Iowa Department of Transportation
**Office of Design**

Superelevation – Automated

Design Manual
Chapter 21
Automation Tools
**Instructions**
Originally Issued: 03-31-09

Geopak provides an extensive set of shape tools to generate, evaluate, edit and generally **Manage** the superelevation shapes. Start the Geopak application from the MicroStation pull-down menu, as follows: *Applications > Bentley Civil > Activate BENTLEY CIVIL*, as shown at the right.
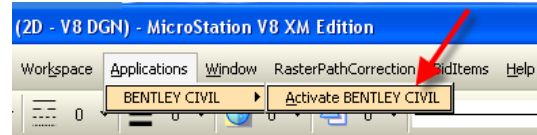
There are two ways to access the Geopak **Superelevation Shape Manager Tools** palette.

A. Directly from the **Applications** pull-down menu as follows: (and as shown at the right)
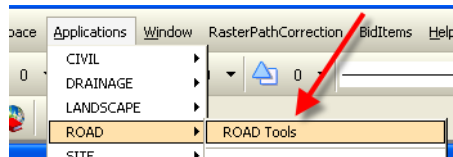
Applications >
  Road >
    Cross Sections >
      Superelevation Shape Manager Tools
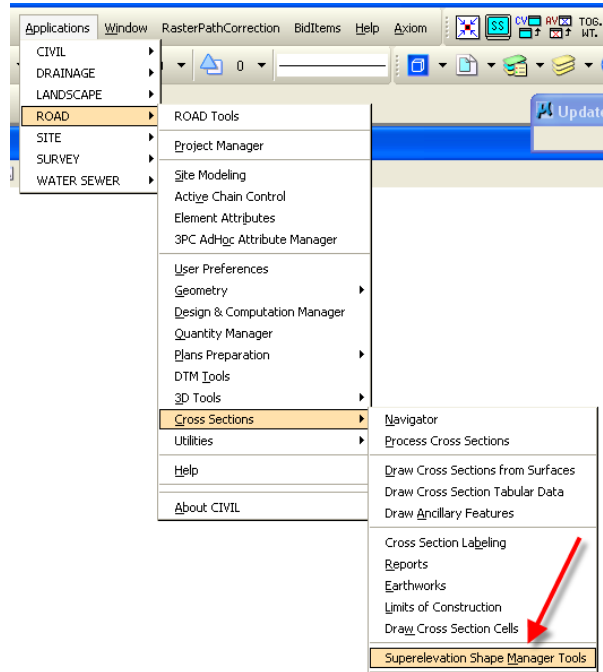
OR

B. Through a series of three Geopak tool palettes, as shown below:

1. Open the Geopak **Road** tools palette from *Applications > ROAD > ROAD Tools,* (as shown below.)

2. From the **ROAD** Tools Palette, access the **Cross Section Navigator** tool palette, as shown at the right.
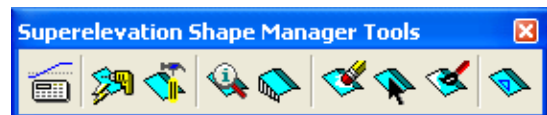
3. From the **Cross Sections** tool palette, select the **Shape Manager** icon, as shown at the right.

Either of the above two methods will produce the **Superelevation Shape Manager Tools** palette, as shown at the right.
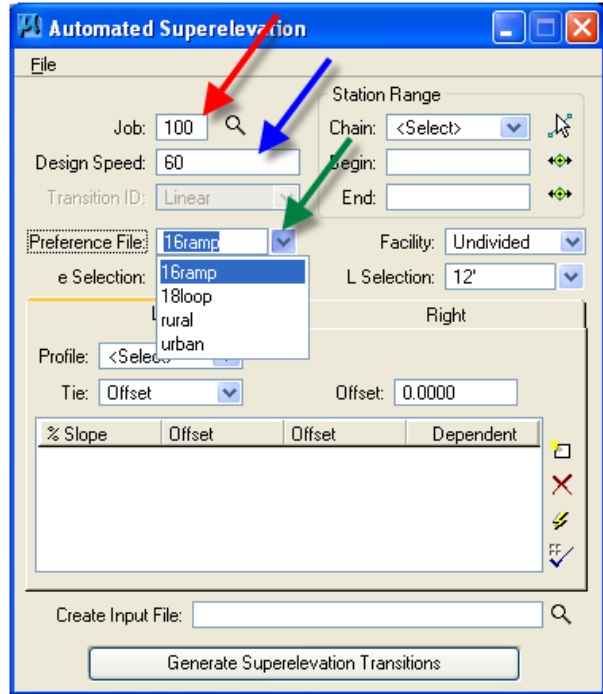
Select the **Automated Superelevation** icon (at right) to produce the dialog shown below.

In the **Automation Superelevation** dialog, at right,

> enter a **Job** number, (red arrow),
> enter a **Design Speed,** (blue arrow), and
> select a **Preference File** from the drop-down selection list, (green arrow).

The **Preference File** options are as follows:

> **16ramp** –
>> file is for 16 foot wide ramps method 5 superelevation distribution method
>
> **18loop** –
>> file is for 18 foot wide ramps method 5 superelevation distribution method
>
> **Rural** –
>> used for open highways and turning roadways, method 5 distribution
>
> **Urban** –
>> used for low speed urban roadway, method 2 distribution

The "**Rural" Preference File** is for higher speed roadways and therefore will be selected most often.

Choose an **"e Selection"** for the appropriate roadway design speed and maximum Superelevation cross-slope percent, as shown by the red arrow at the right.
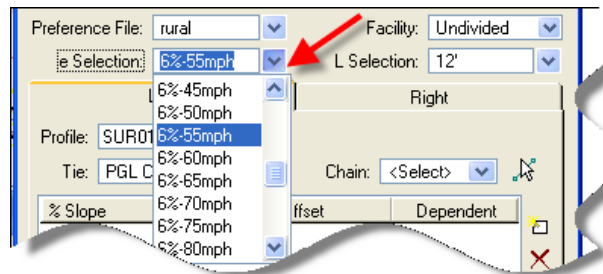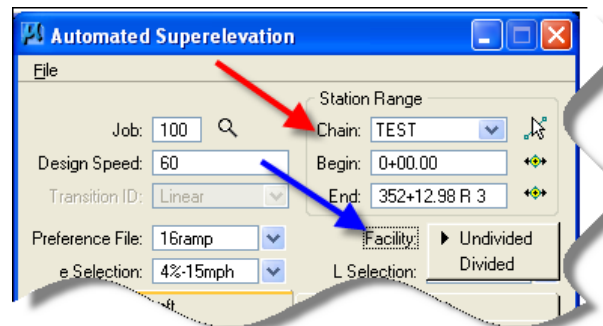
Select a **Chain** name from the drop-down selection list**,** (red arrow at right).

Select a **Facility** type, (blue arrow at right).

> An **Undivided** facility has the axis of rotation at the centerline of the roadway.

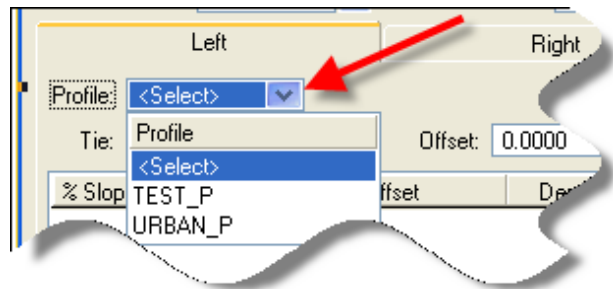> A **Divided** facility has the axis of rotation at the edge of pavement or the edge of shoulder.

Choose an **"L Selection"** normal roadway width**,** (red arrow, at right).

    Use 12' for rural and urban preference file.
    Use 16' for 16ramp preference file.
    Use 18' for 18loop preference file.
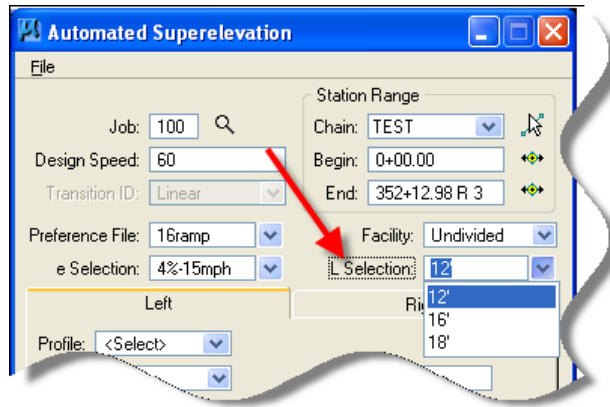
Select a **Profile** from the drop-down list, (red arrow at the right)

From the drop-down selection list, choose the **Tie** location where the Profile is to be applied, (red arrow at the right), which will be either the **PGL Chain** centerline or an **Offset** distance. If **Offset** is selected, a value must also be entered, (blue arrow at the right).
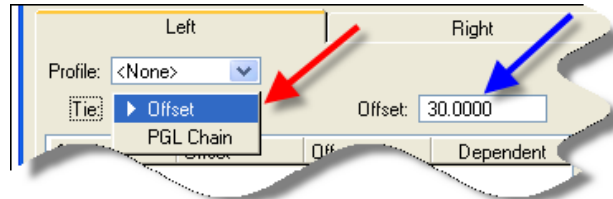
    A **Tie Offset** indicates a constant horizontal offset distance from the baseline to the **Profile**. A negative tie value means the **Profile** is offset to the left of the proposed alignment. A positive tie would be offset to the right of the alignment, relative to the direction of the stationing. If a **Tie Offset** is utilized, then the **PGL Chain** cannot be utilized.
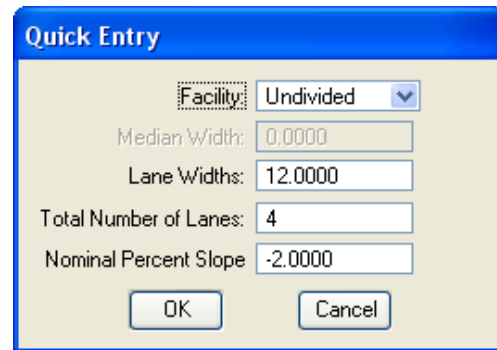
    The **PGL Chain** is the chain that defines the **Profile Grade Line (PGL).** This is optional and only used when the offset distance from the Baseline to the **Profile** is not constant. If a **PGL Chain** is utilized, then the **Tie Offset** cannot be utilized.

Add the necessary lanes in each direction, using either the **New Lane** or **Quick Entry** method, shown at the right and explained below.
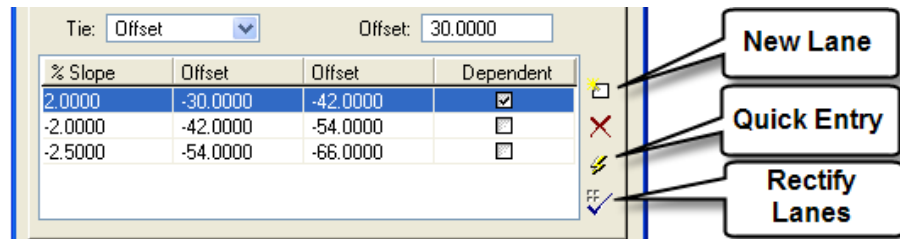
The **New Lane** option enters a new line of data with assumed values that may require editing.

The **Quick Entry** option opens the **Quick Entry** dialog.
After entering the information on this dialog, the number of
lanes and their corresponding offsets are automatically
entered into the shape cluster list boxes, (above). If an odd
number of lanes is entered (such as five) the center lane is
put half on the left tab and half on the right tab. Populate the
dialog with the desired data, then click **OK** to close the
Quick Entry dialog and populate the main dialog.
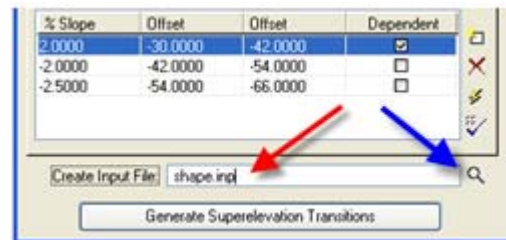
The **Rectify Lanes** option eliminates any gaps or overlaps
between lanes, ensuring that one lane starts where the
other lane ends. For example, if one lane is set to 0 and 12,
while the next lane is set to 10 and 24, there's an overlap between 10 and 12. Clicking **Rectify Lanes** will
leave the 0 to 12 lane intact, and change the second lane to 12 and 26, maintaining the width of the
second lane but eliminating the overlap.

The inside shape elevation is determined directly from the **Profile** elevation**,** and therefore is called the
"dependent shape". (An "independent shape" does not rely on the proposed profile, but obtains it's
elevation from it's connection to a "dependent shape".)

Create Input File for the superelevation shapes by
providing a file name, (red arrow at the right), and
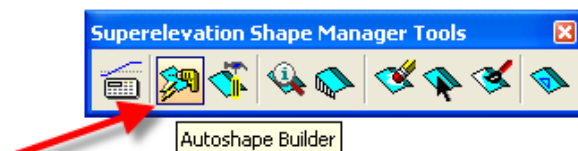browsing for a location to store the file, (blue arrow at the
right).
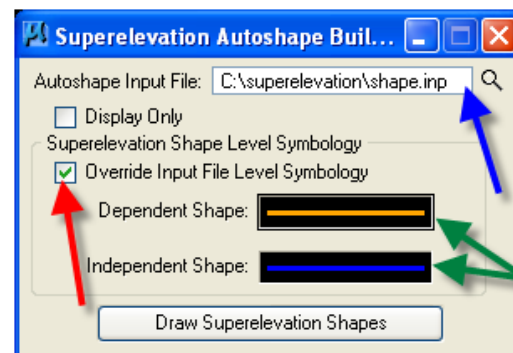
From the **Superelevation Shape Manager Tools**
dialog, shown at the right, select the *Autoshape
Builder* icon, (red arrow), which will display the
Superelevation Autoshape Builder dialog, as
shown below.

In the **Superelevation Autoshape Builder** dialog, locate
and select the appropriate **Autoshape Input File**, (blue
arrow, at the right). If the **Input File Level Symbology** is
to be changed, *check,* (☑), the **Override Input File Level
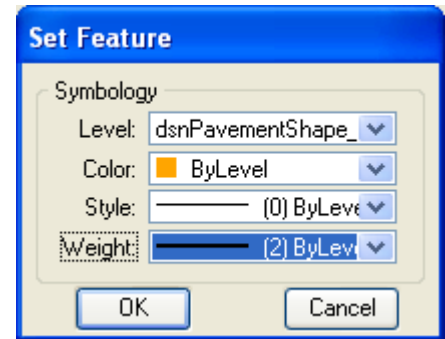Symbology** check-box, (red arrow at the right).

If the Input Overrides check-box, (☑) – red arrow above), is checked, *double-click* on either of the "symbology preview" boxes, (green arrows, above). This will open the **Set Feature** dialog shown at the right. Change the feature values, as necessary, and *click* the **OK** button.

Lastly, *click* the **Draw Superelevation Shapes** button, (blue arrow, to the right), to cause MicroStation to draw the shapes in the design file.
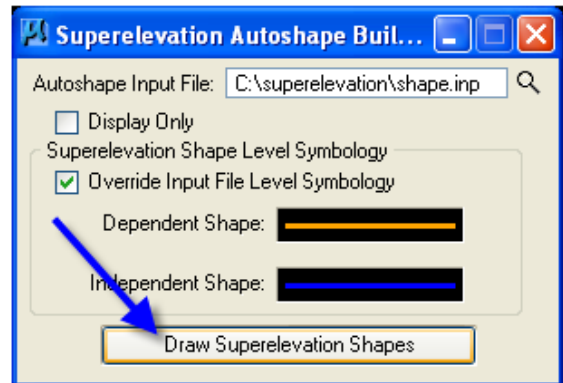
For complete information on Superelevation Automation, see the Geopak Help files, located as follows:
   Applications > ROAD > Help > Index > Automated Superelevation