

CITY OF DALY CITY
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
AUTOCAD DRAFTING STANDARD

APRIL 2003

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**CITY OF DALY CITY
ENGINEERING OFFICE
AUTOCAD DRAFTING STANDARDS**

1. COORDINATE SYSTEM

To allow for easy incorporation of existing data as well as update of City Grid maps and GIS system, all plans, maps and exhibits shall be prepared in Model Space in line with City's system (California State Plane Zone III, NAD83 (feet)). Rotation of displays in Paper Space is permitted in accordance with these Standards.

Topographic map information and Coordinate data is available in the Public Works / Engineering office.

2. ROTATION / MOVING OF BASE MAP

In order to maintain City's coordinate system, rotation or relocation of Base Map data in model space You may rotate the display of base map data in Paper Space by using the following commands. "UCS Z", "PLAN UCS", "UCS W" and "SNAPANG" to rotate the display, of the whole Base Map to keep the coordinate system. Or you can use command "UCSFOLLOW 1", "UCS Z", then "UCSFOLLOW 0", "UCS W" and "SNAPANG". You may "pan" the display within viewports.

If you want to rotate a piece of mview map in paper space and still keep the coordinate system for its model space, the following step is even simpler: Type in "MVSETUP" in paper space. Select "align"; then select "rotate". If there are more than one mview, in the paper space, then pick the piece of mview that you want to rotate its display. Pick any point as base point and assign a rotation angle. After these steps, you are still in paper space, but the piece of map in that mview is rotated. Now, you can go to model space of that mview and change the "SNAPANG", zoom to the scale you want and pan to the desired location.

3. CITY STANDARD BORDER FILES

a. English Units

- 11x8.dwg – Plot with HP Laser Jet 5000N; plot size 10.5x8.0; plot origin point X=0, Y=0; plot window/view from node to node (lower left small point to upper right small point).
- 8x11.dwg – Plot with HP Laser Jet 5000N; plot size 10.5x8.0; plot origin point X=0, Y=0; plot rotate 90° (portrait), plot from node to node.
- 17x11.dwg – Plot with HP Laser Jet 5000N; plot size 16.6x10.6; plot origin point X=-0.1, Y=0; plot from node to node.
- 17x11t.dwg – Title sheet; plot with HP Laser Jet 5000N; plot size 16.6x10.6; plot origin point X=-0.1, Y=0; plot from node to node.
- 34x22.dwg – Plot with HP Ink Jet 750C; plot size 34x22; plot origin point X=0, Y=0; **plot extend** when the drawing file contains only one sheet. Plot window/view

from lower left corner to upper right corner of each sheet's external border when the drawing file contains more than one sheet. If plot in half size, same as plotting a 17x11.dwg.

- 34x22t.dwg – Title sheet; plot with HP Ink Jet 750C; plot size 34x22; plot origin point X=0, Y=0; plot extend. If plot in half size, same as plotting a 17x11t.dwg.
- b. Metric Units (Drawing Units is in Meter, but a 279x216 border is 0.279x0.216m in size)
- 279x216.dwg – Plot with HP Laser Jet 5000N; plot size 10.5x8.0; plot origin point X=0, Y=0; plot window/view from node to node (lower left corner point to upper right corner point).
 - 216x279.dwg – Plot with HP Laser Jet 5000N; plot size 10.5x8.0; plot origin point X=0, Y=0; plot rotate 90° (portrait), plot from node to node.
 - 432x279.dwg – Plot with HP Laser Jet 5000N; plot size 16.6x10.6; plot origin point X=-0.1, Y=0; plot from node to node.
 - 432x279t.dwg – Title sheet; plot with HP Laser Jet 5000N; plot size 16.6x10.6; plot origin point X=-0.1, Y=0; plot from node to node.
 - 864x558.dwg – Plot with HP Ink Jet 750C; plot size 34x22; plot origin point X=0, Y=0; plot extend when the drawing file contains only one sheet. Plot window/view from lower left corner to upper right corner of each sheet's external border when the drawing file contains more than one sheet. If plot in half size, same as plotting a 432x279.dwg.
 - 864x558t.dwg – Title sheet; plot with HP Ink Jet 750C; plot size 34x22; plot origin point X=0, Y=0; plot extend. If plot in half size, same as plotting a 432x279t.dwg.

