Priority Letters	Not Used by Structure and Bridge

To change your database in Falcon, select the database tab in the file menu.



The following window will open:



Select the desired database and select open. For Central Office, the environment variable will also need to be set to Central Office for access to design files. Select the environment tab in the file menu and select Central Office.

In each database, projects have folders listed by UPC number. The location of the folder for a project is typically determined by the office that will doing the majority of the design work for a project. This is done to ensure the best network speed for projects since the servers are located in each office.

Under the UPC folder, each division has a sub-folder which starts with a letter denoting the division followed by the UPC number. The following are the Division designations: b(Structure and Bridge), d(Location and Design), c(Construction), e(environmental), g(Geotech), h(Hydraulics), l(Landscape), r(Right of Way/Utilities), s(Survey), su(Existing Utilities), t(Traffic), and u(In-plan Utility Relocation).

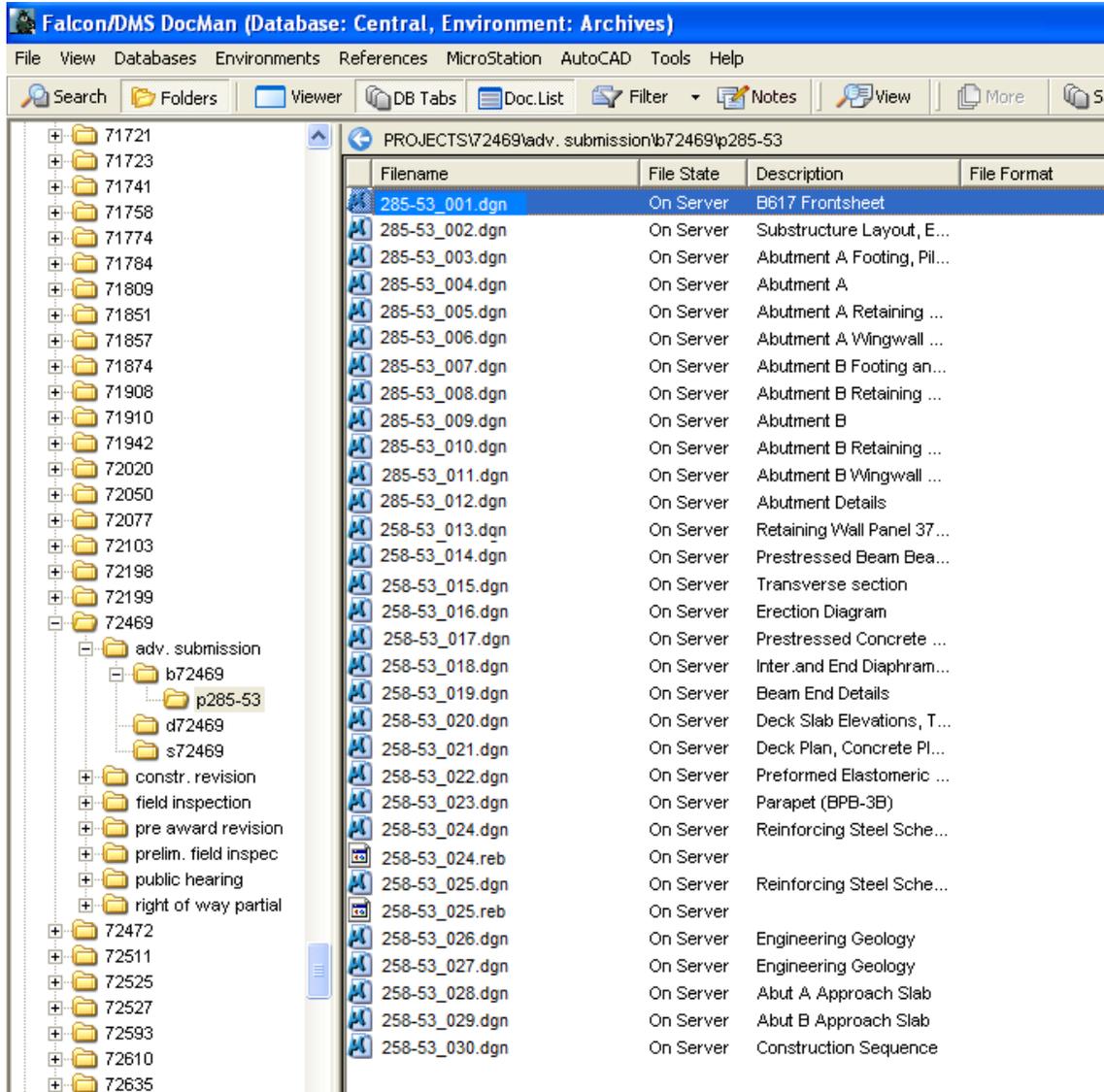
Under the b(UPC number) subfolder, there will be one or more folders for each bridge on the project with folder name p followed by the plan number, p274-56.

During the design of the project and for revisions during construction, the p(plan number) subfolder will be the location used to store all MicroStation DGN files for the project.

For instructions on creating DGN files in falcon, see File No. 01.01.

For new projects or to gain access to existing folders, the designer will need to complete an LD-894 Form and submit to either the project PM or section manager to be approved and forwarded to the Location and Design Helpdesk. Consultant may also get access to Falcon thru the firewall, but will need to fill out forms LD-443 and LD-894 and submit to the project manager.

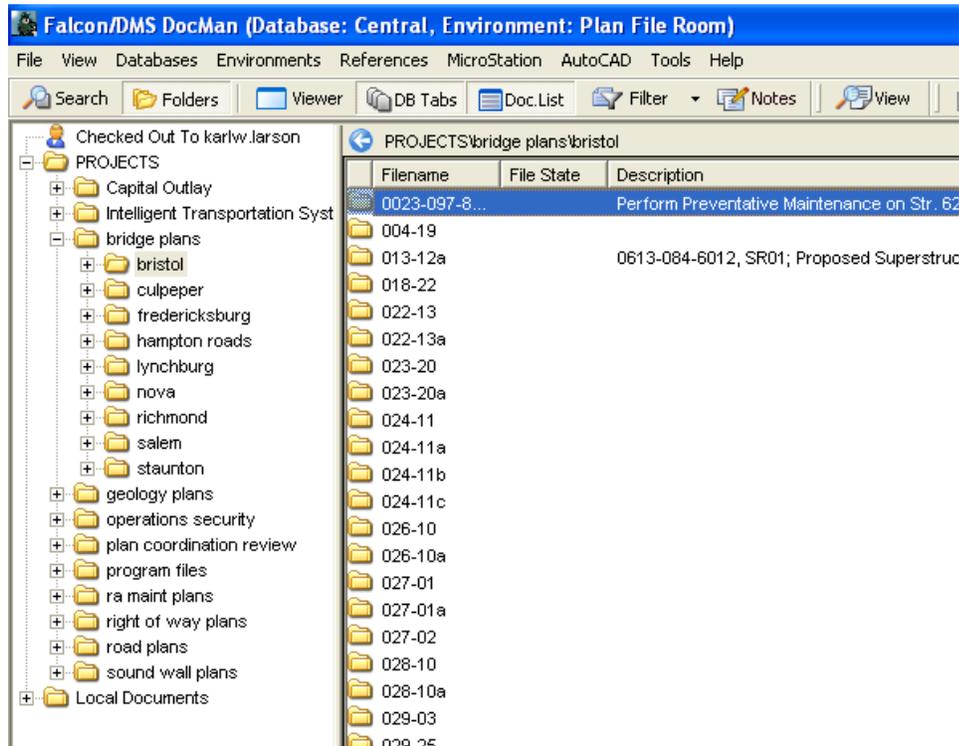
During the life of the project, the DGN files will be archived at designated milestones. The typical major milestones for bridge are final (advertised) submission, construction revision, and As Built. The folders for all projects are located by UPC number in the database: central and environment: Archives.



For instructions on how to archive files, see the Electronic Plan Submission Process Flow Chart located at the following Location and Design web site:

http://www.extranet.vdot.state.va.us/locdes/reference-guides/ElectronicPlan_Submission.pdf.

During project development through final submission, electronic plans (PDF/TIFF) files are stored in the Database: Central and Environment: Plan File Room. The files are located in the folder bridge plans which is divided further by each District.

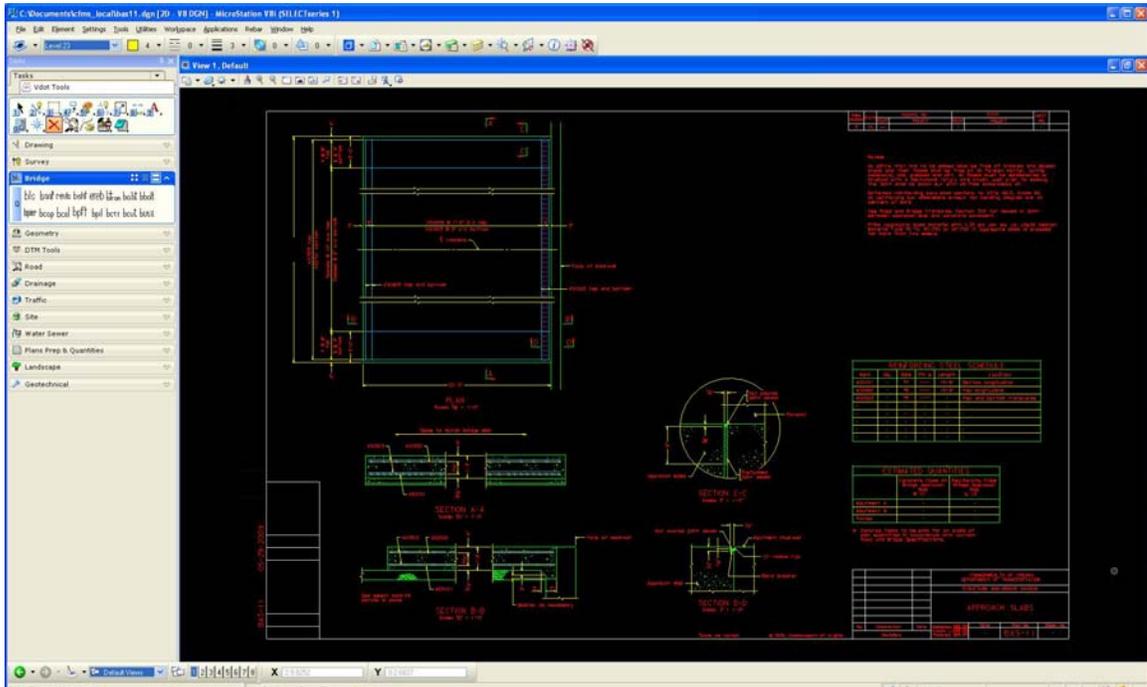


During advertisement and construction, all PDF files and DGN files of current drawings are provided to the contracting community.

Additional information on Falcon is available in the VDOT CADD manual available at the following link: http://www.virginiadot.org/business/locdes/vdot_cadd_manual.asp.

The following checklist should be utilized to ensure that plans sheets are in compliance with the parameters established by the Structure and Bridge Division. Note that the use of the *BRSEED_V8i.DGN* and the MDL files provided by S&B Division, when developing each drawing, will eliminate the need to address many of the items listed below.

1. The drawing is to be located in Window #1 of the drawing file.
2. The drawing shall have only one window open when it is initially pulled up.
3. The drawing shall be centered on the screen when it is initially pulled up.

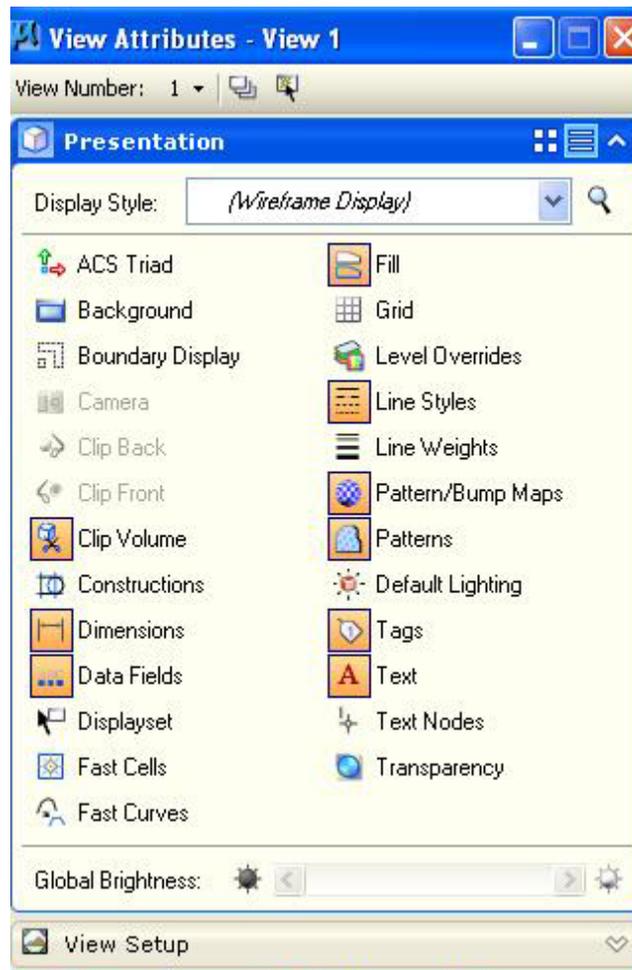


4. All temporary dates shown outside the lower left-hand corner of the border shall be deleted.

**GENERAL DRAFTING PROCEDURES
COMPLETED PLANS
CHECKLIST**

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5. The dialog box displayed below is found under *SETTINGS-VIEW ATTRIBUTES*.



The line weights and constructions shall be unchecked. The fill shall be checked.

6. The current Structure and Bridge color table (*VDOTCOLOR.TBL*) shall be used on all drawings. This color table is the same as *BRCOLORV8.TBL*. This color table is **not** the MicroStation default color table. The dialog box displayed below is found under *SETTINGS-COLOR TABLE*.



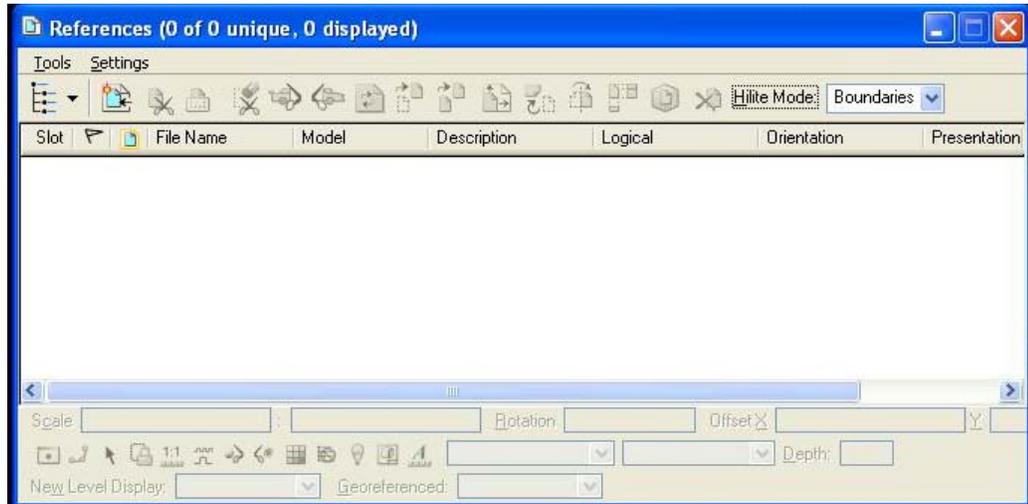
Color Component Information:

Color Number	Level	Revision Number	Red Color Component	Green Color Component	Blue Color Component
0	20		255	255	255
2	25		0	255	0
3	21		255	0	0
4	23		255	255	0
5	24		255	0	255
12	49	9	0	254	160
42	43	3	230	153	0
45	46	6	194	230	0
53	22		0	194	230
85	25		205	0	173
138	45	5	255	214	168
146	42	2	168	255	214
158	41	1	255	168	214
164	48	8	230	230	153
192	44	4	137	205	137
196	47	7	137	205	205
227	50	AB (As Built)	156	115	168

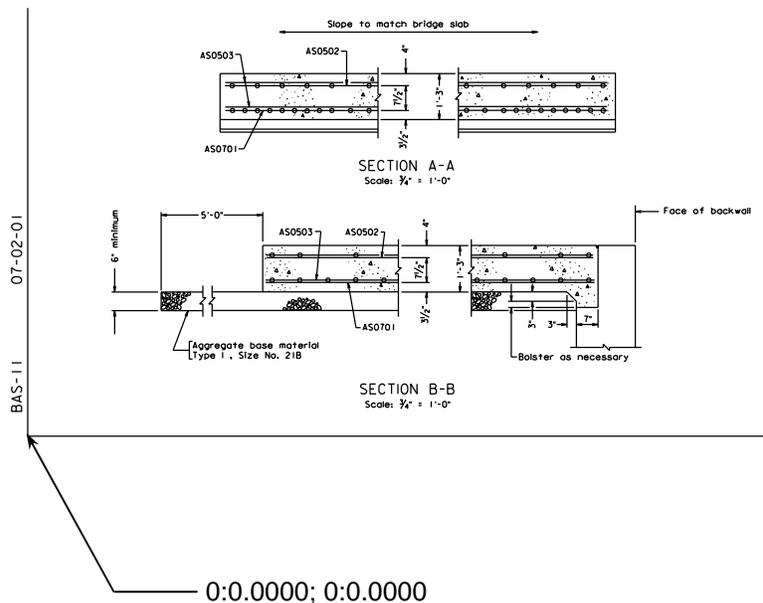
**GENERAL DRAFTING PROCEDURES
COMPLETED PLANS
CHECKLIST**

PART 2
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SHEET 3 of 8
FILE NO. 01.13-3

7. Plan sheet sizes shall conform with Vol. V-Part 2, File No. 01.02-1. The plan sheet cells are located in cell library *bdetails1.cel*. The cell for the front sheet is **FSHT** and the cell for the interior sheet is **SHT**.
8. Reference files are allowed only for the boring log sheet at this time. The window displayed below is found under *FILE-REFERENCE*.



