Precision drafting ~ using entity snaps effectively

Imagine that your design calls for an accurately placed sight line similar to that shown in the figure below. The line runs through the center of a group of pavers and through a central point in a water feature. The sight line has been drawn in gCADPlus using a construction line entity and runs from the main path with an ornamental pond as a focus. It starts at a known midpoint on the edge of the path (labeled midpoint) and passes through the mid point of each paver and through the center of the pond. An ornamental water feature is specified and your construction team needs some accurate set out (peg points) to locate the feature. That means the construction line must be precisely placed so setout points can be extracted. Placing the line ‘by eye’; not good enough in this instance! Accurate location can be dealt with only by using entity snap (osnap) tools in gCADPlus to accurately place new lines and other entities by ‘snapping’ to existing geometry in the design.

This movie shows the use of entity osnaps using some landscape examples.
Using these entity snap tools, it is possible to produce landscape drawings with considerable speed and accuracy. When snaps are used, there is no need to zoom in and place entities by eye; a technique that often results in small gaps in drawings. Instead, entity snap functions are used to set location for the entity being placed. These snaps are versatile and give gCADPlus the ability to snap to a wide range of ‘geometric’ points (or handles) on entities in the drawing. Any time the software asks for a “To point” these snaps can be used to locate a position.

Every entity placed in a gCADPlus landscape drawing has a number of defined snap points. For example, it is easy to jump to the mid or end point of a line, the center of a circle or the center of an arc. These points are indicated by ‘handles’ or ‘grips’ that vary according to the type of entity. The figure below that shows most of the ‘primitive’ entities in gCADPlus and their respective handles (or grips).

This small movie shows how handles and the entity snap system works in the gCADPlus environment.
To reiterate, entity snaps enable quick selection of exact points on existing entities without needing to know the exact coordinates of those points. You start a command - for example the LINE command, and select a start point(say) the end, then locate a destination point on a line, arc, the center point of a circle, the intersection of any two entities. The location does not even have to be an entity. Entity snaps can be used to draw entities that are tangential or perpendicular to existing entities.

The following entity snap ‘jump’ points are available: Center, Near, End, Mid, Node (Point), Quadrant (Grip), Tangent, Perpendicular, Near, Insertion, and Intersection.

Using entity snaps - an example

Suppose two circles indicating a water feature need to be positioned centered on the end of a distribution pipe for a water feature as shown in the figure below.

This little movies show how this drafting step could be done using osnaps and existing geometry.
Precise positioning is managed by selecting the circles, right click and choose the move option. When asked to nominate a base point for the move, it is possible to select the Snap to Center option from the Osnap tool bar (shown below), and in response to the “move to” prompt, use the midpoint option from the tool bar to locate the circles accurately at the end of the rectangle representing the distribution pipe. The result is accurate location, no coordinate positions are needed. Everything flows from existing geometry.

The osnap ‘Near’ option

Let’s take another example, using a different osnap (entity snap) options- the Near option. This particular esnap enables the software to lock onto an entity (e.g. a line). The cursor sticks to the line and the final location of the “to point” can be set by sliding the cursor along the line. The “to point” is locked to the line when the left mouse button is clicked.

Tip: The nearest option is a misnomer. It does not mean that the “to point” is somewhere near the entity you point to, it is right on the money!
The figure below shows the nearest option being used to copy a symbol along a line to indicate a formal row of trees or shrubs.

Using the “Near” option to locate a symbol on top of a construction (or perhaps an irrigation) line.
An alternative method for setting osnap options

In the examples shown thus far, the required entity snap has been selected from the osnap tool bar each time it is required. However, an alternative, and much more efficient method when asked for a ‘to point’ is to simply right click and choose ‘snap overrides’.

Using the right mouse menu to select the required osnap setting.
Snapping to the quadrant of a circle - the Grips option

It is not immediately obvious, but the grips osnap option allows snapping to each of the four quadrants of a circle (or part of a circle - an arc). Consider the design below. As part of a quasi formal design, this landscape designer wanted a construction line to start from a quadrant of a circle to run through the mid point of the path. The grips (or quad osnap) allows that to happen smoothly.

Using the grips option to locate a ray starting at the quadrant of a circle.
Running osnaps

So far, each osnap selection that we have made has been a single 'one-off' selection. However, there are times when you will want a snap selection to stay active. In this case, set a running osnap. The Drafting Settings dialog box - the osnap tab - can be used for that purpose. To activate it, right click in the drawing editor and select drafting settings and the osnap tab. The resulting dialog box is shown below.

Tip: The object snap settings box can also be reached via the osnap tool bar and the format drop down menu.

Running osnaps vs. single use osnap
To set a running osnap, select the first tick box - “Object snap on”, then select the required osnap - end, int, node etc.

*Tip:* Note that the F3 function key is a toggle for switching running osnaps on or off.

*Tip:* Try and minimize the number of option boxes you tick. If you run with a lot of snap options on at the same time, the software will spend far too much time hunting for handles on elements in the drawing. This is particularly a problem in crowded areas of the drawing. You may well find that the to point is not where you expect it to be simply because the software has jumped to a handle that you did not see.

![Visual clues to osnap operation](image)

If an osnap is in operation, the tab on the status lines shows as pressed in. One press on the F3 key takes it off.

To ‘tweak’ the osnap settings on the fly, click the magnet option.

Osnap indicators

When an osnap is selected, and you move close to an entity in the drawing with an appropriate handle, a magenta colored marker shows.

*Tip:* To alter the size (and color) of the marker go to Global Settings on the Tools drop down menu. The size if the aperture box that the software uses to locate the appropriate osnap handle can also be changed in this way.

Why this emphasis on the use of osnaps?

gCADPlus is more than a replacement for a drawing board. When laying out a design, it helps you create an accurate full size model of the real landscape. Because the software builds the model to a high level of accuracy (using osnaps), key information can be extracted. For example:

- Dimensions are not applied by scaling off a ruler, they are drawn (taken) from the model itself. This provides a high level of security that the design can be properly constructed.
- Quantities can be extracted from a drawing answering questions such as what volume of mulch is required to cover a bed to a specific depth.
- A setout point table can be prepared that enables a construction team to quickly mark out the site.

None of the above is possible unless you master the use of entity snap settings.

This emphasis on osnaps applies whether you are placing entities or editing a drawing. Many edit commands require you to anchor points (e.g. the base point in a MOVE operation) accurately. This is best done by the use of entity snaps. Badly drawn CAD drawings often show small gaps between entities and this can cause all sorts of problems, especially when applying hatching. Entity snaps enable you to quickly select exact geometric points on existing entities without having to know the exact coordinates of those points. With entity snaps, you can select (say) the end point of a line or arc, the center point of a circle, the intersection of any two entities, or any other geometrically significant position whenever the software asks for a point location. The location does not even have to be an entity. You even use entity snaps to draw entities that are tangential or perpendicular to an existing entity.