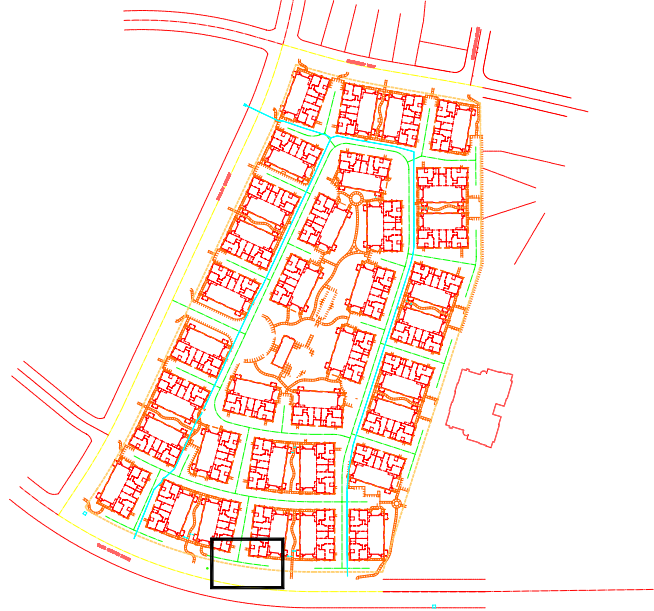


Case Study

Combining Multi-Instrument Data Collection Into a Single Drawing Using Field-to-Finish

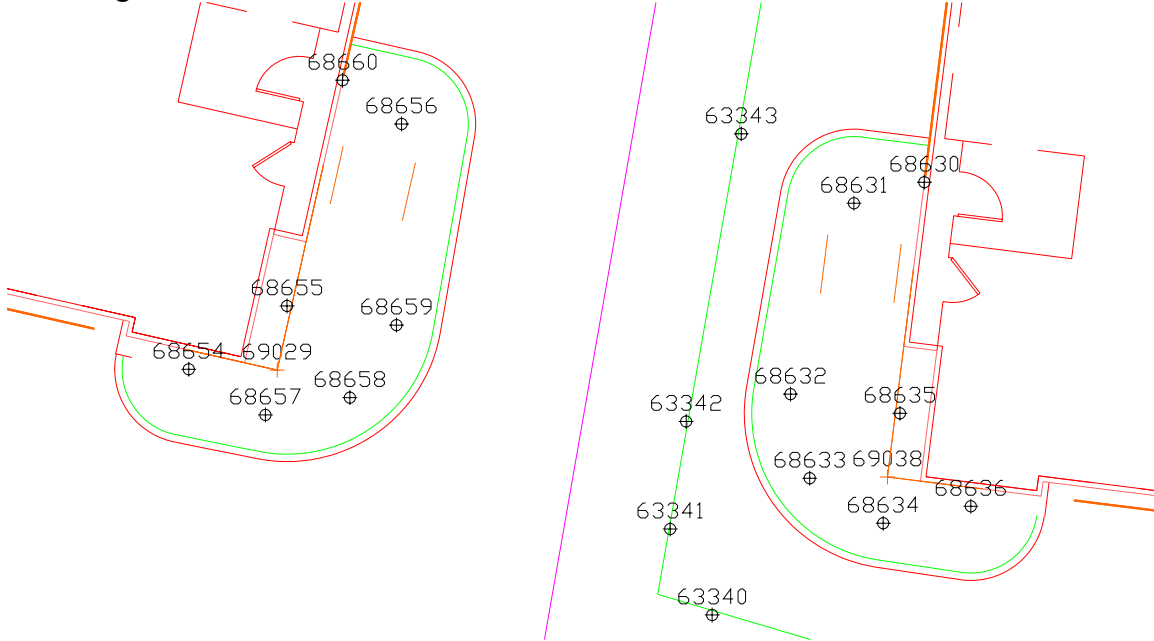
Purpose—To Incorporate Data from Multiple Survey Crews: On fast-track and larger construction projects, it is often necessary to use several survey crews to gather data and conduct stakeout. The challenge then is to incorporate this data into the main drawing, maintaining a “master” drawing with consistent use of layers and avoiding duplicate point numbers in the plotting of points. Consider the drawing shown below:



This is a typical, complexly detailed multi-family housing project, where even the highlighted area near the bottom of the site contains the level of detail shown below:



Isolating to the points and some linework and windowing in further, this area contains the following data:



The challenge is to add points (such as those shown above) from different survey crews such that the points are effectively layerized and do not have duplicate point numbers.