9. The bottom left-hand corner of the sheet border shall be at coordinates 0:0.0000; 0:0.0000.

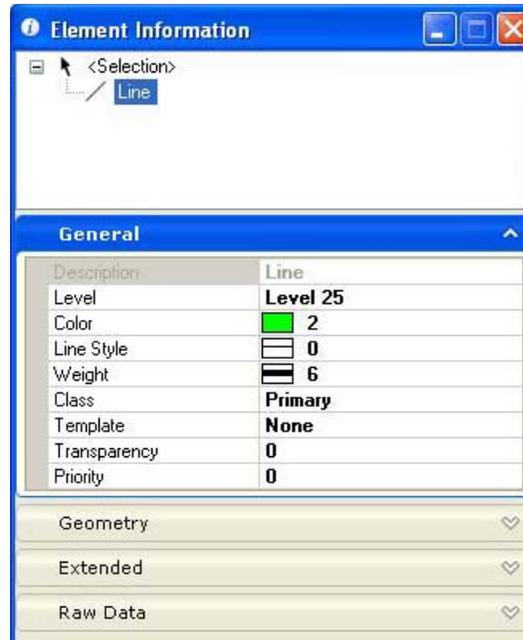


**GENERAL DRAFTING PROCEDURES
COMPLETED PLANS
CHECKLIST**

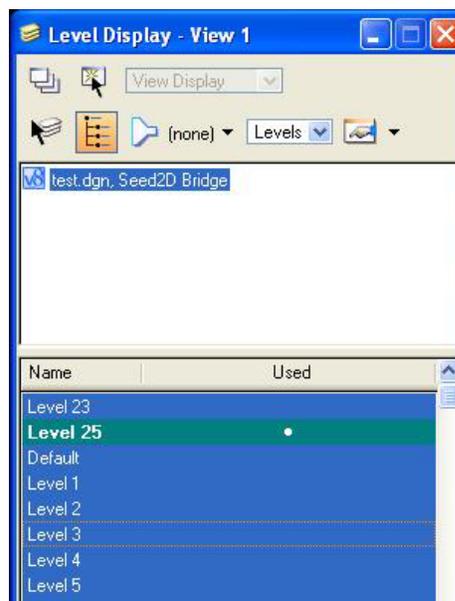
PART 2
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FILE NO. 01.13-4

10. The patterning symbology shall be set as follows: Level = 26, Color = 2, Style = 0, Weight = 0.

The dialog box displayed below is found by selecting  (Analyze Element icon on the menu) and then clicking on the patterned area.



11. No drawing element shall be left outside the drawing sheet borders.
12. All drawing levels shall be turned on. The dialog box displayed below is found under *SETTINGS-LEVEL-DISPLAY*.

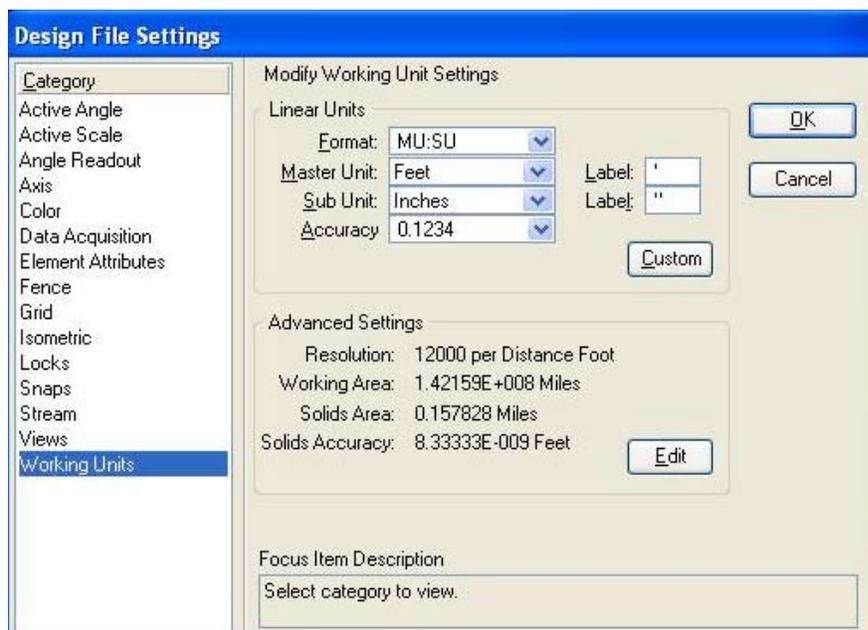


13. No original drawing elements shall be placed on levels 41 through 50 as these levels are reserved for revisions and as-built plans.

Revision Number	Level	Color
1	41	158
2	42	146
3	43	42
4	44	192
5	45	138
6	46	45
7	47	196
8	48	164
9	49	12
AB (As-Built)	50	227

14. The VDOT file-naming procedure shall be followed. See File No. 01.01-4.
15. The line and text symbology shall conform with File Nos. 01.05-2 and 01.06-1.
16. The working units using the new seed file shall be: Master Units = Feet
Sub Units = Inches
Resolution = 12000 per foot

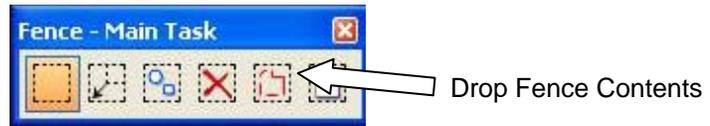
The dialog box displayed below is found under *SETTINGS-DESIGN FILE-WORKING UNITS*.



**GENERAL DRAFTING PROCEDURES
COMPLETED PLANS
CHECKLIST**

PART 2
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FILE NO. 01.13-6

Next, select the *DROP FENCE CONTENTS* command; this command is found on the *FENCE* menu.



The *DROP COMPLEX STATUS OF FENCE CONTENTS* window will display. Make sure that the fence mode is set to *Inside*.



Place a data point inside the fence to drop status on all cells.

19. After making adjustments to the file, be sure to save the settings; otherwise, any changes to the file set-up will not be retained. This is done by selecting *FILE-SAVE SETTINGS*. The design file shall also be compressed by selecting *FILE-COMPRESS-DESIGN*.
20. Consultant firms shall submit an index of drawings with the final CD for reference purposes. This index shall indicate the VDOT drawing file name with the title of the drawing as shown in the title block. The index document is to be provided in Microsoft Word format. An index header shall be provided showing the following information:

Project No. _____, B _____ PPMS No. _____
 Rte. _____ over _____ County/City of _____

<u>Sheet No.</u>	<u>File Name</u>	<u>Sheet Title</u>
1	258-12_001.dgn	Title Sheet
2	258-12_002.dgn	Estimated Quantities, Index of Sheets
3	258-12_003.dgn	Substructure Layout
4	258-12_004.dgn	Slope Protection
5	258-12_005.dgn	Abutment A
Etc.		

For any revisions, corrections shall not be made to the original plan sheets. Files are copied first and corrections are made on the copies. Specific instructions for making revisions to plans are given below:

1. Copying the File: The original sheet shall be left unaltered and shall be copied. All revisions shall be made on the copied file.

For the first revision, the file to be copied is the original contract file. For the second revision to the sheet, both the original contract file and the first revision file are left unaltered. The first revision file is copied into a new file and that new file is then revised to denote corrections applicable to the second revision.

2. Naming Convention: The copied file shall be named the same as the original file with the appropriate revision number. It is extremely important that the file name and the extension (if entered) are in lower case.

For example: Plan No. 258-12, underscore and Sheet 24
Original sheet is named 258-12_024
Copied sheet shall be named 258-12_024r1 (first revision)

There are two distinct changes in this new naming convention for revisions vs. the old naming convention:

An *r* is inserted between the name of the file being revised and the revision number.

A number is used to denote the revision (1, 2, 3, etc.) instead of a letter (a, b, c, etc.)

With the advent of electronic files, the need for this new naming convention was necessitated due to the confusion that arose when naming inserted sheets and added sheets. See below for further explanation:

- a. Inserted Sheets: Sheets may be incorporated into a set of plans, when there is not enough time to rearrange and renumber the sheets. While this is not an ideal situation, there are occasions when this cannot be avoided. The example below illustrates a sheet inserted between sheets 24 and 25 of Plan No. 258-12:

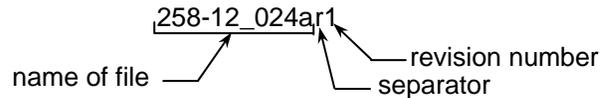
258-12_024
258-12_024a added sheet – carries a suffix of *a*
258-12_025

The example given above illustrates the predicament of naming the first revision of Sheet 24 under the old naming convention. Theoretically, it would be named 258-12_024a. But there is already a sheet 258-12_024a – the inserted sheet. Two files cannot have the same name: hence, the problem. Under the new naming convention, by using an *r* and a revision **number**, it will be easier to name any sheet.

For example:

258-12_024 Sheet 24
258-12_024r1 Sheet 24 – first revision
258-12_024r2 Sheet 24 – second revision
258-12_024a inserted Sheet 24a
258-12_024ar1 inserted Sheet 24a – first revision
258-12_025 Sheet 25

With the *r* as a separator, everything to the left of the *r* represents the name of the sheet, and the number to the right of the *r* represents the revision number. Also, by using a revision number, the number of the revision file correlates to the number inside the delta symbol (Δ) used to denote the changes on the plan sheet.



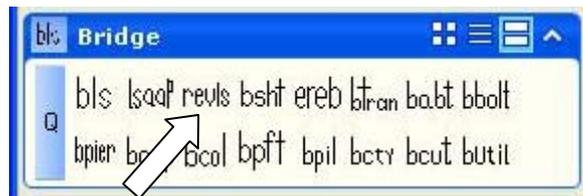
- b. Added sheets: These are sheets which are introduced into the plans as part of a revision. When numerous additional details are needed, it sometimes becomes necessary to add an entire new sheet. An added sheet is named with an *a* at the end of the file name.

For example:

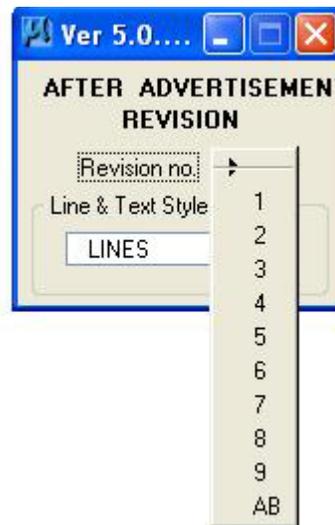
258-12_027	Sheet 27
258-12_027ar1	inserted Sheet 27a as part of Revision 1
258-12_028	Sheet 28

The naming convention for added sheets is identical to those for inserted sheets with one exception: the *r1* is already a part of the file name, since the sheet is created during the revision to the plans.

- 3. Using Proper Revision Colors and Levels: From the **VDOT BRIDGE MDL** task bar, select the *revls* program.

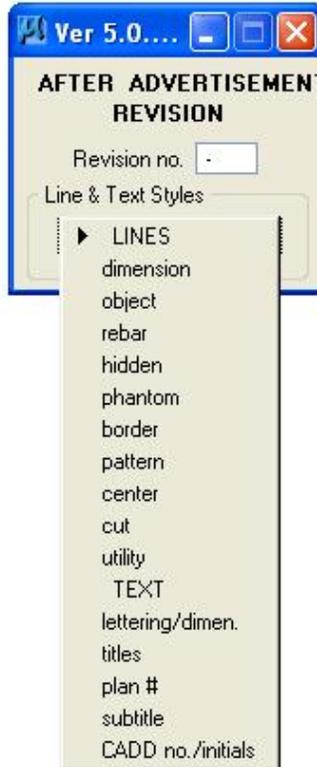


From the sub-palette displayed, select the appropriate revision number.



Selecting the appropriate revision number from the **V 5.0.0 revls S&B** sub-palette ensures that all elements drawn for the revision are the proper color and are placed on the appropriate level. Line and text styles shall also be chosen from this menu. Shown below are the levels and colors for revisions. Everything added or changed during a revision shall use the colors and levels listed.

THE VDOTCOLOR.TBL COLOR TABLE MUST BE ATTACHED.

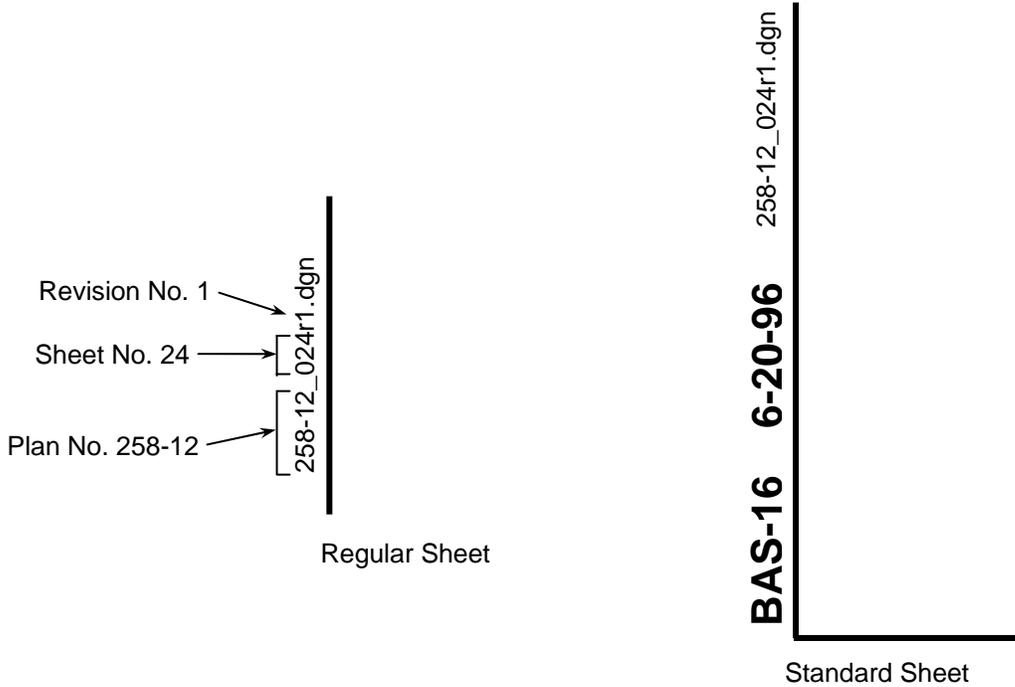


Revision	Level	Color Number	Red Color Component	Green Color Component	Blue Color Component
1	41	158	255	168	214
2	42	146	168	255	214
3	43	42	230	153	0
4	44	192	137	205	137
5	45	138	255	214	168
6	46	45	194	230	0
7	47	196	137	205	205
8	48	164	230	130	153
9	49	12	0	254	160
As-Builts:					
AB	50	227	156	115	168

**GENERAL DRAFTING PROCEDURES
REVISIONS
REVISIONS TO PLAN SHEETS**

PART 2
DATE: 08Oct2010
SHEET 3 of 10
FILE NO. 01.14-3

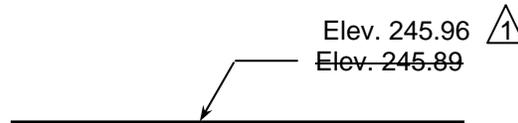
4. Placing File Name on Sheet: On the new (copied) sheet, the name of the sheet will be automatically placed in the lower left-hand border to reflect the name of the file.



5. Placing Information on Revised Sheets: To the maximum extent possible, no elements on the sheet shall be deleted or moved; all data that is part of the original contract as it was advertised should be retained in its original form. A few examples of revising the data are shown below:

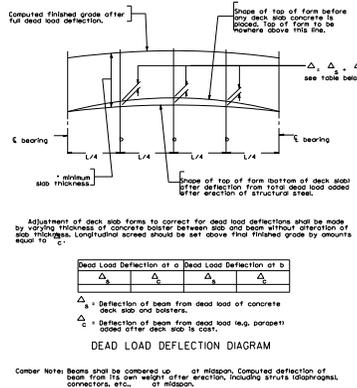
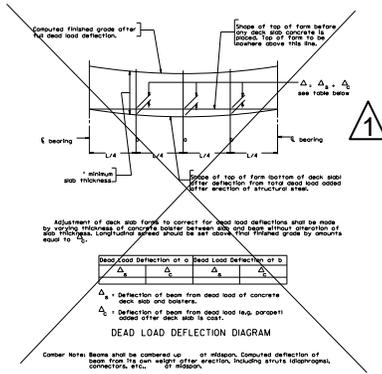
Example A: STRIKE THROUGH – This is the preferred method of revising data. Strike through the original data and show revised data nearby.

A delta symbol (Δ) with the appropriate revision number shown within shall be placed next to the revised data. The delta symbols for the first nine revisions (with the numbers included) are found in cell library *bdetails1.cel*. The cells are named **REV1**, **REV2**, **REV3**, etc. When placing the cell, the scale should be set to 1.0.



Example B: CROSS OUT AND REDRAW VIEW – When there is sufficient room cross out an entire element or view and draw a new one on the sheet to replace it.

A delta symbol (Δ) with the appropriate revision number shown within shall be placed next to both the crossed out view and the new view.

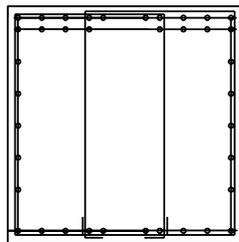


Note:
Delta symbols shown for this example are exaggerated in proportion to the view for legibility.

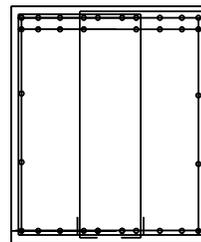
Example C: DELETE AND REDRAW VIEW – When there is insufficient room on the sheet to cross out an entire or partial view and redraw it, the old details may be deleted and redrawn in-place. The revision block shall state that the particular view was redrawn.

A delta symbol (Δ) with the appropriate revision number shown within shall be placed next to the revised view or detail.

For example, the pier cap detail illustrated below needs extensive revision (dimensions and bar spacing) and there is no room on the sheet to redraw it. In this case, the detail may be erased (deleted) and redrawn.



Detail as on original plans.



Redrawn detail.
Old detail was deleted and replaced by new detail.

**GENERAL DRAFTING PROCEDURES
REVISIONS
REVISIONS TO PLAN SHEETS**

PART 2
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Example D: REPLACE SHEET – There are occasions when a sheet needs an extensive number of changes. In this case, it is best to replace the sheet with an entirely new sheet. For example, Sheet 258-12_025 require extensive revisions and needs to be completely replaced. This sheet shall be copied into new Sheet 258-12_025r1. Note that this new sheet does not become an **a** sheet as it is still Sheet 25. The new sheet is named with **r1** because it is a part of the revision to the plans. The description in the revision block of the new sheet shall state “Sheet replaced”.

As with all revisions, the original sheet shall be retained unaltered.

Example E: INSERT NEW SHEET – Occasionally, an additional sheet is inserted into the plans during a revision. See the example below for the naming protocol for the inserted sheet:

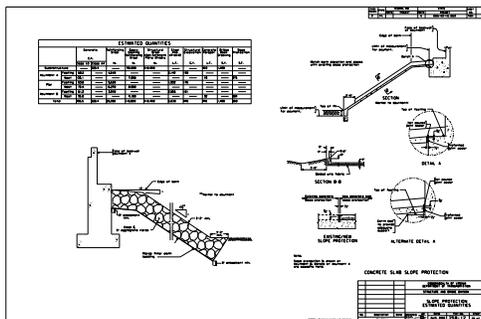
258-12_025
 258-12_025ar1 (inserted sheet)
 258-12_026
 258-12_027

Note that the inserted (added) sheet carries an **a** at the end of the file name and an **r1** to indicate that it is part of Revision 1. The description in the revision block shall state “New sheet added”.

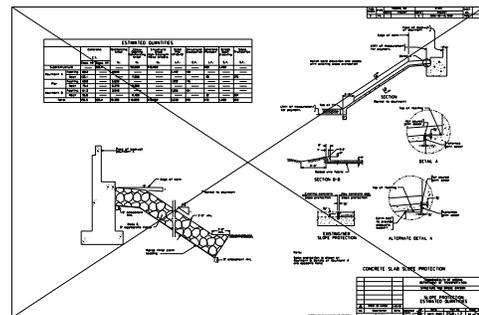
Should another sheet be inserted behind Sheet 25a, it shall be named Sheet 25b, and so forth.

