WEST REGION-OREGON STANDARDS AND GUIDELINES FOR COMPUTER-AIDED-DRAFTING

To avoid complications due to differing drafting styles using the CAD software available, these standards were created to simplify sharing drawings statewide and between states in the West Region.

GENERAL INFORMATION

All drawings and details will be drawn to **REAL WORLD DIMENSIONS**. This allows users to add details and/or symbols without having to manipulate the scale. This also allows users to print/plot on a standard drawing sheet to a given scale. For example, 1 plotted–inch: 100 drawing units means 1" : 100' if the drawing units are in feet.

The Model Space plot factor should be indicated on the drawing as 1 plotted inch = X drawing units considering the appropriate size paper. If paper space is used the plot will be 1 plotted inch = 1 drawing unit.

The suggested Text Style is either **ROMANS** in the vertical position or **ROMANS** with a 22 degree obliging angle, consistent throughout the entire project. The minimum plotted text height will be .06 inches (or units). The range for small text height is 0.06 to 0.12 inches ; medium text is 1.5 times the small text height used; and large text will equal 2 times small text height. When using a 22x34-inch sheet size, the minimum text height will be 0.12 inches for small text, 0.18 inches for medium text, and 0.24 inches for large text. This allows the text size to meet national standards should the drawing be reduced 50% .

The Hatch Pattern Scale when plotting should normally approximate 1/2 of the plotted scale. For example: plot scale is 1"=100'; therefore, hatch pattern scale is 50.

When drawing in real world dimensions, the line types may appear as continuous lines. The **LTSCALE** (lts) command will generally need to be changed from the default value of "1" to "0.5" of the plot scale. (Example: plot scale is 1"=100'; therefore, LTSCALE = 50.) All linetypes need to be representative relative to the drawing geometry. All drawings shall be uncluttered and easily read.

Color and linetypes shall be set to **BYLAYER**. The American Standards Association recommends three line widths for finished drawings: thin, medium and thick. NRCS CAD drawings should follow this convention. The following pen sizes are defined as thin, medium and thick line widths:

PEN ASSIGNMENTS FOR PLOT/PRINT

SIZE	COLOR	*PEN NO.	LINE WIDTH (Recommended for plot size 22x34)	**ALTERNATE
THIN	Color 1 (r)	7	Line width .005 in (.127 mm / Leroy size 5x0)	.002 in
THIN	Color 2 (y)	7	Line width .007 in (.18 mm / Leroy size 4x0)	.003 in
THIN	Color 3 (g)	7	Line width .010 in (.25 mm / Leroy size 3x0)	.005 in
THIN	Color 4 (c)	7	Line width .012 in (.30 mm / Leroy size 00)	.007 in
MED	Color 5 (b)	7	Line width .014 in (.35 mm / Leroy size 0)	.010 in
MED	Color 6 (m)	7	Line width .020 in (.50 mm / Leroy size 1)	.012 in
MED	Color 7 (w)	7	Line width .024 in (.60 mm / Leroy size 2)	.014 in
THICK	Color 8	7	Line width .028 in (.70 mm / Leroy size 2.5)	.020 in
THICK	Color 9	7	Line width .031 in (.80 mm / Leroy size 3)	.024 in
THICK	Color 10	7	Line width .047 in (1.2 mm / Leroy size 4)	.028 in

*Set **Pen No**. to 7 to print black lines when using a color plotter or printer.

The alternate pen widths may be used if your printer prints the recommended lines too thick. **The standard is: Color 1 will be the thinnest line and color 10 the thickest line. Not all brands of printers produce the same line widths—you will need to judge what comes closest to the recommendations, based on drawing clarity, and utilize corresponding line widths accordingly.
After color 10, the pattern is repeated. Example: Color 1, 11, 21, 31...251 will have a line width of .005 in; and Color 2, 12, 22, 32 ...252 will have a line width of .007 in; etc. Reserve colors 250 thru 255 for half tone black lines, assigning corresponding colors and pen number. Example: Color 251 will have a line width of .005 and **Pen No**. 251.

SHARING AND ARCHIVING DRAWINGS

Due to the different versions of CAD software and printers/plotters in use, a **CAD Record** shall be included to the right of the title block and placed on layer **cadrec**. This is a permanent record to document pen widths, plot factor, and drawing history. The CAD Record is to be updated by the drafts person at the time the drawing is created or revised. Layer **cadrec** will be left visible (ON) when the drawing is complete and ready for sharing or archiving.

CAD Record

DRAWING INFORMATION

Drafter's name ———————————————   Software and Version ————————————

Work phone number ——————————————   English or Metric units ——————————

City, State ———————————————————   Plotted inches = Units drawn (insert factor/scale)

Sheet size _____ Factor 1= _____

Sheet size_____ Factor 1= _____

SIZE.	COLOR	PEN NO.	LINE WIDTH (Recommended for plot size 22x34)	*ALTERNATE
THIN	Color 1 (r)	7	Line width .005 in (.127 mm / Leroy size 5x0)	.002 in
THIN	Color 2 (y)	7	Line width .007 in (.18 mm / Leroy size 4x0)	.003 in
THIN	Color 3 (g)	7	Line width .010 in (.25 mm / Leroy size 3x0)	.005 in
THIN	Color 4 (c)	7	Line width .012 in (.30 mm / Leroy size 00)	.007 in
MED	Color 5 (b)	7	Line width .014 in (.35 mm / Leroy size 0)	.010 in
MED	Color 6 (m)	7	Line width .020 in (.50 mm / Leroy size 1)	.012 in
MED	Color 7 (w)	7	Line width .024 in (.60 mm / Leroy size 2)	.014 in
THICK	Color 8	7	Line width .028 in (.70 mm / Leroy size 2.5)	.020 in
THICK	Color 9	7	Line width .031 in (.80 mm / Leroy size 3)	.024 in
THICK	Color 10	7	Line width .047 in (1.2 mm / Leroy size 4)	.028 in
Half Tone Black				
THIN	Color 251	251	Line width .005 in (.127 mm / Leroy size 5x0)	.002 in
THIN	Color 252	252	Line width .007 in (.18 mm / Leroy size 4x0)	.003 in
THIN	Color 253	253	Line width .010 in (.25 mm / Leroy size 3x0)	.005 in
THIN	Color 254	254	Line width .012 in (.30 mm / Leroy size 00)	.007 in
MED	Color 255	255	Line width .014 in (.35 mm / Leroy size 0)	.010 in

The standard is: Color 1 will be the thinnest line and color 10 the thickest line. Pattern repeats from color 11 to color 255. To print black lines on color printer the Pen No. is set to 7. *The alternate widths may be used if your printer prints the recommended lines too thick for 8.5x11 or 11x17 sheets. Colors 250 thru 255 are reserved for half tone black lines.

Additional comments: ——————————————————————————————

———————————————————————————————————————

———————————————————————————————————————

———————————————————————————————————————

RECOMMENDED DIMENSION STYLE

Name style	**NRCS??**	**??** Would represent the plotted scale of the drawing or detail
Dimension Line	Spacing	**0.375 to 0.50**
Extension Lines	Extension	**0.075**
	Origin offset	**0.075**
	Center mark	**0.10**
Arrows	Arrow size	**1.5** times greater than small text height
Text	Text height	**0.06 to 0.12** (.12 for 22x34 sheet size) or **same as small text**
	Style	**romans** (same as small text)
	Vertical	**Above** (most common agency practice**)**
	Alignment	**Align with dimension line** (most common agency practice)
	Text gap	**0.0625**
Scale and Colors	Overall scale	**dependent on plot scale of object**
	Colors	Dimension Line Color (color 2)
		Extension Line Color (color 2)
		Dimension Text Color (color 3)

RECOMMENEDED LAYER NAMES

Layer names should be descriptive of the objects on that layer.

These following layers can be combined and/or expanded as needed. For example: An existing fence might be on a layer called XIST-FENCE; or, a woody debris structure might be on a layer called STRUC-WOODY.

Use the main item first and expand from there. This allows better layer management since AutoCAD or ACAD LT alphabetizes the layers. An example with expanded hatch layers might be as follows:

        HATCH-GABION
        HATCH-RIPRAP
        HATCH-FILL
        HATCH-EXC

New or proposed objects will have a thicker line width than existing objects. Most existing objects will have a line thickness of 0.003 or 0.007 in. In this case, you may want to expand layers with XIST before the main item as follows:

        XIST-DIKE
        XIST-FENCE
        XIST-RIPRAP

RECOMMENDED LAYERS/COLORS

LAYER NAME	DESCRIPTION	COLOR	LINETYPE
ARW-N	North arrow	3	
ARW-S	Section arrow	3	
BLDG	Building	6	
BORDER	Title block border	9	
BOULDER	Boulders or large rock	2	
CL	Centerline	2	center
CL-PLine	Centerline-Pipeline	6	center
CNTY	County lines	2	
CON_PERMIT	Construction Permit	3	dashedx2/dashed
CONT	Contour lines	1 and/or 2	continuous and/or contour
DEFPOINTS	*this layer does **not plot** even when turned on*		
DIM	Dimension	3	
DITCH	Ditch or creek	3	trpldot
ESMT	Easement		
FENCE	Fence line	2/3	
GEOLOGY	Geology information	3	
GRID	Grid lines	1 and/or 2	
GROUND	Natural ground	3	center2
HATCH	Hatch patterns	1 and/or 2	
HIDDEN	Hidden object lines	2 or 3	hidden
MTCH	Match lines	5	
PIPE	Pipeline	4 or 5	
PL	Property line	2	phantom
PNTS	Points	1	
REBAR or Steel	Rebar reinforcement	7	
RIPRAP	Riprap	2	
RIVER	River boundary	3	
RLRD	Railroad	2	
ROAD	Roads	3	
RW	Right-of-way	2	dashed
SCALE	Bar scale	3	
SLOPE	Slope arrows	2 or 3	
STATE	State boundary	5	
STRUC	Structures	6	
TBK	Top of bank	5 or 6	
TBM	Temporary benchmark	3	
TOE	Toe of slope	5 or 6	
TXT-L	Large text (2X small text ht)	7	
TXT-M	Medium text (1.5X small text ht)	5	
TXT-S	Small text (including dimensions)	3	
UTIL	Utilities	2 or 3	
VEGE	Vegetation	2 or 3	
XIST	Existing	2	

REFERENCES

Where to find information on agency standards and guidelines related to drafting:
- National Engineering Manual (NEM) Part 541, Drafting, (210-541)
- TR-73 Computer-Aided-Drafting Standards
- Engineering Field Manual (EFM) Chapter 5, Part 3
- National Engineering Handbook (NEH) Part 6, Chapter 4.4, Detailing reinforced concrete structures
- General Manual (GM) Part 408, Records, (120-408)
- National Map Symbol Handbook, Title 170, Part 601