ARRIS Site Design Components

The ARRIS Site Design Module consists of five general site functions plus a repeated item library containing numerous typical site elements. The Survey module is a set of tools for laying out property lines and lots as well as a utility to output survey data and tables. Contours is a self-explanatory set of tools for the input of topography that forms the basis for the next module, 3D Site, which allows for section cuts, 3D cake and 3D mesh modeling. Last are the Parking and Paving modules with parametric routines for rapid layout of parking lots and walkways.

Survey Tools

Before beginning the actual layout of your property lines, I find it most convenient to set my line parameters by selecting a line style from the Lines menu. You may also want to set your text font but be forewarned that only the distance portion of the label will be affected. The bearing font is "hlc" and it cannot be changed. The property line endpoint marker is selected using the setup icon on the Survey menu.

Next, verify that the labels that are automatically generated as you draw your property lines are set up according to your preferences. There are multiple formats to choose from and remember to set the tangent and curve number parameters if you will be generating a table from your data. For the final setup step, go to the ARRIS Database (flat file) icon, click on Settings and change your Output Units to Feet and Format to Decimal with the desired level of rounding.

Select Run Input box and choose the type of entity to draw. ARRIS will prompt you for a bearing; use the format "N 52 16 23 E" and note that ARRIS will allow you to skip the minutes and seconds if they are equal to zero. After you enter the distance, select the next entity type from the menu of options at the command prompt. Note that the choice "rel line" provides you the opportunity to type in an *angle* (not a bearing) from the last line or arc.

Continue to input your property lines until you are back at the start point. Do not be surprised if your lot does not close exactly as many surveyors will tell you that they often don't. If you are laying out a boundary from scratch, choose the single line or arc icon below Run Input box and select a method to complete your lot.

CLEANING UP – My companys' drafting standard is to have a heavy lot line with thinner text and targets on the ends. Since I have had some difficulty with the Survey edit tools, I only use them for flipping labels. I edit the label text using the text entity filter just as I would for edits of regular text and likewise, a repeated item edit for the symbols.

Contours Menu

Contours are input by simply drawing running lines with a few important exceptions. By using the lines from the Contour menu, one can easily label the contours and change the elevation value quickly. These lines also form the basis for automatic creation of three dimensional topography from within ARRIS.

Setup is straightforward from the setup icon. Note that the rapid lines routine will create a lot of entities in a short time but this choice may result in smoother contours. Once contours have been drawn, use the Contour Labels routine to quickly note the elevation according to your preferred format. A simple routine is also provided for Spot Elevations.

When contours are not available in CAD format, one technique we have found useful is to use raster images of topography which we trace over in ARRIS. While this can take a bit of practice to size the image properly and get desirable results, it provides reasonably accurate proportions and scale for site analysis and design.

3-D Site

Using the Contour menu to input contour lines allows their use for automatic 3-D site creation. These routines include the ability to generate a section cut diagram, 3-D cake and 3-D grid models. The setup menu for each routine prompts for the destination layer of elements to be created as well as for adjustments to grid spacing and output color. Be sure to select shadeable colors for better results when opaquing the display and if desired, differences in height can be accentuated by choosing the Color By Height routine.

There are also two handy routines for automatically elevating contour lines and repeated items to the correct Z height. Contour lines when placed are actually drawn with a Z coordinate of 0 making this routine handy for the export of contours to other CAD programs at the correct elevation. The RI Elevate routine makes correct Z height placement of repeated items automatic, greatly enhancing the efficiency of their use in 3-D models.

Parking & Paving Menus

The parking overwrite menu allows for rapid layout and tabulation of parking lot space totals. Various island shapes can be created following the input sequence shown on the pop-up menu icons. Once the points are entered, the island is drawn with or without a second line for the inside of curb and the shape is automatically filleted according to the current radius setting.

Parking spaces are drawn by entering start and end points and then selecting stall types from the menu. ARRIS will calculate how many stalls of that type will fit and allow you to make multiple adjustments to the mix of stall types and how extra space is handled. Once you are satisfied with the result, click "Place" and the layout is drawn. Extra parking stripe lines can be deleted without affecting parking counts as long as you do not delete the line at the head of the space since this line includes the attribute used for the stall counting routine.

Placement of sidewalks is similar to drawing smart walls in that you choose a side of the walkway as a justification line for placement. However, once the routine has completed, the resulting entities are multiple independent lines and arcs. Curb cuts can be added by drawing an additional line for the curb and then choosing either of the two routines for quickly breaking the line and adding fillets.

Topographer

Topographer duplicates some of the functionality of Site Design and adds features in some key areas. You may notice that clicking on the Survey menu box brings up the same overwrite as in Site while selecting the Contours menu box brings up a different overlay with many of the same functions contained in Contours from the Site module.

One of the major capabilities that Topographer adds is the ability to import and export site survey data in addition to manual point data entry. This can be site data in textual form received directly from a surveyor or it can be obtained from the USGS. There is a higher degree of control and fine tuning available in Topographer as well as some handy display utilities.

The second significant feature provided by Topographer is the ability to perform cut and fill calculations. You can use the contour lines drawn by the Site package or they can be used to generate the point data that Topographer then uses to create a 3D contour grid. Once a three dimensional contour grid is generated, Section Cut lines can be placed and displayed, forming the basis for the Volume Grid calculation and display.

Topographer – Small Project Case Study

Ed Gilmore, of BCAD Services will demonstrate a real world example of his use of Topographer to assist in the relocation of an historic building. The general scope of work included taking field measurements of the proposed new location, inputting those points using Topographer and providing the owner with an analysis of various options such as a full basement, partial basement and crawl space.