Example F: VOIDED SHEET – When a sheet needs to be voided as part of a revision, the sheet is copied into an **r1** sheet. The description in the revision block of the **r1** sheet shall state “Sheet voided”. The copied sheet shall be X-ed out with a bold X (weight 12) from corner to corner of the sheet. See the examples below for the naming protocol and a visual depiction of the X-ed out sheet.

258-12_029
 258-12_029r1



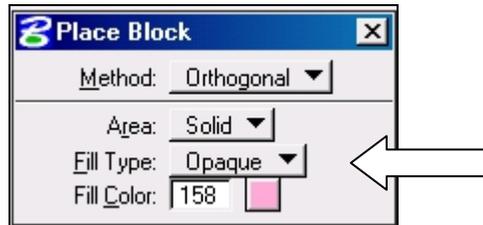
258-12_029 (Original sheet)



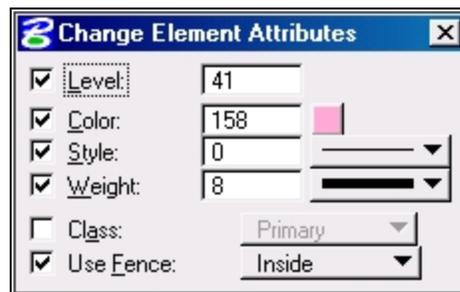
258-12_029r1 (Copied sheet X'ed out)

6. **Filled Elements:** Any elements, added during a revision, that are to be filled shall conform to the color, level, weight and style specified for that revision. Listed below are two methods of filling objects for the revision. The appropriate revision number and line style shall first be selected from the *revls* program to set the proper color, level, weight, etc. **THE VDOTCOLOR.TBL COLOR TABLE MUST BE ATTACHED.**

Method A: When selecting a command such as *PLACE CIRCLE* or *PLACE BLOCK* in Microstation, a dialog box appears. Select *opaque* from the Fill Type drop-down menu. This produces a filled element.



Method B: If the element is a filled cell (such as a reinforcing bar), first place the cell on the drawing. Then, change the attributes of the cell to those of the appropriate revision number by using the *CHANGE ELEMENT ATTRIBUTES* command.



To view the filled elements, select SETTINGS-VIEW ATTRIBUTES-FILL-APPLY.

7. Revision Block: A revision block is located in the lower right-hand corner of each sheet.

Note: Revision block shown for interior sheet.

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
			STRUCTURE AND BRIDGE DIVISION			
			ABUTMENT A			
No.	Description	Date	Designed: ACJ...	Date	Plan No.	Sheet No.
	Revisions		Drawn: NKR...	May 2001	262-01	12 of 22
			Checked: DPE...			

When the sheet is revised, the delta symbol (with appropriate revision number) is shown in the block labeled *No.*, a brief description of the change(s) is shown in the block labeled *Description* (show only the major changes), and the date of the revision is shown in the block labeled *Date*. The date shall be the same for all sheets revised in any particular revision. The text used should be CADD no./initials. Remember to select the *rev/s* program from the **V4.0 English S&B Program MDL** palette. Select *Line & Text Styles*, and click on *CADD no./initials*.

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
			STRUCTURE AND BRIDGE DIVISION			
			ABUTMENT A			
△	Revised wingwall	3-15-02	Designed: ACJ...	Date	Plan No.	Sheet No.
	Revisions		Drawn: NKR...	May 2001	262-01	12 of 22
			Checked: DPE...			

8. Table of Revisions: A Table of Revisions is shown on the second sheet of every set of plans. This table is a cell in *bdetails1.cel* and is named **RVTAB**. The bottom left corner of the table shall be located as shown below. In this table, a list of all sheets involved in the revision is shown along with the date and delta symbol.

Text shall be left justified in block.

△	2, 3, 7, 12, and 22	3-15-02
Rev. No.	Sheets Revised	Date
TABLE OF REVISIONS		

1/2"

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
			STRUCTURE AND BRIDGE DIVISION			
			ESTIMATED QUANTITIES INDEX OF SHEETS			
△	Revised quantities	3-15-02				
No.	Description	Date	Designed: BPM	Date	Plan No.	Sheet No.
	Revisions		Drawn: NKR	May 2001	262-01	2 of 22
			Checked: WPI			

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Sheet 2 is revised in every revision (whether or not changes are made to the sheet) because the Table of Revisions on this sheet has been filled in. Therefore, Sheet 2 is in effect changed and should be so noted in the Revision Block.

△	2, 10, and 11	9-20-02
△	2, 3, 7, 12, and 22	3-15-02
Rev. No.	Sheets Revised	Date
TABLE OF REVISIONS		

			COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
			STRUCTURE AND BRIDGE DIVISION			
			ESTIMATED QUANTITIES INDEX OF SHEETS			
△	Table of revisions	9-20-02				
△	Revised quantities	3-15-02				
No.	Description	Date	Designed: BPM	Date	Plan No.	Sheet No.
	Revisions		Drawn: NKR	May 2001	262-01	2 of 22
			Checked: WPI			

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**GENERAL DRAFTING PROCEDURES
REVISIONS
REVISIONS TO PLAN SHEETS**

PART 2
DATE: 01Feb2005
SHEET 9 of 10
FILE NO. 01.14-9

9. Revision Number: The first revision to a set of plans is Revision 1 and symbol $\triangle 1$ is used, the second revision is Revision 2 and the symbol $\triangle 2$ is used, etc.

When a set of plans is revised, the revision number applies to all sheets revised at that time. A particular sheet is not being revised; the entire set of plans is being revised. Therefore, even if a sheet is being revised for the first time during Revision 4, that sheet will be named with an r4 and $\triangle 4$ will be shown near all the revised information on the sheet.

For example:

<u>Revision</u>	<u>Sheets Revised</u>	
1	2, 4, 7, 8, 13	- these sheets will carry r1 as part of the file name and will use $\triangle 1$ to denote revisions
2	2, 17, 21, 35	- these sheets will carry r2 as part of the file name and will use $\triangle 2$ to denote revisions
3	2, 5, 13, 25	- these sheets will carry r3 as part of the file name and will use $\triangle 3$ to denote revisions

In the above example, since Sheet 13 was revised in the first and third revisions, the following files should now exist.

Sheet 258-12_013
Sheet 258-12_013r1
Sheet 258-12_013r3

It should be noted that there is not an **r2** file for this sheet since the sheet was not revised during Revision 2.

10. Submitting Revisions: After the revision is completed, see the Electronic Plan Submission Process Flow Chart for the procedure for submitting the revision at the following Location and Design web site.

http://www.extranet.vdot.state.va.us/locdes/reference-guides/ElectronicPlan_Submission.pdf

11. Folder Location of older revisions: In the past, the tiff/PDF files for sheets being revised were deleted and replaced with the new tiff file. With each sheet being sealed and signed, these files are now maintained in Falcon.
12. Sealing and Signing: Each time a set of plans is revised except for As-built plans, the plans must be re-dated, resealed, and re-signed on each drawing revised.

General:

The preparation of As-Built plans is important since As-Built plans provide the permanent record of the actual structure and are used to develop plans for future work at the project site.

In accordance with Virginia Department of Transportation's *Post Construction Manual*, bridge and structure projects with plans, both contract and state forces work, shall be marked for the As-Built condition upon completion of the work. This shall include, but is not limited to, bridges, retaining walls, demolition plans (if separate from the structure plans), and any other plans that require finals to be posted by Structure and Bridge or which will be permanently filed within Structure and Bridge for future reference.

Several major changes to past practices are as follows:

1. All sheets in the set of plans, regardless whether they contain As-Built corrections or not, shall be made part of the As-Built plans. This entails copying the sheet, denoting the sheet as an As-Built sheet in the revision table, and tiffing the sheet.
2. The  symbol shall be placed beside each As-Built correction on the sheets.
3. Revision No. 10 is used for As-Built notations in order to set the color to 227 and the level to 50.

The Drafting and Detailing Committee would like to acknowledge Dean W. Hackett, P.E. and Len W. Gisiner for the extensive development and assistance they provided on the As-Built Plans section.

NOTE:

Due to various restrictions on placing files in this manual onto the Internet, portions of the drawings shown do not necessarily reflect the correct line weights, line types, fonts, arrowheads, etc. Wherever discrepancies occur, the written text shall take precedence over any of the drawn views.

As with any other revision, corrections for As-Built conditions shall not be made to the original plan sheet. Files are copied and corrections are made on the copies. On As-Built, no data on the file sheets shall be deleted or moved. Refer to File Nos. 01.14-1 thru -10 for complete plan sheet revision instructions.

All sheets in the set of plans, regardless whether they contain As-Built corrections or not, shall be made part of the As-Built plans. This entails copying the sheet, denoting the sheet as an As-Built sheet in the revision table, and PDFing the sheet.

When the file is copied, the As-Built copy shall be named: [original name of file] + [r - for revision] + [ab], e.g., 278-99_001rab.

The procedure for processing As-Built plans shall be as follows:

PLANS PREPARED IN THE DISTRICT

- Access original CADD files in accordance with S&B Electronic Plan Submission guidelines.
- Make necessary changes to drawings on CADD, on the copied file.
- Full-size plan sheets:
 - Create new .PDF files as per S&B Electronic Plan Submission guidelines.
- 8 ½" x 11" plan sheets:
 - Make changes to 8 ½" x 11" sheets.
 - Create new .PDF files.
- Follow the instructions in the Electronic Plan Submission process for revisions. The As-built PDF's will be stored in the Plan File Room in a folder labeled As-Built.

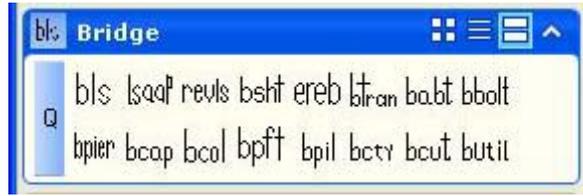
PLANS PREPARED BY CENTRAL OFFICE AND OTHERS

- Request Central Office to give privileges to modify the CADD files that need to be changed.
- Access original CADD files in accordance with S&B Electronic Plan Submission guidelines.
- Make necessary changes to drawings on CADD, on the copied file.
- Full-size plan sheets:
 - Create new .PDF files as per S&B Electronic Plan Submission guidelines.
- E-mail to Central Office S&B File Room stating that drawings are posted.

FINALS CHECKED BY CONSULTANTS

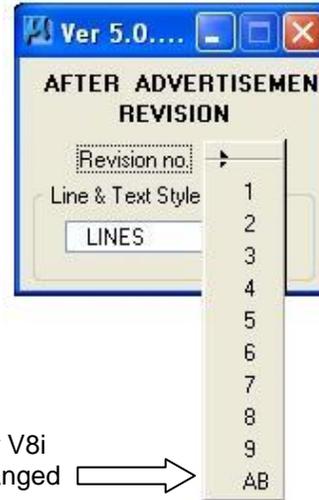
- Request Central Office to give privileges to modify the CADD files that need to be changed.
- Access original CADD files in accordance with S&B Electronic Plan Submission guidelines.
- Make necessary changes to drawings on CADD, on the copied file.
- Full-size plan sheets:
 - Create new .PDF files as per S&B Electronic Plan Submission guidelines.
- E-mail to Central Office S&B File Room stating that drawings are posted.

To set the line and text parameters for As-Built elements, select *revls* from the **VDOT BRIDGE MDL** task bar.



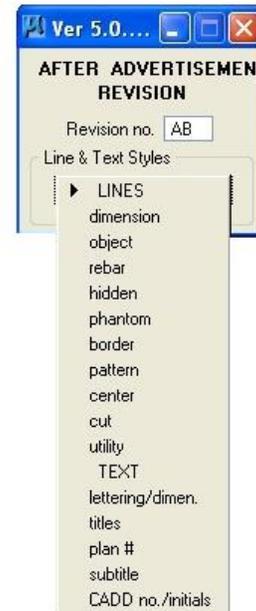
The **V4.0.0 revls S&B** sub-palette displays. Select Revision number 10.

Selecting revision number 10 from the **V4.0.0 revls S&B** sub-palette ensures that all elements drawn for the As-Built are the proper color and are placed on the appropriate level (color 227, level 50).



Revision 10 under V8i has now been changed to AB. →

Line and text styles shall also be chosen from this sub-palette.



The **AB10** cell, found in the *symbols1.cel* library, shall be placed next to all As-Built marked conditions.



Title sheets are to be marked as follows:

In the title block, line thru PROPOSED and to the left, place AS-BUILT.

In the bottom right corner of the sheet, place "Finals posted in (District Name) District Bridge Office on (Date)" and give name and address of contractor. Use text style *lettering/dimension*.



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

~~AS-BUILT PROPOSED~~ BRIDGE ON

RTE. 603 OVER LAUREL FOLK CREEK
FLOYD CO. - AT INT.RTE 601
0603-031-220, B601

~~AS-BUILT~~ Finals posted in Salem District Bridge Office on March 31, 2006

Contractor: Burleigh Construction Co., Inc.
P.O. Box 289
Concord, VA 24538

No.	Description	Date
REVISIONS		
For Table of Revisions, see Sheet 2.		

Scale: 1" = 10'

Recommended for Approval: George M. Clendenin 5/25/04
State Structure and Bridge Engineer Date

Approved: Malcolm T. Kerley 5/26/04
Chief Engineer Date

Date: May 19, 2004 © 2004, Commonwealth of Virginia Sheet 1 of 16

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If finals are posted by the Consultant, in the bottom right corner of the sheet, place "Finals posted for the (District Name) District Bridge Office by (Consultant's Name) on (Date)." Use text style *lettering/dimension*.



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

~~AS-BUILT PROPOSED~~ BRIDGE ON

RTE. 603 OVER LAUREL FOLK CREEK
FLOYD CO. - AT INT.RTE 601
0603-031-220, B601

~~AS-BUILT~~ Finals posted for the Salem District Bridge Office by
Hayes, Seay, Mattern & Mattern, Inc. on April 7, 2005

No.	Description	Date
REVISIONS		
For Table of Revisions, see Sheet 2.		

Scale: 1" = 10'

Recommended for Approval: George M. Clendenin 5/25/04
State Structure and Bridge Engineer Date

Approved: Malcolm T. Kerley 5/26/04
Chief Engineer Date

Date: May 19, 2004 © 2004, Commonwealth of Virginia Sheet 1 of 16

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**GENERAL DRAFTING PROCEDURES
AS-BUILT PLANS
TITLE SHEET NOTATIONS**

PART 2
DATE: 08Oct2010
SHEET 4 of 12
FILE NO. 01.15-4

In the General Notes, make the following notations:

If both metal forms and prestressed concrete deck panels were permitted, indicate which option was actually used. Place note at the end of the General Notes.



Used stay-in-place metal deck forms.

Note the paint system used. Indicate the specific materials used for all coats. Place information to the left of the paint note in the General Notes, if space permits. If not, place note at end of General Notes.



Paint System: System B
Manufacturer: Elite Coatings
Primer: P-159 (Gray)
Intermediate: Water Guard W-112 (White)
Top Coat: Water Guard (Brown)

Design loading includes 20 p.s.f. allowance for tolerances and construction methods.

The use of prestressed deck panels as stay-in-place will not be permitted.

Finish paint color shall be brown, 595-20059.

Deformed reinforcing bars shall conform to A615 bars in pier columns may be Grade 40. All reinforcement on the detailed drawings are to centers of bars unless otherwise noted and are subject to fabrication tolerances.

Estimated quantities sheets are to be marked as follows:

In the Estimated Quantities Table, line thru ESTIMATED and to the left, place ACTUAL.

 ACTUAL ~~ESTIMATED~~ QUANTITIES

Estimated quantities in box: Place single line thru the quantity and place final quantity below it.

Concrete Class A3	Reinforcing Steel	Epoxy Coated Reinforcing Steel
CY	LB	LB
81.2	5,630 5,670 	—
48.2	4,540 4,500  4,520 	—
51.2	28,980	7,590

Lump Sum items: If designation of a Lump Sum item is below Estimated Quantities table, line thru Lump Sum and place 100% at end.

Abutment B	Neat	80.3	5,630	7,590	—
	Footing	46.4	4,540	—	360
Total		497.7	95,510	28,710	941

⊗ Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications.

Construction Surveying - ~~Lump Sum~~ 100% 

If the Lump Sum items are arranged in a separate table, line thru LS and place 100% at end.

LUMP SUM BID ITEMS	
Mobilization	t\$ 100% 
Construction Surveying	t\$ 100% 
Dismantle and Remove Existing Structure Number 9999	t\$ 100% 
Telephone Conduit System - B602	t\$ 100% 
Deck Drainage System - B602	t\$ 100% 

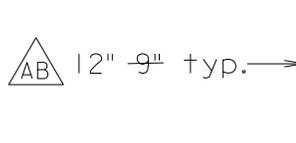
Make sure all inspector changes on As-Builts are reflected in the final quantities shown; correct any discrepancies.

Show all work orders. The cell **ESTWO**, found in *bdetails1.cel* library, should be placed near the Estimated Quantities table. Complete the table by listing the Work Order Number, the Description, the Unit and Quantity.

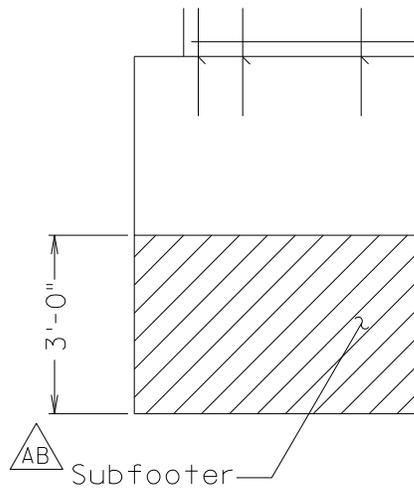
WORK ORDERS			
Work Order Number	Description	Unit	Quantity
1	Temporary Sheet Piling	SF	186
2	Concrete - Abutment A	CY	14
2	Concrete - Footing	CY	14
2	Concrete - Pier 1 Neatwork	CY	8
2	Epoxy Coated Reinf. Steel	LB	3200

Interior sheets are to be marked as follows:

Show all changed dimensions by lining through the plan dimension and showing the As-Built dimension either above or along side of the original.



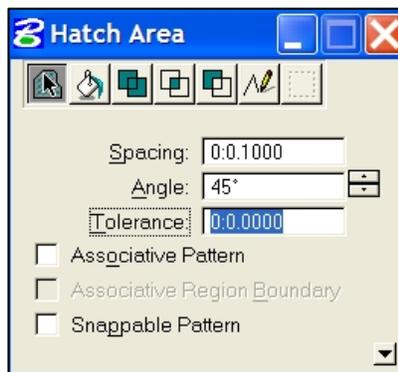
Footings: Show depth to nearest tenth of a foot. If a large change in the footer size or subfooter was added, show a sketch on the applicable sheet.