When inserting a border (other than a title sheet border) to a drawing, please do not explode it, unless you want to make some changes to the border. If you do not explode the border, change the layer of the block of border to "Border" after inserted. Usually use 0,0 as insertion point (if there is several sheets in one file, insert the first border at 0,0). The border insertion scale factor shall equal to the drawing scale (scale of main part of the drawing in a full size plot). For example, in English system, use insertion scale factor 50 for a drawing with scale 1"=50'; in Metric, use insertion scale factor 500 for a drawing with scale 1:500. When creating a title sheet, copy the standard title sheet to your subdirectory or "save as" the standard title sheet to your subdirectory. Then just rename the file and modify it. The scale of standard title sheet 17x11t.dwg and 432x279t.dwg is 1"=1000' and 1:10000; scale of 34x22t.dwg and 864x558t.dwg is 1"=500' and 1:5000. If you want to change the scale of a title sheet, scale the entire sheet in paper space at base point 0,0 with the Mview border (layer 1) on. And then change the scale mark on the drawing.

When creating an English system detail drawing with architectural units (that is count to inches), when inserting the border, you need to time another scale factor "12". When creating a metric system detail drawing using mm as units, you need to time another scale factor "1000".

(Notes to consultants: 1, Consultants shall use 34"x22" or 0.864Mx0.558M size borders only unless assigned by the City otherwise. 2, The "node to node" plotting method

mentioned above is designed for the City for using HP Laser Jet 5000N plotter to plot half size drawings. That printer has an effective plotting area of 16.6”X10.6” when plotting on 17”x11” paper. If the consultants have a different type of plotter, you may use other methods of plotting to ensure the half size drawings you submit to the City be exactly half size, not a 48% reduced size or so. Also, the points at the lower left and upper right corner of the City Standard Border shall not be deleted. 3, When the design work of a City public works improvement plans is awarded to a consulting company, the company shall get a disk copy of the border files listed above and other block files and linetype files listed below.)

4. DRAWING SCALE

Imperial Scale	Nearest Metric Scale	Imperial Scale	Nearest Metric Scale
1”=1’	1:10	1”=20’	1:200
¾”=1’	1:20	1”=40’	1:500
½”=1’	1:20	1”=50’	1:500
3/8”=1’	1:50	1”=100’	1:1000
¼”=1’	1:50	1”=200’	1:2000
1”=5’	1:50	1”=500’	1:5000
1”=10’	1:100	1”=1000’	1:10000

5. LTSCALE AND DIMSCALE

In English system, when the full size plot of a drawing is 11x8 or 17x11, use Lt scale and Dim scale equal to one half of the drawing scale. When the full size plot of a drawing is 34x22, use Lt scale and Dim scale equal to the drawing scale.

In Metric system, when the full size plot of a drawing is 0.279x0.216(m) or 0.432x0.279(m), use Lt scale and Dim scale equal to one half of 1/1000 of the drawing scale. When the full size plot of a drawing is 0.864x0.558(m), use Lt scale and Dim scale equal to 1/1000 of the drawing scale.

Note: When using Metric system, use ACADISO.LIN and ACADISO.PAT for linetype and hatching instead of using ACAD.LIN and ACAD.PAT.

6. UNITS FOR THE DRAWINGS

- a. English system– Use decimal feet for length units; calculate to the fourth decimal place but label to the second decimal place. Use degrees/minutes/seconds or surveyor’s units for angular units; calculate and label to seconds.
- b. Metric system– Use Meter for length units; calculate to the fourth decimal place but label to the third decimal place. Angular units same as English system. (If sometimes you want to use mm as length unit of the drawing, you need to use “border insertion scale” 1000 times as mentioned in paragraph 1; and also you need to ignore the factor 1/1000 in paragraph 3 and 5c.)

7. TEXT

a. Text Font

STANDARD – Romans or simplex, used for text in restricted areas.

RD – Romand, used for basic notes, dimensions and labels.

HB – Hbold, or Arial-regular, used for titles, or words to be highlighted.

HL – Hlvlf, or Swiss721BT, used for titles, or words to be highlighted.

HH – Hlvhf, or Swis721Blk BT, used for titles, or words to be highlighted.

b. Text Size in Plotted Drawings

Size of Full Size Drawing	34x22 in (.864x.558 m)	17x11 in or less (.432x.279 m or less)
In restricted text areas (STANDARD or RD)	0.12 in(3.0 mm)	0.06 in(1.5 mm)
Basic Notes and Dimensions (RD)	0.14 in(3.5 mm)	0.07 in(1.8 mm)
Subtitles and Headings (HB)	0.17 in(4.2 mm)	0.085 in(2.1 mm)
Titles and Headings (HL)	0.20 in(5.0 mm)	0.10 in(2.5 mm)
Sheet Titles (HL)	0.24 in(6.0 mm)	0.12 in(3.0 mm)
Title Sheet Project Description (HH)	0.30 in(7.5 mm)	0.15 in(3.8 mm)
Title Sheet Project Name (HH)	0.40 in(10 mm)	0.20 in(5.0 mm)

Note: We used to use Hbold, Hlvlf, and Hlvhf for HB, HL, and HH. But the fonts Arial-regular, Antique Oliver-regular, and Swis721t-bold is more acceptable by other companies. So we will change to these fonts in our new drawings. When using these fonts, be sure to turn TEXTFILL on (command: TEXTFILL, select “1”).

c. Text Size in Drawing Files

English system– Text size in drawing files equals to plotting text size listed above multiply by the drawing scale. For example, for drawing scale 1”=50’, a 0.14 in high text shall be $0.14 \times 50 = 7$ feet high.

Metric system– Text size in drawing files equals to plotting text size listed above multiply by 1/1000 of the drawing scale. For example, for drawing scale 1:500, a 3.5 mm high text shall be $3.5 \times 500 / 1000 = 1.75$ meter high.

8. LAYERS

0 – Autocad original layer, used to create blocks that can follow current layer after inserted. (White)

1 – Used for border of Mview, freeze when plotting. (White)

100~32010 – Inherited from City Topographic Maps created by Towill Inc. or Aero-Geodetic Corp. (Different colors; change some or all of them to color 11 if you want them screened.) Layer 101 is street name; you can still use that layer for street names even if you change the text styles, sizes and locations. (Yellow)

Border – Used for sheet border (Cyan)

E-e – Existing underground electrical lines (Blue)

E-g – Existing gas lines (White)
 E-rcl – Existing reclaimed water lines (Green)
 E-sd – Existing drainage lines (Yellow)
 E-ss – Existing sewer lines (Magenta)
 E-t – Existing underground telephone lines (White)
 E-tv – Existing TV lines (Green)
 E-w – Existing water lines (Cyan)
 Ex-sign – Existing signs (11 or white as needed for screened or not screened)
 Ex-signal – Existing signals (11 or white as needed for screened or not screened)
 Ex-stripping – Existing striping (11 or white as needed for screened or not screened)
 Grid – Grid lines for sections and profiles (11)
 Half – For “HALF SIZE” symbol in 34x22 drawing, freeze when plotting full size (White)
 Irr – Proposed irrigation systems (Green, or yellow))
 Match – Match lines in plans (Green)
 Mtext – Notes and dimensions in model space (Cyan)
 Pl – Property lines (White)
 Plants – Plants (Green, or yellow)
 Pro-curb – Proposed curb (Green, or yellow)
 Pro-elec – Proposed lighting and signals (Green, or yellow)
 Pro-grading – Grading lines (Green, or yellow)
 Pro-rcl – Proposed reclaimed water lines (Green, or yellow)
 Pro-sd – Proposed storm drain lines (Green, or yellow)
 Pro-sign – Proposed signs (White, or yellow)
 Pro-ss – Proposed sanitary sewer lines (Green, or yellow)
 Pro-stripping – Proposed striping (White, or yellow)
 Pro-w – Proposed water lines (Green, or yellow)
 Ptext – Notes, titles, details, sections and profiles in paper space (White)
 Rw – Right of way lines (Magenta)
 Station – Street centerline and stationing (Cyan)

9. DIMENSION STYLE

A City Standard Dimension Style named “City” is stored in each of the above border drawing. When you insert a border into your drawing you will find the dimstyle “City” already installed in your drawing. Then you need to switch the current dimstyle from Autocad’s default style “Standard” to style “City”. If you do not need a border in your drawing, you can still insert a border then erase it to get the dimstyle “City”.