Avoiding Duplicate Point Numbers: There is no magic trick to avoiding duplicate point numbers. It is recommended that each survey crew be assigned a point range and work in a coordinate file unique to them. Back at the office, a “master” coordinate file should be maintained. Each day, or whenever survey work is complete, the new coordinate data can be merged into the master coordinate file, using the command “Copy/Merge CRD File” found in Coordinate File Utilities (CFU) under the Points pulldown menu. For a 4-crew scenario, working a job called Syrah, one system might be as follows:

Jim-Syrah.crd: 30,000 to 39,999

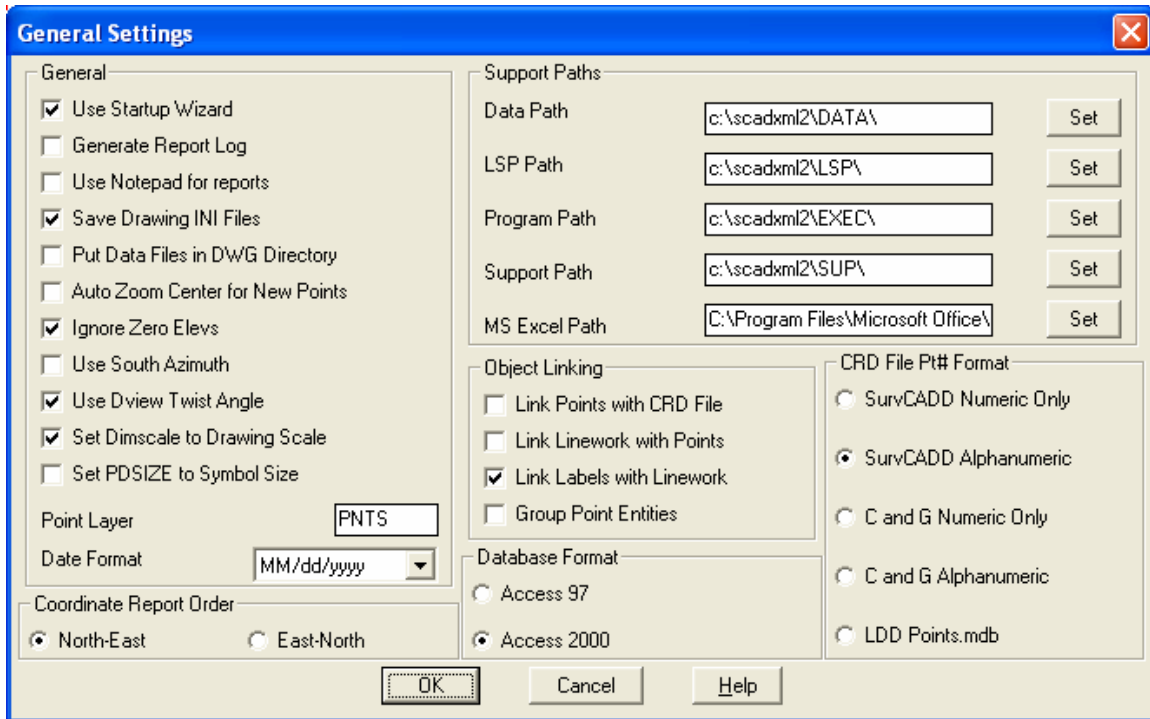
Bill-Syrah.crd: 40,000 to 49,999

Mo-Syrah.crd: 50,000 to 59,999

Kent-Syrah.crd: 60,000 to 69,999

These points would then get systematically merged into the master coordinate file called Syrah.crd, or Total-Syrah.crd. By giving the field crew a full 10,000 point range to work with, the range could be further subdivided to utilities (0-2000), roads (2000-4000), buildings (4000-6000), etc. such that point 42,159 would be a road-related survey shot and point 65,191 would be a building-related survey shot. Point ranges can be effectively used to add “content” to the field survey shots.

It is important to note that when using point numbers over 32,000, it is essential to use alphanumeric point numbers. The alphanumeric point number “style” is set under the File pulldown menu, option Configure SurvCadd, General Settings, in the dialog shown below (see middle right):



For very large file sizes, the numeric format is faster (because it is “binary” and goes straight to the correct point number when recalled, due to “indexing”). But when points are named with text (as in 1A) or point numbers over 32000 are involved, the alphanumeric format is required. The alphanumeric format uses a quick search method to find and display the points.