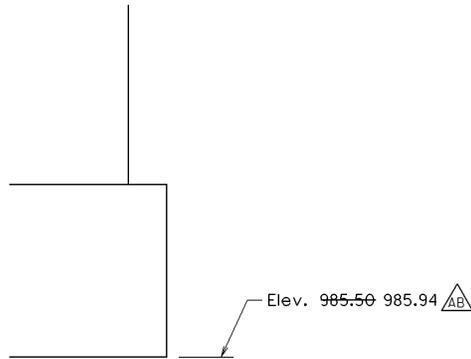
The cross-hatching shall be generated from the Hatch pattern of the **Patterns** palette:



The weight shall be set to 0 and the attributes shall be set as shown in the **Hatch Area** sub-palette shown below:

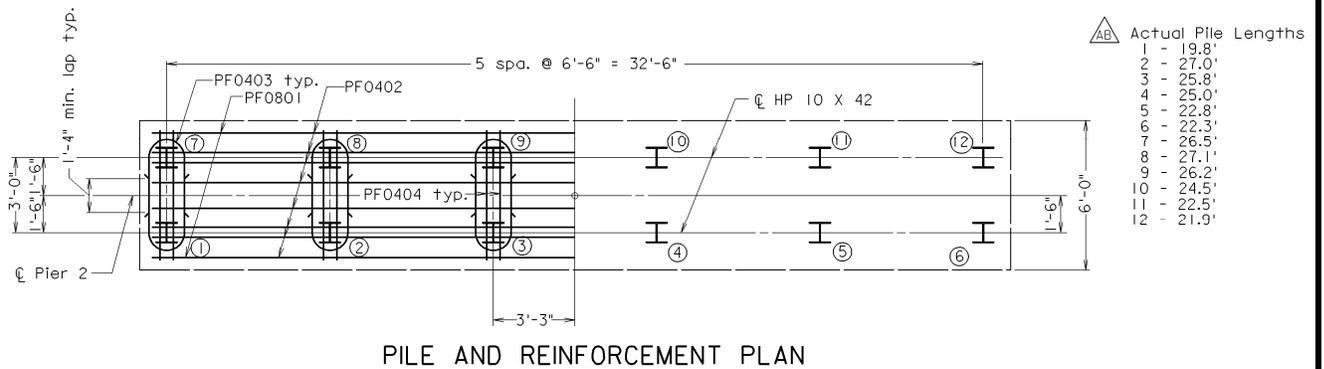


If there is a change in an elevation shown on the plans, show the As-Built elevation (to the nearest hundredth of a foot).

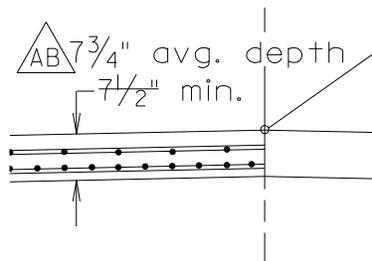


If material type changes from that shown on the proposed plans, note these changes on the applicable sheet.

Show individual pile lengths to the nearest tenth of a foot.



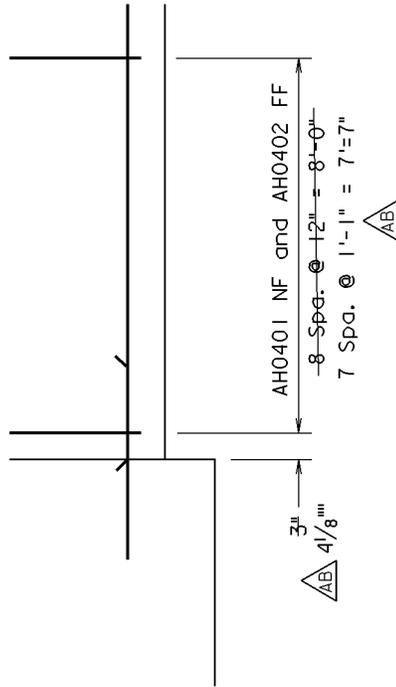
Show the average thickness of the concrete deck on the Transverse Section detail. Show dimensions to the nearest eighth of an inch.



**GENERAL DRAFTING PROCEDURES
AS-BUILT PLANS
INTERIOR SHEET NOTATIONS**

PART 2
DATE: 08Oct2010
SHEET 9 of 12
FILE NO. 01.15-9

Show all the changes that were done to the structure in the field that were different from the plans.



**GENERAL DRAFTING PROCEDURES
AS-BUILT PLANS
INTERIOR SHEET NOTATIONS**

PART 2
DATE: 08Oct2010
SHEET 10 of 12
FILE NO. 01.15-10

Shop Drawings:

Shop drawings for major structural elements should be filed with the As-Built plans. While the As-Built plans will typically be done after all work orders on projects have been resolved, the shop drawings should be filed after project acceptance or earlier.

The paper copies of shop drawings will need to be scanned and electronic files should be posted in plan file room in the As-Built folder in Falcon.

Use the following naming convention for files:

Plan number_(three-letter designation shown below)_XXX.PDF

Listing of Typical Shop Drawings filed:

<u>Type</u>	<u>Designation</u>
Structural Steel	SST
Prestressed Concrete Beam	PCB
Anchor Bolts	ABS
Joint	JOI
Bearing	BEA
Pile (Steel and Prestress)	PIL
Railing	RAI
Utilities	UTI
Machinery	MAC
Drainage	DRA

INTRODUCTION:

This portion of the office practice supplements the Instructional and Informational Memorandum by the Structure and Bridge Division (current IIM-S&B-79). The requirements for the sealing and signing of plans are issued by the Commonwealth of Virginia, Department of Professional and Occupational Regulation (DPOR).

SEALING AND SIGNING OF PLANS:

Unless noted otherwise in this section of the office practice, the term “sealed” when referring to plans or individual plan sheets shall indicate the following:

Sealing and signing by a responsible person (in-house plans)

Signing of plans by a responsible person exempt by the Code of Virginia

Sealing and signing of plans completed by Consultants in accordance with Department of Professional and Occupational Regulation

WHAT IS TO BE SEALED AND SIGNED:

Each sheet of a set of plans will be sealed and signed. This includes the title sheet (front sheet), quantity sheets, notes, bridge/structural plan sheets (superstructure and substructure), detail sheets, standards, geology sheets, etc.

For in-house plans, some plan sheets included in the plan assembly will be sealed by other disciplines, i.e. other than Structure and Bridge. Examples include:

Geology sheet(s) (Materials Division, no seal or signature required)

Plan sheet(s) for traffic management or for maintenance of traffic (Traffic engineer, Regional traffic engineer, etc.)

Approach road plan sheet(s) (Location and Design engineer, etc.) for “bridge-only” projects.

Insertable sheets (VDOT Road and Bridge Standards) issued prior to July 1, 2009 shall not be sealed and signed.

Insertable sheets (VDOT Road and Bridge Standards) issued after July 1, 2009 shall be sealed and signed by Location and Design Special Design Section.

Plan sheets prepared by Consultants (Consultant engineer)

Some plan sheets may require two or more seals. Plan Sheets developed by more than one discipline/engineer, for example, a pier foundation sheet that requires structural design and a drilled shaft that may require geotechnical design.

Standard sheets included in a plan assembly will be sealed. In addition, pre-engineered standards (approach slabs, parapet and railing sheets, utilities, etc.) developed or revised after July 1, 2009 will be sealed by the Engineering Services Section.

WHAT IS TO BE SEALED AND SIGNED: (cont'd)

Each sheet in a plan assembly shall be sealed. While the preferred orientation is vertical, these blocks may be placed horizontally if required.

WHEN ARE PLANS TO BE SEALED AND SIGNED:

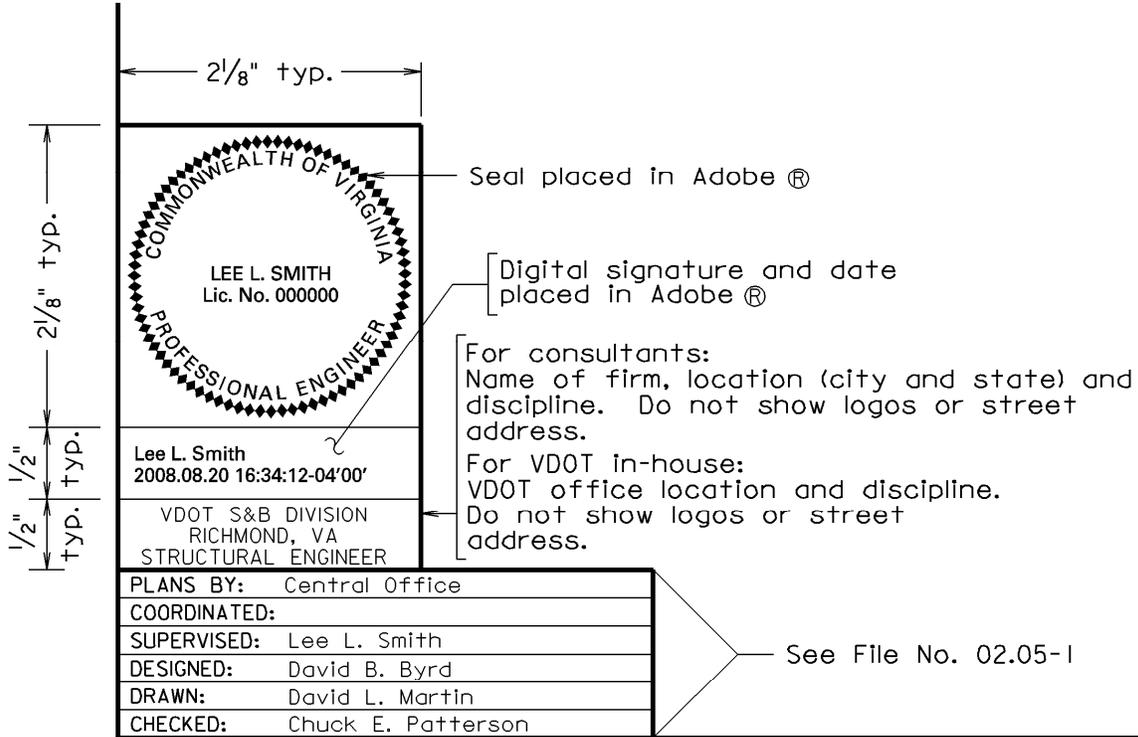
For Tier 2 projects, the plans shall be sealed and signed by Plan Coordination Review (Column 2). For Tier 1 projects, the plans shall be sealed and signed by Column 1 (Contract Development Begins). Any drawing(s) modified after this date shall be re-sealed and re-signed by Advertisement Submission (Column 9 – Tier 2/ Column 6 – Tier 1).

For additional instruction on the plan submission process, see the Electronic Plan Submission Process Flow Chart located at the following Location and Design web site:

http://www.extranet.vdot.state.va.us/locdes/reference-guides/ElectronicPlan_Submission.pdf

The lower left corner of the title sheet shall contain blocks for sealing and signing.

For projects completed in-house and by consultants, only one block will be required even though some interior sheets may be completed by other disciplines or another firm.



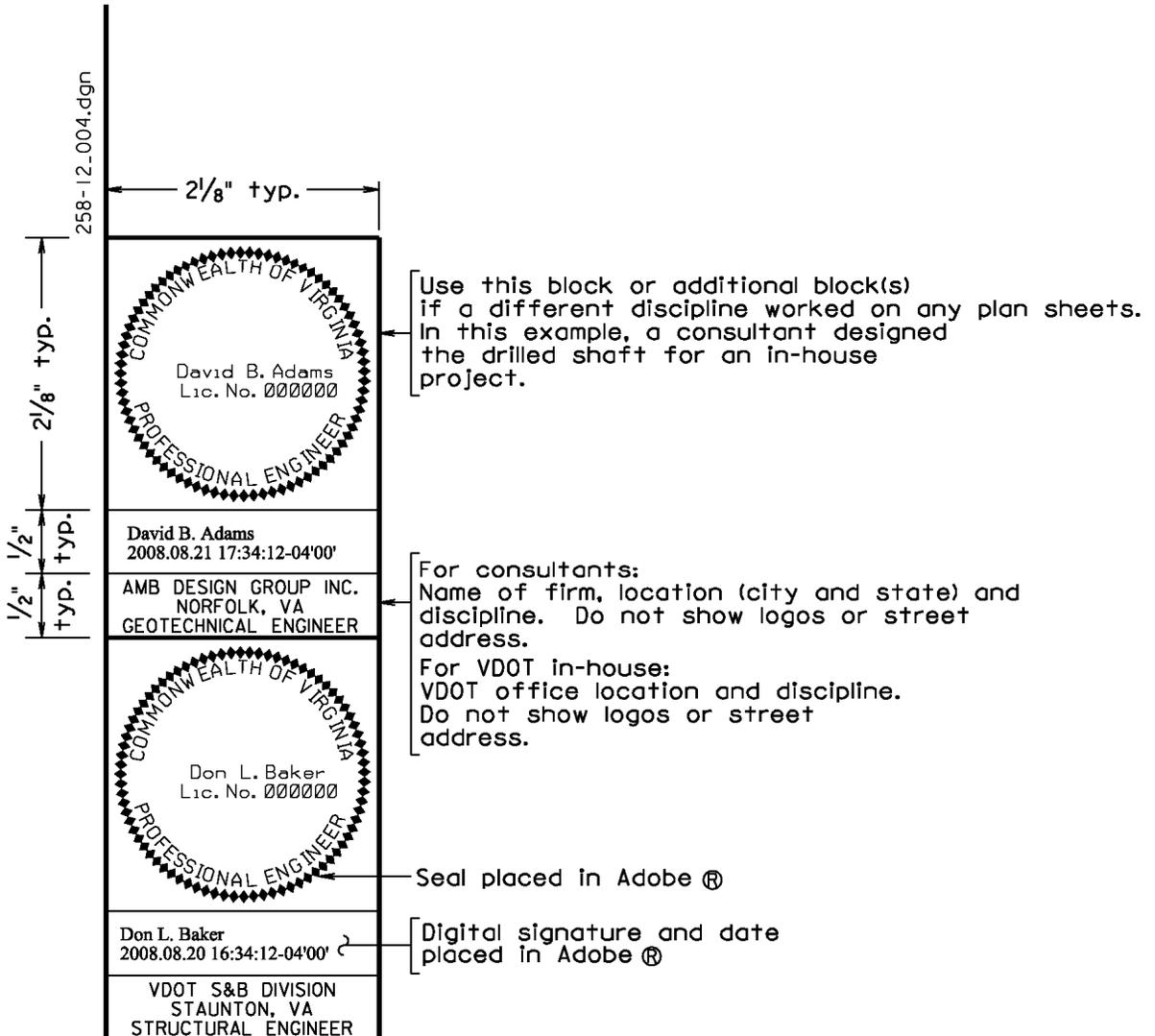
Detail shown at approx. 70% scale.

**GENERAL DRAFTING PROCEDURES
SEALING AND SIGNING OF PLANS
TITLE SHEET**

PART 2
DATE: 08Oct2010
SHEET 3 of 6
FILE NO. 01.16-3

The lower left corner of the interior sheets shall contain blocks for sealing and signing.

The example shown is when two seals are required: The Geotechnical Engineer designed the drilled shafts and the Structural Engineer designed the substructure unit.



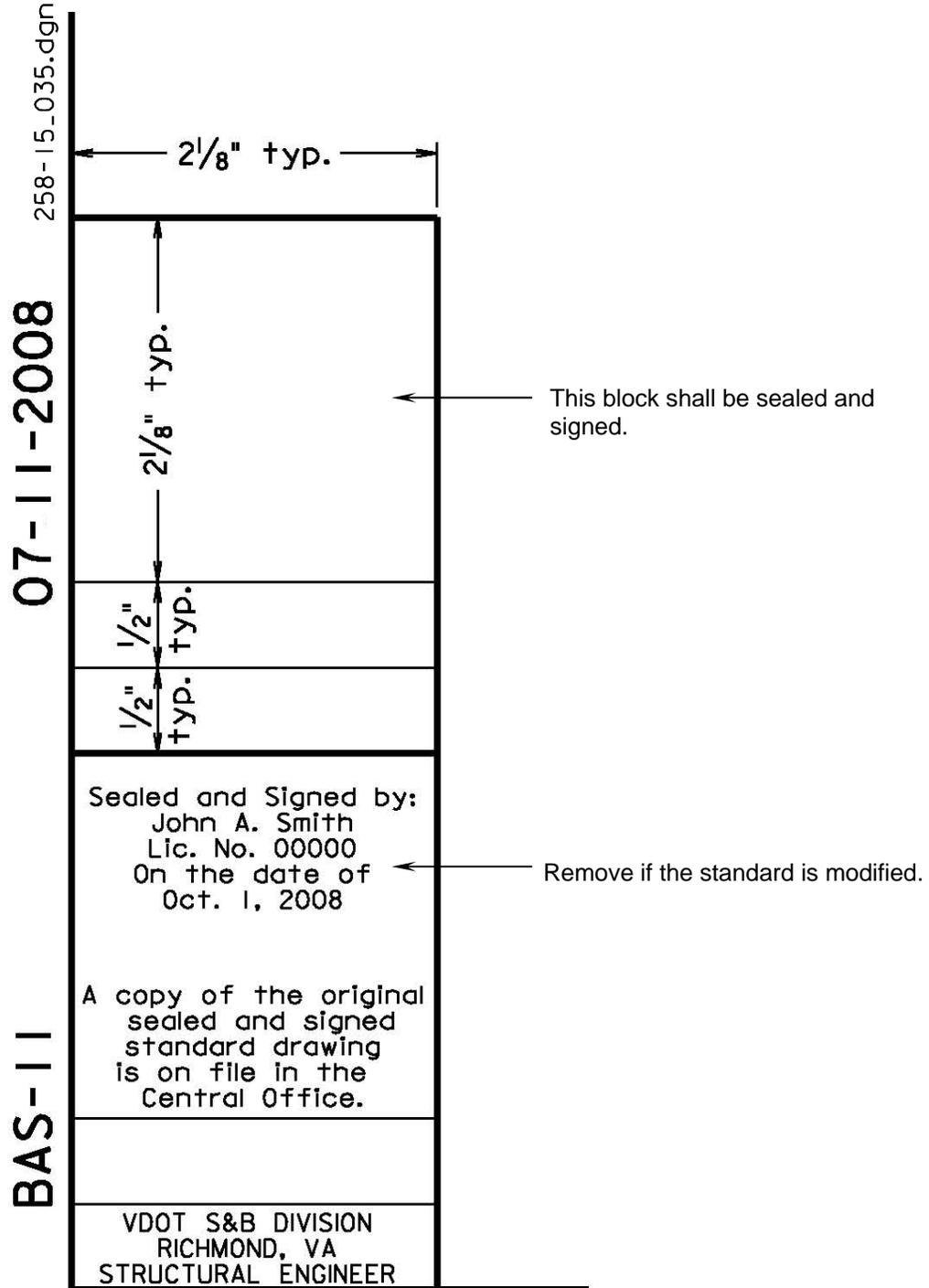
Detail shown at approx. 70% scale.

**GENERAL DRAFTING PROCEDURES
SEALING AND SIGNING OF PLANS
INTERIOR SHEETS**

PART 2
DATE: 18May2016
SHEET 4 of 6
FILE NO. 01.16-4

The lower left corner of standard sheets contains a block for sealing and signing. Pre-engineered standard sheets (approach slabs, parapets, railings, utilities, etc.) developed or revised after July 1, 2009 will be pre-sealed by Central Office Engineering Services. Example shown below.

Standard sheets that are not pre-engineered or have been modified will be sealed and signed similar to interior sheets.



**GENERAL DRAFTING PROCEDURES
 SEALING AND SIGNING OF PLANS
 STANDARD SHEETS**

PART 2
 DATE: 18May2016
 SHEET 5 of 6
 FILE NO. 01.16-5

For all preliminary drawings that are submitted for review, the cell PREL from BDETAILS1.cel shall be included on the drawing. See example below:

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED
FOR CONSTRUCTION

STATE	FEDERAL AID	STATE	SHEET
PERSON	ROUTE	PROJECT	NO.
3			

PRELIMINARY PLANS THESE PLANS NOT TO BE USED FOR CONSTRUCTION					
<small>COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION</small>					
No.	Description	Date	Designed By	Date	Sheet No.

General:

A cell is an element or series of elements that is named and stored in a cell library. A cell can be recalled as a group for placement on a drawing and is subject to the element manipulation tools. The use of cells promotes standardization and reduces repetitive drawing.

The next several sections depict the cells found in several of the cell libraries. The following sheets provide the name of the cell, an image of the cell, and a description of the cell. For larger cells, the origin of the cell is indicated by a star★.

The majority of the cells have been created at a size intended for placement on the scaled-down drawing. A few exceptions are full size.

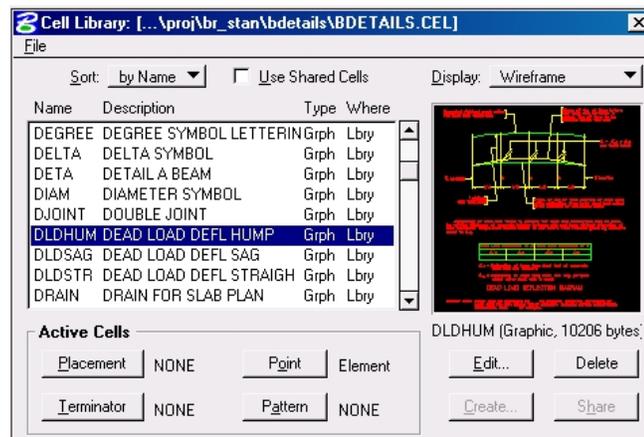
The available cell libraries are:

- bdetails1.cel* - contains common drawings and details. See File No. 01.20.
- symbols1.cel*- contains symbols (i.e., diameter, Greek letters, tie point, etc.).
- trans1.cel* - contains elements to develop transverse section (also utilized by the *btran* mdl program).
- welds.cel* - contains weld symbols.

There are other cell libraries, for example, to support MDL programs, patterning, and the geology sheets. In addition, various standards included in the *Manual of the Structure and Bridge Division* have cell libraries to support them; for example, cell library *sg.cel* has cells for the steel plate girder standards (Part 7 of this manual) and cell library *pcb.cel* for the prestressed concrete beam standards (Part 4 of this manual). For details of these cells, see the particular CELLS-series sheets in the various parts of this manual.

The cell libraries are edited and supplemented continuously. Any drawing or element that is considered a candidate for a cell may be submitted to the Structure and Bridge Division Engineering Services Program Area using the following email address: SBEEngineeringServices@vdot.virginia.gov.

Cells libraries are accessed from *ELEMENT-CELLS*. In the dialog box which opens, select *FILE*. A drop-down listing of the available cell libraries is shown. After selecting the desired cell library, the cells in that particular library are displayed. When a cell is selected (highlighted), an image of that cell is shown in the window to the right.

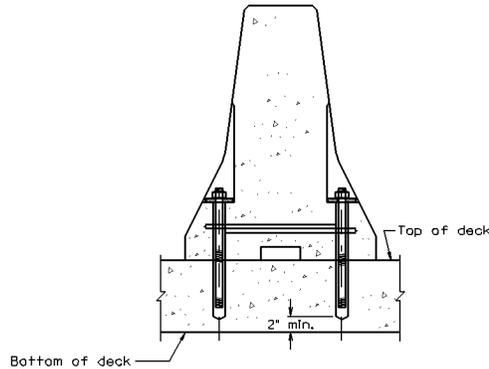


CELL

CELL NAME

CELL DESCRIPTION

AADF



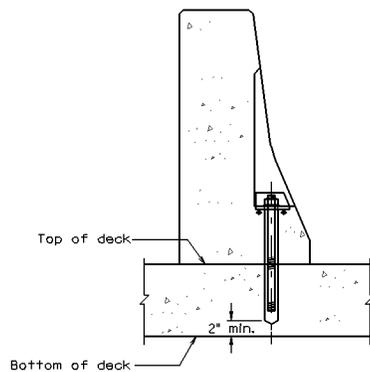
Cell for adhesive anchors with double face barrier MB-11A. See Chapter 25 for use of cell. (approx. 0.50 of actual cell size)

**TRAFFIC BARRIER SERVICE
CONCRETE PARAPET (DOUBLE FACE)**

NOTES:

1. Bolt down side adjacent to traffic.
2. For details not shown, see VDOT Road and Bridge Standards MB-11A.
3. After removing Temporary barrier, cut $\frac{1}{8}$ " ϕ bolt or threaded rod as low as practical below roadway surface and fill recess with epoxy bonding compound EP-4.
4. Anchor system shall be tested to provide a minimum pullout of 32,000 lbs. and Installed according to manufacturer's recommendations.

AASF



Cell for adhesive anchors with single face barrier MB-10A. See Chapter 25 for use of cell. (approx. 0.50 of actual cell size)

**TRAFFIC BARRIER SERVICE
CONCRETE PARAPET (SINGLE FACE)**

NOTES:

1. Bolt down side adjacent to traffic.
2. For details not shown, see VDOT Road and Bridge Standards MB-10A.
3. After removing Temporary barrier, cut $\frac{1}{8}$ " ϕ bolt or threaded rod as low as practical below roadway surface and fill recess with epoxy bonding compound EP-4.
4. Anchor system shall be tested to provide a minimum pullout of 32,000 lbs. and Installed according to manufacturer's recommendations.

CELL

CELL NAME

CELL DESCRIPTION

BORD



Plot line cell for full-size plotting
(approx. 0.05 of actual cell size)



BRCK2

Bracket symbol for 2 lines of text
(approx. actual cell size)



BRCK3

Bracket symbol for 3 lines of text
(approx. actual cell size)



BRCK4

Bracket symbol for 4 lines of text
(approx. actual cell size)



BRCK5

Bracket symbol for 5 lines of text
(approx. actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
★ [BRKL2	Bracket symbol for 2 lines of text with $\frac{1}{8}$ " leader line (approx. actual cell size)
★ [BRKL3	Bracket symbol for 2 lines of text with $\frac{1}{8}$ " leader line (approx. actual cell size)
★ [BRKL4	Bracket symbol for 2 lines of text with $\frac{1}{8}$ " leader line (approx. actual cell size)
★ [BRKL5	Bracket symbol for 2 lines of text with $\frac{1}{8}$ " leader line (approx. actual cell size)

CELL

CELL NAME

CELL DESCRIPTION

CIIF

PORTIONS OF THESE PLANS CONTAIN CRITICAL
INFRASTRUCTURE INFORMATION/SENSITIVE
SECURITY INFORMATION (CII/SSI). UNAUTHORIZED
RELEASE OR REPRODUCTION OF THESE DOCUMENTS
MAY RESULT IN CIVIL PENALTY OR OTHER ACTION.

Critical infrastructure statement for
title sheet
(approx. 0.50 of actual cell size)

CIII

-- RESTRICTED --
CRITICAL INFRASTRUCTURE INFORMATION
Sensitive Security Information

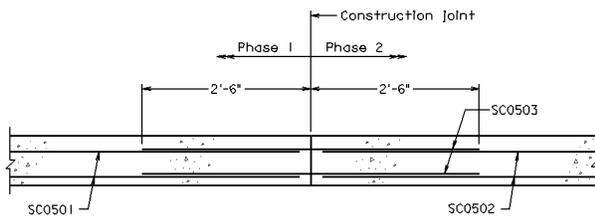
Critical infrastructure statement for
Interior sheet
(approx. 0.50 of actual cell size)

CELL

CELL NAME

CELL DESCRIPTION

CJ



Truss bars are not recommended with phase construction.

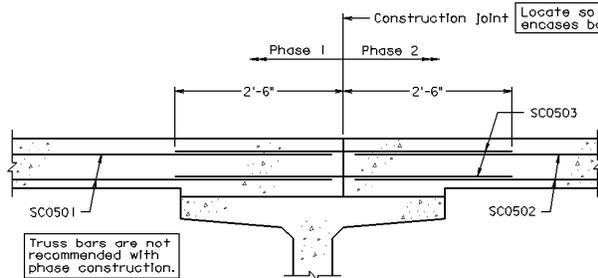
PART SECTION AT CONSTRUCTION JOINT

At the Contractor's option, and at no additional cost to the Department, a mechanical splice may be used in place of the lap splice. In this case, the SC0503 bars are replaced by couplers having 2'-6" leg lengths.

Items in blocks are for the designer's information and not to be placed on the plans. After placing cell, drop status and delete blocks and text within.

Deck slab construction joint for phase construction when joint is located between beams (approx. 0.38 of actual cell size)

CJCP



Locate so that the phase 1 pour encases both stirrup legs.

Truss bars are not recommended with phase construction.

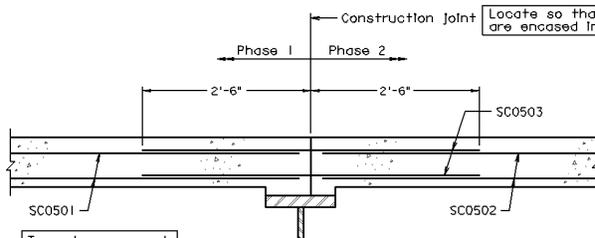
PART SECTION AT CONSTRUCTION JOINT

At the Contractor's option, and at no additional cost to the Department, a mechanical splice may be used in place of the lap splice. In this case, the SC0503 bars are replaced by couplers having 2'-6" leg lengths.

Items in blocks are for the designer's information and not to be placed on the plans. After placing cell, drop status and delete blocks and text within.

Deck slab construction joint for phase construction when joint is located above Bulb-T beam (approx. 0.38 of actual cell size)

CJSTL



Locate so that 2 of the 3 studs are encased in the phase 1 pour.

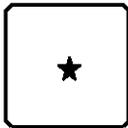
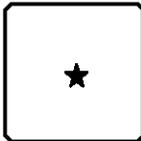
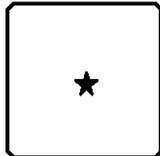
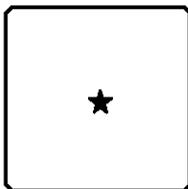
Truss bars are not recommended with phase construction.

PART SECTION AT CONSTRUCTION JOINT

At the Contractor's option, and at no additional cost to the Department, a mechanical splice may be used in place of the lap splice. In this case, the SC0503 bars are replaced by couplers having 2'-6" leg lengths.

Items in blocks are for the designer's information and not to be placed on the plans. After placing cell, drop status and delete blocks and text within.

Deck slab construction joint for phase construction when joint is located above steel girders/beams (approx. 0.38 of actual cell size)

CELL**CELL NAME****CELL DESCRIPTION****CP10**10 in. concrete pile
(approx. 0.04 of actual cell size)**CP12**12 in. concrete pile
(approx. 0.04 of actual cell size)**CP14**14 in. concrete pile
(approx. 0.04 of actual cell size)**CP16**16 in. concrete pile
(approx. 0.04 of actual cell size)**CP18**18 in. concrete pile
(approx. 0.04 of actual cell size)**CP20**20 in. concrete pile
(approx. 0.04 of actual cell size)**CP24**24 in. concrete pile
(approx. 0.04 of actual cell size)

GENERAL DRAFTING PROCEDURES
CELL LIBRARY: BDETAILS1.CEL
CELL CP10 – CP24

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DATE: 06Feb2012
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FILE NO. 01.20-6

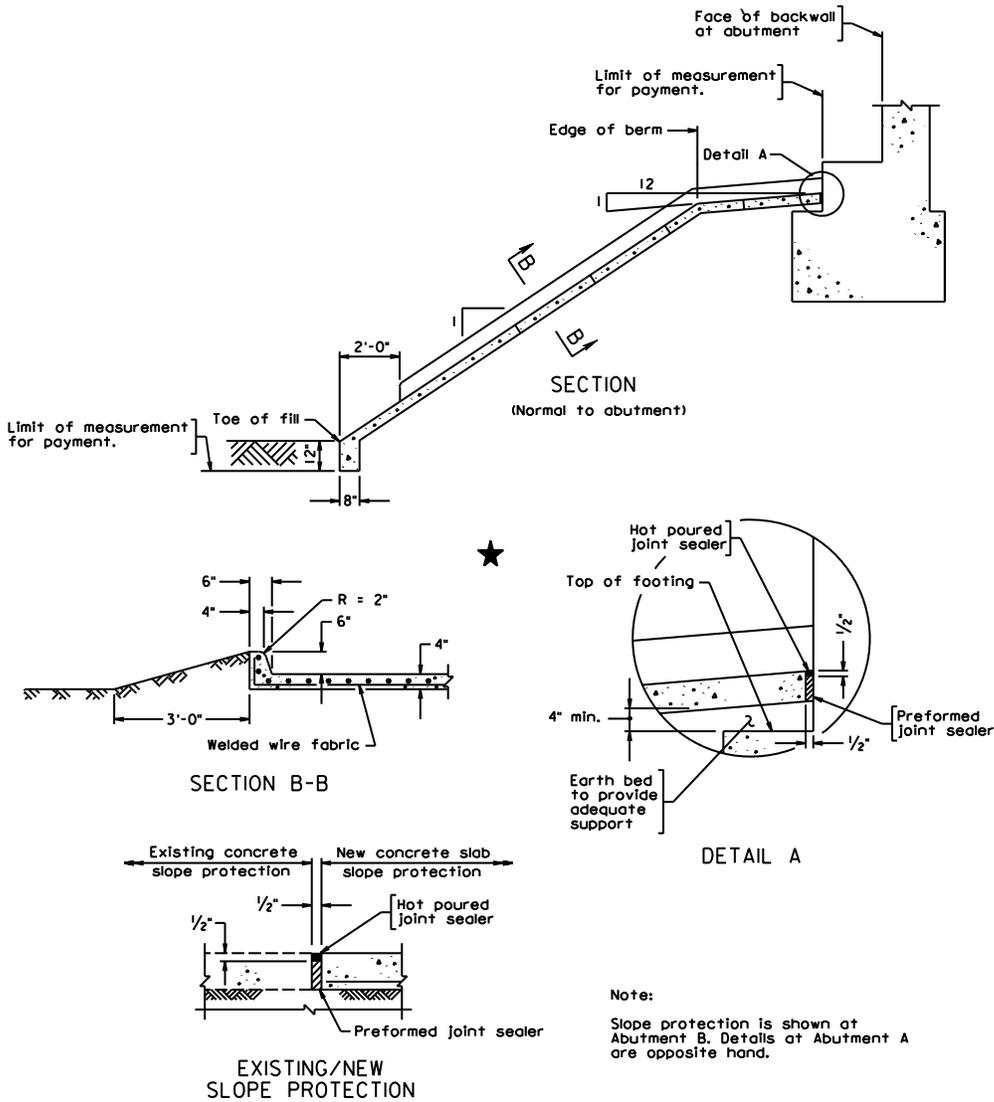
CELL

CELL NAME

CELL DESCRIPTION

CSLP

Concrete slope protection
(approx. 0.38 of actual cell size)



CONCRETE SLAB SLOPE PROTECTION

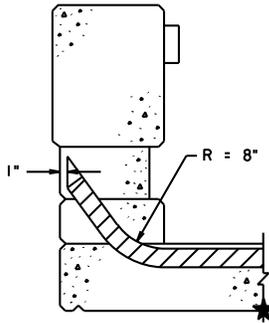
GENERAL DRAFTING PROCEDURES
CELL LIBRARY: BDETAILS1.CEL
CELL CSLP

VOL. V - PART 2
DATE: 06Feb2012
SHEET 7 of 28
FILE NO. 01.20-7

CELL

CELL NAME

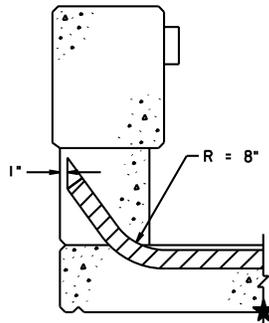
CELL DESCRIPTION



CS3

2'-8" Kansas rail parapet with curb
(approx. 0.50 of actual cell size)

SECTION



CS4

2'-8" Kansas rail parapet without curb
(approx. 0.50 of actual cell size)

SECTION

CELL

CELL NAME

CELL DESCRIPTION



CUT

Cut symbol - to be used after the drawing has been scaled down (approx. actual cell size)



DBLAR

Double arrowheads to indicate continuation (approx. actual cell size)

ESTQ1

ESTIMATED QUANTITIES - SUBSTRUCTURE ONLY														
	Concrete Class #3	Reinforcing Steel		Corrosion Resistant Reinf. Steel, Class 1	Corrosion Resistant Reinf. Steel, Class 2	Prestressed Concrete Piles	Struct. Excov.	Concrete Parapet	Railing, BR2C 1 Rail	Concrete and Stone Paving	Select Material Type 1 per CIP 30	Dry Stone, Class 1 SF		
		CY	LB											LB
Abutment A	Neat	133.1	5,630											
	Footings	48.2	4,540			482		105			375	170		
Pier 1	Neat	51.2	26,980		7,590									
	Footings	37.4	6,270			101		115						
Pier 2	Neat	52.4	20,000	8,980										
	Footings	37.4	6,270			110		118						
Bent 3	Neat	38.8	13,650				303							
Bent 4	Neat	24.4		4,550			176							
Abutment B	Neat	38.2		7,590					15	15				
	Footings	46.4	4,540			450		105			180	220		
Total		497.7	84,250	26,750	7,590	1,193	479	443	25	25	375	350	220	

Estimated quantity table for standard bridge (approx. 0.20 of actual cell size)

Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications.

LUMP SUM BID ITEMS	
Mobilization	LS
Construction Surveying	LS
Remove and Replace Existing Structure Number 9999	LS
Telephone Conduit System - B8X**	LS
Deck Drainage System - B8X**	LS

MISCELLANEOUS / ROAD ITEMS	
Item	Units Quantity
Traffic Barrier Service Concrete	LF 1500
Guardrail GR-2	LF 150
Electronic Arrow	HR 1000
Truck Mounted Attenuator	HR 48
Group 2 Channelizing Devices	Day 5000
Asphalt Concrete Base Course BM-25.0	TON 250
Asphalt Concrete Surface Course 1y, SM-12.5E	TON 75
Demolition of Pavement (ft/wheel)	SF 250

ESTIMATED QUANTITIES - SUPERSTRUCTURE ONLY		
Item	Units	Quantity
Concrete Class #4	CY	528.4
Corrosion Resistant Reinf. Steel, Class 1	LB	410,400
Concrete Parapet	LF	500
Railing, BR2C 1 Rail	LF	500
Structural Steel Plate Girders ASTM A109 Grade 50#	LB*	250,000
Preformed Elastomeric Joint Sealer 21y	LF	44
Elastomeric Expansion Dam 2+3	LF	44
Bridge Deck Grooving	SF	2,333
Pedestrian Fence B'	LF	500
Concrete Class #4 Bridge Approach Slope	CY	44.2
Railroad Steel Bridge Approach Slope	LB	1,420

Big Item Deck Drainage System - B8X** and include drain assemblies, drain pipes, pipe supports and splash blocks

**Cost responsibility shall be 100% Central Telephone Company of Virginia

Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications.

Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications. Big Item Bridge Deck Grooving includes the quantity for approach slopes.

ESTQ2

ESTIMATED QUANTITIES - SUBSTRUCTURE ONLY														
	Concrete Class #3	Reinforcing Steel		Corrosion Resistant Reinf. Steel, Class 1	Corrosion Resistant Reinf. Steel, Class 2	Prestressed Concrete Piles	Struct. Excov.	Concrete Parapet	Railing, BR2C 1 Rail	Concrete and Stone Paving	Select Material Type 1 per CIP 30	Dry Stone, Class 1 SF		
		CY	LB											LB
Abutment A	Neat	81.2	5,630											
	Footings	48.2	4,540			370		105			375	170		
Pier 1	Neat	51.2	26,980		7,590									
	Footings	37.4	6,270			101		115						
Pier 2	Neat	52.4	20,000	8,980										
	Footings	37.4	6,270			110		118						
Bent 3	Neat	38.8	13,650				303							
Bent 4	Neat	24.4		4,550			176							
Abutment B	Neat	38.2		7,590					15	15				
	Footings	46.4	4,540			360		105			180	220		
Total		497.7	84,250	26,750	7,590	941	479	443	25	25	375	350	220	
Abutment A	Neat	81.2	5,630											
	Footings	48.2	4,540			370		105			375	170		
Pier 1	Neat	51.2	26,980		7,590									
	Footings	37.4	6,270			101		115						
Pier 2	Neat	52.4	20,000	8,980										
	Footings	37.4	6,270			110		118						
Bent 3	Neat	38.8	13,650				303							
Bent 4	Neat	24.4		4,550			176							
Abutment B	Neat	38.2		7,590					15	15				
	Footings	46.4	4,540			360		105			180	220		
Total		497.7	84,250	26,750	7,590	941	479	443	25	25	375	350	220	

Estimated quantity table for dual bridges with individual "B" numbers (approx. 0.20 of actual cell size)

Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications.

LUMP SUM BID ITEMS	
Mobilization	LS
Construction Surveying	LS
Remove and Replace Existing Structure Number 9999	LS
Telephone Conduit System - B8X**	LS
Deck Drainage System - B8X**	LS

ESTIMATED QUANTITIES - SUPERSTRUCTURE ONLY		
Item	Units	Quantity
Concrete Class #4	CY	528.4
Corrosion Resistant Reinf. Steel, Class 1	LB	410,400
Concrete Parapet	LF	500
Railing, BR2C 1 Rail	LF	500
Structural Steel Plate Girders ASTM A109 Grade 50#	LB*	250,000
Preformed Elastomeric Joint Sealer 21y	LF	44
Elastomeric Expansion Dam 2+3	LF	44
Bridge Deck Grooving	SF	2,333
Pedestrian Fence B'	LF	500
Concrete Class #4 Bridge Approach Slope	CY	44.2
Railroad Steel Bridge Approach Slope	LB	1,420

Denotes items to be paid for on the basis of plan quantities in accordance with current Road and Bridge Specifications. Big Item Bridge Deck Grooving includes the quantity for approach slopes.

**GENERAL DRAFTING PROCEDURES
CELL LIBRARY: BDETAILS1.CEL
CELLS CUT - ESTQ2**

VOL. V - PART 2
DATE: 12Sep2014
SHEET 9 of 28
FILE NO. 01.20-9

CELL

CELL NAME

CELL DESCRIPTION



GNNTE

Current general notes cell
(approx. 0.48 of actual cell size)

The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Width: XX'-XX" face-to-face of XXXXX.

Span layout:

Capacity: HS20-44 loading and alternate military loading.

Capacity: HL-93 loading.

Drainage area: XXX sq. mi.



The existing structure will be removed by State Forces after construction of the proposed bridge is completed.

The existing structure is designated a Type B structure in accordance with Sec. 411.

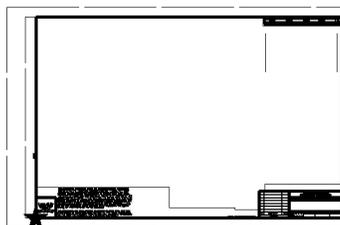
Seeding, if required, will be done by State forces.

Use of XXXXX is a XXXXX approved experimental project. No substitutions will be allowed. The office of the State Structure and Bridge Engineer shall be notified at least seven days in advance of any work to be performed on this item.

B.M.: XXXXX

GSHT

Geology sheet cell
(approx. 0.05 of actual cell size)



CELL

CELL NAME

CELL DESCRIPTION

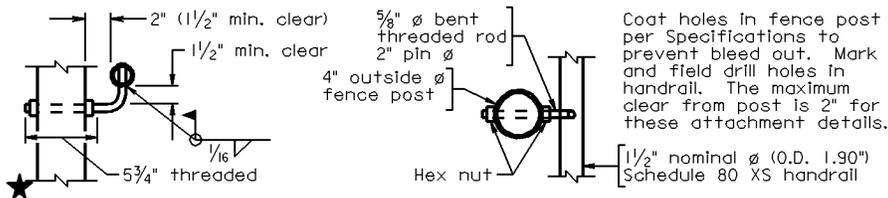
HALF

Plot line cell for half-size plotting
(approx. 0.05 of actual cell size)



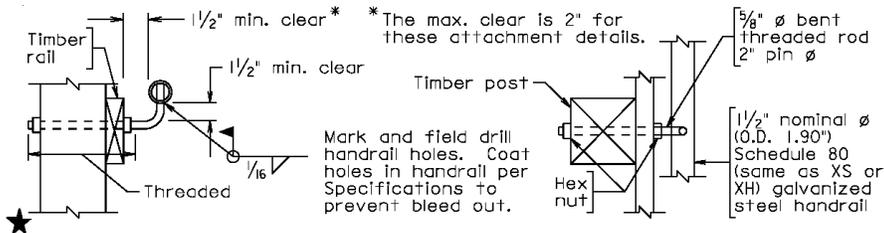
HRA1

Pedestrian handrail detail for
maximum post spacing of 8'-0"
(approx. 0.50 of actual cell size)



HRA2

Pedestrian handrail detail for
maximum post spacing of 8'-0"
timber bridges
(approx. 0.50 of actual cell size)



CELL

CELL NAME

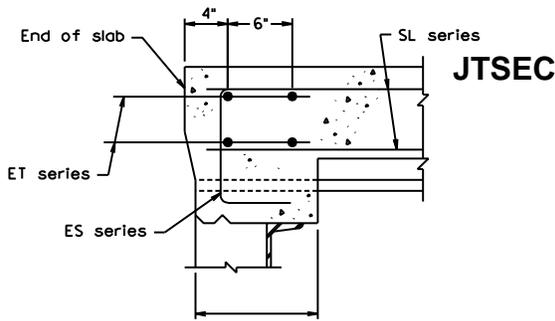
CELL DESCRIPTION

★

INDEX OF SHEETS	
Sheet No.	Description
1	Title sheet: Plan, profile, design exceptions and general notes
2	Estimated quantities and Index of sheets
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
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17	
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INDEX

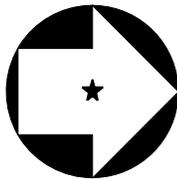
Index of sheets (25 lines)
(approx. 0.25 of actual cell size)



JTSEC

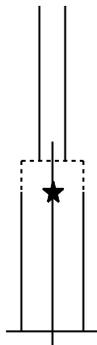
Joint detail
(approx. 0.50 of actual cell size)

TYPICAL SECTION PERPENDICULAR TO END OF SLAB
(SC series & joint details not shown)



NARRW

North arrow
(approx. actual cell size)



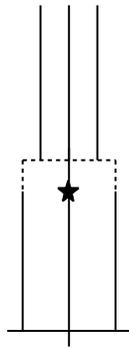
PCI

Elevation prestressed concrete pile
Place cutline and centerline symbols using the bcut and bctr mdl's on the scaled down drawing.
(approx. 0.03 of actual cell size)

CELL

CELL NAME

CELL DESCRIPTION



PC2

Elevation prestressed concrete pile
Place outline and centerline symbols
using the bcut and bctr mdl's on the
scaled down drawing.
(approx. 0.03 of actual cell size)

PDB

Block for preliminary design-build
plans
(approx. 0.50 of actual cell size)

Note to Offerors:

These plans depict the approximate location
and a concept of the proposed structure.
The bridge geometrics, span lengths, type
and size of superstructure members and
substructure elements and maintenance of
traffic are to be developed by the Offeror.

PDD

Signature lines for "Bridge-only"
projects.
(approx. 0.50 of actual cell size)

Recommended for Approval: _____
Programming Division Director Date

Recommended for Approval: _____
Chief of Planning and Programming Date

PDD2

Signature lines for "Bridge-only"
maintenance projects with state
funds.
(approx. 0.50 of actual cell size)

Recommended for Approval: _____
District Administrator Date

CELL

CELL NAME

CELL DESCRIPTION

RECOMMENDED FOR APPROVAL FOR CONSTRUCTION
VDOT PROJECT MANAGER
DISTRICT CONSTRUCTION MANAGER

PDD3

Signature block for approval of Design-build plans (approx. 0.50 of actual cell size)

PDD4

Signature block for approval of Tier 1 projects (apox. 0.3 of actual cell size)

Recommended for Approval, Date
District Planning and Investment Manager

Recommended for Approval, Date
District Project Development Engineer

Approved,
District Administrator

VDOT S&B DIVISION RICHMOND, VA STRUCTURAL ENGINEER

PE

PE BLOCK (approx. 0.50 of actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
	PFA	Pedestrian fence type a (approx. 0.01 of actual cell size)
	PFAA	Pedestrian fence type a alternate (approx. 0.01 of actual cell size)
	PFB	Pedestrian fence type b (approx. 0.01 of actual cell size)
	PFC	Pedestrian fence type c (approx. 0.01 of actual cell size)

CELL

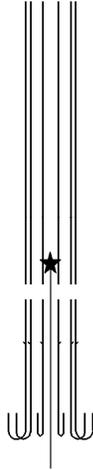
CELL NAME

CELL DESCRIPTION

PREL

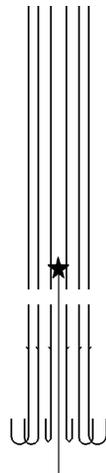
Preliminary plans stamp for TS&L plans, etc.
(approx. actual cell size)

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED
FOR CONSTRUCTION



PV3

PV bars for 3 feet diameter column
(approx. 0.01 of actual cell size)



PV35

PV bars for 3½ feet diameter column
(approx. 0.01 of actual cell size)



REBAR

Reinforcing steel bar 1" diameter full-size
(approx. 0.25 of actual cell size)
See File No. 01.11-1.

**GENERAL DRAFTING PROCEDURES
CELL LIBRARY: BDETAILS1.CEL
CELLS PREL - REBAR**

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DATE: 06Feb2012
SHEET 17 of 28
FILE NO. 01.20-17

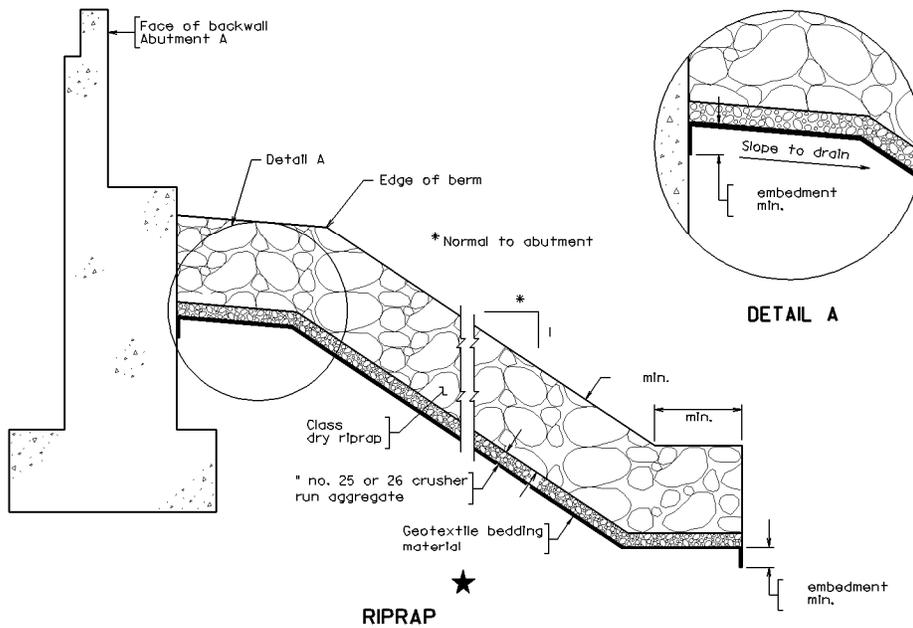
CELL

CELL NAME

CELL DESCRIPTION

RIP

Riprap details
(approx. 0.38 of actual cell size)



ROW

No additional Right-of-Way required

Text for title sheet of bridge-only contracts
(approx. actual cell size)

Rev. No.	Sheets Revised	Date

★

TABLE OF REVISIONS

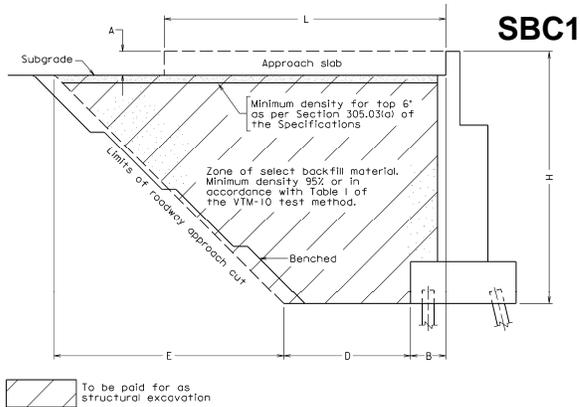
RVTAB

Table of revisions
(approx. 0.38 of actual cell size)

CELL

CELL NAME

CELL DESCRIPTION



Select backfill for conventional abutment in cut section (approx. 0.30 of actual cell size)

SECTION THROUGH ABUTMENT - CUT SECTION

Abutment drainage not shown
Not to Scale

Material in the abutment select backfill zone shall be Select Material Type I, minimum CBR 30, and shall be compacted in accordance with Sections 303 and 305 of the VDOT Road and Bridge Specifications. 21A or 21B may be substituted for Select Material Type I, minimum CBR 30, at no additional cost to the Department.

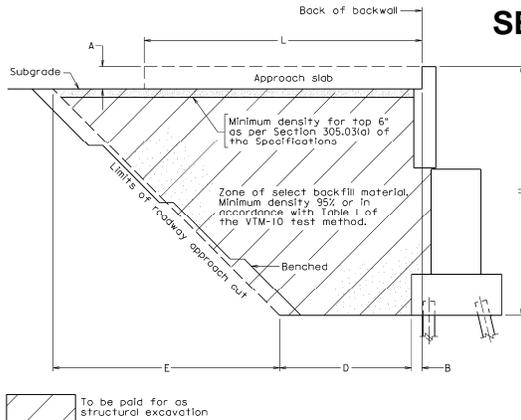
In cut situations, material with strength characteristics greater than the select backfill may be left in place.

The final depth A of the embankment side slopes shall be regular embankment material placed and finished as required.

The estimated quantity given for the abutment select backfill zone has been reduced by the estimated quantity of MSE wall backfill in the zone. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

At the Contractor's option and at no additional cost to the Department, the MSE wall backfill may be used for the entire abutment select backfill zone in lieu of Select Material Type I, minimum CBR 30. If the MSE wall backfill is #8 or coarser, a separator fabric shall be used between the MSE wall backfill and roadway subgrade, and between the select backfill and the approach roadway cut or fill. The separator fabric shall be needle-punched, non-woven geotextile in accordance with Section 245.03 (d)2 of the Specifications or in accordance with the Special Provision located in VDOT's Manual of the Structure and Division, Part 2, File No. 17.13-8 at no additional cost when utilizing this option. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

SBC2



Select backfill for semi-integral abutment in cut section (approx. 0.30 of actual cell size)

SECTION THROUGH ABUTMENT - CUT SECTION

Abutment drainage not shown
Not to Scale

Material in the abutment select backfill zone shall be Select Material Type I, minimum CBR 30, and shall be compacted in accordance with Sections 303 and 305 of the VDOT Road and Bridge Specifications. 21A or 21B may be substituted for Select Material Type I, minimum CBR 30, at no additional cost to the Department.

In cut situations, material with strength characteristics greater than the select backfill may be left in place.

The final depth A of the embankment side slopes shall be regular embankment material placed and finished as required.

The estimated quantity given for the abutment select backfill zone has been reduced by the estimated quantity of MSE wall backfill in the zone. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

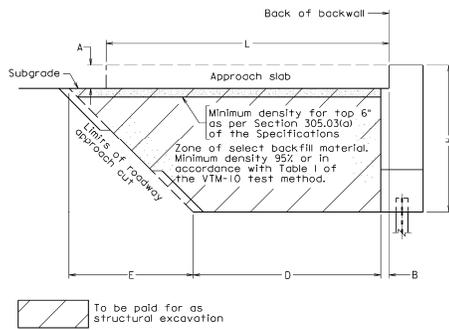
At the Contractor's option and at no additional cost to the Department, the MSE wall backfill may be used for the entire abutment select backfill zone in lieu of Select Material Type I, minimum CBR 30. If the MSE wall backfill is #8 or coarser, a separator fabric shall be used between the MSE wall backfill and roadway subgrade, and between the select backfill and the approach roadway cut or fill. The separator fabric shall be needle-punched, non-woven geotextile in accordance with Section 245.03 (d)2 of the Specifications or in accordance with the Special Provision located in VDOT's Manual of the Structure and Division, Part 2, File No. 17.13-8 at no additional cost when utilizing this option. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

CELL

CELL NAME

CELL DESCRIPTION

SBC3



SECTION THROUGH ABUTMENT - CUT SECTION

Abutment drainage not shown
Not \star scale

Material in the abutment select backfill zone shall be Select Material Type I, minimum CBR 30, and shall be compacted in accordance with Sections 303 and 305 of the VDOT Road and Bridge Specifications. 21A or 21B may be substituted for Select Material Type I, minimum CBR 30, at no additional cost to the Department.

In cut situations, material with strength characteristics greater than the select backfill may be left in place.

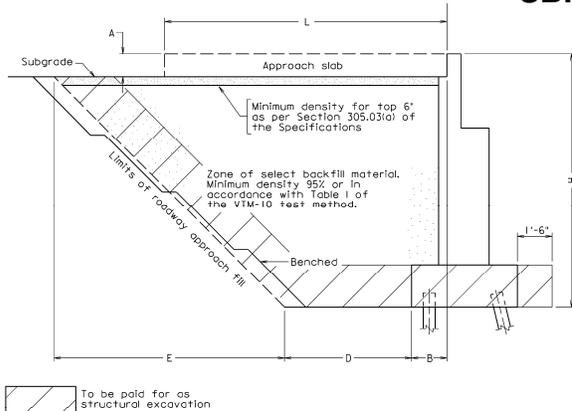
The final depth A of the embankment side slopes shall be regular embankment material placed and finished as required.

The estimated quantity given for the abutment select backfill zone has been reduced by the estimated quantity of MSE wall backfill in the zone. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

At the Contractor's option and at no additional cost to the Department, the MSE wall backfill may be used for the entire abutment select backfill zone in lieu of Select Material Type I, minimum CBR 30. If the MSE wall backfill is #8 or coarser, a separator fabric shall be used between the MSE wall backfill and roadway subgrade, and between the select backfill and the approach roadway cut or fill. The separator fabric shall be needle-punched, non-woven geotextile in accordance with Section 245.03 (d)2 of the Specifications or in accordance with the Special Provision located in VDOT's Manual of the Structure and Division, Part 2, File No. 17.13-8 at no additional cost when utilizing this option. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

Select backfill for full integral abutment in cut section (approx. 0.30 of actual cell size)

SBF1



SECTION THROUGH ABUTMENT - FILL SECTION

Abutment drainage not shown
Not \star scale

Material in the abutment select backfill zone shall be Select Material Type I, minimum CBR 30, and shall be compacted in accordance with Sections 303 and 305 of the VDOT Road and Bridge Specifications. 21A or 21B may be substituted for Select Material Type I, minimum CBR 30, at no additional cost to the Department.

In cut situations, material with strength characteristics greater than the select backfill may be left in place.

The final depth A of the embankment side slopes shall be regular embankment material placed and finished as required.

The estimated quantity given for the abutment select backfill zone has been reduced by the estimated quantity of MSE wall backfill in the zone. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

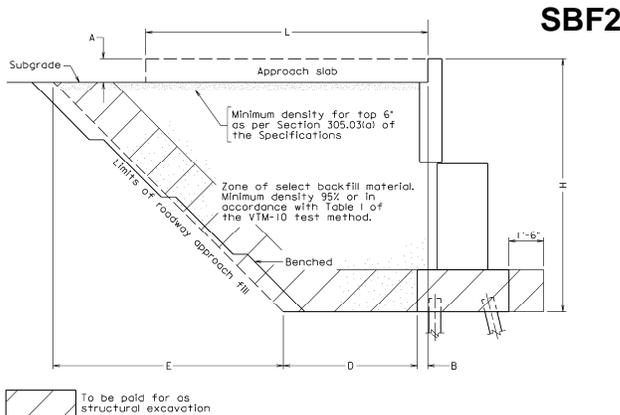
At the Contractor's option and at no additional cost to the Department, the MSE wall backfill may be used for the entire abutment select backfill zone in lieu of Select Material Type I, minimum CBR 30. If the MSE wall backfill is #8 or coarser, a separator fabric shall be used between the MSE wall backfill and roadway subgrade, and between the select backfill and the approach roadway cut or fill. The separator fabric shall be needle-punched, non-woven geotextile in accordance with Section 245.03 (d)2 of the Specifications or in accordance with the Special Provision located in VDOT's Manual of the Structure and Division, Part 2, File No. 17.13-8 at no additional cost when utilizing this option. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

Select backfill for conventional abutment in fill section (approx. 0.30 of actual cell size)

CELL

CELL NAME

CELL DESCRIPTION



SBF2

Select backfill for semi-integral abutment in fill section (approx. 0.30 of actual cell size)

SECTION THROUGH ABUTMENT - FILL SECTION

Abutment drainage not shown
Not to scale

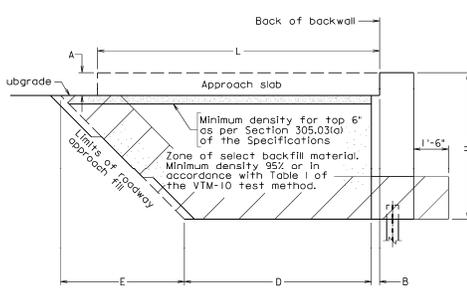
Material in the abutment select backfill zone shall be Select Material Type I, minimum CBR 30, and shall be compacted in accordance with Sections 303 and 305 of the VDOT Road and Bridge Specifications. 21A or 21B may be substituted for Select Material Type I, minimum CBR 30, at no additional cost to the Department.

In cut situations, material with strength characteristics greater than the select backfill may be left in place.

The final depth A of the embankment side slopes shall be regular embankment material placed and finished as required.

The estimated quantity given for the abutment select backfill zone has been reduced by the estimated quantity of MSE wall backfill in the zone. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

At the Contractor's option and at no additional cost to the Department, the MSE wall backfill may be used for the entire abutment select backfill zone in lieu of Select Material Type I, minimum CBR 30. If the MSE wall backfill is #8 or coarser, a separator fabric shall be used between the MSE wall backfill and roadway subgrade, and between the select backfill and the approach roadway cut or fill. The separator fabric shall be needle-punched, non-woven geotextile in accordance with Section 245.03 (a)2 of the Specifications or in accordance with the Special Provision located in VDOT's Manual of the Structure and Division, Part 2, File No. 17.13-8 at no additional cost when utilizing this option. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)



SBF3

Select backfill for full integral abutment in fill section (approx. 0.30 of actual cell size)

SECTION THROUGH ABUTMENT - FILL SECTION

Abutment drainage not shown
Not to scale

Material in the abutment select backfill zone shall be Select Material Type I, minimum CBR 30, and shall be compacted in accordance with Sections 303 and 305 of the VDOT Road and Bridge Specifications. 21A or 21B may be substituted for Select Material Type I, minimum CBR 30, at no additional cost to the Department.

In cut situations, material with strength characteristics greater than the select backfill may be left in place.

The final depth A of the embankment side slopes shall be regular embankment material placed and finished as required.

The estimated quantity given for the abutment select backfill zone has been reduced by the estimated quantity of MSE wall backfill in the zone. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

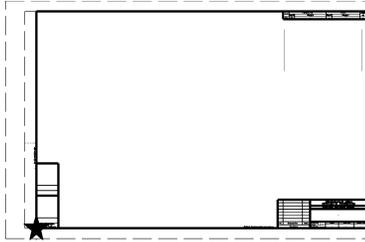
At the Contractor's option and at no additional cost to the Department, the MSE wall backfill may be used for the entire abutment select backfill zone in lieu of Select Material Type I, minimum CBR 30. If the MSE wall backfill is #8 or coarser, a separator fabric shall be used between the MSE wall backfill and roadway subgrade, and between the select backfill and the approach roadway cut or fill. The separator fabric shall be needle-punched, non-woven geotextile in accordance with Section 245.03 (a)2 of the Specifications or in accordance with the Special Provision located in VDOT's Manual of the Structure and Division, Part 2, File No. 17.13-8 at no additional cost when utilizing this option. (Note to be used when MSE walls compose all or part of the abutment.) (Delete note if MSE walls are not utilized.)

CELL

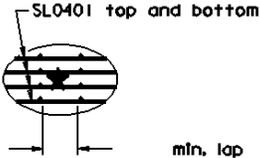
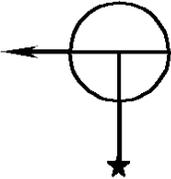
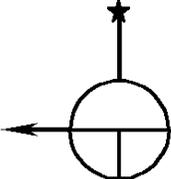
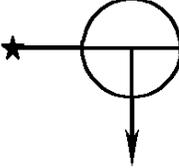
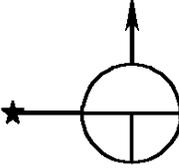
CELL NAME

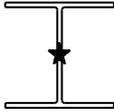
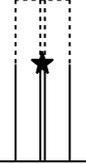
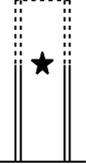
CELL DESCRIPTION

SHT



Current interior sheet cell.
When placing the sheet, the lower
Left corner of the sheet should be
Located at coordinates 0,0.
(approx. 0.05 of actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
	SLAB	<p>Slab reinforcing steel detail Adjust lap marks for skew. (approx. 0.50 of the actual cell size)</p>
	SM	<p>Section mark. To be used when sections are on the same sheet that the section was taken. It is used after drawing is scaled down. (approx. actual cell size)</p>
	SM1	<p>Section mark. Use this only when section is shown on another sheet. It is used after drawing is scaled down. (approx. actual cell size)</p>
	SM2	<p>Section mark. Use this only when section is shown on another sheet. It is used after drawing is scaled down. (approx. actual cell size)</p>
	SM3	<p>Section mark. Use this only when section is shown on another sheet. It is used after drawing is scaled down. (approx. actual cell size)</p>
	SM4	<p>Section mark. Use this only when section is shown on another sheet. It is used after drawing is scaled down. (approx. actual cell size)</p>

CELL	CELL NAME	CELL DESCRIPTION
	SP	Steel pile plan view (approx. 0.06 of actual cell size)
	SPE	Elevation steel pile Place cut symbol on the scaled down drawing using the bcut mdl. (approx. 0.03 of actual cell size)
	SPES	Elevation steel pile Place cut symbol on the scaled down drawing using the bcut mdl. (approx. 0.03 of actual cell size)
r	SPP11	SAAP sheet 8.5 x 11 (approx. 0.20 of actual cell size)
★		
r	SPP14	SAAP sheet 8.5 x 14 (approx. 0.20 of actual cell size)
L ★		

CELL

CELL NAME

CELL DESCRIPTION



STRME

Stream edge symbol for title sheet
(approx. actual cell size)



STRM1

Tail of steam arrow for title sheet
(approx. actual cell size)



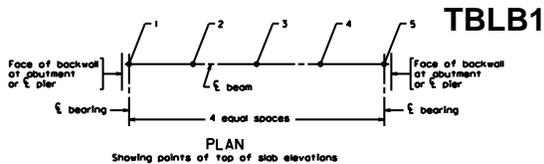
STRM2

Head of steam arrow for title sheet
(approx. actual cell size)



TARRW

Arrowhead for line terminator used
in dimensioning after sheet has
been scaled down
(approx. actual cell size)



TBLB1

Top of slab elevation along
centerline beams (quarter points)
(approx. 0.25 of actual cell size)

TOP OF SLAB ELEVATIONS ALONG ξ BEAMS						
Span	Point	1	2	3	4	5
a	Beam A					
	Beam B					
	Beam C					
	Beam D					
	Beam E					
	Beam F					
b	Beam A					
	Beam B					
	Beam C					
	Beam D					
	Beam E					
	Beam F					
c	Beam A					
	Beam B					
	Beam C					
	Beam D					
	Beam E					
	Beam F					
d	Beam A					
	Beam B					
	Beam C					
	Beam D					
	Beam E					
	Beam F					
e	Beam A					
	Beam B					
	Beam C					
	Beam D					
	Beam E					
	Beam F					

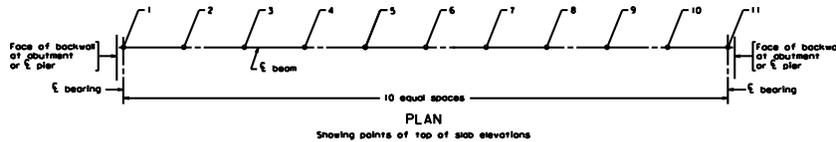
CELL

CELL NAME

CELL DESCRIPTION

TBLB2

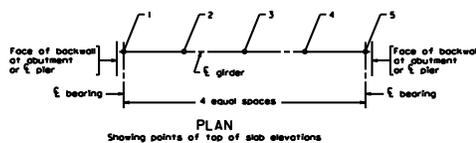
Top of slab elevation along centerline beams (tenth points)
(approx. 0.25 of actual cell size)



TOP OF SLAB ELEVATIONS ALONG ε BEAMS												
Span	Point	1	2	3	4	5	6	7	8	9	10	11
a	Beam A											
	Beam B											
	Beam C											
	Beam D											
	Beam E											
	Beam F											
b	Beam A											
	Beam B											
	Beam C											
	Beam D											
	Beam E											
	Beam F											
c	Beam A											
	Beam B											
	Beam C											
	Beam D											
	Beam E											
	Beam F											
d	Beam A											
	Beam B											
	Beam C											
	Beam D											
	Beam E											
	Beam F											
e	Beam A											
	Beam B											
	Beam C											
	Beam D											
	Beam E											
	Beam F											

TBLG1

Top of slab elevations along centerline girders (quarter points)
(approx. 0.25 of actual cell size)



TOP OF SLAB ELEVATIONS ALONG ε GIRDERS						
Span	Point	1	2	3	4	5
a	Girder A					
	Girder B					
	Girder C					
	Girder D					
	Girder E					
	Girder F					
b	Girder A					
	Girder B					
	Girder C					
	Girder D					
	Girder E					
	Girder F					
c	Girder A					
	Girder B					
	Girder C					
	Girder D					
	Girder E					
	Girder F					
d	Girder A					
	Girder B					
	Girder C					
	Girder D					
	Girder E					
	Girder F					
e	Girder A					
	Girder B					
	Girder C					
	Girder D					
	Girder E					
	Girder F					

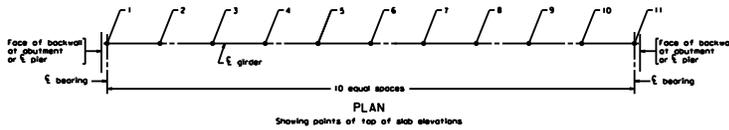
CELL

CELL NAME

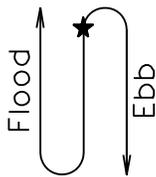
CELL DESCRIPTION

TBLG2

Top of slab elevation along centerline girders (tenth points)
(approx. 0.25 of actual cell size)

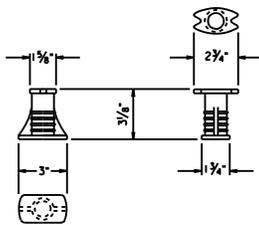


		TOP OF SLAB ELEVATIONS ALONG GIRDERS										
Span	Point	1	2	3	4	5	6	7	8	9	10	11
a	Girder A											
	Girder B											
	Girder C											
	Girder D											
	Girder E											
	Girder F											
b	Girder A											
	Girder B											
	Girder C											
	Girder D											
	Girder E											
	Girder F											
c	Girder A											
	Girder B											
	Girder C											
	Girder D											
	Girder E											
	Girder F											
d	Girder A											
	Girder B											
	Girder C											
	Girder D											
	Girder E											
	Girder F											
e	Girder A											
	Girder B											
	Girder C											
	Girder D											
	Girder E											
	Girder F											



TIDAL

Flood and ebb used for coastal bridges
Check direction of flood and ebb.
(approx. actual cell size)



TINS

Threaded insert
(approx. 0.38 of actual cell size)

THREADED INSERTS FOR
7/8" Ø BOLTS
Scale: 3" = 1'-0"



TINS1

Insert for prestressed beam
(approx. actual cell size)

CELL

CELL NAME

CELL DESCRIPTION

PAGE INTENTIONALLY LEFT BLANK

**GENERAL DRAFTING PROCEDURES
CELL LIBRARY: BDETAILS1.CEL**

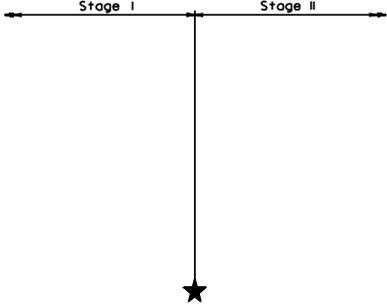
VOL. V - PART 2
DATE: 06Feb2012
SHEET 28 of 28
FILE NO. 01.20-28

CELL	CELL NAME	CELL DESCRIPTION
	AB10	As-built notation (approx. actual cell size)
	AC	Approved for construction notation, to be used only on PPTA projects (approx. actual cell size)
α	ALPHA	Alpha symbol (approx. actual cell size)
	ANGLE	Angle symbol (approx. actual cell size)
*	ASTER	Asterisk symbol (approx. actual cell size)
	BATR	Pile batter direction (approx. actual cell size)
β	BETA	Beta symbol (approx. actual cell size)
	BLTJ	Symbol for baseline. Use for text with <u>LEFT TOP JUSTIFICATION</u> . Type L with the text and place cell by snapping to L the text. Drop cell status and delete L leaving just the B with the text. (Approx. actual cell size to be used on regular text size)
	BLCJ	Symbol for baseline. Use for text with <u>LEFT CENTER JUSTIFICATION</u> . Type L with the text and place cell by snapping to L the text. Drop cell status and delete L leaving just the B with the text. (Approx. actual cell size to be used on regular text size)

CELL	CELL NAME	CELL DESCRIPTION
	BORE	Boring location symbol (approx. actual cell size)
	CG	Center of gravity symbol (approx. actual cell size)
	CLCJ	Symbol for centerline. Use for text with <u>LEFT CENTER JUSTIFICATION</u> . Type L with the text and place cell by snapping to the L of the text. Drop cell status and delete L leaving just the C with the Text. (approx. actual cell size to be used on regular text size)
	CLTJ	Symbol for centerline. Use for text with <u>LEFT TOP JUSTIFICATION</u> . Type L with the text and place cell by snapping to the L of the text. Drop cell status and delete L leaving just the C with the Text. (approx. actual cell size to be used on regular text size)
	DEG	Degree symbol for text (approx. actual cell size) (approx. 0.75 of the lower case o of regular text used)
	DELTA	Delta symbol (approx. actual cell size)
	DIA	Diameter symbol for text. Diameter symbol is created from regular lower case o and a slash placed at the center of the o. Adjust size when using text other than lettering/dimension. (approx. actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
	DIRSA	Directional straight arrow (approx. actual cell size)
	DIRTA	Directional turn arrow (approx. actual cell size)
γ	GAMMA	Gamma symbol (approx. actual cell size)
≥	GREG	Greater than or equal to symbol (approx. actual cell size)
	LAPL	Lap mark left (approx. 0.08 of actual size cell)
	LAPR	Lap mark right (approx. 0.08 of actual size cell)
	LDR	Leader symbol (approx. actual cell size)
≤	LESEQ	Less than or equal to symbol (approx. actual cell size)
π	PI	Pi symbol (approx. actual cell size)

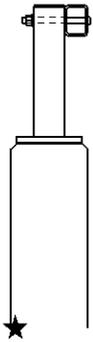
CELL**CELL NAME****CELL DESCRIPTION****REV1**Revision symbol
(approx. actual cell size)**REV2**Revision symbol
(approx. actual cell size)**REV3**Revision symbol
(approx. actual cell size)**REV4**Revision symbol
(approx. actual cell size)**REV5**Revision symbol
(approx. actual cell size)**REV6**Revision symbol
(approx. actual cell size)**REV7**Revision symbol
(approx. actual cell size)**REV8**Revision symbol
(approx. actual cell size)**REV9**Revision symbol
(approx. actual cell size)**SEAL**State of Virginia seal
(approx. 0.75 of actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
	SQUIG	Squiggle symbol used to point to surface (approx. actual cell size)
	STAGE	Stage/Phase construction (approx. 0.375 of actual cell size)
	STAR	Star symbol (approx. actual cell size)
	SUM	Sum symbol (approx. actual cell size)
	THETA	Theta symbol (approx. actual cell size)
	TIE	Tie point symbol (approx. actual cell size)
	VDOT	Virginia Department of Transportation logo (approx. actual cell size)
	XMARK	Plan quantity symbol used in estimated quantity table (approx. 0.75 of actual cell size)

CELL

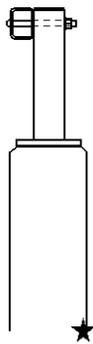
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CELL DESCRIPTION



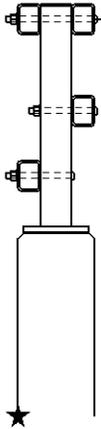
BC12L

3'-6" BR27C-12 left side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

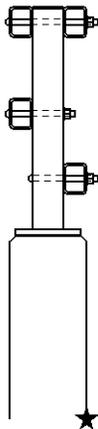


BC12R

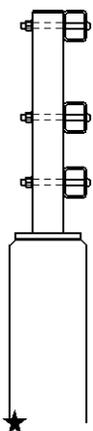
3'-6" BR27C-12 right side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

CELL**CELL NAME****CELL DESCRIPTION****BC13L**

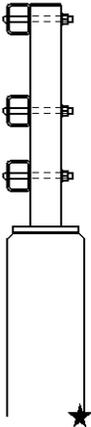
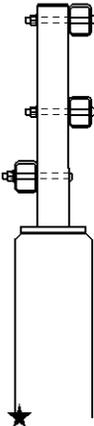
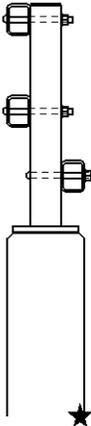
4'-6" BR27C-13 left side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

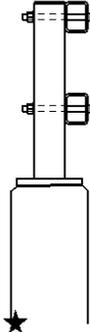
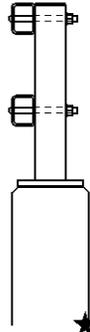
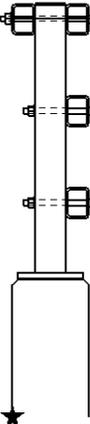
**BC13R**

4'-6" BR27C-13 right side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

**BC14L**

4'-6" BR27C-14 left side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

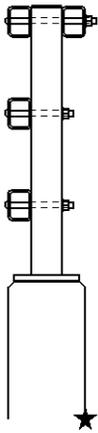
CELL	CELL NAME	CELL DESCRIPTION
	BC14R	4'-6" BR27C-14 right side Place concrete patterning on the Scaled down drawing (approx. 0.04 of actual cell size)
	BC15L	4'-6" BR27C-15 left side Place concrete patterning on the Scaled down drawing (approx. 0.04 of actual cell size)
	BC15R	4'-6" BR27C-15 right side Place concrete patterning on the Scaled down drawing (approx. 0.04 of actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
	BD8L	3'-6" BR27D-8 left side Place concrete patterning on the Scaled down drawing (approx. 0.04 of actual cell size)
	BD8R	3'-6" BR27D-8 right side Place concrete patterning on the Scaled down drawing (approx. 0.04 of actual cell size)
	BD9L	4'-6" BR27D-9 left side Place concrete patterning on the Scaled down drawing (approx. 0.04 of actual cell size)

CELL

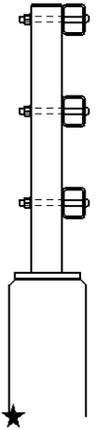
CELL NAME

CELL DESCRIPTION



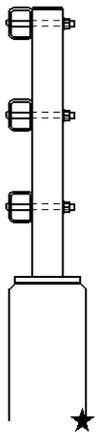
BD9R

4'-6" BR27D-9 right side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)



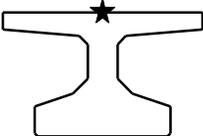
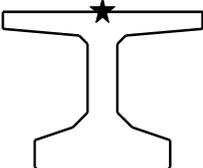
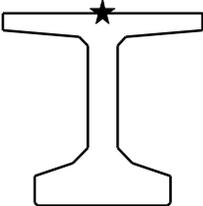
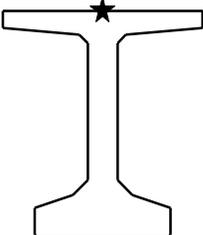
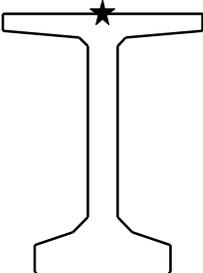
BD10L

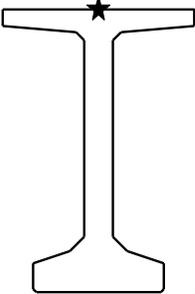
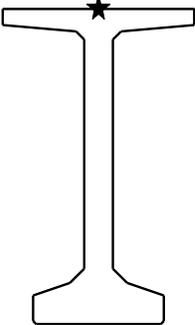
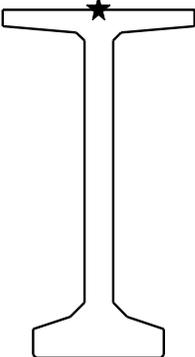
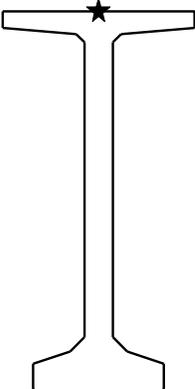
4'-6" BR27D-10 left side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

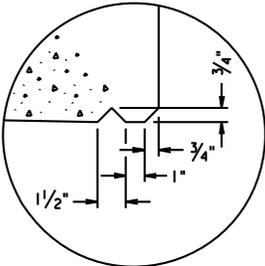
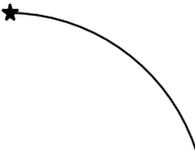
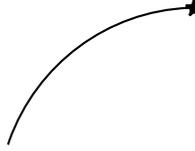
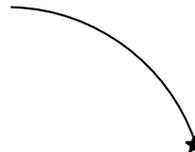
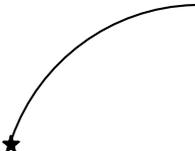


BD10R

4'-6" BR27D-10 right side
Place concrete patterning on the
Scaled down drawing
(approx. 0.04 of actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
	BT29	29" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT37	37" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT45	45" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT53	53" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT61	61" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)

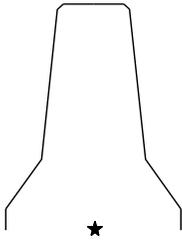
CELL	CELL NAME	CELL DESCRIPTION
	BT69	69" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT77	77" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT85	85" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)
	BT93	93" Bulb-T Place concrete patterning on the scaled down drawing. (approx. 0.02 of actual cell size)

CELL	CELL NAME	CELL DESCRIPTION
 <p>DRIP DETAIL</p>	DRIP	Drip bead detail for edge of slab (approx. 0.50 of actual cell size)
	FLLTM	Fillet left curb median (approx. 0.50 of actual cell size)
	FLRTM	Fillet right curb median (approx. 0.50 of actual cell size)
	FLLTS	Fillet left curb sidewalk (approx. 0.50 of actual cell size)
	FLRTS	Fillet left curb sidewalk (approx. 0.50 of actual cell size)

CELL

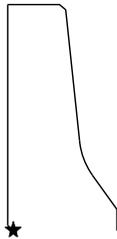
CELL NAME

CELL DESCRIPTION



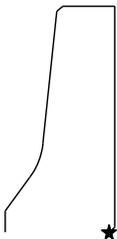
FMB

F-shape median barrier section
Place concrete patterning on the
scaled down drawing.
(approx. 0.04 of actual cell size)



FMBL

F-shape left median
Place concrete patterning on the
scaled down drawing.
(approx. 0.04 of actual cell size)



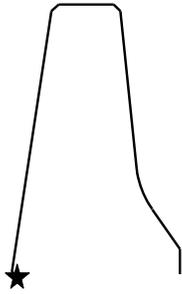
FMBR

F-shape right median
Place concrete patterning on the
scaled down drawing.
(approx. 0.04 of actual cell size)

CELL

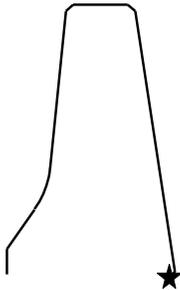
CELL NAME

CELL DESCRIPTION



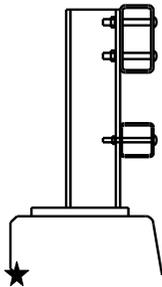
FPARL

F-shape concrete parapet left side
Place concrete patterning on the scaled down drawing.
(approx. 0.04 of actual cell size)



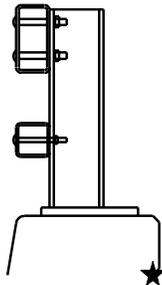
FPARR

F-shape concrete parapet right side
Place concrete patterning on the scaled down drawing.
(approx. 0.04 of actual cell size)



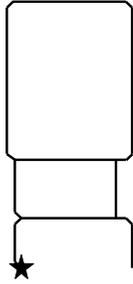
ILRL

Illinois steel railing left side
(approx. 0.04 of actual cell size)

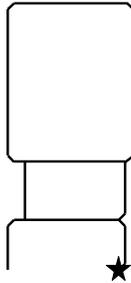


ILRR

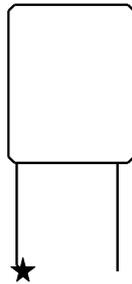
Illinois steel railing right side
(approx. 0.04 of actual cell size)

CELL**CELL NAME****CELL DESCRIPTION****KCCL8**

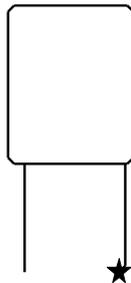
2'-8" Kansas Corral with curb left side
Place concrete patterning on the scaled down drawing (approx. 0.04 of actual cell size)

**KCCR8**

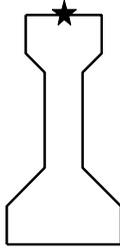
2'-8" Kansas Corral with curb right side
Place concrete patterning on the scaled down drawing (approx. 0.04 of actual cell size)

**KCL8**

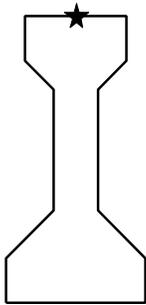
2'-8" Kansas Corral without curb left side
Place concrete patterning on the scaled down drawing (approx. 0.04 of actual cell size)

**KCR8**

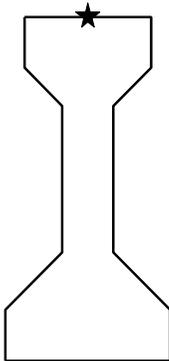
2'-8" Kansas Corral without curb right side
Place concrete patterning on the scaled down drawing (approx. 0.04 of actual cell size)

CELL**CELL NAME****CELL DESCRIPTION****PB2**

Type II AASHTO beam
Place concrete patterning on the
scaled down drawing.
(approx. 0.03 of actual cell size)

**PB3**

Type III AASHTO beam
Place concrete patterning on the
scaled down drawing.
(approx. 0.03 of actual cell size)

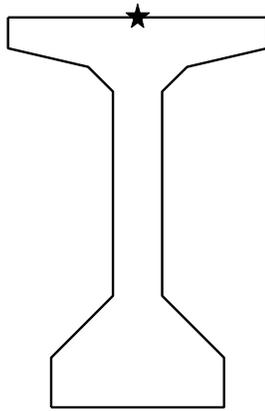
**PB4**

Type IV AASHTO beam
Place concrete patterning on the
scaled down drawing.
(approx. 0.03 of actual cell size)

CELL

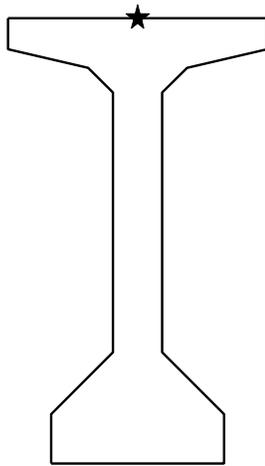
CELL NAME

CELL DESCRIPTION



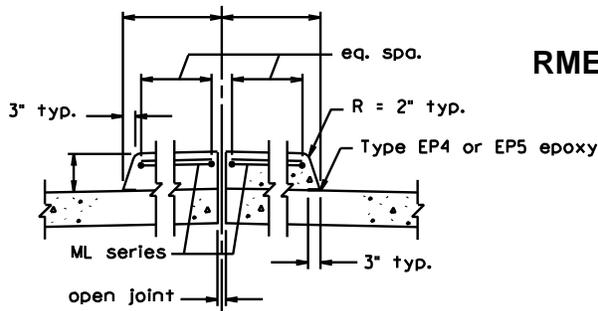
PB5

Type V AASHTO beam
Place concrete patterning on the scaled down drawing.
(approx. 0.03 of actual cell size)



PB6

Type VI AASHTO beam
Place concrete patterning on the scaled down drawing.
(approx. 0.03 of actual cell size)



RMED

Raised median section
(approx. 0.50 of actual cell size)

MEDIAN SECTION

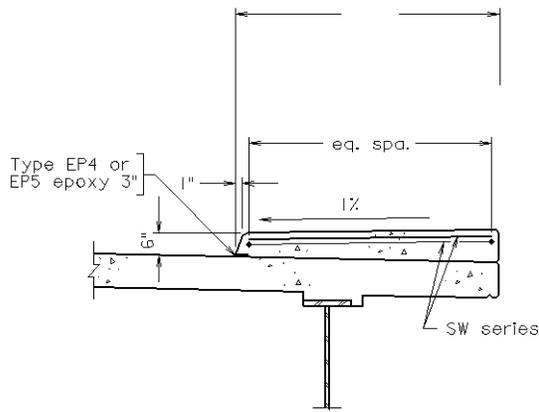
GENERAL DRAFTING PROCEDURES
CELL LIBRARY: TRANS1.CEL
CELLS PB5 - RMED

VOL. V - PART 2
DATE: 09Jul2012
SHEET 13 of 16
FILE NO. 01.22-13

CELL

CELL NAME

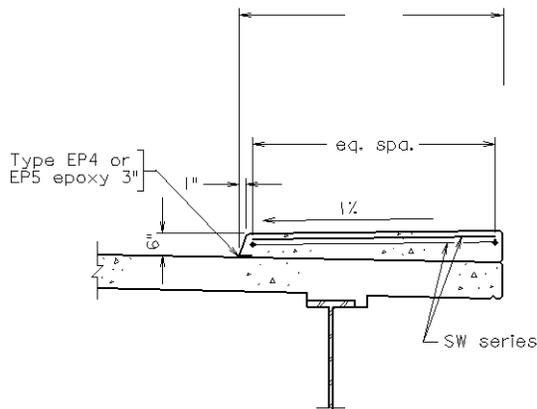
CELL DESCRIPTION



SWK1

Sidewalk section with plate girders
(approx. 0.50 of actual cell size)

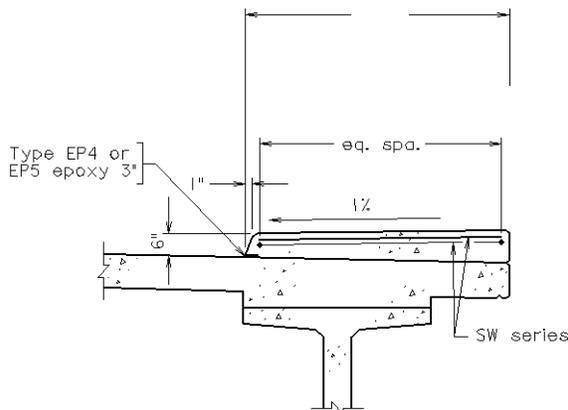
SIDEWALK SECTION



SWK2

Sidewalk section with rolled beams
(approx. 0.50 of actual cell size)

SIDEWALK SECTION



SWK3

Sidewalk section with prestressed
concrete Bulb-T's
(approx. 0.50 of actual cell size)

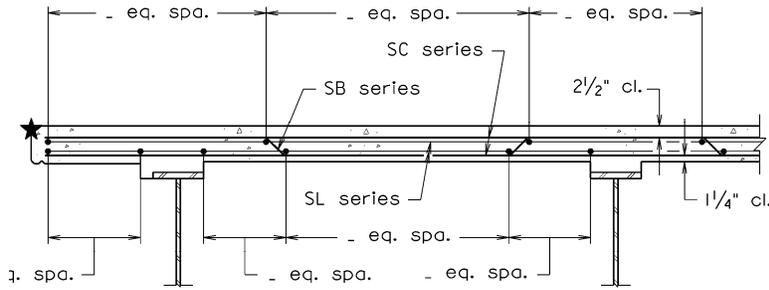
SIDEWALK SECTION

CELL

CELL NAME

CELL DESCRIPTION

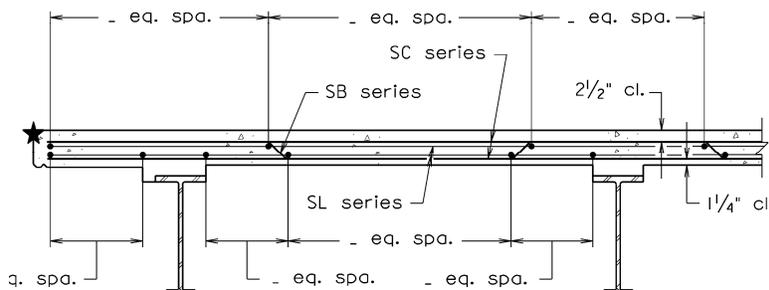
TRNS1



Part transverse section with plate girders
(approx. 0.52 of actual cell size)

PART SECTION

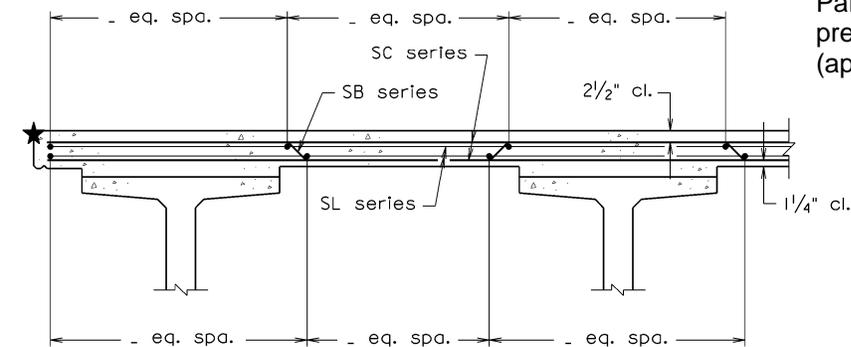
TRNS2



Part transverse section with rolled beams
(approx. 0.52 of actual cell size)

PART SECTION

TRNS3

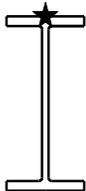


Part transverse section with prestressed concrete Bulb-T's
(approx. 0.52 of actual cell size)

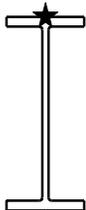
PART SECTION

CELL**CELL NAME****CELL DESCRIPTION****W24**

24" deep steel rolled beam
Place steel patterning on the scaled
down drawing.
(approx. 0.03 of actual cell size)

**W27**

27" deep steel rolled beam
Place steel patterning on the scaled
down drawing.
(approx. 0.03 of actual cell size)

**W30**

30" deep steel rolled beam
Place steel patterning on the scaled
down drawing.
(approx. 0.03 of actual cell size)

**W33**

33" deep steel rolled beam
Place steel patterning on the scaled
down drawing.
(approx. 0.03 of actual cell size)

**W36**

36" deep steel rolled beam
Place steel patterning on the scaled
down drawing.
(approx. 0.03 of actual cell size)