The main system variables for dimstyle “City” are:

DIMASZ=0.14 (dimension arrow size)

DIMTXT=0.14 (dimension text size)

DIMTAD=1, DIMTIH=0, DIMTOH=0, (dimension text on top and parallel to dimension line)

DIM: STYLE=RD (text style is RD)

DIMCLRD=40 (color of dimension lines are 40, a very thin pen is assigned for color 40 when plotting)

DIMCLRE=40 (color of extensions lines are also 40)

DIMCLRt=256 (color of text is BYLAYER)

When working in English system, set DIMALT=off; when working in Metric system, set DIMALT=on.

You can put dimensions in the same layer of the object they label or put in the layer “Mtext”.

10. PEN SETTINGS FOR PLOTTING A DRAWING (FOR BLACK AND WHITE PLOT)

HP configuration:

Pen No.1 – Solid

Pen No.2 – Screened 30%

Pen No.3 – Screened 15%

Pen No.4 – Screened 20%

Pen No.5 – Screened 40%

Lines merge, line ends right at the end point, line joints use half circle.

Pen assignment:

Color	Pen No.	Pen Width (Laser 5000N)	Pen Width (Ink jet 750c)	Remarks
1~7	1	0.007	0.014	1. Color 10 is used in our old drawings, for new drawings, use color 11 instead of 10. 2. Color 40 is used for dimension lines, leaders, hatch lines, center line of detail drawings, etc. 3. Usually, use screened lines for existing objects and solid lines for improvements to make improvements look standout in the drawings.
8	4	0.007	0.014	
10~11	2 Or 5	0.007	0.014	
40	1	0.003	0.007	
60	3	0.014	0.028	
65	1	0.014	0.028	
200	1	0.021	0.042	

11. PAPER SPACE AND MODEL SPACE; VIEWS

- a. Drawings that contain a piece of Daly City Base Map must keep the coordinate system of the Base Map. The piece of Base Map shall be put in **MODEL SPACE** of the drawing; and the plot border shall be put in **LAYOUT** (paper space). Generally, all drawing entities related to Base Map shall be put in **MODEL SPACE**; drawing border, headings, titles, profiles, sections, details and sheet notes shall be put in **LAYOUT** (paper space).
- b. Border of a Mview in paper space shall always be put in layer “1”. Usually, freeze layer “1” when plotting a drawing.
- c. Drawings do not contain a piece of Base Map, such as detail drawings and quantity sheets shall be worked entirely in **LAYOUT** (including border insertion).
- d. Create views in a drawing file that contains more than one sheet of drawings for use in

plotting. Each sheet shall have a view from lower left node point of the sheet border to upper right node point of the sheet border for use in plotting on Laser Jet 5000N plotter, named as “L1”, “L2”, “L3” etc. Each sheet shall have a view from lower left corner of the sheet’s external border to upper right corner of the sheet’s external border for use in plotting on Ink Jet 750C plotter, named as “V1”, “V2”, “V3” etc. If the drawing file has only one drawing sheet, “L1” is still needed, but “V1” which is the same as zoom extents is not needed any more. (Beware that some lower left node point or upper right node point of the border drawing is very close to the corner of the inner border, you can find it only by osnap to “node”.)

12. PLOTTING A DRAWING WITH NONSTANDARD BORDER

There is no problem to use an accurate scale when plotting a drawing with nonstandard border on the Ink Jet 750C plotter. But when plotting a half size drawing on the Laser Jet 5000N plotter, you need to select one of the following two ways: 1) to plot exactly to half size; or, 2) to plot extend but not to scale. If you need to plot the drawing exactly to half size, draw a point at some where near the lower left corner of the drawing, and then copy that point @ 16.6x2xScale, 10.6x2xScale to some where near the upper right corner. When plot from node to node use these two points as limits of window/view. You may need to move these two points (at the same time, that is, keep their relative distance) to adjust the limits to prevent losing some part of the drawing. If you do not need exact scale, you can use the lower left corner and the upper right corner of the border as limits to plot. Then the so-called half size drawing may actually be a 48% size or so.

13. NORTH ARROW

- a. Use Caltrans Standard North Arrow as standard north arrow for all Daly City drawings.
- b. Blocks for Standard North Arrow are Nar.dwg and Nar-m.dwg for English and Metric system drawings respectively.
- c. To insert a North Arrow to a piece of Base Map, insert it in model space with a zero rotation. The direction of the arrow will automatically follow the coordinate system. Use insert scale equal to one half of drawing scale for drawings sized 17x11 (432x279) or smaller; length of arrow will be 1.4” (35mm) in plot. Use insert scale equal to drawing scale for drawings sized 34x22 (864x558); length of arrow will be 2.8” (70mm) in plot.

14. EXISTING BLOCKS IN TOPOGRAPHIC MAPS (BASE MAPS)

There are some ground object blocks in the Base Maps, for example “CB” (catch basin). They were inserted with a insertion scale factor of 100, because the set of Bas Map was prepared for plotted in 1”=100’ scale. When we use the Base Map as the base of a 1”=20’ drawing, these objects look awfully big.

To scale down these object one by one will take a long time. We can use one-command to change one kind of object at a time by redefining that block. Three sets of blocks are listed under N:\Blocks\Symbols\Topo-20, \Topo-40, and \Topo-50. The “CB” block in subdirectory \Topo-20, \Topo-40, and \Topo-50 is 20%, 40%, and 50% of the size of the

original “CB” block. They are prepared for use in 1”=20’, 1”=40’, and 1”=50’ drawings respectively. The method of using these blocks is as follows:

For preparing a 1”=20’ base map, insert CB.dwg under \Topo-20 to that piece of base map. When the computer asks, “Do you want to redefine the block?” you click “Yes”. When the computer asks for “insertion point”, just press the ESC key. After regenerating the drawing, all the catch basin will reduce size to 20% of the original one.

Legend of Topographic Maps is shown in appendix C.

15. TRANSFER A PIECE OF BASE MAP TO METRIC SYSTEM

At present, the City has only English system Topographic Maps. If we want to transfer a piece of base map to Metric system, go to **MODEL SPACE**, unfreeze all layers, and scale the entire piece of map at base point 0,0,0 with a scale factor 0.3048 (feet transfer to meter). After scaled, you need to change the value of spot elevation one by one using the scale factor 0.3048, too. But the old contour lines are not usable any more. The ground object blocks in the Metric system base map thus created are still English system blocks, but the insertion scale factor is multiplied by 0.3048, that is $100 \times 0.3048 = 30.48$.

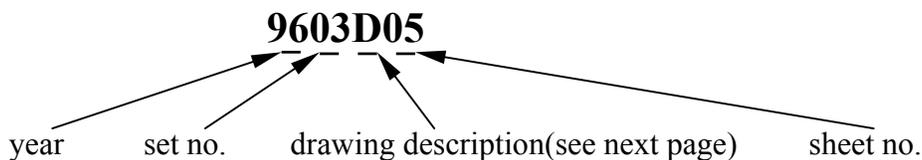
16. INSERT AN ENGLISH SYSTEM SYMBOL BLOCK TO A METRIC SYSTEM DRAWING

We have created many symbol blocks (and Traffic blocks) in English system. But up to now only a few have been transferred to the Metric system. Before all the transfer work has been done, we can still insert an English system block to a Metric system drawing by using an additional insertion scale factor. For example, when we insert an English system North Arrow block to a 1”=50’ English system drawing, we use a insertion scale 50; when we insert an English system North Arrow block to a 1:500 Metric system drawing, we use a insertion scale $500/12 \times 0.3048 = 500 \times 0.0254$. But some blocks have real ground sizes, such as traffic arrow pavement markings, they are shown on drawings at real sizes (for instance, Type I(18) Arrow is 18 feet long), when inserting these English System blocks into Metric drawing, the insertion factor shall be 0.3048.

17. AUTOMATIC UPDATE STAMP

Every formal drawing must have an Automatic Update Stamp. If you open a drawing and make no changes before closing it, do not make a save. For “Bid Sets” drawings, after issued, no changes is allowed, the “Stamp” shall remain unchanged after issued. But there is a problem, these drawing files will finally be moved from the designer’s subdirectory to the “DC-CAD-Final” subdirectory, after moved, the “path” in the “stamp” still remain the old path.

18. DRAWING FILE NAME



Drawing Description List:

D – Conceptual or Design Stage Drawing prepared by the City

If the drawing set is finally issued as a bid set, file it in “\Bid-Set\project-name” subdirectory. Other wise, file in “\No-Construction (For reference)\project-name” subdirectory if it is useful for future reference.

If some sheets of the set of drawings are to be prepared by the consultants, these sheets shall still file as “D” drawings.

If a drawing file contains two or more sheets, use the first sheet name as the file name. For example, file 9603D05 may contain sheets 9603D05, 9603D06 and 9603D07.

R – Revision Drawings during Bid or Construction

If issued, file in “\Revision\project-name”. A revision block shall be put in the revised drawing.

The drawings 9603R105 and 9603R205 are the first and second revision of drawing 9603D05.

If the original bid set has total 18 sheets, and we need to add a new sheet during bid or construction, the new drawing shall be filed as 9603D18+1. Then after, if there is any revision for that drawing, the first revision of this drawing shall be 9603R118+1.

A – As Built Drawing

Should be marked **AS-BUILT** in each drawing.
After Reviewed, file in “\As-Built\project-name”.

M – Manual Drawing

G – General Drawing,

For example Capital Project Schedule, Parcel Description Drawing etc.
After approved, file in “\No-Construction (For reference)\drawing-name”.

CS – Whole set CAD Drawings prepared by Consultants

File in “\Original by Others\project-name”.
If the City made minor changes before issue for bid, file the revised set in “Original by Others\project-name\Revised”, and the revised set shall be filed as “D” drawings.

CM – Manual Drawings by Consultants

FD – Drawing Prepared for Fire Department

File in “\No-Construction\drawing name”.

PD – Drawing Prepared for Police Department

File in “\No-Construction\drawing name”.

BD – Drawing Prepared for Building Division
File in “\No-Construction\drawing-name”.

PL – Drawing Prepared for Planning Division
File in “\No-Construction\drawing-name”.

(Consultant prepared drawings shall follow the above “D” or “CS” drawing filing method. If the consulting company has its own filing system, both filing name can be appeared on the drawing, but the submitted disk files shall have the City’s filing names.)

19. LINETYPES

Autocad linetype file ACAD.LIN contains some linetypes that need to be used in different ltscale, they are difficult for us to use. Also, the variety of linetypes in that file is not enough. We created our own linetype file ACAD1.LIN located in N:\Blocks\Linetypes\. You can copy this file to your “Support” subdirectory. ACAD1.LIN contains most of the linetypes we need, including underground utilities. These linetypes is consistent with Caltrans CADD Users Manual, and can be used in a uniform ltscale as mentioned in Paragraph 3. But this file can only be used in English system drawings; we are creating an ACADISO1.LIN for Metric system soon. A drawing named ACAD1-ltypelist.dwg is enclosed as appendix A; also, you can find the drawing file in N:\Blocks\Linetype\.

20. BLOCKS

There are five subdirectories under N:\Blocks\; they are “Borders”, “Linetypes”, “Symbols”, “Traffic” and “CAD Standard”. The blocks under “Symbols” and “Traffic” are shown in drawings Bksmpl-1.dwg and Bksmpl-2.dwg; see appendix B. Two drawing files are in the directory N:\Blocks\.

21. XREFERENCE DRAWINGS

Xreference file(s) nested within another Xreference file is to be avoided.
Consultants must submit all Xreference files, if any, when submitting drawing files.

22. DRAWINGS FROM CONSULTANTS

All City public works improvement plans prepared by the consultants shall follow these CAD Standards. In case the consultants cannot follow the City Standards thoroughly, they must submit all the special font files and “plotting pen chart” at the time Autocad files are submitted to the City.