Procedure to get Points from Multiple CRD Files Plotted into One Master Drawing:

The quick description is for all field crews to use a common description coding, then to bring the various CRD files into a new, blank drawing using Field-to-Finish, then insert the new drawing into the master drawing. The step-by-step process might be described as follows:

1. Start New DWG
2. Set Scale so that points plot at the same size used in the Master Drawing
3. Upload each of the (eg. 4) CRD files using Field-to-Finish to the New Drawing
4. Save New DWG as new, unique name (this drawing shows the layerized points)
5. Load Master DWG and verify that the CRD file is the master, “Total” CRD file
6. Using Copy/Merge CRD File, merge in all new CRD files to the master CRD file
7. Insert the New DWG file containing the new points into the Master Drawing

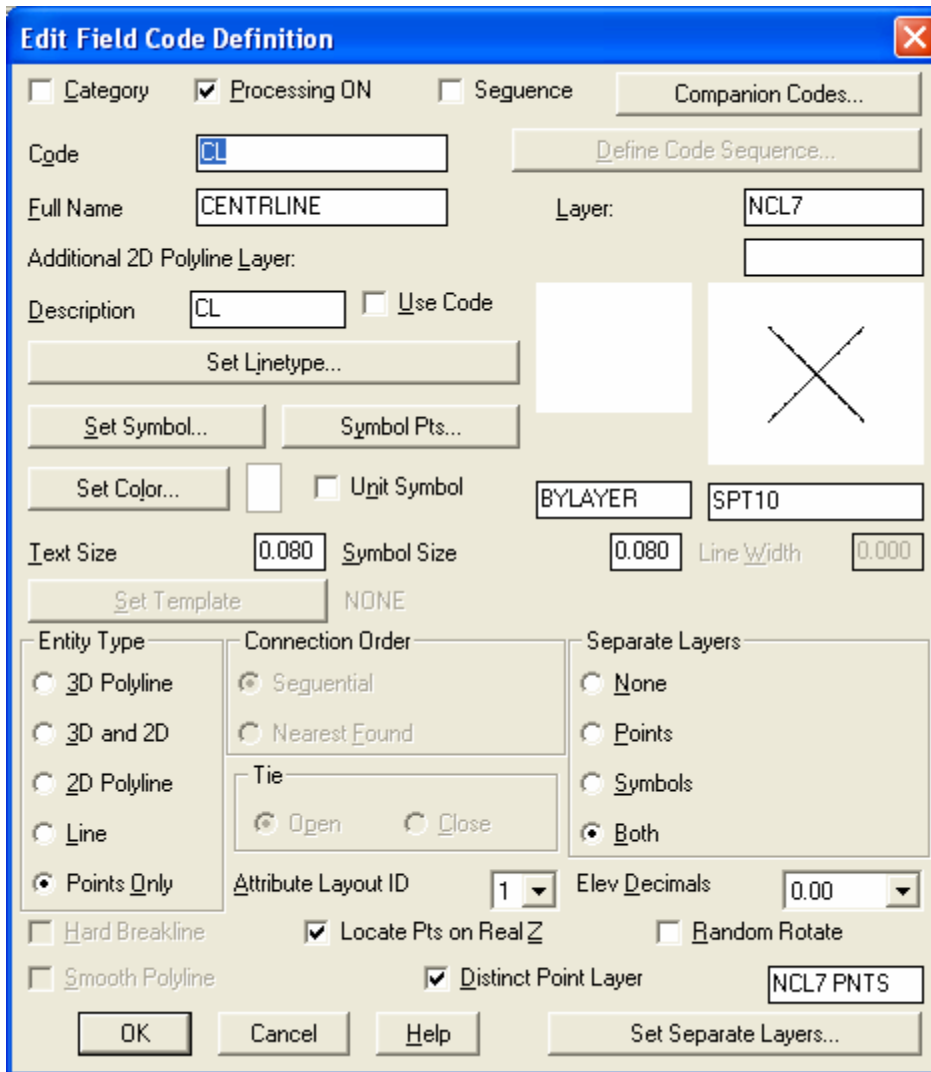
The 7-Step Process in Practice: Starting a new drawing file is as simple as starting up AutoCad from scratch, or selecting File, New if already working in a drawing. To determine the scale to set on the new drawing, open the master drawing and use the List command to get the size of the points. Note that at a 50 scale, with point scale factor set to 0.08, points plot at a 4 unit size. So if the size of the points is 1 unit, you could set a 10 scale with the point scale factor set to 0.1. The “0.1” means that when you plot at the set

scale, the points will measure 0.1” when plotted on paper. For very busy drawings, where the intent is to plot at 20 scale, you could choose the combination of 20 scale and point scale factor of 0.05 to get points of the same unit size. The rules are different for metric plots, where scale factor refers to plot ratio as in 1:500 or 1:1000.

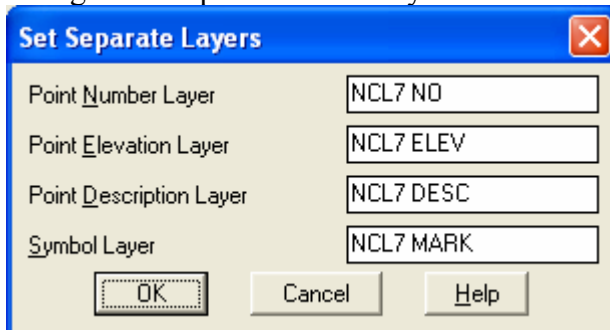
Techniques of Field-to-Finish: To force the points to plot on the correct, pre-defined layers based on their descriptions, it is critical to use Field-to-Finish, found under the Tools pulldown menu. Do not use Draw/Locate Points. This command will draw the points, but will draw them on a pre-set layer. There is an option in Draw/Locate Points to draw the points on a layer equivalent to the description used, but this will not allow drawing of the points on pre-defined layers with pre-defined symbols. The key is to use Field-to-Finish. The Field-to-Finish table shown below might apply to a typical construction project:

CODE	FULL NAME	DESC	SYMBOL	LINETYPE	ENTITY	TIE	LAYER	ON/OFF
DEFAULT			SPT11	CONTINUOUS	Point	Open	0	Of1
AD	AREA DRN	AD	SPT45	BYLAYER	Point	Open	NCL1	On
ARU	AIR REL UL	ARU	SPT23	BYLAYER	Point	Open	NCL2	On
BLDG	BLDG CORN	BLDG	SPT9	BYLAYER	Point	Open	NCL3	On
BOV	BLOW OFF U	BOV	SPT66	BYLAYER	Point	Open	NCL4	On
BOW	BACK OF SW	BOW	SPT1	BYLAYER	Point	Open	NCL5	On
CATU	CABLE TU	CATU	SPT7	BYLAYER	Point	Open	NCL6	On
CL	CENTRLINE	CL	SPT10	BYLAYER	Point	Open	NCL7	On
CP	CNTRL PNT	CP	SPT12	BYLAYER	Point	Open	NCL8	On
CU	CHECK ULU	CU	SPT38	BYLAYER	Point	Open	NCL9	On
DI	STORM DI	DI	SPT90	BYLAYER	Point	Open	NCL10	On

If a description such as “CL” is used, then all points with that description will plot with the features and layering defined by CL, as shown below (selecting CL and clicking Edit):



The “Separate Layers” option allows you to specify distinct layer names for the point number, point elevation, point description and point symbol by clicking “Set Separate Layers”, shown at the bottom right of the above dialog. When this is done, another dialog comes up where these layer names are entered:



One advantage of naming each layer with a consistent pattern of beginning text (as in “NCL7”) is that commands such as Layer, F for Freeze can be used at the command line,

with the convention of NCL7* causing all layers beginning with NCL7 to freeze. In reverse, these layers can be thawed by entering Layer, T for Thaw, then NCL7*. The "*" acts like a wildcard and does the operation to all layer names beginning with "NCL7".

The Set Separate Layers option ghosts out and is not available if the "None" option is selected. Using "None", a distinct point node layer can be used, but layer names for the attributes would be preset as shown in the graphic below:

90013 Pntno Layer
 NCL7 PNTS Layer X 13.75 Pntelev Layer
 CL Pntdesc Layer

90014 Pntno Layer
 NCL7 PNTS Layer X 13.57 Pntelev Layer
 CL Pntdesc Layer

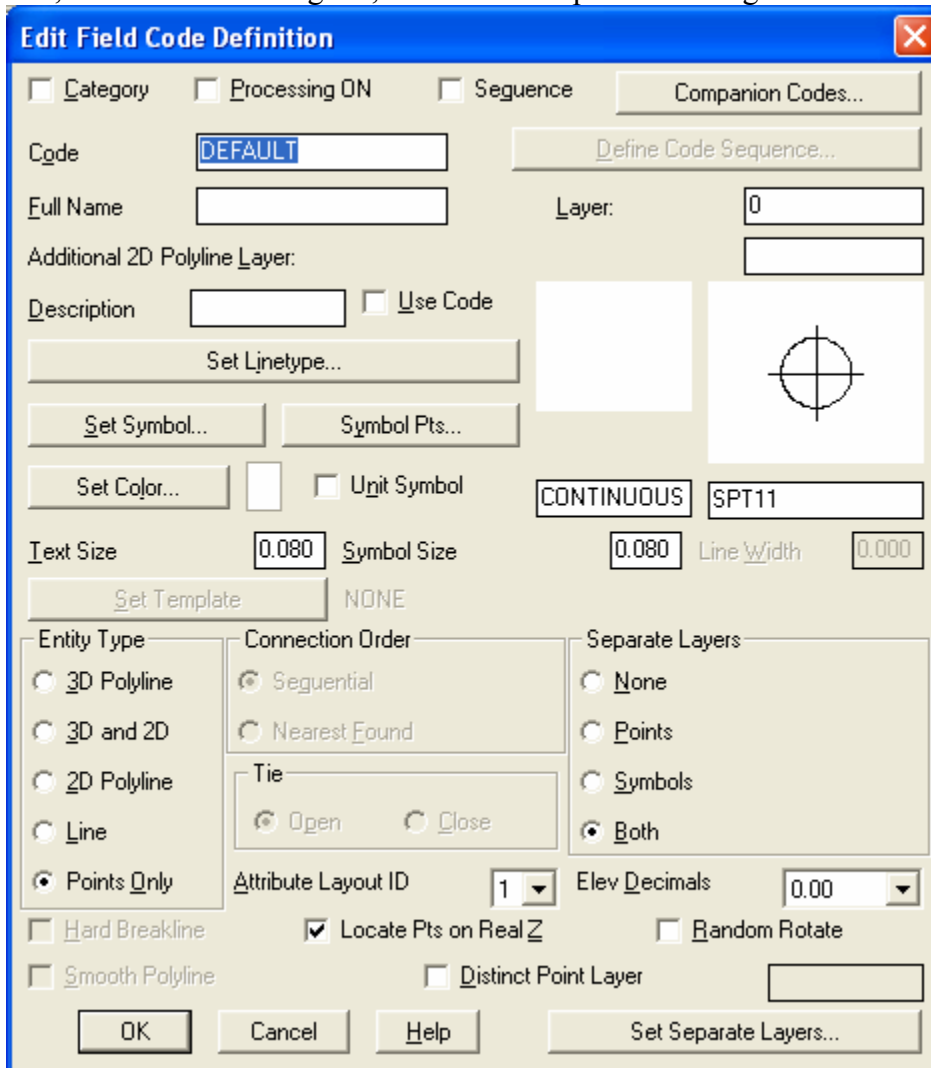
The problem with this method, is that the freezing of the "Pntno" layer would freeze all point numbers. If you want to show point numbers on some types of point descriptions, you would need a distinct attribute layer for the point number. This is accomplished with the "Both" option. You could keep point number attributes for centerlines visible by not freezing NCL7 NO layers, but hide the point numbers on check valves by freezing NCL9 NO (the layer for the check valve point numbers). Here is the above plot using "Both".

90013 NCL7 NO Layer
 NCL7 PNTS Layer X 13.75 NCL7 ELEV Layer
 CL NCL7 DESC Layer

90014 NCL7 NO Layer
 NCL7 PNTS Layer X 13.57 NCL7 ELEV Layer
 CL NCL7 DESC Layer

Using the "Default" Description in Field-to-Finish: One very useful aspect of Field-to-Finish is to set a so-called "Default" description, which is a "grab bag" descriptor that assigns symbols, layers and other aspects to any description not found or defined in the

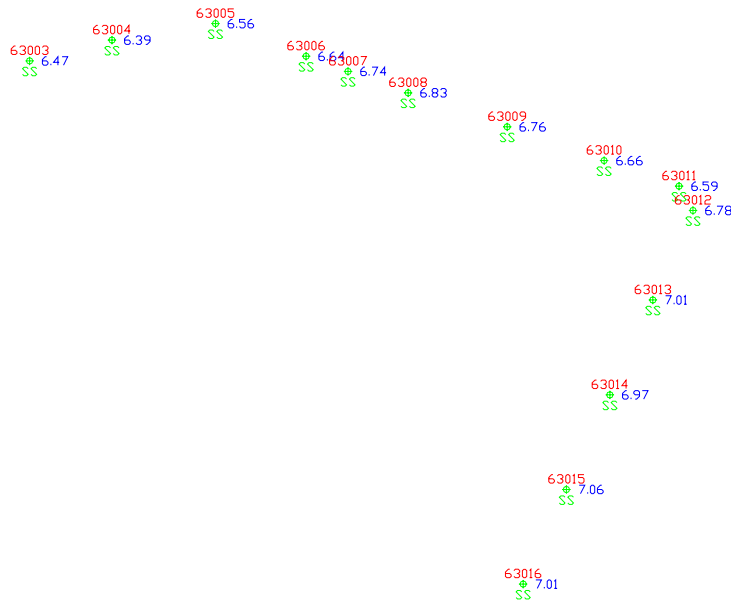
table. But the Default description can also be set to simply not plot at all. In this way, descriptions not in the Field-to-Finish list will not plot, although the points will be part of the point file and will List and plot in Draw/Locate Points. To avoid plotting non-defined text, click off Processing On, found at the top of the dialog in Edit within Field-to-Finish.



The effect of this is to avoid plotting points that were saved as part of a stakeout exercise, with cut/fill text, and also to avoid plotting an extra point or points where a text was appended to a description found in Field-to-Finish. In the dialog shown below, text such as SS and CL were used, by additional descriptions were added. Those additional descriptions would lead to the plotting and overwriting of additional text on the drawing itself, which is avoided by setting the Default text to Processing Off.

SurvCADD Edit : c:\scadxml2\USER\scadrprt.tmp				
File Edit Settings				
Open	Save	Print	Exit	Find
Screen	Hide			
60017	15385.390	9753.989	10.302	FILL:1.721
60018	15408.638	9665.546	14.234	CUT:0.882 *
60019	15413.386	9438.599	13.849	CUT:1.046
60020	16058.954	9801.177	13.940	CL
60021	15689.389	9682.966	15.181	CL HP
63001	15779.803	9240.781	9.123	SS - 8''hell exist Dunlay Dr.
63002	15779.987	9239.297	9.346	JT - exist SMUD-TEL
63003	16360.423	9518.980	6.465	SS - 8'' in MH-30
63004	16364.346	9534.528	6.394	SS - 8''
63005	16367.457	9554.078	6.559	SS - 8'' in MH-31
63006	16361.303	9571.197	6.636	SS - 8''
63007	16358.451	9579.106	6.738	SS - 8''wye
63008	16354.404	9590.452	6.828	SS - 8''
63009	16347.996	9609.176	6.764	SS - 8''
63010	16341.623	9627.463	6.664	SS - 8''
63011	16336.792	9641.620	6.587	SS - 8''out MH-19
63012	16332.209	9644.259	6.781	SS - 8'' in MH-19
63013	16315.321	9636.677	7.005	SS - 8''
63014	16297.422	9628.554	6.971	SS - 8''
63015	16279.570	9620.352	7.060	SS - 8''
63016	16261.717	9612.184	7.006	SS - 8''

Thus points 63001 through 63016 would plot only as the base text such as CL, SS and JT, as shown below:



If these points were plotted with the Default text item set to processing on, you would obtain a plot as shown below, with plenty of extra information “overwriting” on the points.



Insert New Drawing into Master Drawing: With all points correctly plotted into one, single master drawing from multiple files received from SurvCE, Tsunami or other data collector sources, the next step is to save that new drawing and then open up the master drawing for the entire site. With the master drawing open, type Insert or pick Insert or pick Insert under the Draw pulldown menu and insert in the new drawing with the plotted points. Use an insertion point of 0,0,0 set all scales to 1.0 and click Explode on. This completes the mapping process.

Merge the New Coordinates into the Master Coordinate File, one File at a time: Use the command Copy/Merge CRD File found in Coordinate File Utilities (CFU at command prompt), located in the Points pulldown menu. Typical prompting is shown below:

```
Copy points FROM another file to the current file
or copy the current file TO another file [<From>/<To>]? (Enter default to "From")
Point numbers to copy: all
Renumber the points [Yes/<No>]? N
```

This completes the entire process. The new points are plotted, with appropriate layers frozen and colored per settings in the master drawing:

