

# **Intro to TransCAD GIS**

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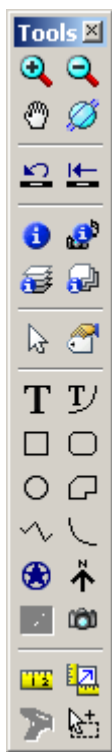
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# 1 TransCAD Basics

This section focuses on very basic features of TransCAD that will be used to bring in a line file and build a map for our modeling and planning projects. The advanced features will be covered in other training sessions later.

## 1.1 Using Main Toolbox

The Main Toolbox is displayed automatically when you open a map in TransCAD. If it is not, choose *Tools - Toolbox* to open it.



Tool	Name	How to Use It
	Zoom In	Click on a point, or drag a rectangle, to make the scale larger and change the center
	Zoom Out	Click on a point, or drag a rectangle, to make the scale smaller and change the center
	Pan	Drag the map to change the center
	Previous Scale	Click the button to return to the previous scale
	Initial Scale	Click the button to restore the initial scale
	Magnifier	Move it over the map to enlarge the area under the magnifier

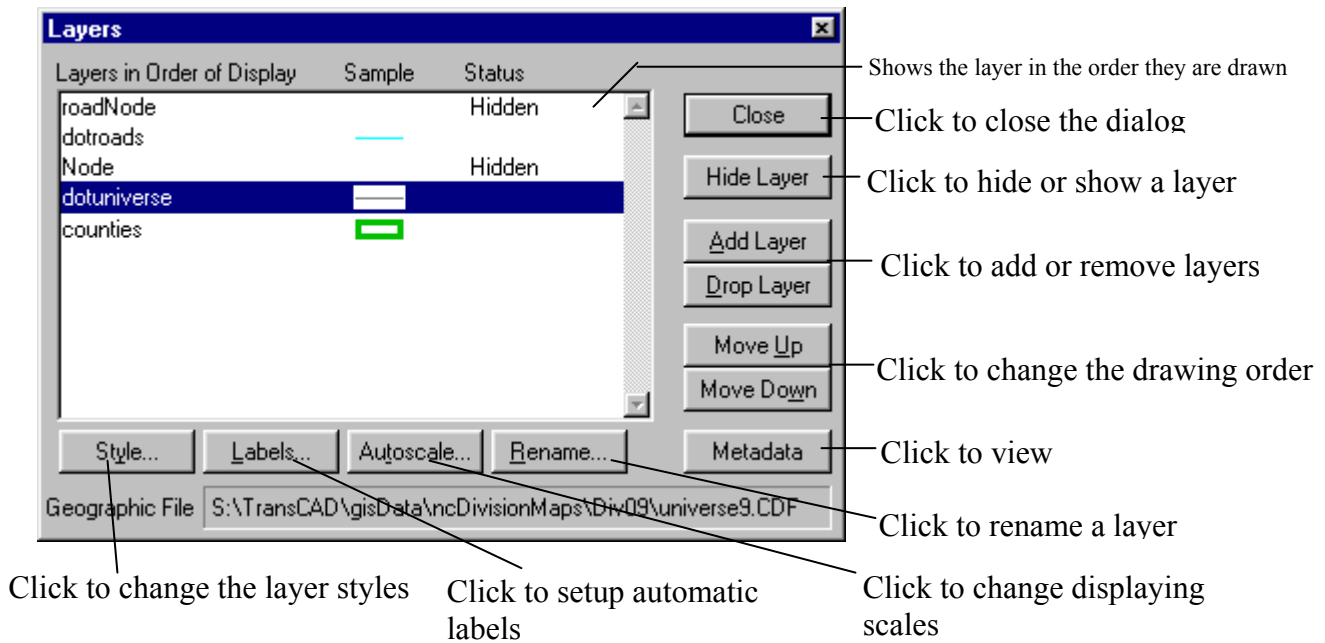
Tool Name	How to use it
Text	Drag a rectangle on the map, type the text you want, and press Enter. Type a vertical bar " " in your text to skip to another line.
Curved Text	Click on each point along the curve, double-click to end it, type the text you want, and press Enter.
Rectangle	Drag a rectangle on the map, or hold the Shift key to drag a square.
Rounded Rectangle	Drag a rectangle on the map, or hold the Shift key to drag a square with rounded corners.
Circle	Drag an ellipse on the map, or hold the Shift key to drag a circle.
Polygon	Click on each corner of the polygon, and double-click to close it (the first and last points connect automatically).
Line	Click on each point along the line, and double-click to end it.
Curve	Click on each point along the curve, and double-click to end it.
Bitmap	Drag a rectangle on the map, then choose a bitmap (.BMP) or JPEG (.JPG) file.
Symbol	Click on the map. Hold the Shift key and click on the map to choose a symbol.
North arrow	Drag a rectangle on the map, then choose a style and color.

Tool	Description
	Multi-Layer Info tool: finds the points, lines, and areas at or near the location where you click, then displays all the fields for one feature at a time in the Multi-Layer Information toolbox
	Multi-Layer Area Info tool: finds the area feature in each area layer at the location where you click, then displays one field for each area feature in the Multi-Layer Area Information toolbox

## 1.2 Layering Features on A File

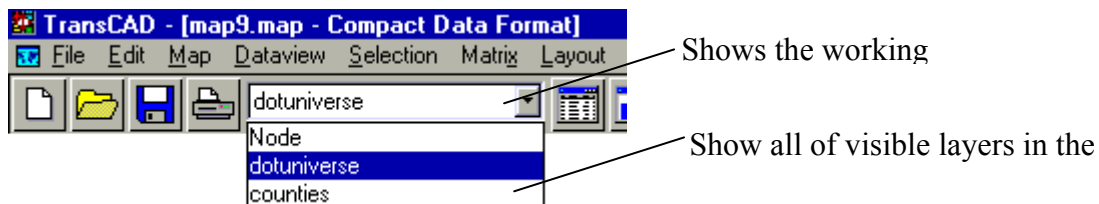
A map is a collection of information. TransCAD organizes the information in a map into layers. Each layer is a group of features of the same type, such as states, highways, or airports. You control the contents of a map by choosing which layers to include and the order in which they should be drawn. You can also set layers so that they display automatically at certain map scales.

To open the **Layers** dialog box, click on 



## 1.3 Choosing Current Working Layer

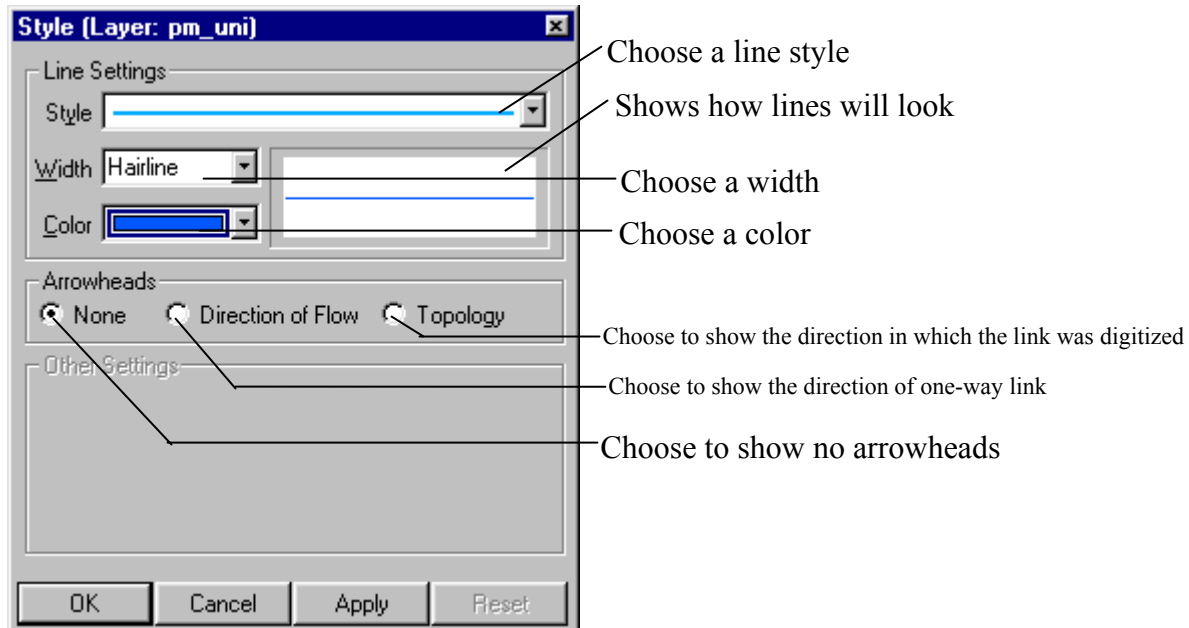
The TransCAD commands that are used to set colors, styles, thematic map settings, and labels operate on one layer at a time. This layer is called the working layer. The name of the working layer is shown in the layer list on the toolbar. You change the working layer by choosing one of the visible layers in a map from the drop-down list.



## 1.4 Using Styles

TransCAD uses the term style to talk about the colors, patterns, symbols, and lines that are used to draw map features. Each layer in a map is drawn in a particular style. You change the style of a layer using the Style dialog box. The Style dialog box looks different for point, line, and area layers because you have different choices for each type of layer.

To open the **Style** dialog box, click on 



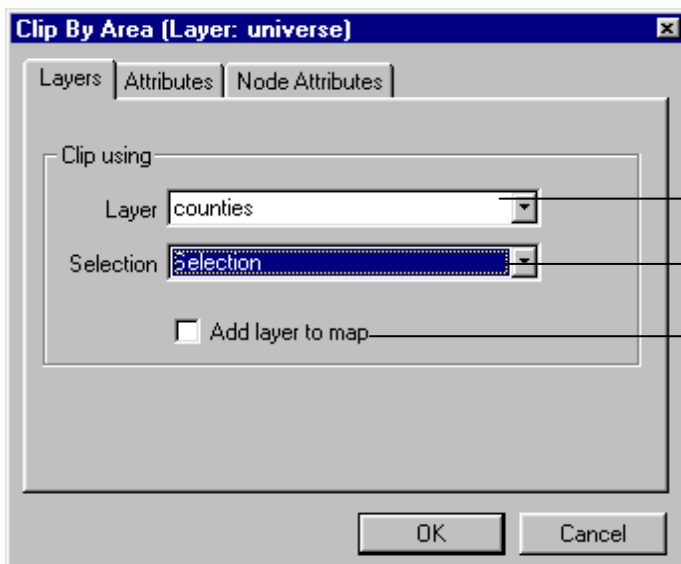
### TIP

- With the **Direction of Flow**, arrow heads will only be shown on one-way streets (links)

## 1.5 Clipping Geographic Files By Area

The *Tools-Geographic Utilities-Clip by Area* command allows you to export the portion of the working layer that is within an area of interest. For example, you could select a few counties from the statewide county map, and use the *Clip by Area* command to create new geographic files of just the roads, highways, or TAZs in the selected counties. You can control how attributes are handled for lines and areas that are split.

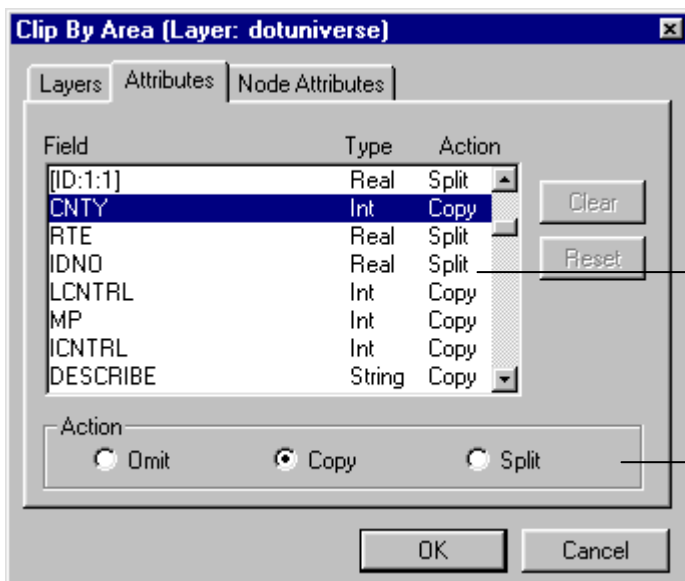
To open the *Clip By Area* dialog box, choose *Tools-Geographic Utilities-Clip by Area*



Choose the cutting layer

Choose the feature set to use for cutting

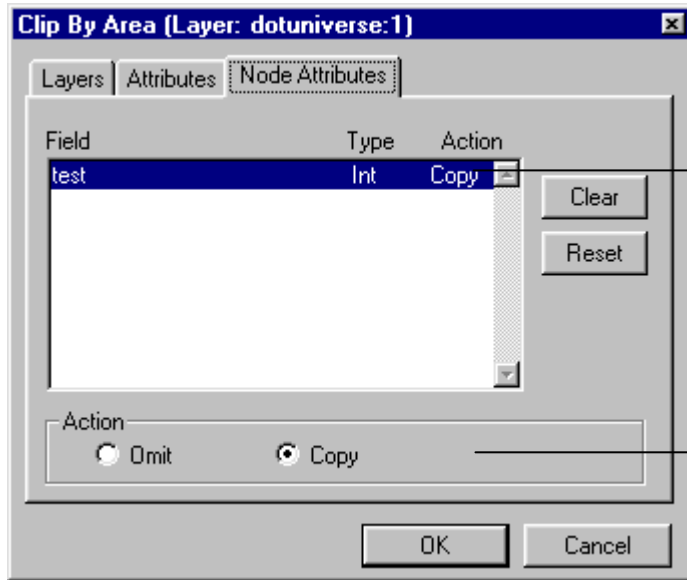
Choose to add the layer in the current map



Shows how to compute line attributes

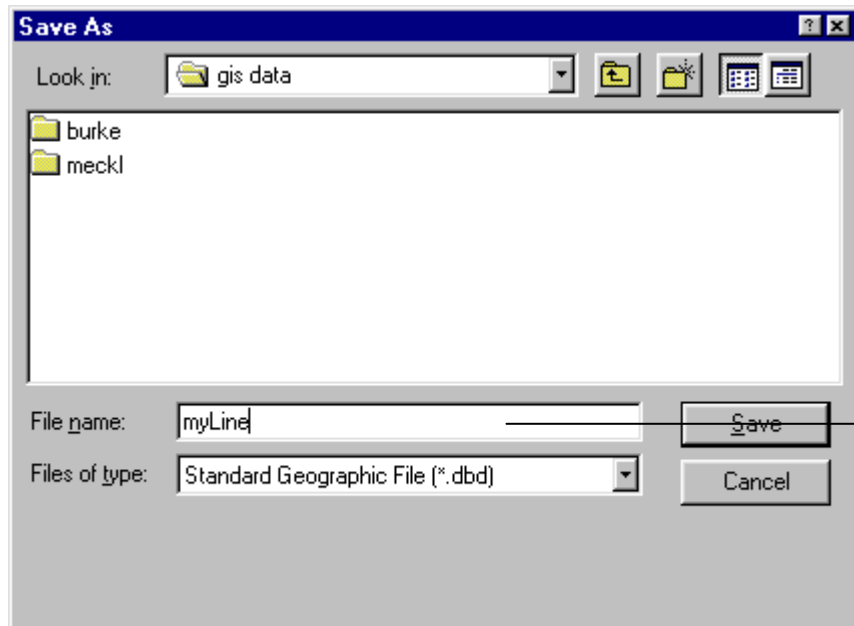
Choose how to compute line attributes





Shows how to compute node attributes

Choose how to compute node attributes

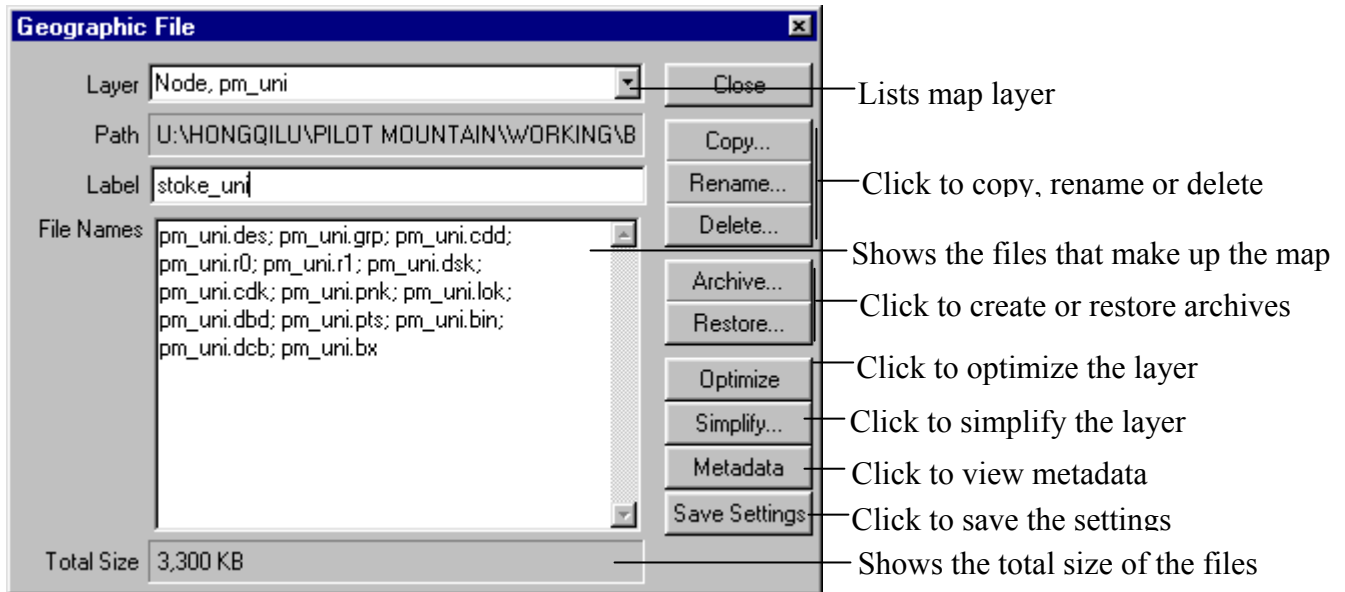


Save your line file

## 1.6 Maintaining Geographic Files

Geographic File dialog box shows you the names and total size of all the files on disk that make up a single geographic file or map layer. From the Geographic File dialog box, you can copy, rename, and delete geographic files, create or restore archives of geographic files, optimize and simplify geographic files. You can also view the metadata which describes your data and save the settings for the layer including display style, selection sets, themes and labels.

To open the **Geographic File** dialog box, choose *Tools-Geographic Utilities-Geographic File*




### TIP

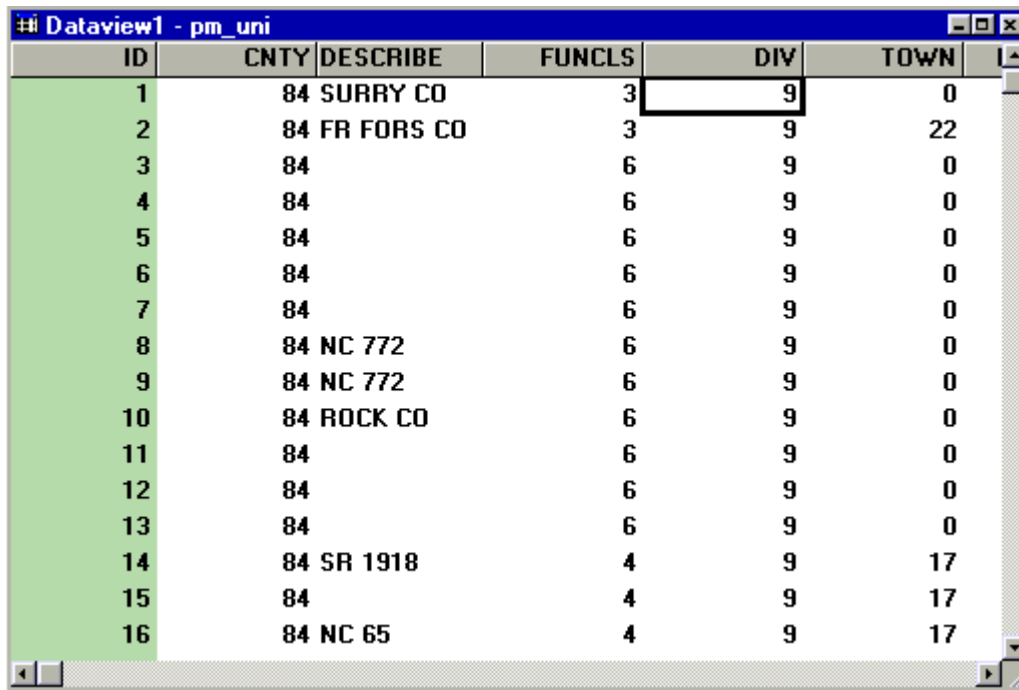
- All geographic file copying, renaming, and deleting should be done within TransCAD using the geographic file dialog box rather than Windows Explorer

## 1.7 Displaying Data In Dataview

A dataview is a window that displays data as a table, with information presented in rows and columns. Each row is called a record and represents the data for each geographic element. (For example, one segment of a road, one endpoint, or one TAZ.) Each column is called a field and contains one piece of information about each record. At the top of each column is a heading that contains the name of the field.

Common fields for a geographic file representing roadway data are length, road name, speed limit, capacity, etc. Common fields for TAZ layer are TAZ number and area.

To open a **Dataview** window, click on 



The screenshot shows a window titled "Dataview1 - pm\_uni" containing a table with the following data:

ID	CNTY	DESCRIBE	FUNCLS	DIV	TOWN
1	84	SURRY CO	3	9	0
2	84	FR FORS CO	3	9	22
3	84		6	9	0
4	84		6	9	0
5	84		6	9	0
6	84		6	9	0
7	84		6	9	0
8	84	NC 772	6	9	0
9	84	NC 772	6	9	0
10	84	ROCK CO	6	9	0
11	84		6	9	0
12	84		6	9	0
13	84		6	9	0
14	84	SR 1918	4	9	17
15	84		4	9	17
16	84	NC 65	4	9	17

## 1.8 Modifying Data Table

TransCAD lets you change the structure of a table so you can remove fields you no longer need or add space for new data. You can use the ***Dataview-Modify Table*** command to make these types of changes:

- Add or remove fields
- Change the order of fields
- Change the field names
- Change the type, width, number of decimals, and format for any field
- Add or remove indexes for any field
- Change the description of each field
- Indicate how data should be aggregated
- Attach or drop lookup codes

To open the **Modify Table** dialog box, choose ***Dataview-Modify Table***

The 'Modify Table' dialog box contains the following table of field specifications:

Field Name	Type	Width	Dec	Index	Default	Format	Display Name
ID	Integer (4 bytes)	10		<input checked="" type="checkbox"/>		None	
Length	Real (8 bytes)	10	2	<input type="checkbox"/>		None	
Dir	Integer (2 bytes)	2		<input type="checkbox"/>		None	
MPO_Screenline	Character	16		<input type="checkbox"/>		None	
Func Class_Old	Character	3		<input type="checkbox"/>		None	
Func Class	Character	3		<input type="checkbox"/>		None	
02-08_Update_F(	Integer (4 bytes)	10		<input type="checkbox"/>		None	
Func Class_02	Character	3		<input type="checkbox"/>		None	
Func Class_09	Character	3		<input type="checkbox"/>		None	
Func Class_15	Character	3		<input type="checkbox"/>		None	
Func Class_25	Character	2		<input type="checkbox"/>		None	

Annotations for the dialog box:

- Lists the fields in the table (points to the table)
- Click to add or remove a field (points to Add Field and Drop Field buttons)
- Click to change the order of fields (points to Move Up and Move Down buttons)
- Click to attach, drop or export lookup codes (points to Attach Codes, Drop Codes, and Export Codes buttons)
- Click to view the default aggregation method (points to Aggregation button)
- Not available with modifying a table (points to Settings... button)

An **index** is a set of additional information about the values of a field that TransCAD uses when you make a selection or sort a dataview. Indexes make selection and sorting faster but take up space on your hard disk or network drive. Only use indexes for the most key fields.

**Attach Codes** is used to attach a lookup table to the original data table. Often a database will contain shorthand codes that have a particular meaning. Using codes saves space because long character strings are replaced with shorter codes. Using **Attach Codes** feature, you attach a lookup table to the original table. Then TransCAD can automatically replace these shorthand codes with more accurate, descriptive text in the table.

You can also setup the default **Aggregation Method** used when you overlay, merge and join views. We are going to cover these features in more detail later in the advanced training session.

**Record Information** section is not available for modifying a table. It is used when you create a new table.

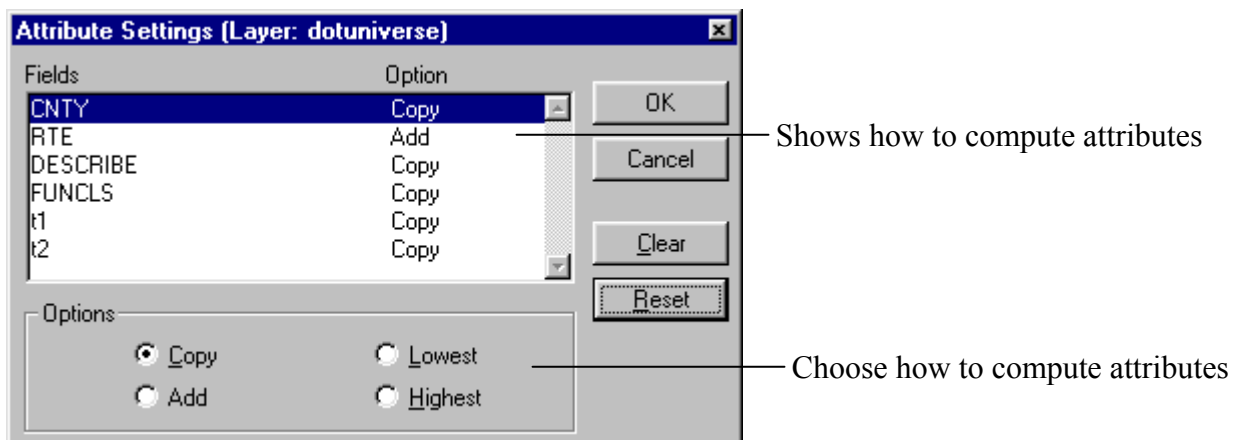
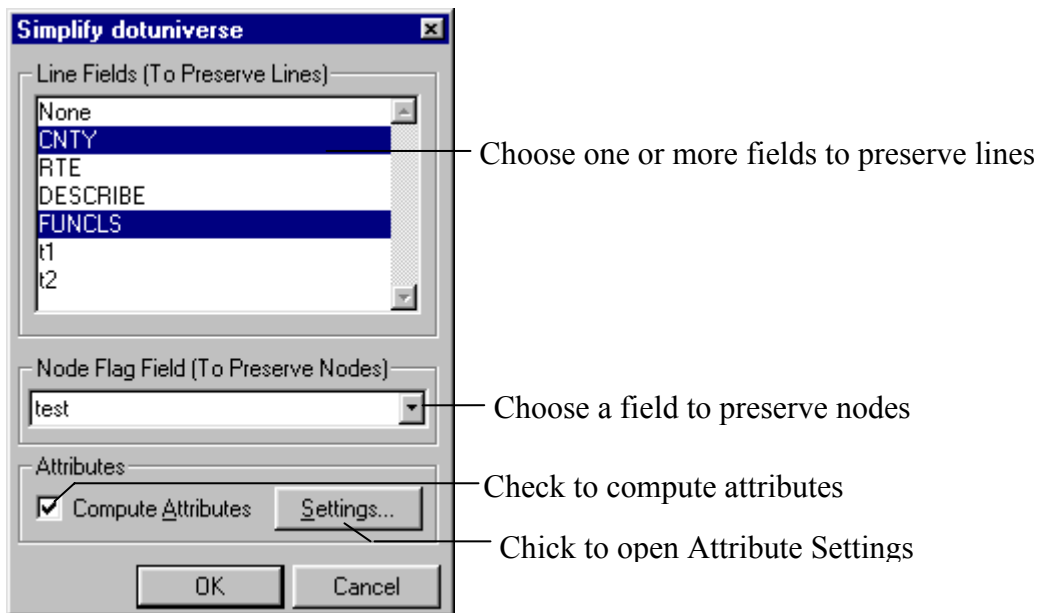
**TIP**

- Archive your file before modifying your data table so you won't lose the data.

## 1.9 Simplifying A Line Layer

Using the feature of simplifying a line layer can reduce your editing work of your line file. At nodes where there are only two lines without an intersection, you can join lines and remove the node. You can choose one or more fields that must be compared before the lines are joined. If the values in any of the chosen fields are different, the lines will not be joined. You can also choose a numeric flag field for preserving nodes. If the field contains the value 1 the node will be preserved; otherwise the node can be removed.

To open the **Simplify** dialog box, choose *Tools-Geographic Utilities-Geographic File* to open the **Geographic File** dialog box, then click on *Simplify...* button



Character fields can only be copied. For numeric fields you can also add the values or use the lowest or highest value.

**Clear** sets the options to copy.

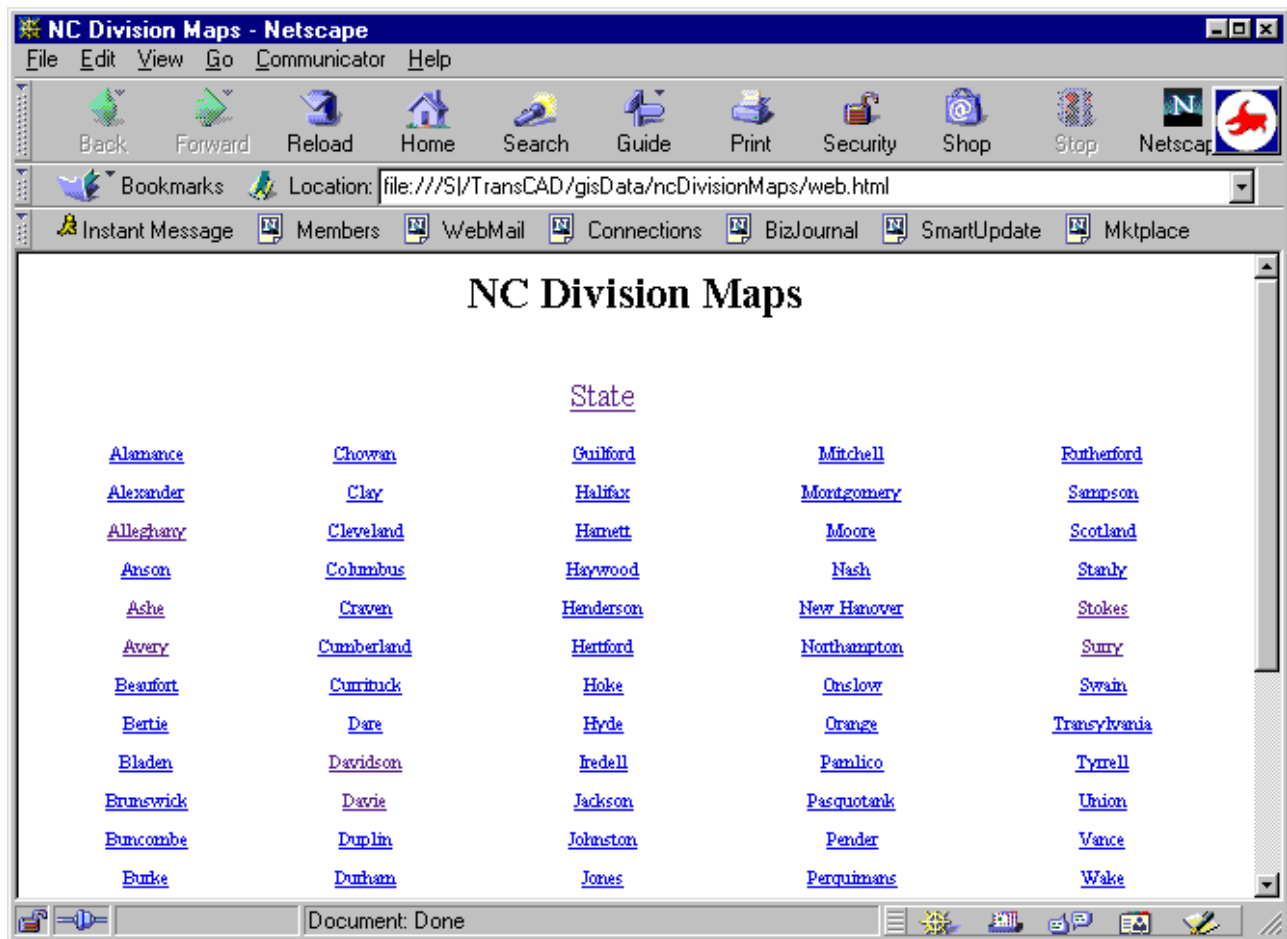
**Reset** sets Character fields to Copy and numeric fields to Add.

## 2 Bringing In A Line File

You can bring in a highway map from the NC Division Maps web page, export your study area into your own file for editing.

### 2.1 Opening the State Map

To opening the state map, go to <S:\TransCAD\gisData\ncDivisionMaps\web.html> and click on the **State** to open the map in TransCAD. If one division map can cover your whole study area, then you may want to use a division map instead.





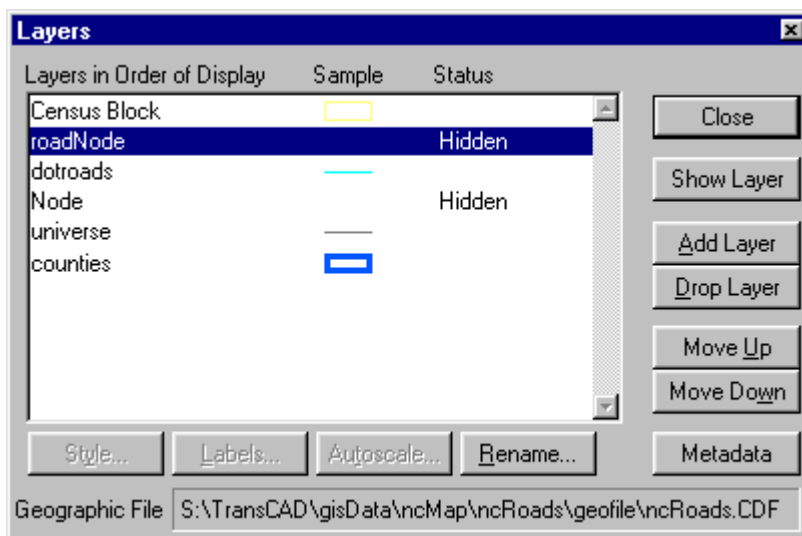
## 2.2 The NC State Map

There are four geographic files in the map. They are **dotuniverse**, **dotroads**, **counties** and **census block 2000**. They have been already converted into TransCAD geographic file format, so you don't need to do any converting to them.

The **universe** file can be used to create your highway line work. The **dotroads** can be used as a reference when you editing your line work. The **census block** can be used to create your TAZs. And the **counties** can be used as a reference layer to export your study area.

The following table describes the files in details.

Layer Name	Data Source	Data Field Description
universe	GIS Unit	<a href="http://www.ncdot.org/planning/statewide/gis/DataDist/GIS_Metadatas.html#q12">http://www.ncdot.org/planning/statewide/gis/DataDist/GIS_Metadatas.html#q12</a>
dotroads	GIS Unit	<a href="http://www.ncdot.org/planning/statewide/gis/DataDist/GIS_Metadatas.html#q7">http://www.ncdot.org/planning/statewide/gis/DataDist/GIS_Metadatas.html#q7</a>
counties	GIS Unit	N/A
census block	Census 2000 CD from Caliper	N/A



## 2.3 Exporting Your Study Area

After you open the state map in TransCAD, you want to select your study area from the **counties** layer, then use it as an area cutter to cut out all the features covered by the area and export them into your own file. This is done on one layer at a time.

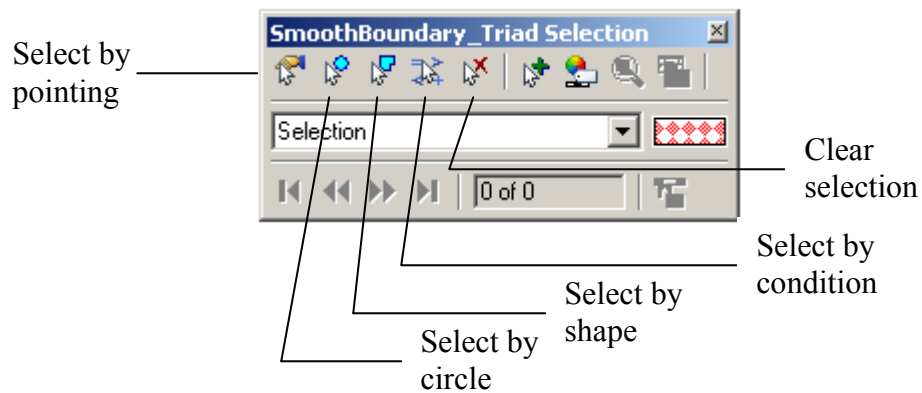
### 2.3.1 Making a selection

**What:** First thing to do is to select the counties that are in your study area from the **counties** layer.

**Why:** You can use the selected area as a cutter to cut out the features in **universe**, **dotroads** and **census block** layer to export them into your own file.

**How:**

1. Open the state or a division map from the web page.
2. Select **counties** as current working layer
3. Go to **Tools-Selection**. Select the counties in your working area using the selecting tools in the toolbox.



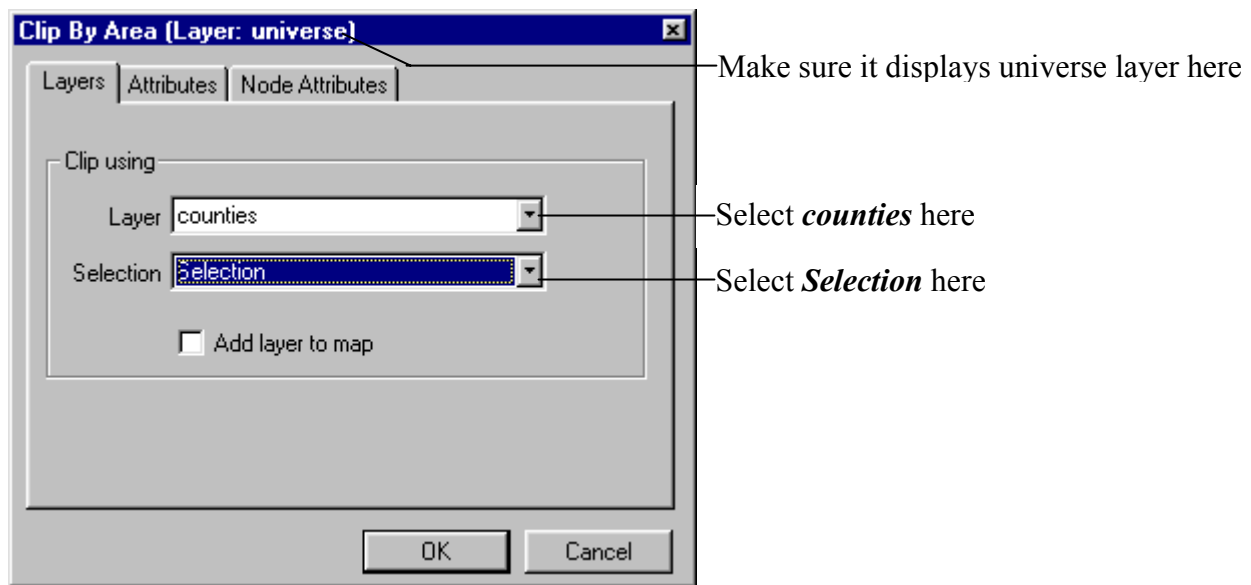
### 2.3.2 Exporting Study Area of Universe Layer Using Clip By Area

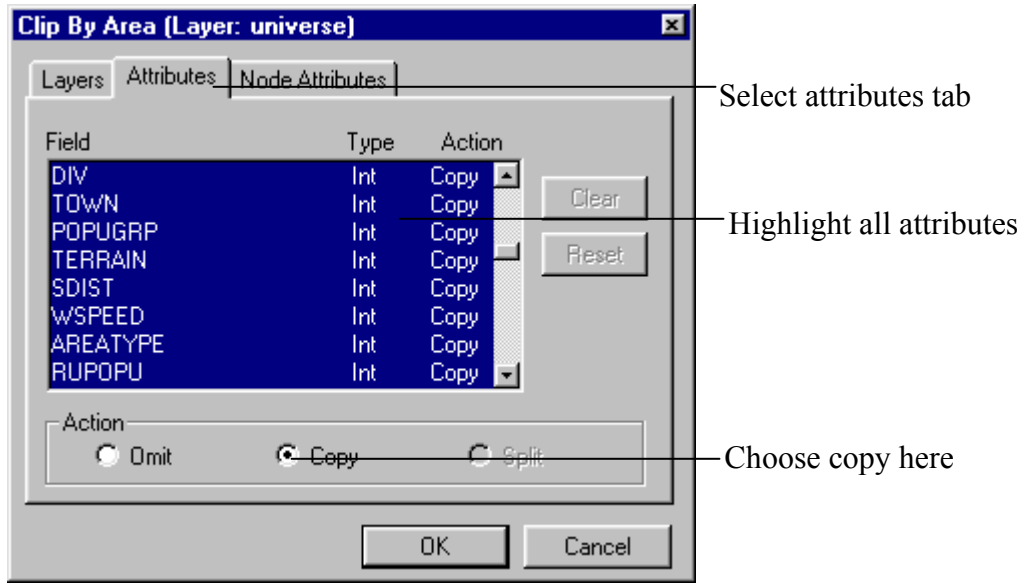
**What:** Export all the highway line features covered in your study area to your own file

**Why:** You can create an editable highway line work for your study area with all the existing data.

**How:**

1. Select *universe* as the current working layer in the map
2. Choose *Tools -Geographic Utilities - Clip by Area* to open the **Clip by Area** dialog box
3. Select *counties* in the Layer drop-down list
4. Select *Selection* in the Selection drop-down list
5. Select *Attributes* tab
6. Highlight all the fields, then select *Copy* action
7. Click on OK to save your exporting file





Refer to Section 1.5 for more detail.

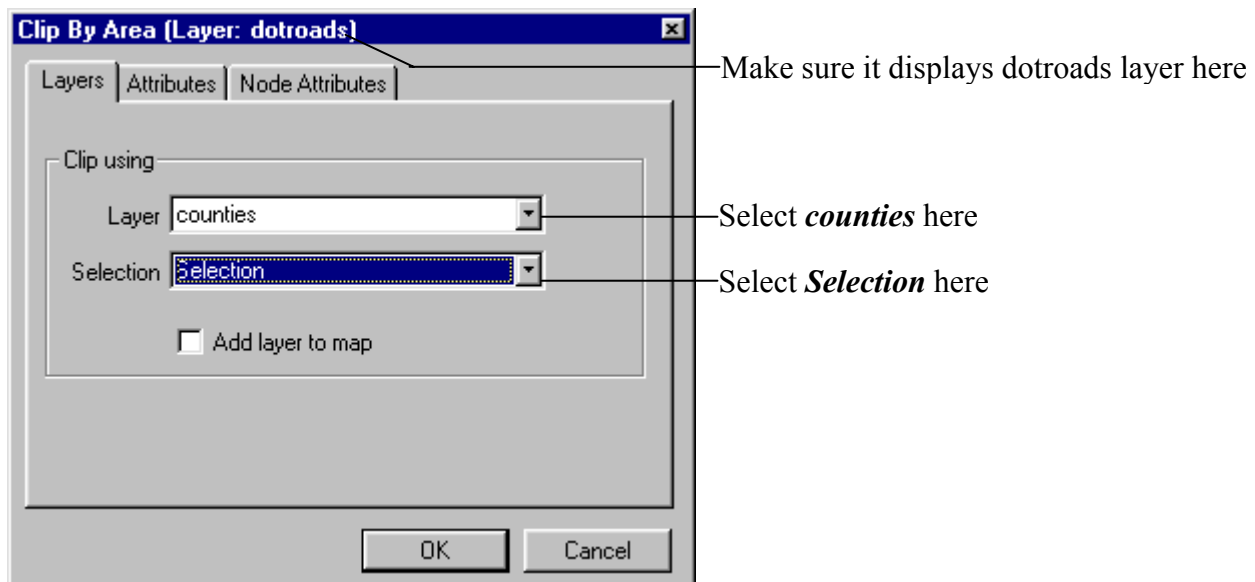
### 2.3.3 Exporting Study Area of dotroads Layer Using Clip By Area

**What:** Export all the dotroads line features covered in your study area to your own file

**Why:** You can create road layer as reference layer for your study area with all the existing data.

**How:**

1. Select *dotroads* as the current working layer in the map
2. Choose **Tools -Geographic Utilities - Clip by Area** to open the **Clip by Area** dialog box
3. Select *counties* in the Layer drop-down list
4. Select *Selection* in the Selection drop-down list
5. Select *Attributes* tab
6. Highlight all the fields, then select *Copy* action
7. Click on OK to save your exporting file



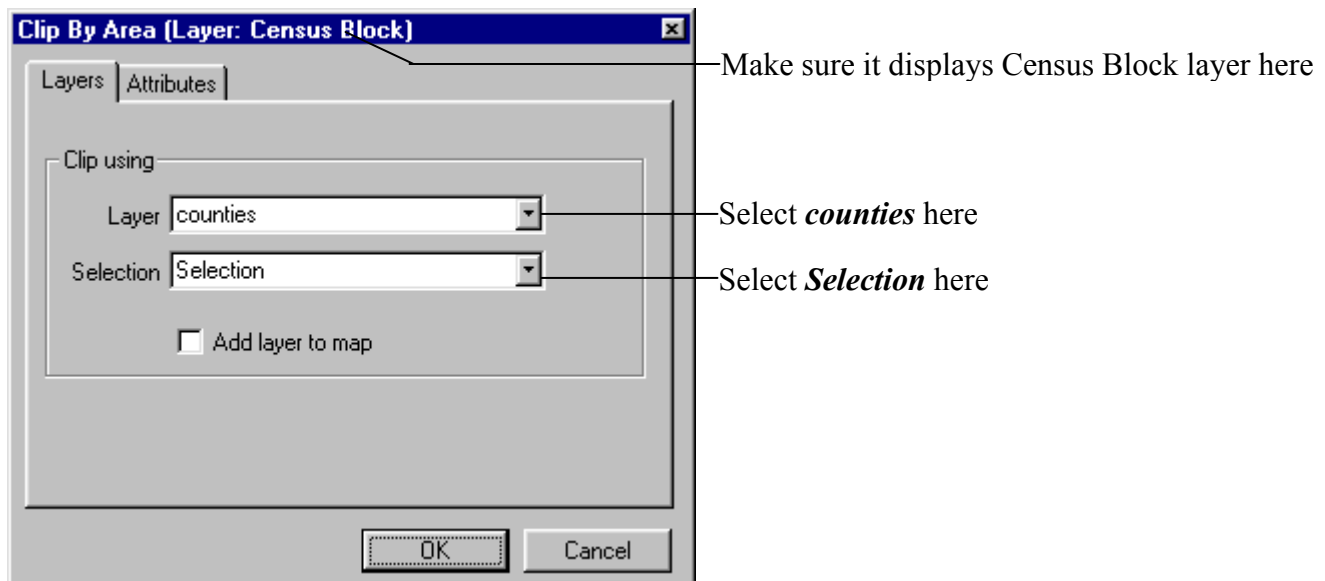
### 2.3.4 Exporting Study Area of Census Block Layer Using Clip By Area

**What:** Export all the census block features covered in your study area to your own file

**Why:** You can create census block layer as source layer to build your TAZs or as reference layer for your study area with all the existing data.

**How:**

1. Select **census block** as the current working layer in the map
2. Choose **Tools -Geographic Utilities - Clip by Area** to open the **Clip by Area** dialog box
3. Select **counties** in the Layer drop-down list
4. Select **Selection** in the Selection drop-down list
5. Click on OK to save your exporting file



### 3 Building Your Map


Now you can build your map containing the highway layer as your line work, NC roads layer as a reference layer and maybe the counties layer as well. So every time when you open the map, all the layer will be displayed with the style and color that you have setup.

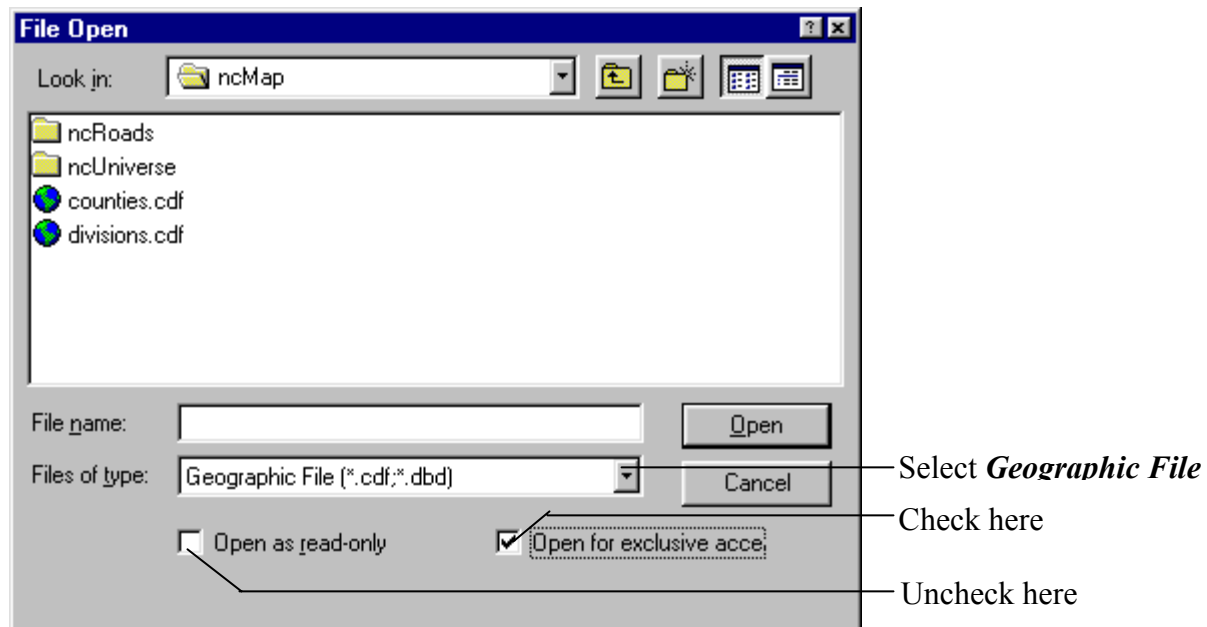
#### 3.1 Opening The Universe File

**What:** Open the universe file (the exported layer) of your study area for editing.

**Why:** You can clean up the layer the way you want.

**How:**

1. Open the **File Open** dialog box by clicking on 
2. Select **Geographic File** from the **Files of type** drop-down list
3. Uncheck the **Open as read-only**
4. Check the **Open for exclusive access** to prevent others from opening the file at the same time
5. Select your file to open it



#### TIP


- **Open for exclusive access:** the data table structure of a geographic file can be modified only if the file is opened for exclusive access

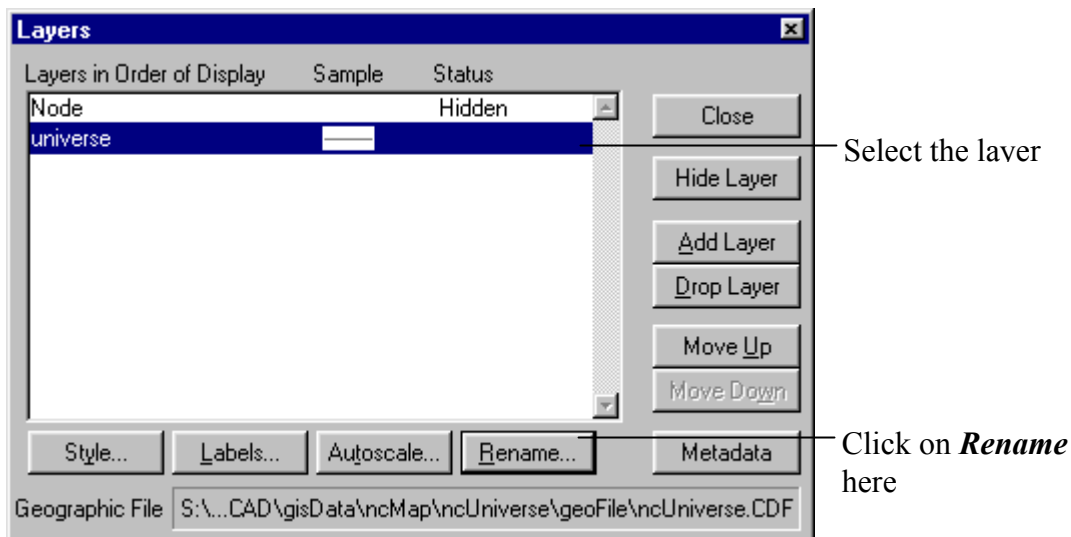
## 3.2 Renaming Layers

**What:** Rename the universe layer to highway layer and the universe node layer to highwayNode

**Why:** You can recognize them easily

**How:**

1. Open the **Layers** dialog box by clicking on 
2. Select the *universe* layer
3. Click on the **Rename** button to open the **Rename Layer** dialog box
4. Type in the new layer name: *highway* and click on **OK**
5. Select the *Node* layer
6. Click on the **Rename** button to open the **Rename Layer** dialog box
7. Type in the new layer name: *highwayNode* and click on **OK**






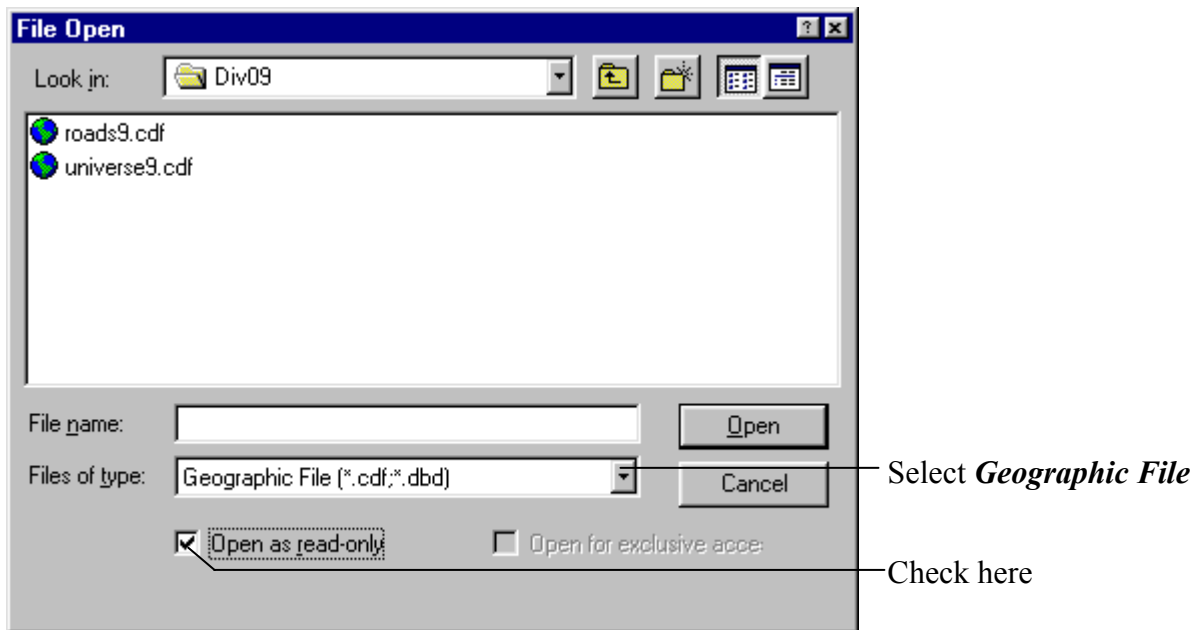
### 3.3 Adding dotroads Layer Into Your Map

**What:** Add the dotroads layer of your study area in the map

**Why:** You can use the layer as a reference when you clean up your highway line work.

**How:**

1. Open the **Layers** dialog box by clicking on 
2. Click on **Add Layer** button to open the **File Open** dialog box
3. Select **Geographic File** from the **Files of type** drop-down list
4. Check the **Open as read-only** because you do not want to edit this layer
5. Select the dotroads file to open it



#### TIP

- You can also add other layers as references if you want, such as the county boundary file located at *S:\TransCAD\gisData\ncMap\counties.cdf*. Make sure to add in the layer as **read-only** if you are not going to edit it.

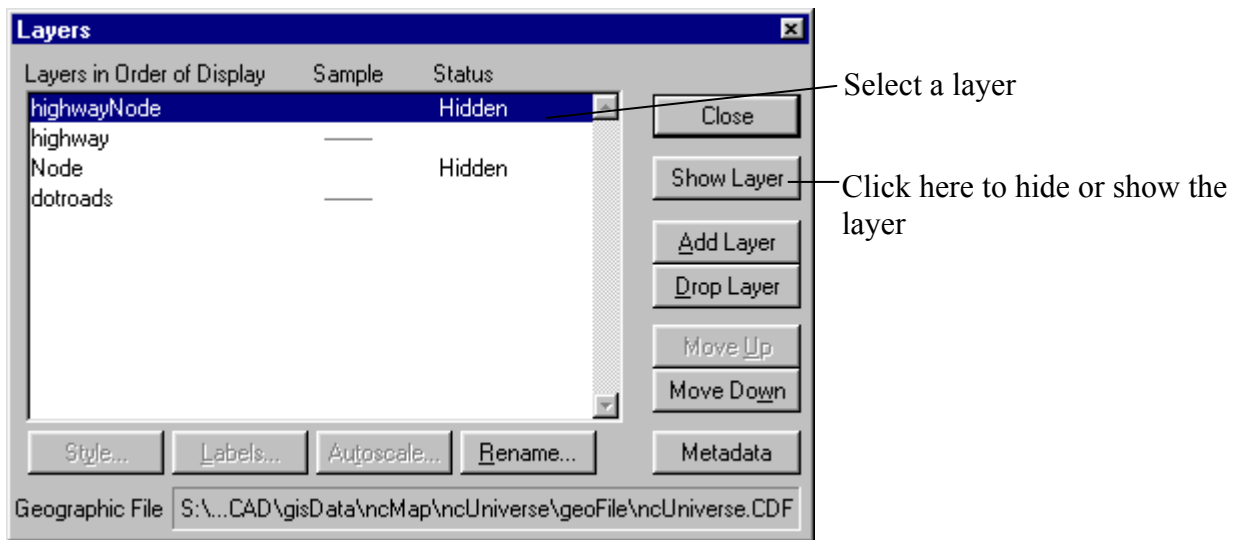
### 3.4 Showing and Hiding Layers

**What:** Hiding the *dotroads* layer and showing the *highwayNode* layer

**Why:** You need to see the *highwayNode* layer when you editing your line work. You only want to see the *dotroads* layer when you need it for reference.

**How:**

1. Select the *dotroads* layer, then click on **Hide Layer** to hide it.
2. Select the *highwayNode* layer, then click on **Show Layer** to show it.



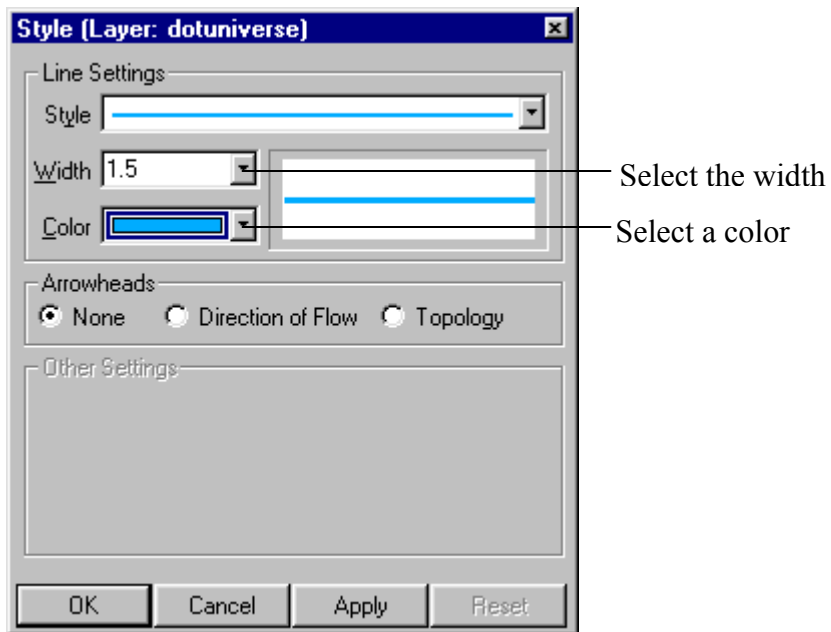
### 3.5 Changing the Highway Layer Style

**What:** Change the color and width for the *highway* layer.

**Why:** You can see it better when you edit it.

**How:**

1. Double click on the *highway* layer to open the **Style** dialog box
2. Change the **width** and **color** with your preference and click on **OK**



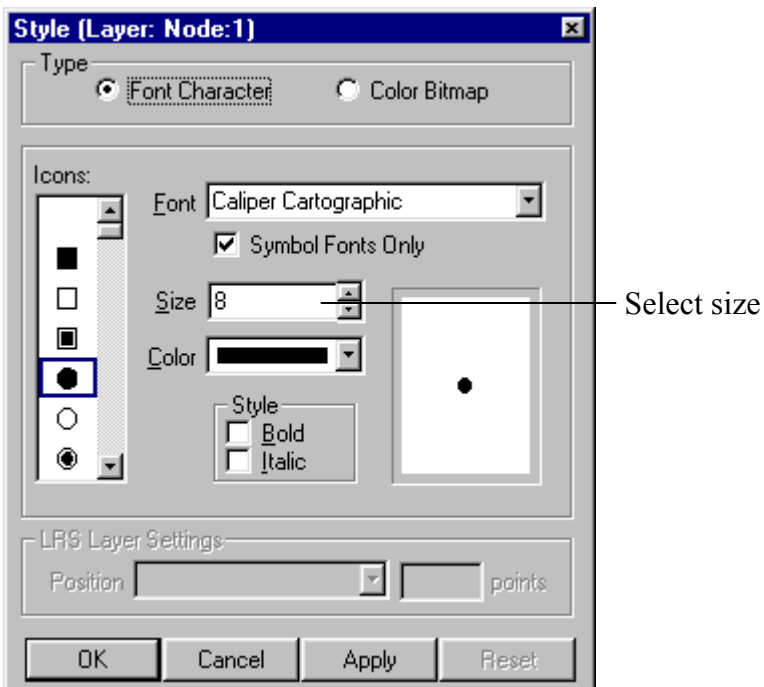
### 3.6 Changing the highwayNode Layer Style

**What:** Change the highway nodes to bigger size

**Why:** You can see the layer better when editing.

**How:**

1. Double click on the *highwayNode* layer to open the **Style** dialog box
2. Change the **size** and other attributes with your preference and click on **OK**



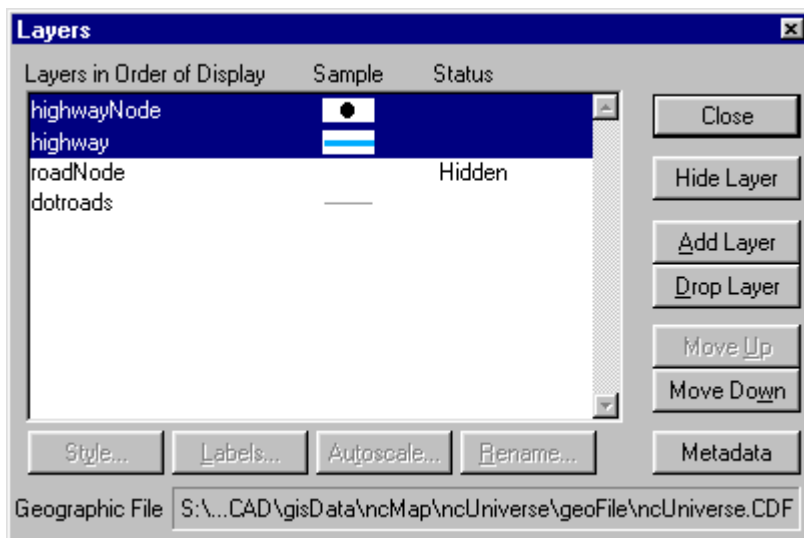
### 3.7 Changing the Layer Drawing Order

**What:** Change drawing order to draw the *highway* layer on the top of *dotroads* layer

**Why:** You want see the *highway* layer that you are editing

**How:**

1. Select both *highway* and *highwayNode* layers from the **Layers** dialog box
2. Click on the **Move Down** button to move them to the bottom to draw them on the top of the map



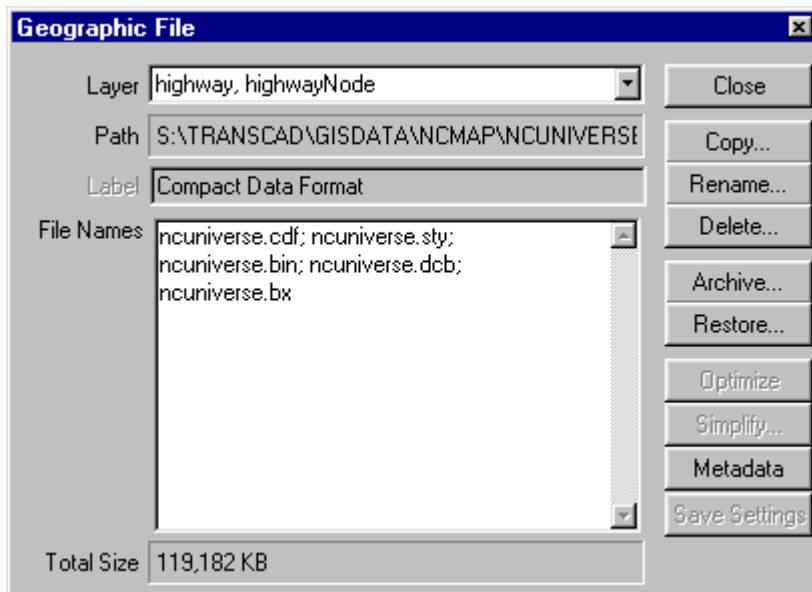
### 3.8 Archiving Your File

**What:** Archive your *highway* line work

**Why:** You can get the file back if you make mistakes when editing

**How:**

1. Select the *highway* layer as the current working layer
2. Choose **Tools - Geographic Utilities - Geographic file** to open the **Geographic File** dialog box
3. Click on **Archive** button to archive the file



#### TIP


- Archiving file is very important so that you do not lose your work. Always make an archive before you make a big change in your geographic file and data table.

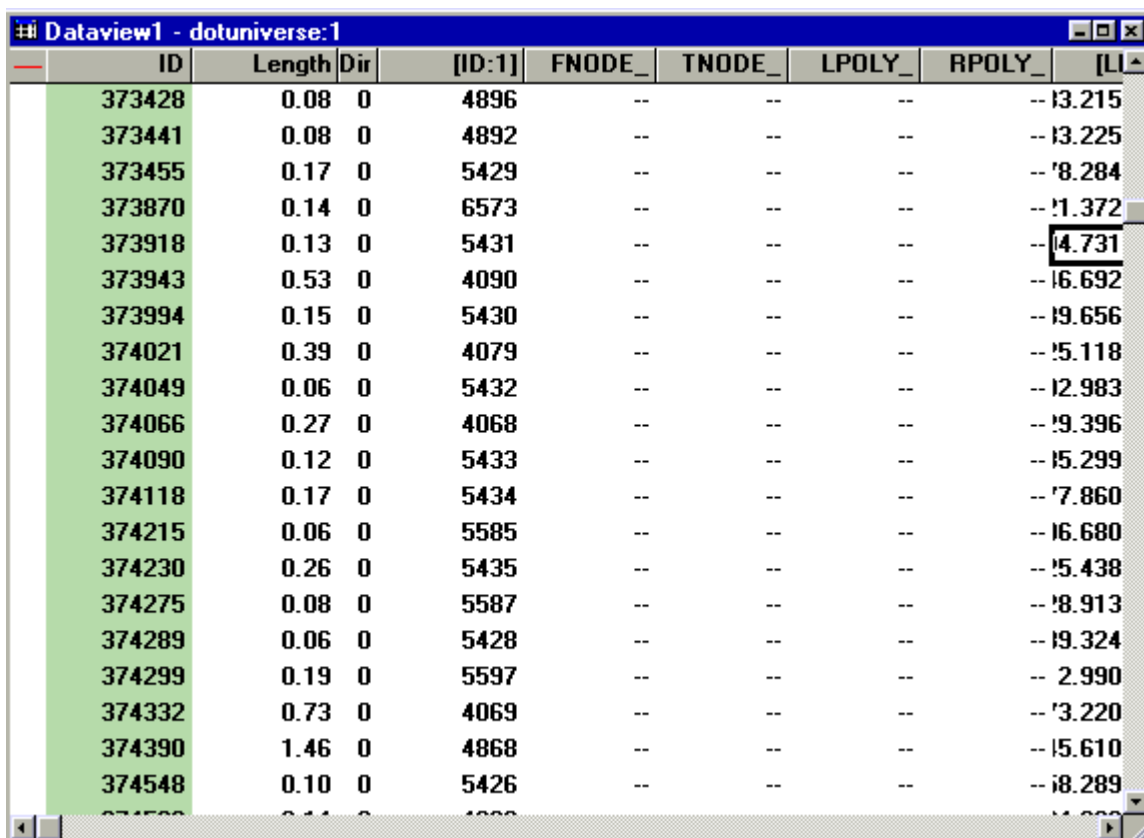
### 3.9 Viewing the Data Table of the Highway Layer

**What:** View the data in *highway* layer to see what fields are

**Why:** You can delete the unneeded data later

**How:**

1. Select the *highway* layer as the current working layer
2. Open the **Dataview** table by clicking on 



ID	Length	Dir	[ID:1]	FNODE_	TNODE_	LPOLY_	RPOLY_	[LI_
373428	0.08	0	4896	--	--	--	--	--13.215
373441	0.08	0	4892	--	--	--	--	--13.225
373455	0.17	0	5429	--	--	--	--	--8.284
373870	0.14	0	6573	--	--	--	--	--1.372
373918	0.13	0	5431	--	--	--	--	--4.731
373943	0.53	0	4090	--	--	--	--	--16.692
373994	0.15	0	5430	--	--	--	--	--19.656
374021	0.39	0	4079	--	--	--	--	--5.118
374049	0.06	0	5432	--	--	--	--	--12.983
374066	0.27	0	4068	--	--	--	--	--9.396
374090	0.12	0	5433	--	--	--	--	--15.299
374118	0.17	0	5434	--	--	--	--	--7.860
374215	0.06	0	5585	--	--	--	--	--16.680
374230	0.26	0	5435	--	--	--	--	--5.438
374275	0.08	0	5587	--	--	--	--	--8.913
374289	0.06	0	5428	--	--	--	--	--19.324
374299	0.19	0	5597	--	--	--	--	--2.990
374332	0.73	0	4069	--	--	--	--	--3.220
374390	1.46	0	4868	--	--	--	--	--15.610
374548	0.10	0	5426	--	--	--	--	--8.289

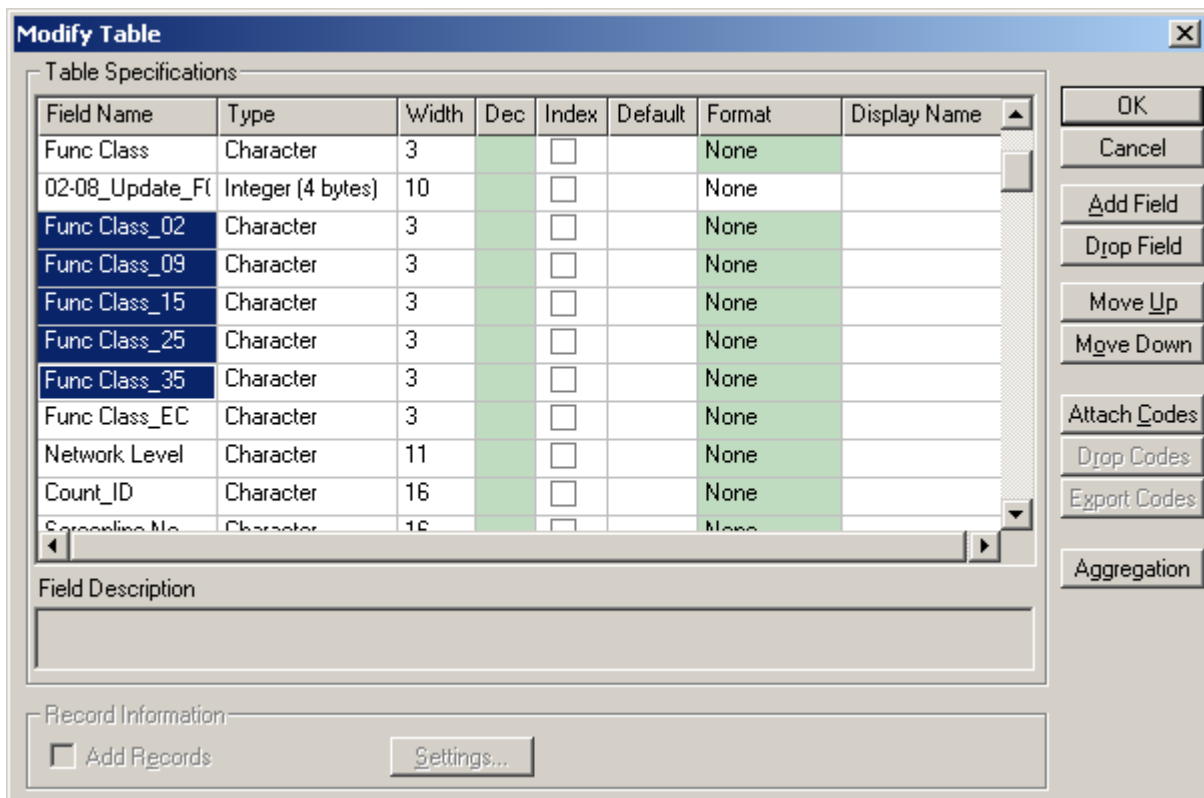
### 3.10 Removing Unneeded Data Fields

**What:** Remove the unneeded data fields from your *highway* line work

**Why:** Make it easier to verify the data while you editing the line layer

**How:**

1. Choose *Dataview - Modify Table* to open the **Modify Table** dialog box
2. Select unneeded data fields
3. Click on **Drop Field** button to remove the data fields
4. Archive the layer into a different file





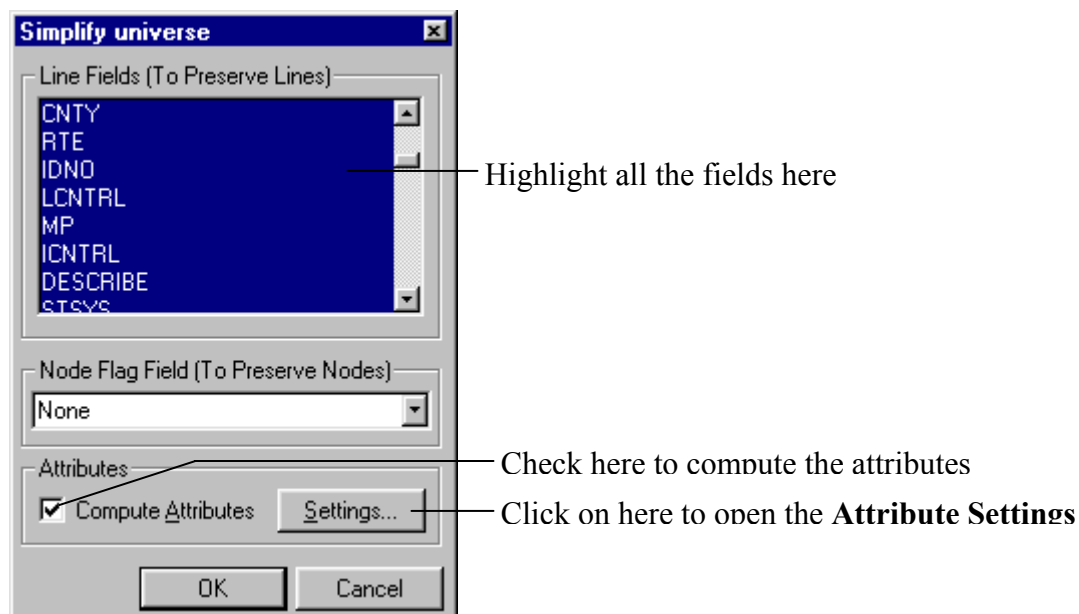
### 3.11 Simplifying A Layer

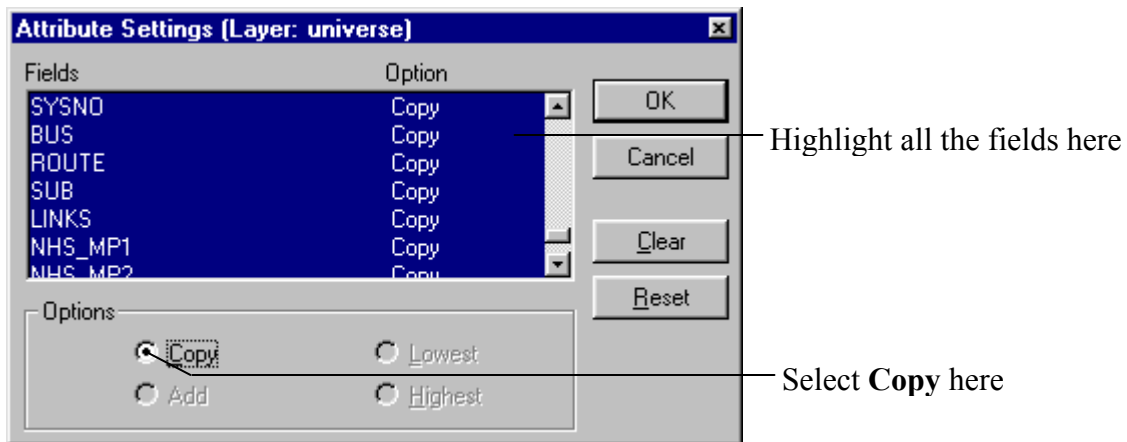
**What:** Simplify the **highway** line layer to merge the line segments

**Why:** It can reduce your editing work

**How:**

1. Make sure you've archived the layer into a different file
2. Select the **highway** layer as the current working layer
3. Choose **Tools - Geographic Utilities - Geographic file** to open the **Geographic File** dialog box
4. Click on **Simplify** button to open the **Simplify** dialog box
5. Highlight all the fields in the **Line Fields** list to preserve lines
6. Check the box **Compute Attributes** to compute the attributes
7. Click on **Settings** button to open the **Attribute Settings** dialog box
8. Highlight all the fields in the list then choose **Copy** option
9. Click on **OK** to close the **Attribute Settings** dialog box
10. Click on **OK** to simplify the layer
11. Click on **Close** to close the **Geographic File** dialog box
12. Open the **dataview** table to make sure no data is missing
13. Archive the file again





Refer to Section 1.9 for more detail.

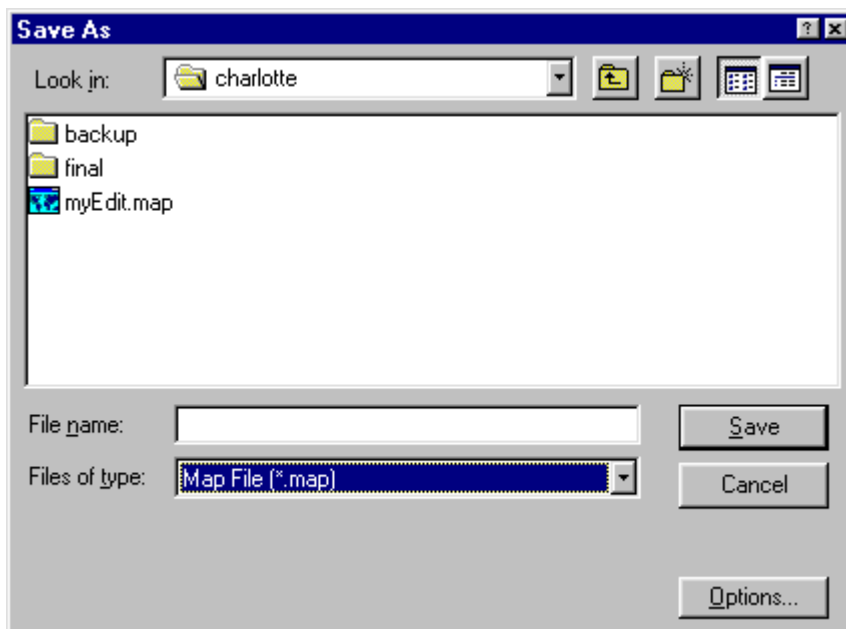
### 3.12 Saving Your Map

**What:** Save your map the current way it is

**Why:** Save your efforts of adding reference layers (such as **dotroads** and **countier** layers), and changing styles for the layers next time when you open the files.

**How:**

1. Choose **File - Save as** or **Save** to open the **Save** file dialog box
2. Select the **Map File** as file type (it's the default)
3. Type in the file name to save the map



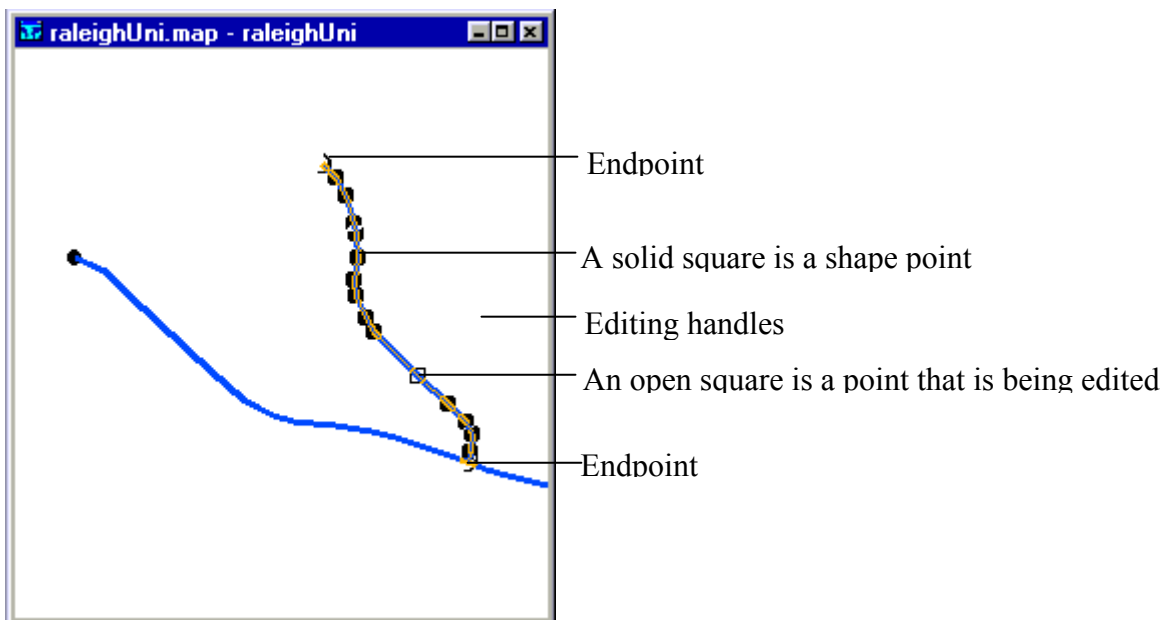
**TIP**

- Saving a map does not change the geographic file. It only saves the way that the geographic file is displayed.

## 4 Editing a Line File

Lines have a starting point and an ending point, and they may also have any number of shape points in between. While you are adding or editing a line, the line is displayed with editing handles. Endpoints are shown as circles, shape points are shown as solid squares, and an open square is a point that is being edited.


A geographic file containing a line layer always has a second layer for the endpoints of the lines. You do not edit the endpoints directly. When you edit the lines, TransCAD keeps the endpoint layer up to date.














## 4.1 Using Map Editing Toolbox

The Map Editing Toolboxes look slightly different for a line layer, an area layer, or a point layer. The toolbox for a line layer looks like this:



To display the Map Editing toolbox, choose Tools-Map Editing-Toolbox or click  on the toolbar. The map editing tools and buttons for lines are:

Tool	Name	How to use it
	Add	Click on the map to add a new line.
	Delete	Click on a line to delete it.
	Modify	Click on a line to show the editing handles; drag handles to edit.
	Join	Click on an endpoint where exactly two lines meet to join the lines.
	Split	Click on a shape point to split the line in two, or click on an endpoint to separate lines from each other.
	Replace Line	Click on a line then click on the map to replace it.
	Edit Line Attributes	Click on a line to display a dataview with the line attributes; type new values in the dataview to edit.
	Edit Node Attributes	Click on a node to display a dataview with the node attributes; type new values in the dataview to edit.
Button Name	How to use it	
	Configure Settings	Click to change settings
	Green Light	Click to save your edits
	Red Light	Click to cancel your edits

**Note:** **Edit Line Attributes** and **Edit Node Attributes** tools will be covered in more detail when we talk about populating data tables.

### TIP


- Make sure you have archived the layer before the editing
- Make sure you have simplified your line layer
- Before you do any editing, be sure to configure the **Editing Settings** first
- Simplify and archive your file constantly as needed while editing.
- You may want to save the map before the exit of TransCAD
- You may want to use the **Window-Refresh** command to update your map display every time you open a map

## 4.2 Deleting Unneeded Lines

**What:** Delete the lines that you don't need as early as possible.

**Why:** You'll have less line features to take care of.

### How:

1. Select your highway layer as the working layer.
2. Activate the *Delete* tool by clicking on 
3. Click on the lines in the map that you want to delete. TransCAD marks each deleted line in red.
4. Click *Save Edits* (the green light) to save your edits.

#### TIP

- Click on less than 5 lines to delete them each time, otherwise TransCAD may crash

### 4.3 Configuring Geographic Editing Settings


When you add or replace a line, you have the option of manually placing all of the shape points or using the **Click Curves** option. When you use the **Click Curves** option, TransCAD automatically inserts extra shape points between the points where you click. You can change the number of shape points inserted from the **Configure Geographic Editing Settings** dialog box.

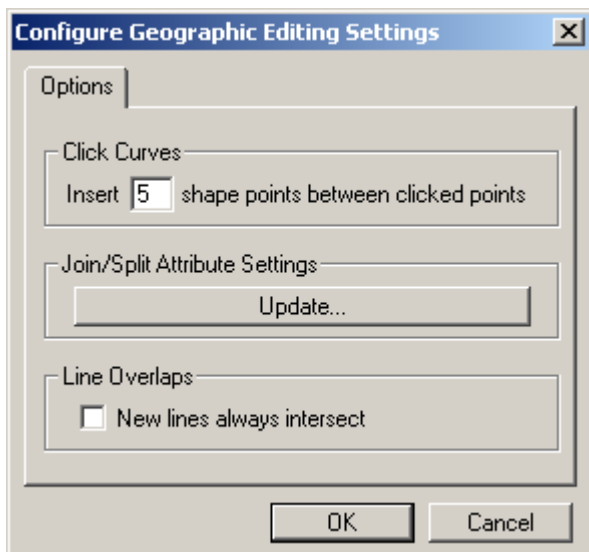
You can change the attribute settings from the **Data Update** dialog box to let TransCAD know how to create the new attributes when you split or join line features. For a string field, you can only select **Blank** or **Copy**. For a numeric field, you can select any one of the options.

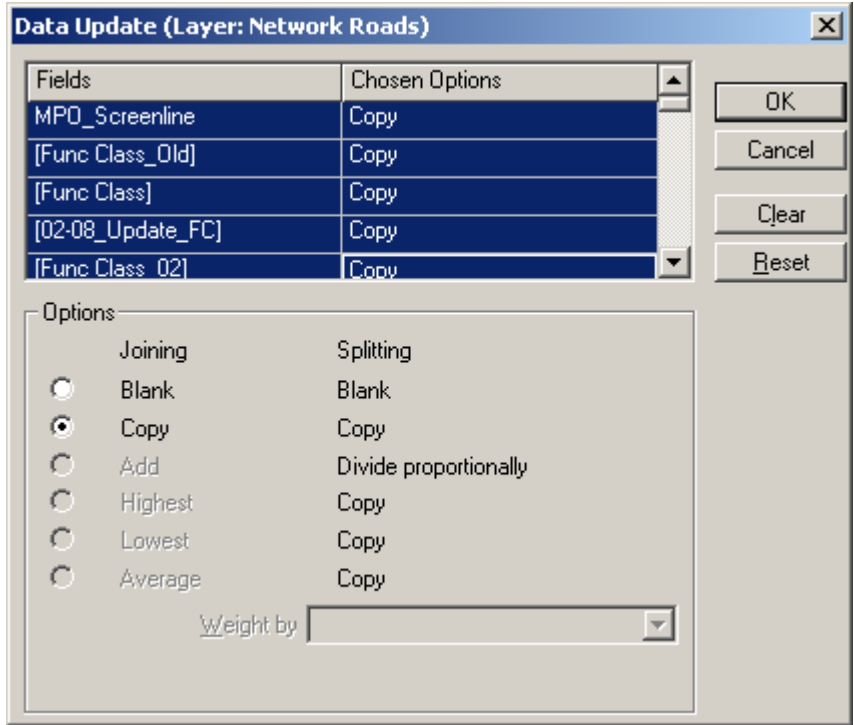
**What:** Before editing the file, configure the editing settings to copy all attributes when joining or splitting a line.

**Why:** You won't lose your data.

**How:**

1. Display the **Configure Geographic Editing Settings** dialog box by clicking on 
2. Type the number of shape points to be added between clicked points in the **Click Curves Insert** edit box.
3. Click on **Update** button to display the **Data Update** dialog box
4. Select all the fields from the **Field** list
5. Select option **Copy** or other option as appropriate
6. Click on **OK** to close the **Data Update** dialog
7. Click on **OK** to close the **Configure Geographic Editing Settings** dialog







## 4.4 Checking Line Layer Connectivity

Potential connectivity problems can be checked with the *Tools-Map Editing-Check Line Layer Connectivity* command. You can check based on all of the nodes or just selected nodes, and you can set the threshold distance for searching for potential problems around a node. TransCAD redraws the map to show any problem nodes in selection sets Level 1, Level 2, and Level 3.

- Level 1 (in red color) contains nodes that have only one connected line
- Level 2 (in green color) contains nodes that have two connected lines
- Level 3 (in yellow color) contains nodes that have three or more connected lines

Each selection set is in a distinctive color. By examining the selected nodes, you can focus on potential problems, then use the map editing tools to correct any problems.

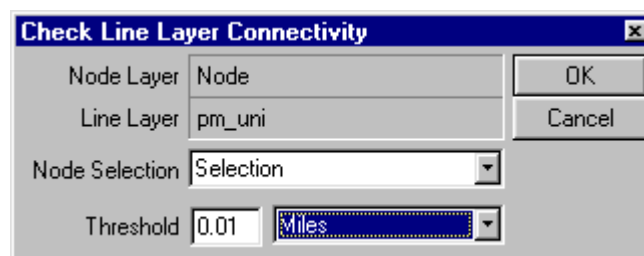
**What:** Select a small area of line layer nodes, check the line connectivity using threshold *0.01 miles*.

**Why:** It will display where the connectivity problems are in the selected area.

**How:**

1. Select your line node layer as the working layer.
2. Use the selection tools to select the nodes, if you want to check the connectivity of selected nodes.
3. Choose *Tools-Map Editing-Check Line Layer Connectivity* to display the **Check Line Layer Connectivity** dialog box.
4. Choose *Selection* set from the **Node Selection** drop-down list.
5. Type *0.01* as a threshold distance in the **Threshold** edit box, Choose *Miles* as the units from the drop-down list.
6. Click **OK**. TransCAD checks the connectivity and displays a **Note** dialog box with the number (if any) of the problem nodes.

TransCAD redraws the map to show any problem nodes in selection sets Level 1, Level 2, and Level 3.




**TIP**

- If you are working with a small geographic file you may want to run ***Check Line Layer Connectivity*** for entire area by choosing ***ALL*** from the **Node Selection** drop-down list. However for large areas, it is much quicker to run on a selection set.
- You may want to use 0.05 mile as the threshold to check the connectivity after the first run with 0.01 mile.
- Displaying the **Topology** arrowheads can be helpful with examining the connectivity problems sometimes. See section 1.4 "**Using Styles**" for more detail.

## 4.5 Modifying Lines


**What:** You can use *Modify* Tool to do two types of editing: to change the shape of lines and to connect two lines at a common point.

### How to Change the Shape of Lines:

5. Activate the *Modify* tool by clicking on 
6. Click on each of the lines you want to modify. TransCAD displays editing handles at the endpoints and shape points.
7. If you want to move a point, drag it to a new location.
8. If you want to add a shape point, click anywhere on the line.
9. If you want to delete a shape point, click on a shape point and press the *Delete* key, or drag the shape point onto an adjacent shape point.
10. Click *Save Edits* (the green light) to save your edits, or click *Cancel Edits* (the red light) to cancel.

If you saved your edits, TransCAD draws the map with the lines in their new shapes. If you move the endpoint of a line, other lines that end at the same place will be changed automatically.

### How To Make Sure Two Lines Meet at a Common Point:

1. Activate the *Modify* tool by clicking on 
2. Select two or more lines by clicking on them. Editing handles are displayed at the endpoints and shape points of all the lines you select.
3. If the lines cross each other, click on the point where they cross to add an endpoint and split both lines in two. (This one is not easy to use.)
4. If the lines don't cross, drag any point of one line so it is on top of any point on the other line, and drop it there. TransCAD changes that point to an endpoint and splits both lines in two.
5. Click *Save Edits* (the green light) to save your edits, or click *Cancel Edits* (the red light) to cancel.

If you saved your edits, TransCAD draws the map with the lines updated.


#### TIP

- You can use this tool along with the *Split* tool to create an intersection.

## 4.6 Splitting Lines


**What:** You can use *Split* tool to split a line in two. When several lines meet at a common endpoint, you can use the Split tool to separate them so they don't end at the same location.

### How to Split a Line in Two:

1. Activate the *Split* tool by clicking on 
2. Click on the line where it is to be split. TransCAD splits the line into two separate lines and adds an endpoint, or if you clicked at a shape point, TransCAD changes the shape point to an endpoint.
3. Click *Save Edits* (the green light) to save your edits, or click *Cancel Edits* (the red light) to cancel.

If you saved your edits, TransCAD draws the updated map.

### How to Split Lines Apart Where They Meet:

1. Activate the *Split* tool by clicking on 
2. Click on an endpoint where two or more lines meet. TransCAD displays editing handles on the lines and splits the endpoint into a separate endpoint for each line, so the lines no longer meet.
3. Click *Save Edits* (the green light) to save your edits, or click *Cancel Edits* (the red light) to cancel.

If you saved your edits, TransCAD draws the updated map.

#### TIP

- You can use this tool along with the *Join* tool to change an intersection to an overpass.

## 4.7 Joining Lines

**What:** Two lines can be joined if they have a common endpoint and if there are exactly two lines that end at that point.

**How:**

1. Activate the *Join* tool by clicking on



2. Click on an endpoint where two lines meet. TransCAD changes the endpoint to a shape point and joins the two lines. Editing handles are displayed on the new line.
3. Click on other endpoints to join lines together.
4. Click *Save Edits* (the green light) to save your edits, or click *Cancel Edits* (the red light) to cancel.

If you saved your edits, TransCAD draws the map with the lines joined together.

## 4.8 Adding Lines

**What:** When you add a line, you have the option of having shape points lie along curves or not having curves. When you use the **Click Curves** option, TransCAD automatically inserts extra shape points between the points where you click, using the editing settings you choose in the **Configure Geographic Editing Settings** dialog box. See section 4.3 for more detail.

### How:

5. Check **Click Curves** in the **Map Editing** toolbox, if you want to have shape points lie along curves
6. Remove the check from **Click Curves**, if you do not want to have curves
7. Activate the **Add** tool by clicking on



8. Click at the starting point of the line.
9. To add one or more shape points, move the mouse to the next point and click. Click the right mouse button to back up.
10. To end the line, press **Enter** or double-click on the endpoint. TransCAD displays the line with editing handles at the endpoints and shape points.
11. Click **Save Edits** (the green light) to save your edits, or click **Cancel Edits** (the red light) to cancel.

If you saved your edits, TransCAD draws the map with the added lines.


#### TIP

- If you start or end a line near the starting or ending point of any other line in the layer, TransCAD automatically makes sure the lines meet.

## 4.9 Replacing Lines

**What:** When you replace the shape points of a line, you have the option of having shape points lie along curves or not having curves. When you use the **Click Curves** option, TransCAD automatically inserts extra shape points between the points where you click, using the editing settings you choose in the **Configure Geographic Editing Settings** dialog box. See section 4.3 for more detail.

### How:

1. Check **Click Curves** in the **Map Editing** toolbox, if you want to have shape points lie along curves
2. Remove the check from **Click Curves**, if you do not want to have curves
3. Activate the **Replace Line** tool by clicking on 
4. Click on a line. All existing shape points are deleted.
5. Add shape points by clicking at the points
6. Or remove the previous shape point by clicking the right mouse button
7. Add the last shape point by double clicking on the last (or only) shape point
8. To replace other lines, return to Step 4.
9. Click **Save Edits** (the green light) to save your edits, or click **Cancel Edits** (the red light) to cancel.

TransCAD draws the map with the replaced lines.

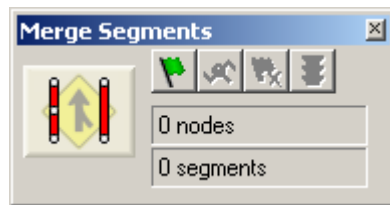
**Note:** The Replace Line tool assumes a start and an end point. The start point is automatically chosen when you click on the line, and it is the node closest to where you clicked. The first shape point is connected to the start point.

## 4.10 Merging Line Segments

**What:** The **Merge Segments** command can be used to merge a series of segments into a single segment. This is useful when the line file has many small, often straight segments without intersection nodes, where one segment between intersections is desired.

**How:**

1. Choose the line layer you want to edit as the **Working Layer**.
2. Choose **Tools-Map Editing-Merge Segments** to display the **Merge Segments** toolbox.



3. Activate the **Add a Node** tool by clicking on



4. Click on the beginning node and the end node of the segments that will be merged.
5. Highlight the segments on the shortest paths between the nodes you have added by clicking on **Find the Segments**



6. If you have highlighted segments that have different names, TransCAD displays a Confirm dialog box: Click **Yes** to highlight the segments. If you click **No** to not highlight the segments, you can return to step 4 to add more nodes.

Once the segments are highlighted, the **Add a Node** tool is disabled, **Merge Segments** (the green light) is enabled, and the number of segments is displayed in the toolbox.

7. If you want to clear the nodes you have added, and any segments that have been highlighted, click **Clear All Nodes and Segments**.



8. Merge the segments by clicking on **Merge Segments**



9. Return to step 4 if you want to merge other segments.



## 4.11 Using Simplify Vs. Join Tool vs. Merge Segments

TransCAD offers three ways to merge segments in a line layer: Using **Simplify** command from *Tools-Geographic Utilities-Geographic File* dialog box; Using the **Join Lines** tool in the **Map Editing** toolbox; And using the **Tools-Map Editing-Merge Segments** command.

- Using the **Simplify** command joins all the lines that can be joined (if they are connected well without an intersection in between) in the layer using the **Aggregation Methods** that you have defined.
- Using the **Join Lines** tool in the **Map Editing** toolbox requires you to click on every node where segments are to be joined. Then TransCAD joins all the lines that they can be joined (if they are connected well without an intersection in between).
- Using the **Tools-Map Editing-Merge Segments** command, you indicate nodes along a shortest path and merge the segments along the path. However TransCAD will not join any lines if any one of the lines along the path are not connected. It may find the wrong shortest path sometimes if the lines are not connected well along the path that you want.

### TIP

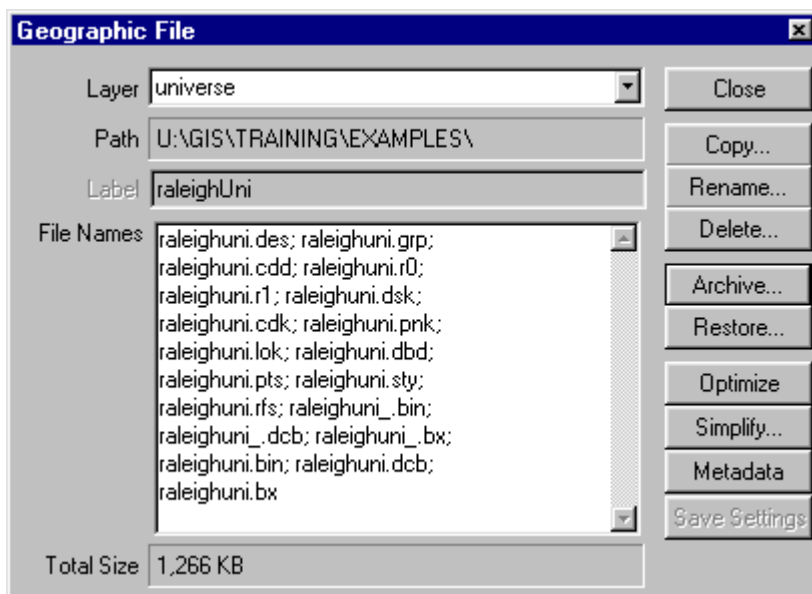
- When you use the **Merge Segments** command to join lines, the data values can only be copied.

## 4.12 Archiving and Restoring a Geographic File

**What:** TransCAD includes tools you can use to create and use archives of geographic files. An archive is a compressed version of the file you can use for backup purposes. TransCAD archives are in industry-standard PKZIP format. (This means you can restore archives of geographic files using other programs that read or write this format.)

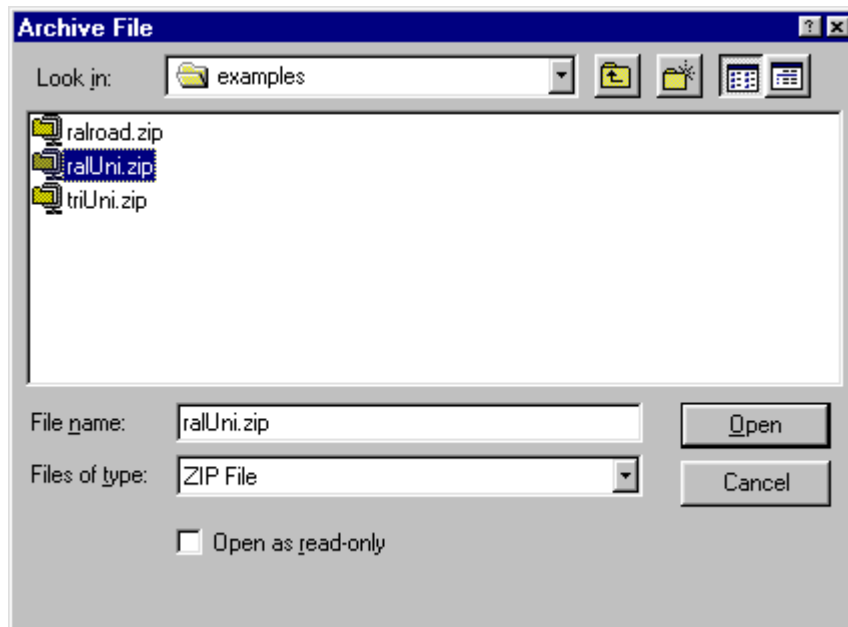
### How to Archive a Geographic File:

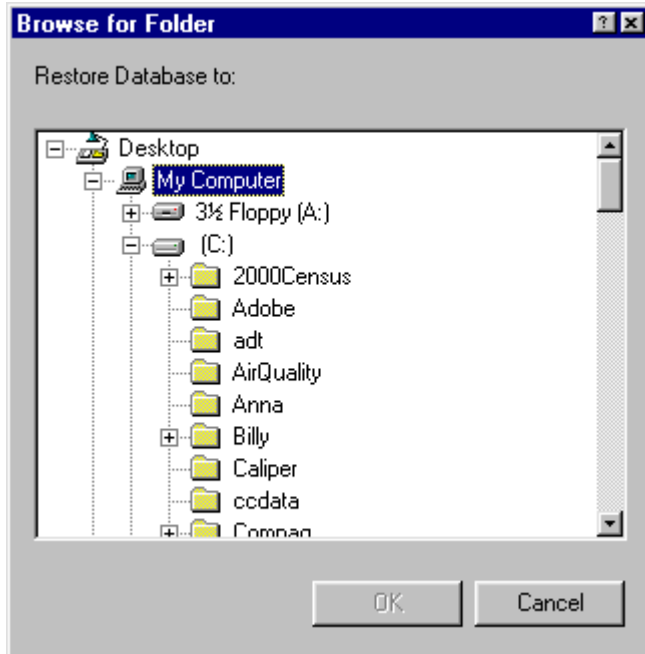
1. Choose **Tools-Geographic Utilities-Geographic File** to display the **Geographic File** dialog box.
2. If no geographic files are open, click **Archive**. TransCAD displays the **Archive File** dialog box. Choose the geographic file to archive and click **Open** to display the **Save As** dialog box.
3. If a geographic file is open in a map or dataview, choose the layer to archive from the **Layer** drop-down list and click **Archive** to display the **Save As** dialog box.
4. Type a file name for the archive file and click **Save**. TransCAD creates an industry-standard PKZIP format archive of the geographic file.
5. Click **Close** to close the Geographic File dialog box.



## How to Restore a Geographic File from an Archive:

1. Choose **Tools-Geographic Utilities-Geographic File** to display the **Geographic File** dialog box.
2. Click on **Restore** button. TransCAD displays the **Archive File** dialog box.
3. Choose the archive file containing the archive of the layer you want to restore, and click **Open**. TransCAD displays the **Browse for Folder** dialog box.
4. Choose where to restore the file and click **OK**. TransCAD restores the archived file.
5. Click **Close** to close the **Geographic File** dialog box.





#### TIP

- You have to restore the archive back to its original location if you are using a map pointing to the geographic file. Otherwise you can restore an archive anywhere you want.
- You have to close the geographic file in TransCAD first, if you want to restore the archive back to its original location.
- Always provide people with an archived geographic file when you want to share the file with others.

## 5 Advanced Line Editing Tools

TransCAD includes some advanced line editing tools for improving the geographical accuracy of line segments. You can use the tools to conflate and dualize line segments, to set directionality of segments, to copy and past line segments from one layer to another. There is also a toolbox for creating different types of highway interchanges.

### 5.1 Dualizing Segments

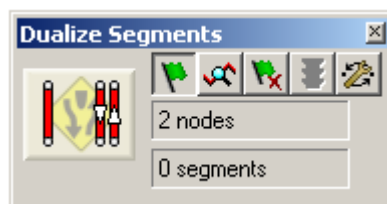
The **Dualize Segments** toolbox, along with the toolbox for creating interchanges, makes it easy to change single-line segments with simple intersections into more accurate sets of parallel segments, with each side set to one-way in the proper direction. You can set the shift of the segments from the centerline **before dualizing the segments**.



**What:** Dualize the two way roads using the **Dualize Segments** toolbox.



**Why:** You can create interchanges later.

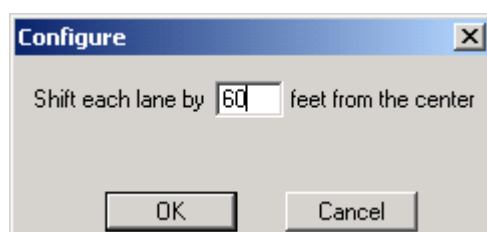
**How:**


1. Choose the line layer you want to edit from the drop-down list on the toolbar. The layer's geographic file must be editable.
2. Choose **Tools-Map Editing-Dualize Segments**. TransCAD displays the **Dualize Segments** toolbox.



3. Activate the **Add a Node** tool by clicking on 
4. Click at nodes along the segments that will be dualized.
5. To highlight the segments on the shortest path between the nodes you have added, click on **Find the Segments** 

6. If you have highlighted segments that have different names, TransCAD displays a **Confirm** dialog box to ask if you want to continue. Click **Yes** to highlight the segments. If you click **No** to not highlight the segments, you can return to step 4 to add more nodes.
7. Check the highlighted segments to make sure that they are the segments you want to dualize.
8. If you want to clear the nodes you have added, and any segments that have been highlighted, click **Clear All Nodes and Segments**  Return to step 4 to click at other nodes.
9. If you want to check or change the shift for each lane, click **Configure**  to display the **Configure** dialog box.



10. Enter **60** as the value for the shift, then click **OK**. TransCAD closes the **Configure** dialog box.
11. Click **Dualize Segments**  to dualize the segments.  
  
The segments are set one-way in each direction, based on the left- or right-hand drive preference set with the **Edit-Preferences** command.
12. Return to step 4 if you want to dualize other segments.
13. To close the toolbox, click the close button in the top right corner of the toolbox or choose **Tools-Map Editing-Dualize Segments**.

TransCAD closes the toolbox. Any pending changes are ignored.

**TIP**

- Make sure you have archived the layer before the dualizing
- Make sure you have simplified and cleaned up your line file before the dualizing
- Display arrowheads to show one-way streets
- You may have to separate the nodes on the dualized links

## 5.2 Setting One-Way Direction

Every line layer contains a special data field (called Direction or DIR) that TransCAD uses to keep track of one-way streets. This field provides information about the Direction of Flow relative to the line features Topology as follows:

DIR Value	Meaning
0	Travel is allowed in both directions
1	Travel is one-way in the same direction as the topology. Topology is the direction in which the coordinates of the line feature are stored
-1	Travel is one-way in the opposite direction of the topology.

TransCAD offers two ways to set the directionality of segments in a line layer:

- Indicating nodes along a shortest path and setting segments as one way in the direction of the path, using the *Tools-Map Editing-Set One-Way Segments* command.
- Selecting segments and marking them as one way north, south, east, or west, using the *Networks/Paths-Link Directions* command. This requires you to first select all the segments that are to be set as one way. This command also lets you reset one-way segments as two-way.

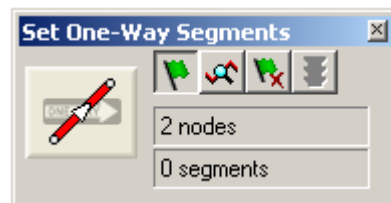
### 5.2.1 Using Set One-Way Segments Command

**What:** Set one-way roads using *Set One-Way Segments* Command.




**Why:** You can create accurate network with your line file later.

**How:**

1. Choose the line layer you want to edit from the drop-down list on the toolbar. The layer's geographic file must be editable.
2. Choose *Tools-Map Editing-Set One-Way Segments*. TransCAD displays the **Set One-Way Segments** toolbox.



3. Click on the *Add a Node*  tool to activate it.

4. Click at nodes along the segments in the direction that the segments will become one way.
5. Click **Find the Segments**  to highlight the segments on the shortest path between the nodes you have added.
6. If you have highlighted segments that have different names, TransCAD displays a **Confirm** dialog box to ask if you want to continue. Click **Yes** to highlight the segments. If you click **No** to not highlight the segments, you can return to step 4 to add more nodes.
7. If you want to clear the nodes you have added, and any segments that have been highlighted, click **Clear All Nodes and Segments** .
8. Click **Set One-Way Segments**  to set the direction of the highlighted segments.  
  
Return to step 4 if you want to set the direction of other segments
9. To close the toolbox, click the close button in the top right corner of the toolbox or choose **Tools-Advanced Line Editing-Set One-Way Segments**. TransCAD closes the toolbox. Any pending changes are ignored.

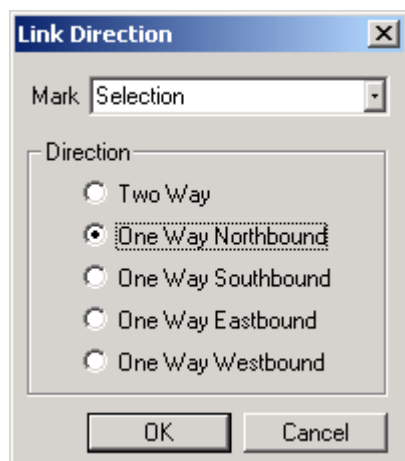
## 5.2.2 Using Link Directions Command

**What:** Set one-way roads using **Link Directions** Command.

**Why:** You can create accurate network with your line file later.

**How:**

1. Select the streets you want to mark using any of the selection tools or commands.
2. Choose **Networks/Paths-Link Directions** to display the **Link Direction** dialog box.





3. Choose **Selection** from the **Mark** drop-down list to mark only the features in a selection set.
4. Choose the compass direction that best indicates the permitted direction of travel from the **Direction** radio buttons.
5. Click **OK**.

TransCAD updates the direction of travel on the streets you chose.

**TIP**

- Display arrowheads to show one-way streets

### 5.3 Setting Two-Way Direction

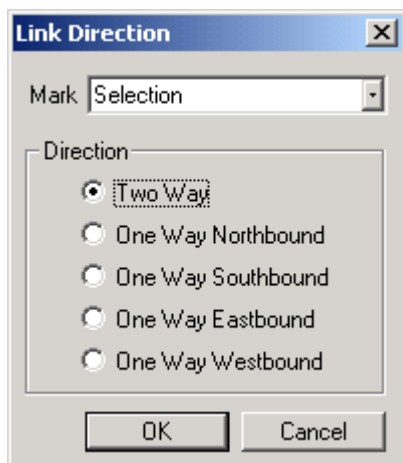
You can set two-way roads using the *Link Directions* Command in case you need to change one-way roads back to two-way.

**What:** Set two-way roads using *Link Directions* Command.

**Why:** You can create accurate network with your line file later.

**How:**

1. Select the streets you want to mark as two-way using any of the selection tools or commands.
2. Choose *Networks/Paths-Link Direction* to display the **Link Direction** dialog box.



3. Choose the **Selection** from the **Mark** drop-down list to mark the selected segments only.
4. Click the *Two-Way* radio button.
5. Click **OK**.

TransCAD updates the direction of travel on the streets you chose.

**TIP**

- Display arrowheads to show one-way streets

## 5.4 Creating Interchanges

You can create several kinds of interchanges using the **Create Interchange** toolbox:

- Cloverleaf interchanges, with up to eight ramps, for joining two sets of dualized segments
- Diamond interchanges, with up to four ramps, for joining a set of dualized segments to single-line segments
- Trumpet interchanges, with up to four ramps, for one set of dualized segments that has a "T" intersection with another set of dualized segments
- Y interchanges, with up to six ramps, for a set of dualized segments splitting into two sets of dualized segments
- Single point urban interchanges, with up to four ramps, for joining a set of dualized segments to single-line segments

There are two kinds of diamond interchanges, depending on the orientation of the dualized segments, North-South or East-West.

You need to have the right number of segments at the node where the interchange will be, and the dualized segments need to have the correct one-way direction.

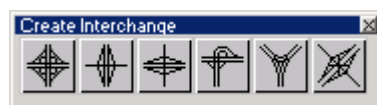
Interchange Type	Number of Segments	One-Way?
Cloverleaf	8	All segments
Diamond	6	4 dualized segments
Trumpet	6	All segments
Y	6	All segments
Single point urban interchange	6	4-dualized segments

**What:** Using the **Create Interchange** toolbox to create interchanges.

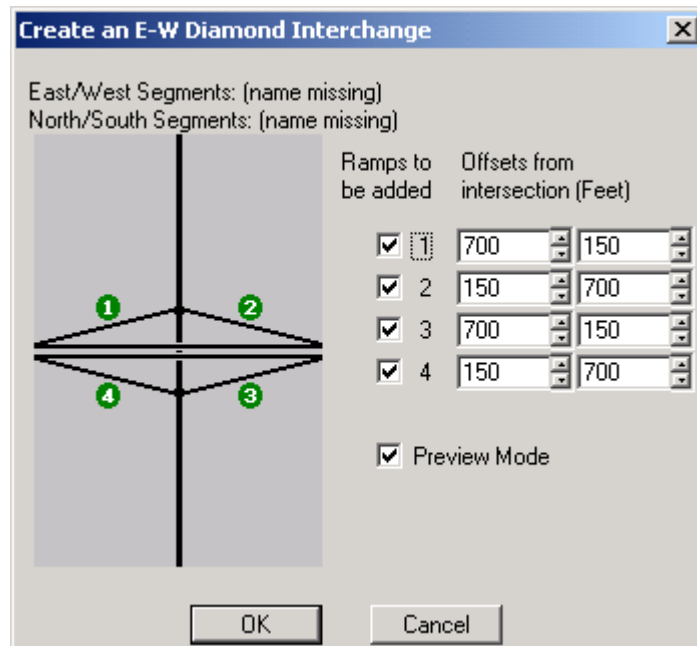
**Why:** You can create accurate network with your line file later.

**How:**

1. Choose the line layer you want to edit from the drop-down list on the toolbar. The layer's geographic file must be editable.
2. Choose *Tools-Map Editing-Create Interchanges*. TransCAD displays the **Create Interchange** toolbox.



3. Choose the tool for the type of interchange that you want to create.
4. Click on the node where the highways intersect. TransCAD put a marker at the node and displays the dialog box for that type of interchange.



5. Check the **Preview Mode** to display a preview of the interchange on the map.
6. Uncheck the ramp if you want to remove it.
7. Change an offset of a ramp from the intersection using the up and down buttons on the spinner for that ramp, or type a new value.
8. Click **OK**. TransCAD creates the interchange and displays it on the map.
9. To close the dialog box, click the close button in the top right corner of the toolbox or choose **Tools-Map Editing-Create Interchanges**.

**Note:** Sometimes you may have to create the interchanges manually using the editing tools.

**TIP**

- Archive the line file before creating the interchanges.
- Display arrowheads to show one-way streets
- Display a reference line layer to see the size of the interchanges

## 5.5 Conflating Segments

The **Conflate Segments** toolbox lets you interactively conflate (reshape) one segment at a time, based on the more accurate shape of one or more segments in another line layer. You can choose whether the endpoints of the target segment should be snapped to the source segment endpoints as well.

A good use of this toolbox is to take a generalized line file and add shape points to improve its positional accuracy. You can have the **Map Editing** toolbox open at the same time and use each toolbox as appropriate.

The target layer contains the segments that you want to reshape; this must be an editable geographic file. The source layer contains the more accurately shaped segments and can be a compact geographic file.

There are two ways to identify the source segments:

- Select a set of segments
- Add nodes and have TransCAD find the segments on the shortest path between the nodes

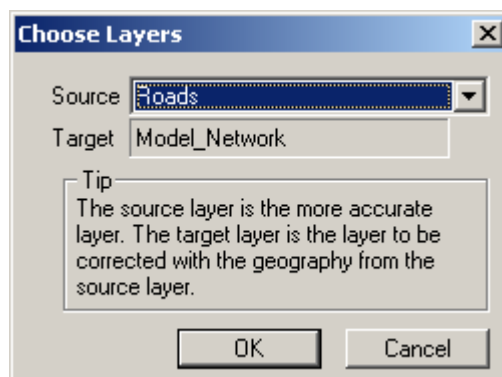
You can limit the shortest path to source segments that have matching values in fields that you choose, such as the segment name field in each line layer.

**What:** Using the **Conflate Segments** command to reshape line segments.

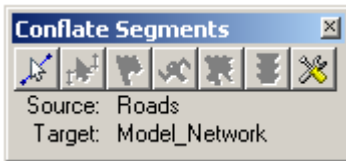
**Why:** You can get more accurate shape of lines.

**How:**


1. Choose or create a map that has at least two line layers. The geographic file for the layer that will be the target layer must be editable.
2. Choose **Tools-Map Editing-Conflate Segments**. TransCAD displays the **Choose Layers** dialog box.

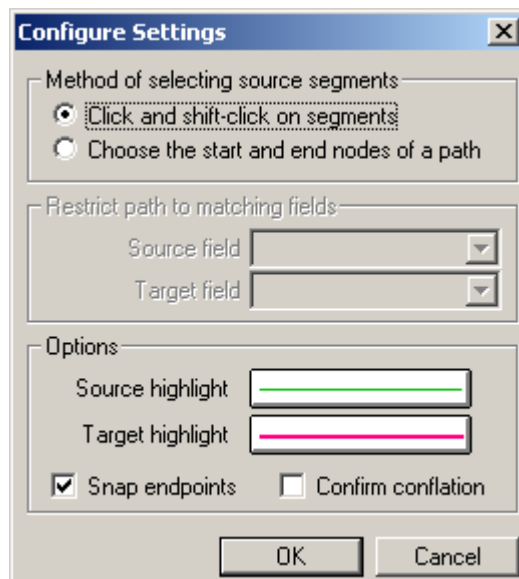


- Choose the source and target layers from the drop-down lists. Only editable line layers are listed in the Target drop-down list.
- Click **OK**. TransCAD displays the **Conflate Segments** toolbox.






- Click the **Select the Target Segment** tool  to activate it and click on the segment.

- Click **Configure**  to display **Configure Settings** dialog box



- Choose **Click and Shift-Click on Segments** from the **Method of Selecting Source Segments** radio list if you want to select source segments by clicking on them.
- Or **Choose the Start and End Nodes of a Path** from the **Method of Selecting Source Segments** radio list if you want to select source segments by using a shortest path
- Check **Snap Endpoints** to snap the endpoints of the target segment
- Choose the colors to be used to display the source and target layers using the **Source highlight** and **Target highlight** options.
- Click on **OK** to configure the settings

12. If you select source segments by clicking on them, then click the **Select the Source Segments**  to activate it and click on the first segment. Press the Shift key and click on any additional segments. Press the Ctrl key and click on selected segments to unselect them.
13. Or if you select source segments by using a shortest path, click the **Add a Node** tool  to activate it and click on two or more nodes.

Click **Find the Segments**  to select the segments along the shortest path.

You can click **Clear All Nodes and Segments**  to clear the selected nodes and segments and start over with new nodes

14. Click **Conflate Segment** 

TransCAD displays one or more **Confirm** dialog boxes to indicate what is about to happen.

15. Click **Yes** to continue the conflation process. TransCAD conflates the target segment to the source segment or segments. Return to step 5 to conflate another segment.
16. If you want to undo the changes to the target segment, click **Edit-Undo Previous Conflation** before returning to step 5 to select another target segment.
17. To close the toolbox, click the close button in the top right corner of the toolbox or choose **Tools-Map Editing-Conflate Segments**.

TransCAD closes the toolbox. Any pending changes are ignored.

**TIP**

- This procedure is particularly useful if you are converting an old Tranplan network to a TransCAD geographic file to be used for a TransCAD model

## 5.6 Copying and Pasting Segments

You can copy segments from one line layer and paste them into another with the tools in this toolbox. If you have a line layer that needs updating, you can get the missing segments from another line layer.

You paste the segments into the target layer, which must be an editable geographic file. You copy the segments from the source layer, which can be a compact geographic file.

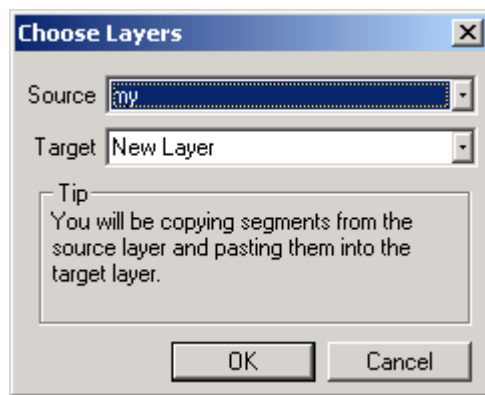
You can move data from the source layer to the target layer, by indicating the source field to use for each target field.

**What:** Using the **Copy & Paste Segments** command to copy line segments from another line file.

**Why:** You can add missing segments into your line file.

### How:

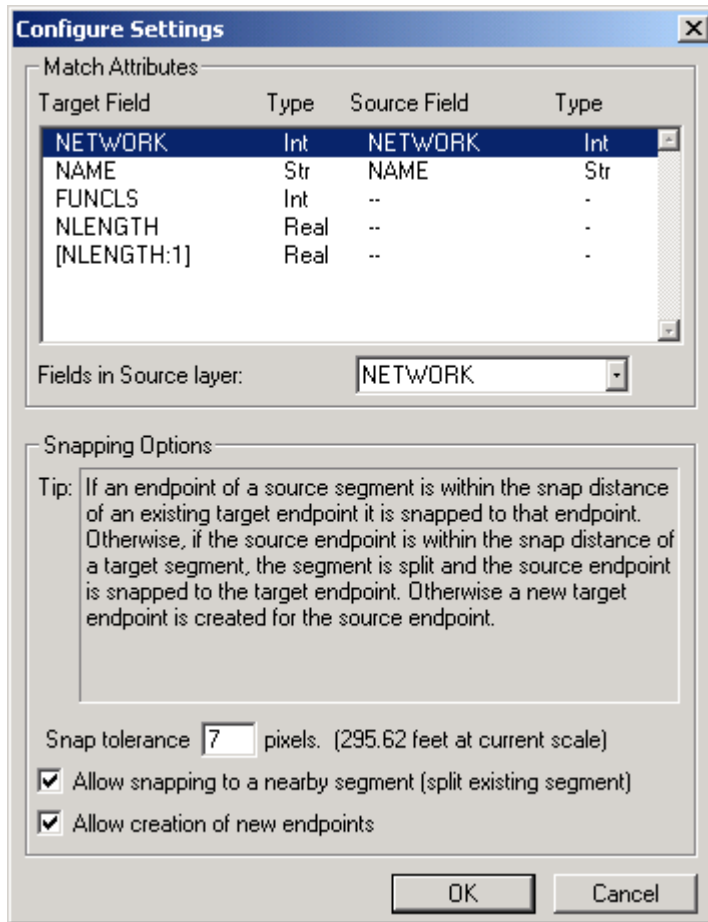
1. Choose or create a map that has at least two line layers. The geographic file for the layer that will be the target layer must be editable.
2. Choose *Tools-Map Editing-Copy & Paste Segments*. TransCAD displays the **Choose Layers** dialog box.



3. Choose the source and target layers from the drop-down lists. Only editable line layers are listed in the **Target** drop-down list.








- Click **OK**. TransCAD displays the **Configure Settings** dialog box.



- To copy data to the target line layer, highlight a target field in the **Match Attributes** scroll list and choose a field from the **Fields in Source Layer** drop-down list. Choose **None** to not copy data into a target field
- Type 7 in the **Snap Tolerance** edit box to set the snap tolerance.
- Check **Allow Creation of New Endpoints**.
- Check **Allow Snapping to a Nearby Segment** to allow the splitting of existing segments. Or uncheck **Allow Snapping to a Nearby Segment** to prevent the splitting of existing segments.
- Click **OK**. TransCAD displays the **Copy & Paste Segments** toolbox.



10. To select source segments to be copied, click the **Select Source Segments** tool  to activate it and click on the first segment. Press the **Shift** key and click on any additional segments. (Press the **Ctrl** key and click on selected segments to unselect them.)
11. Click **Find Target Placement**  to see how the segments will be pasted
12. Click **Paste New Segments**  to paste the segments or **Cancel New Segments**  to cancel pasting
13. You may change the configuration settings by clicking **Configure**  and return to step 5 to change the settings.
14. Return to step 10 to copy and paste more segments.
15. To close the toolbox, click the close button in the top right corner of the toolbox or choose **Tools-Map Editing-Copy & Paste Segments**.

TransCAD closes the toolbox. Any pending changes are ignored.


## 6 Working with Data

GIS maps have data associated with them. The data are displayed in tables with rows and columns. Each row is called a record and represents the data for each geographic element. (For example, one segment of a road, one endpoint, or one TAZ.) Each column is called a field and contains one piece of information about each record. At the top of each column is a heading that contains the name of the field.

### 6.1 Displaying Data

In TransCAD, you can use the **Info** tool to display the data that go with a map feature, or you can display the data in tabular form, using dataviews. A dataview lets you change the way data are displayed without changing the data themselves. You can rearrange the columns or the rows, and change the dataview name, font, grid settings, and column names and formats.

There are several other changes you can make that affect the appearance of a dataview. When you first open a table in a dataview, TransCAD uses the default font and other settings. You can change the defaults for dataviews by choosing the *Edit-Preferences* command and going to the *Dataviews* tab in the **User Preferences** dialog box.

To open a **Dataview** window, click  on the toolbar.

#### 6.1.1 Moving Around a Dataview

The dataview window may not be big enough to display all of the fields and records in your data. As in most Windows products, you can use either the keyboard or the mouse to see more.

To move around a dataview using the keyboard:

Use this key...	To do this...
Left Arrow	Move one field to the left
Right Arrow	Move one field to the right
Up Arrow	Move to the previous record
Down Arrow	Move to the next record
PgUp	Move up one page of records
PgDn	Move down one page of records
Home	Move to the first field in the current record (all the way to the left)
End	Move to the last field in the current record (all the way to the right)
Tab	Move one page of records to the right
Shift-Tab	Move one page of records to the left
Ctrl-Home	Move to the first record in the dataview
Ctrl-End	Move to the last record in the dataview

## 6.1.2 Arranging Columns in a Dataview

You can arrange columns in a dataview in many ways. You can use the mouse to change column widths, or use tools on the toolbar to hide columns you don't want to see.

**Note:** The customization to the dataview affects only the dataview that you are working on and it's temporary unless you save it.


To move or hide columns with the mouse, you first select the columns you want. TransCAD highlights the selected columns so you can see which ones you are working with. Here's how you select columns in a dataview:

To do this...	Do this...
Select a single column	Click on the column heading (the name of the field at the top of the column)
Select an additional column	Hold down the Shift key and click on the column heading
Remove a column from the selection	Hold down the Ctrl key and click on the heading

### To Move a Column to a Different Position

1. Select a single column by clicking on the column heading. TransCAD highlights the column.
2. Use the *left* and *right arrow* keys to move the column left or right. TransCAD draws the dataview with the columns in the new order each time you press the key.
3. Click in any cell to turn off the highlight.

### To Hide One or More Columns

1. Select one or more columns by clicking on the column headings. TransCAD highlights the selected columns.
2. Click  to hide the selected columns.

- OR -

1. Click the *right mouse* button on a cell, column heading, or range and choose *Hide*.

TransCAD hides the columns and displays the dataview without them.



## To Change the Width of a Column by Dragging

You change the width of a column by dragging the border between two columns.

1. Move the cursor so that it is between the headings of the column whose width you want to change and the next column in the dataview. The cursor changes to a double arrow.
2. Press and hold down the mouse button. A vertical line is displayed between the columns.
3. Drag the line to the left to make the column narrower, or to the right to make the column wider.
4. Release the mouse button.

TransCAD displays the dataview with the new column width.


## To Change the Width of One or More Columns

1. Select one or more columns by clicking on the column headings. TransCAD highlights the selected columns.
2. Click  on the toolbar to make the selected columns wider,  or to make the selected columns narrower. TransCAD displays the dataview with the new column widths each time you click.
3. Click in any cell to turn off the highlight.

## To Lock One or More Columns

You can lock one or more columns in place at the left of the dataview so they can always be seen.

When columns are locked, they stay in the same place, even when you use the left arrow, right arrow, Tab, Shift-Tab, and horizontal scroll bars.

1. Select one or more columns by clicking on the column headings. TransCAD highlights the selected columns.
2. Choose **Dataview-Lock Columns** or click  on the toolbar.

- OR -

1. Click the right mouse button on a cell, column heading, or range and choose **Lock Columns**.

TransCAD locks the columns with highlighted cells. Any columns that were locked are unlocked.

The columns, locked in the order that you selected them, are shaded in gray. The locked columns remain anchored in place when you move left and right in the dataview.

### To Unlock Locked Columns


1. Click  on the toolbar.

TransCAD unlocks any locked columns and displays them without any gray shade. The columns are left in the same order, but all of them now scroll left and right.

### To Show All Columns in a Dataview

1. Click the right mouse button on a cell or column heading and choose **Show All**.

- OR -

1. Choose **Dataview-Fields** or click  on the toolbar to display the **Dataview Fields** dialog box.
2. Click the **Show All** button.
3. Click **OK**.

TransCAD displays the dataview with all columns.

### 6.1.3 Arranging Rows in a Dataview

When you create a dataview, the records are displayed in the order in which they are stored. You can sort the records in a dataview to put them in a different order. Sorting a dataview makes it easy to find records with the highest and lowest values, or to produce a ranked list. You often sort data to produce a report.

You can sort a dataview based on a single field or on several fields. When TransCAD sorts, it puts character fields in alphabetic order, and numeric fields in order from lowest to highest. You can change the order using the **Edit-Preferences** command and choosing the **Dataview** tab in the **User Preferences** dialog box, or by using the **Sort a Dataview** dialog box.

Sorting a dataview does not change the way the data are stored on disk. Sorting only changes the way the data are displayed in the dataview.

### To Sort Records Based on a Single Column

1. Click the **right mouse** button on a cell, column heading, or range, and choose **Sort Increasing** or **Sort Decreasing** to sort the records.

- OR -

1. Click on the column heading of the field you want to sort.
2. Click



TransCAD sorts the records and displays the dataview with the rows in the new order.

### To Sort Records Based on Several Fields

1. If you want, select one or more columns by clicking on the column headings. TransCAD highlights the selected columns.
2. Choose *Dataview-Sort* to display the **Sort a Dataview** dialog box.
3. Chose the fields on which to sort and the sort order.
4. Click **OK**.

TransCAD sorts the data based on the fields you chose and displays the data in the new order.

### To Display Records in Their Original Order

1. Choose *Dataview-Sort* to display the **Sort a Dataview** dialog box.
2. Choose *Natural Order* from the top of the **Sort By** drop-down list.
3. Click **OK**.

TransCAD displays the data in the original order.

## 6.2 Modifying the Structure of a Table

As you combine your own data with TransCAD maps, you may find that you want to restructure your data tables to add information, speed up performance, and so on. You can easily do so using the built-in TransCAD database management capabilities.

TransCAD lets you change the structure of a table so you can remove fields you no longer need or add fields for new data. You can also add or remove permanent indexes, and convert fields from one format to another.

### 6.2.1 About Data Fields

Tables can contain the following types of fields:

Type	Contents	Examples
Integer	Whole numbers between -2,147,483,646 and 2,147,483,647	1, -400, 32000, 0
Real Number	Numbers (with decimals) ranging from -1.7E+308 to 1.7E+308; the smallest absolute value being 2.3E-308	-0.00001, 492452.4
Character (String)	Letters, symbols, and numbers (up to 254 characters wide in dBASE and FoxPro)	"F99.Q4", "New York"

Fixed-format binary files can contain the following types of fields:

Type	Contents	Examples
Real (8 bytes)	Numbers (with decimals) ranging from -1.7E+308 to 1.7E+308; the smallest absolute value being 2.3E-308	-0.00001, 492452.4
Real (4 bytes)	Numbers (with decimals) ranging from -3.4E+38 to 3.4E+38; the smallest absolute value being 1.2E-38	-123.45, 47536.7
Integer (4 bytes)	Whole numbers between -2,147,483,646 and 2,147,483,647	1, -400, 87650, 0
Integer (2 bytes)	Whole numbers between -32,766 and 32,767	15375, -27013, 2
Integer (1 byte)	Whole numbers between 0 and 254	3, 7, 100



## 6.2.2 Modifying a Table

You can use the **Dataview-Modify Table** command to make these types of changes:

- Add or remove fields
- Change the order of fields
- Change the field names
- Change the type, width, number of decimals, and format for any field
- Add or remove indexes for any field
- Change the description of each field
- Indicate how data should be aggregated
- Attach or drop lookup codes

We are going to cover features of adding data fields, removing data fields and modifying the data fields in this session. And leave the rest in other sessions later.

### **TIP**

Any changes made using the *Dataview-Modify Table* command are permanent. So archive your files before making the changes.

To Add a Data Field in a Table

1. Choose *Dataview-Modify Table* to display the **Modify Table** dialog box.
2. Click **Add Field** to add a new field to the list.
3. Type in the field name.
4. Select the field type.
5. Check the **Index** box if you want to add the indexes for the field. Most time you don't want to do it.
6. Click **OK**. TransCAD displays the **Confirm** dialog box.
7. Click **Yes** to save the modifications.

TransCAD modifies the table as you requested.

### **TIP**

Selecting the right data field type is important. You can only compute statistics on the fields with the type of **Integer** or **Real Number**. You can only assign a text value to a field with the type of **Character**.

### To Remove Data Fields

1. Choose **Dataview-Modify Table** to display the **Modify Table** dialog box.
2. Select one or more fields to be removed from the list
3. Click **Drop Field** to remove the field from the list.
4. Click **OK**. TransCAD displays the **Confirm** dialog box.
5. Click **Yes** to save the modifications.

TransCAD modifies the table as you requested.

### To Modifying a Data Field

1. Choose **Dataview-Modify Table** to display the **Modify Table** dialog box.
2. Do one of the following operations:

To do this...	Do this...
Change the order	Click on a field, then click Move Up or Move Down.
Change a display name	Click on a field and type a label in the Display Name box.
Change a field name	Click on a field and type a name in the Name box.
Change a field type	Click on a field, then choose a type from the Type drop-down list.
Change a field width	Click on a field and type the width in the Width box.
Change the number of decimals	Click on a field and type the number of decimal places in the Decimals box.
Change a field format	Click on a field, then choose a format from the Format drop-down list.
Change a field description	Click on a field, then edit the description in the Description edit box.
Index a field	Click on the field and check the Index box.

3. Click **OK**. TransCAD displays the **Confirm** dialog box.
4. Click **Yes** to save the modifications.

TransCAD modifies the table as you requested.

#### **TIP**

Changing the type of a field can affect your data and should be used with caution.

## 6.3 Populating and Editing Data

TransCAD lets you edit data in several different ways:

- Edit the data in the dataview directly
- Fill a range of cells or a column using commands
- Clear a range of cells or a column
- Add and delete records

You can also create formula fields that do computations on the fly.

### TIP

- When you change a value in a dataview, the change is stored immediately in the geographic file or database. You do not need to save the dataview to save changes to your data. Instead, you may want to archive your files before the editing.
- Changing a value in a dataview actually changes the source file. Saving a dataview saves only the way the data are arranged and displayed.
- There are some cases where you cannot edit the data you see in a dataview. For example, you cannot edit data if you check the **Read Only** box when you open a file, or if the data are stored in a protected file or directory on a network. Data that cannot be changed are shaded in green in the dataview (with unknown exceptions sometimes).

### 6.3.1 Editing Data in a Dataview

You edit data in a dataview just the way you would expect -- by clicking on a cell and typing a new value.

1. Click on the cell containing the data you want to edit.
2. Type a new value.
3. Press **Enter**.

- OR -

1. Double-click on the cell containing the data you want to edit.
2. Make changes to the current value.
3. Press **Enter**.

Note that if you change data that is used in a map for a theme or for labels, you will need to choose **Windows-Refresh** in order to see the changes on the map. Selection sets are not updated when you edit the data upon which they are based.

### 6.3.2 Filling a Range of Cells or Groups of Columns with Data

TransCAD lets you fill a range of cells or one or more columns of a dataview with data by using the **Edit-Fill** command.

You can fill an existing column or range of cells with a single constant value or a sequence of numbers. You can also store the result of a formula. TransCAD fills the result of the formula into an existing column of a dataview. When you store a formula, the range you select must be entirely within a single column of the dataview.

If the dataview contains data for features in a map, you can fill in a column with the name of the nearest feature in another map layer. This is called **tagging**.

Layer to be tagged (Destination)	Layer tagged from (Source)		
	Point	Line	Area
Point	Closest point	Closest line	Area that the point is in
Line	Point that is closest to the line	Line that is closest to a shape point on the line	Area that the midpoint of the line is in
Area	Point that is closest to the area centroid	Line that is closest to the area centroid	Area that the centroid of the area is in

You can also use the **Edit-Fill** command to clear the values in a column or range of cells.

#### TIP

- You may want to display only the selected records in dataview to make the editing easier.

#### To Fill a Range of Cells or a Column with Data

- Select the range to fill in one of three ways:
  - Drag a rectangle over the cells
  - Click in one corner of the range, and shift-click in the other corner
  - Click on the name of a field to select a column, and shift-click to select more columns

2. Choose **Edit-Fill** or click the **right mouse** button on a column heading or range and choose **Fill**. TransCAD displays the **Fill dialog** box.

3. Choose a method, and fill in the details that go with the method you chose:

For this method...	Do this...
Single value	Type the value you want to appear in all the highlighted cells. If the column of the dataview is set up to hold only numeric data, you must type a number.
Sequence of numbers	Enter the starting number and the increment you want. TransCAD fills in the first cell with the starting number, and then adds the increment before filling in the next cell.
Formula	Enter a formula
Tag	You can tag each record with a field from the nearest feature in another map layer. To use this method, you must choose to fill a single column in the dataview, and the field type must match the type of data you are filling in: <ol style="list-style-type: none"> <li>From the <b>Using Layer</b> drop-down list, choose the other layer to search.</li> <li>From the <b>Tag With</b> drop-down list, do one of the following:               <ul style="list-style-type: none"> <li>If you want to fill in the shortest distance from the feature in the dataview to the nearest feature in the other layer, choose <b>Distance to Feature</b>. (<b>Not working most time!!!</b>)</li> <li>If you want to fill in the column with the data of a field from the nearest feature in the other layer, choose the name of a field from the other layer.</li> </ul> </li> </ol>
Aggregate	See To Fill a Field with Aggregate Data
Clear	See To Clear a Range of Cells or a Column

4. Click **OK**.

TransCAD fills the highlighted columns or range of cells with data, overwriting any data that were stored in the highlighted cells.

#### To Fill a Field with Aggregate Data

You can fill in records with the aggregate data from **another** layer. To use this method, you must choose to fill a single column in the dataview.

- Select the field to fill by clicking on the name of the field.
- Choose **Edit-Fill** or click the **right mouse** button on a column heading or range and choose **Fill**. TransCAD displays the **Fill dialog** box.
- Click the **Aggregate** radio button. TransCAD displays the **Aggregate Data** dialog box.

4. Choose the layer from which to aggregate from the **Layer** drop-down list, which records to aggregate from the **Include** drop-down list, and a band size. If the layer you are working with is a point or line layer, you must enter a band size other than zero.
5. Choose the aggregation method from the **Fill With** drop-down list and the field to aggregate. The following table outlines the aggregation methods:

Method	What it does
Total	TransCAD adds the values for all of the individual features that are within the area specified.
Average of	TransCAD computes a weighted average of the values from the individual features.
Low Value of	TransCAD uses the lowest value from the individual features.
High Value of	TransCAD uses the highest value from the individual features.
Count	TransCAD counts the number of individual features.

6. Click **OK** to return to the **Fill** dialog box.
7. Click **OK**.

TransCAD fills the highlighted column with the aggregate data, overwriting any data that were stored in the field.

### 6.3.3 To Clear a Range of Cells or a Column

1. Select the range to clear in one of the following ways:
  - Drag a rectangle over the cells
  - Click in one corner of the range, and shift-click in the other corner
  - Click on the name of a field to select a column, and shift-click to select more columns
2. Choose **Edit-Fill** or click the right mouse button on a column heading or range and choose **Fill**. TransCAD displays the **Fill** dialog box.
3. Click the **Clear All Values** in the **Range** radio button.
4. Click **OK**.

- OR -

1. Select the range to clear in one of the following ways:
  - Drag a rectangle over the cells;
  - Click in one corner of the range, and shift-click in the other corner;
  - Click on the name of a field to select the entire column, and shift-click to select more columns.
2. Click the **right mouse** button and choose **Clear**, to display the **Confirm** dialog box.
3. Click **Yes** to confirm clearing the values.


TransCAD clears the values in the highlighted cells by setting the values to missing.

### 6.3.4 Adding and Deleting Records

You can use a dataview to delete records from a table. When you delete records, the data for these records are either removed from the file or marked in the file as deleted. When you delete records, you can choose the ones to delete by highlighting them in the dataview, or by using one of the selection commands.

You cannot add records of line or area features to a geographic file from a dataview. Instead, you must use the geographic editing tools. (You can add records to and delete records from a standard (.DBD) point geographic file.) When you add point features to a geographic file from a dataview, the longitude and latitude of the point are left blank. You can then type in a longitude and latitude, or use one of the locate commands to fill in the correct location. You can also use the geographic editing tools to add point features.

#### To Delete One or More Records

1. Select the record to delete in one of three ways:
  - Click on any cell in a record
  - Click and drag to highlight several records
  - Click on the first record in a range, and Shift-click on the last record
2. Choose **Edit-Delete Records** or click  on the toolbar.
3. TransCAD asks you to confirm that you want to delete the records.
4. Click **Yes** to delete the records, or **No** to cancel the operation.

#### To Delete Selected Records

You can delete a group of records at once by selecting them. When you use this method, the records you delete must be in the selection set named "Selection."

1. Select the records you want to delete using one of the selection commands or tools.
2. Choose **Edit-Delete Set**.
3. TransCAD asks you to confirm that you want to delete the records.
4. Click **Yes** to delete the records, or **No** to cancel the operation.

TransCAD deletes the records.


#### TIP

You can edit data using the **Info Tool** or **Map Editing** toolbox as well.

### 6.3.5 Copying Data Value With the Edit Attributes Tools

The *Edit Line Attributes* and *Edit Node Attributes* tools help you to display and edit attributes for one or more lines or nodes. The attributes are displayed in an **Edit Attributes** window. You can choose which fields are displayed by creating field sets, and you can edit and copy values from the highlighted features to other features in the **Edit Attributes** window.

The edits to line attributes are stored in the map editing buffer and are not saved until you click 


(green light) to save edits. If you click  (red light) to cancel edits, all pending attribute (and geographic) edits will be discarded. Clicking either button will also close the **Edit Attributes** window.

#### To Copy Line Attributes

1. Activate the *Edit Line Attributes* tool  in the **Map Editing** toolbox by clicking on it.
2. Select the line or lines to display in an **Edit Attributes** window as follows:

To do this...	Do this...
Select one line	Click on the line. TransCAD displays the line in the <b>Edit Attributes</b> window.
Select more lines	Hold the Shift key and click on the lines. TransCAD adds the lines to <b>the Edit Attributes</b> window.
Deselect lines	Hold the Ctrl key and click on the lines. TransCAD removes the lines from the <b>Edit Attributes</b> window.

The last line selected has its ID field highlighted in the Edit Attributes window. To make sure you are about to edit the correct line, hold the Shift key and click on that line.

3. Click the *right mouse* button on a column heading or a cell in a record and choose *Copy Values* to display the **Confirm** dialog box. Click **OK** to copy the values from the highlighted record to the other selected records.
4. To edit attributes for other lines, return to Step 2.
5. Click  (green light) to save your edits.

TransCAD updates the attributes for the lines and displays the map with any changes.



## 6.4 Doing Calculations with Data

To compute new data based on data you already have, you can add, subtract, multiply, or divide the existing data. You can have TransCAD do these calculations for you by creating a formula.

Once you create a formula, you can use it in either of two ways:


- Store the formula itself, so TransCAD can compute the result on the fly. To do so, you use the ***Dataview-Formula Fields*** command.
- Store the result of the formula in an existing column of a dataview. To do so, you use ***the Edit-Fill*** command, and choose ***Formula*** as the method.

### 6.4.1 Using a Formula Field

TransCAD stores a formula in a formula field. You create a formula field using ***the Dataview-Formula Fields*** command. Once you create a formula field, you can use it like any other field. For example, you can sort a dataview based on a formula field or, if the dataview contains data that are linked to a map layer, you can use the formula field to make thematic maps or to label map features.

You can change the formula that is used in a formula field, or delete the formula field when it is no longer needed. You also can create formula fields that are based on other formula fields.

#### To Create a Formula Field

1. Choose ***Dataview-Formula Fields*** or, if a dataview is the current window, click  on the toolbar to display the **Formula** dialog box.
2. Enter a formula in the **Formula** box, or use the formula builder to create a formula.
3. Click ***Verify*** if you want to check the formula. TransCAD indicates whether the formula is correct. Return to step 2 if you need to correct the formula.
4. Type a name for the formula field in the ***Formula Field*** box.
5. Click ***OK***.

TransCAD creates the formula field and, depending on whether you are looking at a dataview or a map, you see the following:


- If you are looking at dataview, TransCAD displays the formula field as the last column in the dataview.
- If you are looking at a map, TransCAD adds the formula field to the list of fields you can use in labeling and thematic mapping.

## To Use the Formula Builder

The formula builder lets you create a formula by choosing field names, operators, and functions from drop-down lists.


To use the formula builder, simply pick the fields, operators, and functions you want from the drop-down lists. TransCAD adds your choices to the formula displayed in the **Formula** box. You can also click on the formula and use the keyboard to make changes.

## To Change a Formula Field

1. Choose **Dataview-Formula Fields** or, if a dataview is the current window, click  on the toolbar to display the **Formula** dialog box.
2. Choose an existing formula field from the **Formula Fields** scroll list. TransCAD displays the formula in the formula box.
3. Edit the formula using the keyboard, mouse, and formula builder.
4. Click **OK**.

TransCAD updates the formula and any dataviews that are affected by the change you have made.

## To Delete a Formula Field

1. Choose **Dataview-Formula Fields** or, if a dataview is the current window, click  on the toolbar to display the **Formula** dialog box.
2. Choose an existing formula field from the **Formula Fields** scroll list. TransCAD displays the formula in the formula box.
3. Click **Delete**. TransCAD asks you to confirm the operation.
4. Click **Yes**.

TransCAD deletes the formula field and removes the formula field from any dataviews in which it is displayed.

## To Store the Result of a Formula

When you store the result of a formula, TransCAD fills the result of the formula into an existing column of a dataview. You store the result of a formula using the **Edit-Fill** command. When you use this command, the range you select must be entirely within a single column of the dataview.

1. Select the range to fill in one of three ways:
  - Drag a rectangle over the cells
  - Click in the top cell of the range, and shift-click in the bottom cell
  - Click on the name of a field to select the entire column.
2. Choose **Edit-Fill** to display the **Fill** dialog box.

3. Click **Formula** to display the **Formula** dialog box.
4. Enter a formula in the **Formula** box, or use the formula builder to create a formula.
5. Click **Verify** if you want to check the formula. TransCAD indicates whether the formula is correct. Return to step 4 if you need to correct the formula.
6. Click **OK** to return to the **Fill** dialog box.
7. Click **OK**.


TransCAD evaluates the formula for each highlighted record in the dataview and fills the highlighted column or range of cells with data. Any data stored in the highlighted cells are overwritten.

## 6.4.2 Displaying Node Data for a Line Layer

TransCAD has special features for displaying node data as part of the dataview for a line layer. For example, a dataview can contain information on a road layer and shows the ID of the start node, the ID of the end node, and information about every line feature.

You add node data to a line layer by creating a special type of formula field. Once you create a formula field that adds node data to the line layer, you can display the node information in a dataview, or use the data like any other field to create thematic maps, label a map, or perform queries.

### To Add Node Data to a Line Layer

1. Choose **Dataview-Formula Fields** or click  on the toolbar to display the **Formula** dialog box.
2. Click **Node Fields** to display the **Node Formula Fields** dialog box.
3. Choose one or more node fields.
4. Choose which nodes to include from the radio buttons.
5. Click **OK**.

TransCAD displays the node fields as the first columns in the dataview.

#### **TIP**

When you make changes with formula fields, you need to save the map to keep the changes.

## 7 Using Themes

TransCAD can assemble information about map features to create a map that illustrates the patterns in the data. This is called a thematic map. Thematic maps use distinctive colors, symbols, and fill styles to portray map data. The different styles highlight the similarities and differences among map features. Using thematic map, the information becomes easier to see, understand, and interpret. This feature is useful for viewing traffic analysis zone data and highway network attributes.

### 7.1 About Map Themes

A map theme is a styling of map features according to the values of one or more data fields. TransCAD has six theme types:

- Color themes
- Pattern themes
- Dot-density themes
- Pie and bar chart themes
- Scaled-symbol themes
- Prism maps

You create themes on a single map layer. Choose the layer you want to map from the drop-down list on the map toolbar or by opening a dataview of the layer. A map can show any number of themes, and can even combine several types of themes on a single layer.

#### 7.1.1 Deciding Which Type of Theme to Use

You choose the theme you want based on the number of fields of data you want to show and the types of data you wish to present:

- Most theme types can be used with any point, line, and area layer.
- Dot-density themes and prism maps, however, can only be used with area layers.
- To illustrate the values of two or more fields, choose between using a chart theme and a dot-density theme.
- To illustrate the values of a single field, you can choose from all five theme types, using the following guidelines:

<b>If your data contain...</b>	<b>For example...</b>	<b>Then you should...</b>
Counts or amounts	Population, Employment data	Use any kind of theme
Percentages, ratios, or averages	Avg. Income, % Retail	Avoid dot-density themes
Negative numbers	Change in Population	Use color or pattern themes
Non-numeric information	Zoning, County name	Use color or pattern themes

## 7.2 Color and Pattern Themes

Color themes and pattern themes work in the same way. They both group the features in a map layer into classes, based on the value of a data field. Each class contains all of the features with similar values for the chosen field. For example, a theme based on income might have the following classes:

- Less than \$20,000 per year
- \$20,000 to \$30,000 per year
- \$30,000 to \$40,000 per year
- \$40,000 to \$50,000 per year
- \$50,000 to \$75,000 per year
- Over \$75,000 per year

When the map is drawn, the classes are displayed using different colors or patterns.


### 7.2.1 Creating Color and Pattern Themes

You create color themes and pattern themes in exactly the same way. You choose the layer you want to map, then pick the data field you want to see or create a formula field. MapWizard will take care of the rest, or you can customize the map settings to display the data any way you want.

When you create a theme using a formula field instead of an existing data field, TransCAD adds the formula field to the layer. You can then display that formula field in a dataview and use it to create more themes or to label map features.

If your data have changed you can recalculate the classes, based on the current settings, by clicking **Recalculate** in the **Color** or **Pattern Themes** dialog box. This will not change the number or style of the classes.


To Create a Color Theme from a Dataview

1. Select the data field you want to map by clicking on the column heading. TransCAD highlights the entire column.
2. Click  on the toolbar.

TransCAD creates a new map that uses a color theme to illustrate the values of the chosen field.

To Add a Color Theme to a Map

1. Choose the layer you want from the drop-down list on the toolbar.

2. Choose *Map-Color Theme* or click  on the toolbar to display the **Color Theme** dialog box.
3. Choose a *field* from the drop-down list, or choose *Formula* at the end of the list to create a formula field. MapWizard fills in all the other settings in the dialog box.
4. Change the settings as desired:

Setting	What it does
Method	Determines how classes will be set up
# Classes	Sets the number of classes
Options	Sets options for creating the classes
Styles	Customize the display style for each class
Manual	Set low and high values for each class manually

5. Click **OK**.

TransCAD draws the map with the color theme and displays a legend.

To Add a Pattern Theme to a Map


1. Choose the layer you want from the drop-down list on the toolbar.
2. Choose *Map-Pattern Theme* to display the **Pattern Theme** dialog box.
3. Choose a field from the *Field* drop-down list, or choose *Formula* at the end of the list to create a formula field. MapWizard fills in all the other settings in the dialog box.
4. Change the settings as desired:

Setting	What it does
Method	Determines how classes will be set up
# Classes	Sets the number of classes
Options	Sets options for creating the classes
Styles	Customize the display style for each class
Manual	Set low and high values for each class manually

5. Click **OK**.

TransCAD draws the map with the pattern theme and displays a legend.

To Change a Color or Pattern Theme

1. Choose *Map-Color Theme* or click  on the toolbar to display the **Color Theme** dialog box, or choose *Map-Pattern Theme* to display the **Pattern Theme** dialog box.
2. Change the *field*, *method*, *number of classes*, and *options* as desired. If you just want to recalculate the classes, based on the current settings, to reflect changes to the data, click **Recalculate**. You can preview the changes by clicking **Apply**.

3. Click OK.

TransCAD draws the map with the modified theme.

#### To Turn Off a Color or Pattern Theme

1. Choose **Map-Color Theme** or **Map-Pattern Theme** to display the theme dialog box.
2. Click **Remove** to clear the settings and close the dialog box.

TransCAD draws the map without the theme.

### 7.2.2 Setting Styles for a Color or Pattern Theme

For any class in a color or pattern theme, you can customize the style and change the text that describes it in the map legend. This lets you tailor every aspect of a thematic map.

TransCAD includes a collection of predefined color and pattern sets. If you choose one of these predefined color or pattern sets, TransCAD will update the appearance of all the classes in that theme. You can also update the style of each class individually.

TransCAD has a special color ramp feature you can use to set the colors for a color theme. The color ramp lets you pick a starting color and an ending color, and then fills in the rest of the colors to make a gradual transition from the first to the last. If you used the **Break At** option, you can pick a starting color, a color for the break point, and an ending color, and let TransCAD fill in the rest.

#### To Change the Style of a Color or Pattern Theme

1. Choose **Map-Color Theme** or **Map-Pattern Theme** to display the theme dialog box.
2. Click the **Styles** tab.
3. Make changes according to the table below.

To do this...	Do this...
Change the style of a class	Click on the class you want to change, and click <b>Style</b> to display the <b>Style</b> dialog. Choose the settings you want and click <b>OK</b> .
Change the legend text for a class	Click on the class you want to change, and type the new text in <b>the Legend Text</b> box.
Use the same pattern for all classes	Click on the class whose pattern you want to copy, and click <b>Copy Pattern</b> .
Choose a predefined color set	Click << <b>Previous</b> or <b>Next</b> >> to browse through the available color sets.
Use the color ramp	Choose a starting and ending color from the <b>From</b> and <b>To</b> drop-down lists. If the <b>Break At</b> option is on, choose a third color from the <b>Via</b> drop-down list.

Reverse the order of colors	Click <i>Swap Start and End</i>
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As you make each change, TransCAD updates the dialog box to show the new appearance and legend text for each class. You can preview the changes on the map by clicking *Apply*.

4. Click *OK*.

TransCAD draws the map with the new styles and legend text.

### 7.2.3 Options for Color and Pattern Themes

There are many options you can choose when creating a color or pattern theme. Choose these options from the Color Theme or Pattern Theme dialog box.

#### Methods

TransCAD lets you set up the classes using any of several methods, described in the following table:

Method	Meaning
Equal number of features	Each class has the same number of features. If you ask for four classes, each one will contain one-fourth of the features.
Equal size intervals	Each class has the same range of numbers (for example, 0-1000, 1000-2000, and so on). Each class will probably have a different number of features.
Equal feature area	The total land area of features in each class is about the same, so you see the same amount of each color or pattern on the map. <b>It can only be used for area features.</b>
Equal feature length	The total length of features in each class is about the same, so you see the same amount of each line style or line color on the map. <b>It can only be used for line features.</b>
List of values	Each value is assigned to a separate class. This and Manual are the only classification methods for character (string) fields, and is useful if there are only a few different values.
Standard deviation	Features are split into classes for a number of standard deviations above and below the average value. Type the number of standard deviations in each class in the options box.
Nested averages	Features are split into two classes based on the average value. Each of those classes is split in two based on the average value for features in the class, and so on. This method creates 2, 4, 8, 16, 32, 64, 128, 256, or 512 classes.
Manual	The minimum and maximum value for each class or the number or percentage of features in each class are set manually.



## Number of Classes

Maps communicate most effectively when there are only a small number of classes, about four or five. TransCAD lets you choose to create up to 512 classes in your color or pattern themes.

The number of classes that appear in your theme may be higher or lower than you ask for. For example, TransCAD adds an extra class (called "Other") when there are features that have no data or that contain a value not assigned to any class. Also, if you ask for eight classes when there are only six features on the map, you will get fewer classes than you asked for.

## Ignore Values Above or Below

These options let you create a theme that ignores features with values higher or lower than some limit you set. For example, you could create a color theme showing the population over certain level of all areas by ignoring the ones with population below a certain level. Areas whose populations are not within the range you choose are assigned to the "Other" class.

## Break At

This option forces a separation between classes at the value you specify. For example, if you are creating a theme to illustrate a field called Population Growth, you can set up Break At to 0 to make the areas with positive population growth look different from areas with negative population growth.

## Treat Zeros as Missing Values

Some database programs, like dBASE, have no way of indicating that a particular piece of data is missing or unavailable. A zero value for Population in a dBASE file may mean the population is zero, or it may mean the population is unknown.

If this option is checked, TransCAD assumes that a value of zero means that the real value is not known. Features with a zero value will be placed in the "Other" class, and TransCAD will not take them into account when building the classes.

## Round Off the Values in Each Class

If this option is checked, TransCAD rounds off the low and high values in each class to make the legend easier to read. TransCAD rounds off each number as much as it can without changing the assignment of features to classes.

## Include Counts in Legend

If this option is checked, the legend will display the number of map features that fall within each class.

Std. Dev. Per Class

When you use the standard deviation method, TransCAD creates classes that are one standard deviation in size. To change the size of the classes, enter a different number here.


## 7.3 Dot-Density Themes

A dot-density theme uses dots or other symbols on the map to show the values of one or more numeric data fields. **Each dot on a dot-density map represents some amount of data. However a dot location does not represent any geo-location of the data. Dot-density themes can only be created on an area layer**, such as TAZs, census tracts, or census blocks.

### 7.3.1 Creating Dot-Density Themes


You create a dot-density theme by choosing the layer you want to map and one or more data fields that you want to see. MapWizard takes care of the rest by picking a dot value that will provide not too many and not too few dots in each area. If you prefer, you can choose the dot value yourself by typing it into the dialog box.

To Create a Dot-Density Theme from a Dataview

1. Select the data field you want to map by clicking on the column heading. To use more than one field, shift-click on additional column headings. TransCAD highlights the selected columns.
2. Click  on the toolbar.

TransCAD creates a new map that uses a dot-density theme to illustrate the values of the chosen field.

To Add a Dot-Density Theme to a Map

1. Choose the layer you want from the layer list in the map toolbar.
2. Choose *Map-Dot Density Theme* or click  on the toolbar to display the **Dot-Density Theme** dialog box.
3. Choose one or more fields from the scroll list.
4. Let MapWizard choose the dot value setting, or choose *Manually At* and type a value for the count per dot.
5. Click **OK**.

TransCAD draws the map with the dot-density theme and displays a legend.

To Change a Dot-Density Theme

1. Choose *Map-Dot Density Theme* or click  on the toolbar to display the **Dot-Density Theme** dialog box.

2. Change the field and the dot value settings as desired. You can preview the changes by clicking *Apply*.
  3. Click *OK*.
- TransCAD draws the map with the modified theme.

#### To Turn Off a Dot-Density Theme


1. Choose *Map-Dot Density Theme* or click  on the toolbar to display the **Dot-Density Theme** dialog box.
2. Click *Remove*.

TransCAD draws the map without the dot-density theme.

### 7.3.2 Setting Styles for a Dot-Density Theme

In TransCAD, you can choose the symbol you want and customize the text that appears in the map legend for each field.

#### To Change the Style of a Dot-Density Theme

1. Choose *Map-Dot Density Theme* or click  on the toolbar to display the **Dot-Density Theme** dialog box.
2. Click the *Styles* tab.
3. Make changes according to the table below:

To do this...	Do this...
Change the dot style	Click on the field you want to change, and click the <i>Style</i> button to display the <b>Style</b> dialog box. Choose the settings you want and click <i>OK</i> .
Use one symbol for all fields	Click on the field whose symbol you want to copy, and click <i>Copy Symbol</i> .
Use one color for all fields	Click on the field whose color you want to copy, and click <i>Copy Color</i> .
Change the legend text	Click on the field you want to change, and type the new text in the <b>Legend Text</b> box.

As you make each change, TransCAD updates the dialog box to show the new symbols and legend text. You can preview the changes by clicking *Apply*.

4. Click *OK*.

TransCAD draws the map with the new styles and legend text.

## 7.4 Pie and Bar Chart Themes

Pie and bar chart themes place pie or bar charts on map features to illustrate the data that go with each feature.

TransCAD has 5 chart styles from which you can choose:

- Pie Chart
- Vertical Bar Chart
- Stacked Vertical Bar Chart
- Horizontal Bar Chart
- Stacked Horizontal Bar Chart

All bar charts have a 3-D option.

Chart themes can be created on point, line, and area layers. When you display charts on a line layer, the chart is centered at the midpoint of the line. For point layers, the chart is centered at the location of the point. For area layers, the chart is centered at the centroid of the area.


Stacked bar charts can only be used if you choose more than one data field.

### 7.4.1 Creating Chart Themes

You create a chart theme by choosing the layer you want to map, one or more numeric data fields that you want to see, and the type of chart you want. MapWizard will take care of the rest.


If you want, you can control the minimum and maximum size of the charts, and indicate the values to which these sizes should correspond. The size of a pie chart is its diameter, the size of a vertical bar chart is its height, and the size of a horizontal bar chart is its width. Chart sizes are set in points.

To Create a Chart Theme from a Dataview

1. Select the data field you want to map by clicking on the column heading. To use more than one field, shift-click on additional column headings. TransCAD highlights the selected columns.
2. Click  on the toolbar.

TransCAD creates a new map that uses a chart theme to illustrate the values of the chosen field. If you choose a single data field, TransCAD creates a 3-D vertical bar chart. If you choose more than one field, TransCAD creates a pie chart.

## To Add a Chart Theme to a Map


1. Choose the layer you want from the **layer** list in the map toolbar.
2. Choose **Map-Chart Theme** or click  on the toolbar to display the **Chart Theme** dialog box.
3. Choose one or more fields from the list of fields.
4. Choose a chart type from the **Chart Type** scroll list.
5. Let MapWizard choose the chart size, or choose **Manually** and fill in one or more of the size fields according to the table:

This entry...	Does this...
Low Value	Features with values below this level will not have a chart drawn
Low Size	Features with the low value will be this size
High Value	Features with values at or above this level will have a chart of maximum size
High Size	Features with values at or above the high value will be this size
Bar Width/Height	Sets the width of vertical bars or the height of horizontal bars

6. Click **OK**.


TransCAD draws the map with the chart theme and displays a legend.

## To Change a Chart Theme

1. Choose **Map-Chart Theme** or click  on the toolbar to display the **Chart Theme** dialog box.
2. Change the fields, chart type, and size settings as desired. You can preview the changes by clicking **Apply**.
3. Click **OK**.

TransCAD draws the map with the modified theme.

## To Turn Off a Chart Theme


1. Choose **Map-Chart Theme** or click  on the toolbar to display the **Chart Theme** dialog box.
2. Click **Remove**.

TransCAD draws the map without the chart theme.

## 7.4.2 Setting Styles for a Chart Theme

TransCAD uses one color and fill pattern for each field you use in a chart theme. For each field, you can choose the color and fill pattern you want and customize the text that appears in the map legend.

To Change the Style of a Chart Theme

1. Choose **Map-Chart Theme** or click  on the toolbar to display the **Chart Theme** dialog box.
2. Click the **Styles** tab.
3. Make changes according to the table below:

To do this...	Do this...
Change chart style	Click on the field you want to change, and click <b>Style</b> to display the <b>Style</b> dialog. Choose the settings you want and click <b>OK</b> .
Use one fill pattern for all fields	Click on the field whose fill pattern you want to copy, and click <b>Copy Pattern</b> .
Use one color for all fields	Click on the field whose color you want to copy, and click <b>Copy Color</b> .
Change the legend text	Click on the field you want to change, and type the new text in <b>the Legend Text</b> box.

As you make each change, TransCAD updates the dialog box to show the new colors, patterns, and legend text. You can preview the changes by clicking **Apply**.

4. Click **OK**.

TransCAD draws the map with the new styles and legend text.

## 7.5 Scaled-Symbol Themes

A scaled-symbol theme uses symbols of different sizes or lines of different widths to show the value of a data field.

Scaled-symbol themes can be created on point, line, or area layers. On line layers, the lines are scaled in width based on the value for the chosen field. On point layers, the symbol that is used to display the point is scaled in size based on the value of the chosen field. On area layers, you choose the symbol you want to use, and TransCAD displays the symbol at the center of the area, scaled in size based on the value of the chosen field.

TransCAD has a special dual-bandwidth feature for line layers that lets you see data that vary by direction. This feature can be used to show many different types of data, for example: The number of cars traveling in both directions on a street network or highway pavement width.

To create a dual-bandwidth theme, your layer must contain two fields that indicate the value of the field in each direction along the link. One field contains the value for the link in its "forward" topological direction, and the other contains the value for the link in its "backward" topological direction. The name of one of these fields must contain "AB" and the name of the other must contain "BA." When you choose one of these fields as the field to use in a scaled symbol theme, TransCAD automatically finds the matching field and displays dual bandwidths.


Many TransCAD procedures produce results that are directional. The traffic assignment models, for example, produce estimates of flow and travel time in both directions along each link, stored in fields named [AB Flow], [BA Flow], [AB Time], and [BA Time].

### 7.5.1 Creating Scaled-Symbol Themes

You create a scaled-symbol theme by choosing the layer you want to map, then choosing the numeric data field that you want to see. MapWizard will take care of the rest.

If you want, you can control the minimum and maximum size of the symbols or lines, and indicate the values to which these sizes should correspond. Symbol sizes and line widths are always set in points.


To Create a Scaled-Symbol Theme from a Dataview

1. Select the numeric data field you want to map by clicking on the column heading. TransCAD highlights the selected column.
2. Click  on the toolbar.



TransCAD creates a new map that uses a scaled-symbol theme to illustrate the values of the chosen field.

#### To Add a Scaled-Symbol Theme to a Map


1. Choose the layer you want from the layer list in the map toolbar.
2. Choose *Map-Scaled Symbol Theme* or click  on the toolbar to display the **Scaled-Symbol Theme** dialog box.
3. Choose a field from the *Field* drop-down list, or choose *Formula* at the end of the list to create a formula field.
4. Let MapWizard choose the symbol size, or choose *Manual* and fill in the size information according to the table:

<b>This entry...</b>	<b>Does this...</b>
Low Value	Features with values below this level will not have a symbol drawn
Low Size	Features with the low value will be this size
High Value	Features with values at or above this level will have a symbol of maximum size
High Size	Features with the high value will be this size

5. Click **OK**.


TransCAD draws the map with the scaled-symbol theme, and displays a legend.

#### To Change a Scaled-Symbol Theme

1. Choose *Map-Scaled Symbol Theme* or click  on the toolbar to display the **Scaled-Symbol Theme** dialog box.
2. Change the field and size settings as desired. You can preview the changes on the map by clicking *Apply*.
3. Click **OK**.

TransCAD draws the map with the modified theme.

#### To Turn Off a Scaled-Symbol Theme

1. Choose *Map-Scaled Symbol Theme* or click  on the toolbar to display **the Scaled-Symbol Theme** dialog box.
2. Click **Remove**.


TransCAD draws the map without the scaled-symbol theme.

## 7.5.2 Setting Styles for a Scaled-Symbol Theme

On a point layer, TransCAD uses the symbol and color you have chosen for the layer, and adjusts the size of the symbol based on the value of the field you choose. On a line layer, TransCAD uses the line style and color you have chosen for the layer, and adjusts the width of the line based on the value of the field you choose. To change the appearance of a scaled-symbol map on a point or line layer, you must change the style of the layer.

On an area layer, you can set the style of symbol used in a scaled-symbol map. TransCAD displays the symbol at the center of the area, and adjusts the size of the symbol based on the value of the field you choose. You can customize the color and symbol that are used to show the scaled-symbol theme.

To Change the Style of a Scaled-Symbol Theme on an Area Layer

1. Choose *Map-Scaled Symbol* Theme or click  on the toolbar to display the **Scaled-Symbol Theme** dialog box.
2. Click *Style* to display the **Style** dialog box.
3. Choose the font, symbol, and color you want to use.
4. Click **OK** to close the **Theme Style** dialog box. You can preview the changes by clicking *Apply*.
5. Click **OK**.

TransCAD draws the map with the new symbol.

## 7.6 Summary

In this session, we have discussed using different map themes in TransCAD. Now you should be able to create thematic maps to make your data easier to see, understand and interpret. In addition, you can take advantage of a thematic map to check errors in your data.

## 8 Working With TAZs

You can use TransCAD to create the TAZ (Traffic Analysis Zone) layer. It is an area layer with zone numbers in one of the data fields. There are different approaches to create the TAZ layer. You can draw zones based on an existing zone map and roads layer. Or you can create TAZs using census block data.


### 8.1 Creating TAZ Layer Using Existing Zone Map And Roads Layer

If you have a zone map and you want to create TAZ layer based on that map, you can use map editing tools to draw the zone.


#### 8.1.1 Drawing The Zone Layer Using The Editing Tools

To draw the zones, you first need to display your roads layer in TransCAD so you can use it as a reference. Then you create a new area layer in TransCAD as your TAZ layer and draw the zones using the map editing tools.

To display your roads layer



1. Choose **File-Open** or click  on the toolbar, to display the **File Open** dialog box.
2. Choose an appropriate file type from the **Files of Type** drop-down list.
3. Choose your roads file.
4. Click **Open** to open the file.

To create a new area layer

1. Choose **File-New** or click  to display the **New File** dialog box.
2. Choose **Geographic File** from the list of file types, then click **OK**. TransCAD displays the **New Geographic File** dialog box.
3. Click the **Area Geographic** file radio button.
4. Type a layer name in the **Name** text box.
5. Click the option **Add the layer to the current map window**.
6. Click **OK**. TransCAD displays the **Attributes for New Layer** dialog box.
7. Click **Add Field** to Add new data field TAZ with the data type of **Integer (2 bytes)**. This will be the field to number the TAZs.
8. Click **OK** to displays the **Save As** dialog box.
9. Select a folder and type a file name for the new geographic file and click **Save**.

TransCAD creates an empty geographic file for the map layer. You are now ready to use the editing tools to draw zones to the layer.

To draw the zones

1. Select the **TAZ** layer as the working layer from the drop-down list on the toolbar.
2. Choose **Tools-Map Editing-Toolbox** or click  on the toolbar to display the **Map Editing** toolbox
3. Activate the **Add** tool  by clicking on it.
4. Click at the starting point of the boundary line.
5. To add one or more shape points, move the mouse to the next point and click. Click the right mouse button to back up.
6. To end the line, press **Enter** or **double-click** on the endpoint. TransCAD displays the boundary line in black, with editing handles at the endpoints and shape points. TransCAD also displays editing handles on nearby areas to show the newly added area is connected to the nearby areas.
7. Click on the **green light** to save your edits, or click on the **red light** to cancel.
8. To add more TAZs, return to step 4.

**TIP**

You may want to draw the TAZs one after another in order. TransCAD may mess up if there is a gap between the TAZs that you have drawn.


If you saved your edits, TransCAD creates new areas that are defined by the lines you have drawn and draws the map with the revised areas. If you add boundary lines that do not close off an area, TransCAD ignores them. If you add boundary lines that are a little too long, TransCAD trims them neatly, just where you would expect.

Once you start adding area boundaries, you cannot use the **Delete** or **Join** tools until you have saved your edits by clicking the **green light**, or canceled them by clicking the **red light**. You can, however, use the **Modify** tool to adjust the lines you have drawn.

### 8.1.2 Creating a .bin File And Populate With Socio-Economic Data

You can store your socio-economic data in a separate .bin file, which is a table with fixed-format binary file type. Each table row (record) represents one TAZ. Each table column (field) contains one piece of information about each record. And one of the fields has to contain TAZ numbers so you can join this .bin file to your TAZ layer later using the TAZ number field.

To create a .bin file

1. Choose **File-New** or click  to display the **New File** dialog box.
2. Choose **Table** as the file type and click **OK**. TransCAD displays the **New Table Type** dialog box.
3. Choose **Fixed-format binary** as the table type from the radio buttons.
4. Click **OK**. TransCAD displays the **New Table** dialog box.
5. Select **Add a field** to add all the data fields for the socio-economic data.
6. To automatically add records to the new table, check the **Add Records** box and choose **Add a fixed number of records** method from the radio list in the **Add Records** dialog box
7. Type the record number to add the records
8. Click **OK** to close the **Add Records** dialog box.
9. Click **OK** to close the **New Table** dialog box. TransCAD displays the **Save As** dialog box.
10. Select a folder and type a file name and click **Save**.

TransCAD creates the new table file, and adds new records according to your choices.

To populate the table with socio-economic data

1. Click on the cell containing the data you want to edit.
2. Type a new value.
3. Press **Enter**.

You may also use **Fill** command to fill the values in the table.

### 8.1.3 Joining Your .bin File to the TAZ Layer

When you want to visualize the your data stored in the .bin file, you can join the file to the TAZ layer to make a map from the data. This creates a joined view.

Once you create a joined view, you can use your data in a map in ways such as creating a theme or labeling the map. You can display dataviews that show data from the geographic file side by side with your own data. You can even create formulas that combine fields from the two different sources.

A joined view is a live link between a map layer and your own data. Creating a joined view does not change your data in any way, but any changes in your data are reflected in the maps you make.


TransCAD also handles more complex joins, such as one-to-many joins, which we will cover in some advanced topics.

Creating a joined view involves three steps:

- Choose the TAZ layer you want to use and display it in a map or dataview.
- Open a dataview to display your .bin file data.
- Join the layer to your dataview.

To join the TAZ layer and your .bin file, the values in TAZ column of your .bin file should match the values in the TAZ column of the TAZ layer. Although the field names for the TAZ column in your TAZ layer and .bin file can be different, as long as the values match, you are encouraged to choose the same names for the columns.

To join your .bin file to your TAZ layer

1. Open the .bin file in TransCAD
2. Open the TAZ layer in TransCAD
3. Choose *Dataview-Join* or click  on the toolbar to display the **Join** dialog box.
4. Choose the *TAZ* layer from the **Joining From Table** drop-down lists.
5. Choose the *TAZ* field from the **Joining From Field** drop-down lists.
6. Choose your *socio-economic* dataview from the **To Table** drop-down lists.
7. Choose the *TAZ* field from the **To Field** drop-down lists.
8. Type a name or edit the suggested name for the joined view in the **Name** text box.
9. Click the **Options** tab, and check the option *Show the joined view in a dataview*
10. Click **OK**.

TransCAD creates a joined view, linking the TAZ layer to the dataview that contains your data.

#### 8.1.4 Using a Joined View

A joined view contains all the fields from the TAZ layer, and all the fields from the socio-economic data table, including the TAZ fields that were used to join the two together. Once you create a joined view, you can:

- Make thematic maps. The field list in the theme dialog box will contain the fields from the map layer and the fields from your data file.
- Add labels to maps using any of your data fields. The field list in the label dialog box will contain the fields from the map layer and the fields from your data file.
- Select records using any combination of fields from the map layer and fields from your data file.
- Display the joined view in a dataview, sorting the records and rearranging the columns any way you like.
- Create formula fields that combine data from the map layer and your own data file.
- Use the Info tool to display data for a map feature. You will see all of the fields in the joined view.

### 8.1.5 Editing Data in a Joined View

You can edit data in a joined view as you do to a regular dataview. When you edit data in a joined view, the changes you make are stored just where you would expect: changes to fields that are part of the map layer update the geographic file; changes to fields from your own data update your data file.

There are some restrictions on modifying a joined view.

- You cannot edit the two fields you used to create the joined view, because these fields are the glue that holds the two files together.
- You cannot add or delete records, since what appears to be a single record in the joined view is really a combination of data from two different places.
- You cannot modify structures of the two data tables.

However, you can drop the joined view first, do the modification to the individual tables, then rejoin the views after.

### 8.1.6 Dropping a Joined View

To drop a joined view, just close the joined dataview table.

## 8.2 Creating TAZ Layer Using Census Block Data

TAZs can be made up of several smaller census blocks, all joined together so that you don't have to draw them yourself and you can take advantage of the data in the census block file. Although you may still want to create a separate .bin file for your socio-economic data. One way to use the census data is to merge the blocks by value. The other way is to use the map editing tools to join the blocks to TAZs.

### 8.2.1 Getting The Census Data

You can clip out the census blocks using your study area boundary layer. It will make it easier to create your TAZ layer with a smooth boundary. Or you can export census blocks for your study area.

To clip out the census blocks

1. Open the **NC Division Maps** web page located at <S:\TransCAD\gisData\ncDivisionMaps\web.html>.
2. Click on **State** to open the state map in TransCAD
3. Add or create your study area boundary layer in TransCAD.
4. Select the **Census Block** as working layer from the drop-down list on the toolbar.
5. Choose **Tools-Geographic Utilities-Clip by Area** to display the **Clip by Area** dialog box.
6. Choose the your study area boundary layer from the **Layer** drop-down list.
7. Choose **All** records from the **Selection** drop-down list.
8. Uncheck the box **Add layer to map**
9. Click **OK**. TransCAD displays the **Save As** dialog box.
10. Choose a folder, type a file name for the new geographic file and click **Save**.
11. Close the state map **without** saving it.

TransCAD creates a new geographic file containing the census blocks for your study area.

#### **TIP**

You can also use county boundaries to clip out the census blocks for your study area.

To exporting census blocks

1. Open the **NC Division Maps** web page located at <S:\TransCAD\gisData\ncDivisionMaps\web.html>.
2. Click on **State** to open the state map in TransCAD



3. Select the **Census Block** as working layer from the drop-down list on the toolbar.
4. Select your area using a selecting tool in TransCAD
5. Choose **Tools-Export** to display the **Export Geography** dialog box.
6. Choose **Selection** to export from the **Export** drop-down list.
7. Choose **Standard Geographic File** from the **To** drop-down list.
8. Choose the field **ID** from the **ID field** drop-down list.
9. Check the **Include Built-in Data** box to export the tabular data along with the geographic data.
10. Click **OK**. TransCAD displays the **Save As** dialog box.
11. Choose a folder and type the file name and click **Save**.
12. Close the state map **without** saving it.

TransCAD exports the census blocks for your study area.

### 8.2.2 Merging The Census Blocks To TAZs

When you use the **Tools-Geographic Analysis-Merge by Value** command to create TAZs from the census block layer, it creates a new area (TAZ) layer, which is stored in a new geographic file. In this new TAZ layer, each TAZ is made up by grouping one or more census blocks based on the TAZ numbers. That is, all the census blocks with the same TAZ numbers will be grouped into one TAZ.


In order to merge the census blocks by TAZ numbers, you have to first fill the zone numbers in the TAZ field of the census block layer.

To fill the zone number

1. Choose **Census Blocks** as the working layer from the drop-down list on the toolbar.
2. Select the census blocks that will be in the same zone using a **Selection** tool
3. Open a dataview table for the census block layer
4. Choose to view the selected records only
5. Select the **TAZ** field by clicking on the column header
6. Choose **Edit-Fill** or click the right mouse button on a column heading and choose **Fill**.  
TransCAD displays the **Fill** dialog box.
7. Click the **Single value** radio button and type the zone number
8. Click **OK**. TransCAD fills the selected blocks with the zone number.
9. Click on the map to go back to the map window
10. Select different census blocks that will be in the same zone using a **Selection** tool
11. Click on the dataview table to activate the window
12. Return to step 5 until the TAZ field is filled for all the records

To merge the blocks by zone numbers

1. Choose the **Census Block** as working layer from the drop-down list on the toolbar.




2. Choose **Tools-Geographic Analysis-Merge by Value** or click  on the toolbar to display the **Merge by Value** dialog box.
3. Choose **All records** from the **Merge** drop-down list.
4. Choose **TAZ** field from the **Based On** drop-down list.
5. Type **TAZ** for the new map layer in the **Create Layer** text box.
6. Check the **Compute Attributes** box, then click **Attributes** button to display **Attributes Settings** dialog box.
7. For all the numeric fields, check **Add** option
8. For all the character fields, check **Copy** option
9. Click **OK** to close **Attributes Settings** dialog box.
10. Click **OK** to displays the **Save As** dialog box.
11. Choose a folder and type a file name for the new geographic file, and click **Save**.

TransCAD creates the TAZ layer and adds it to the map.

### 8.2.3 Creating TAZ Layer Using Map Editing Tools

You can also join the census blocks into TAZs using map editing tools and save it as your TAZ layer.

To join census blocks into TAZs

1. Open the census block layer of your study area
2. Add your roads layer to the map as reference
3. Choose the **Census Block** as working layer from the drop-down list on the toolbar.
4. Choose **Tools-Map Editing-Toolbox** or click  on the toolbar to display the **Map Editing** toolbox.
5. Configure geographic editing using the **Configure Settings** tool . Select **Add** option for all the numeric fields. Select **Copy** option for all the character fields.
6. Activate the **Join** tool  by clicking on it.
7. Click on the census blocks you want to join into one TAZ. TransCAD displays editing handles on the boundaries.
8. Click the green light to save your edits, or click **red light** to cancel. If you saved your edits, TransCAD draws the map with the joined areas.
9. Return to step 7 until all the TAZs are created
10. Fill the zone number in the TAZ data field

### **8.3 Summary**

In this session, we have discussed the different ways to create TAZs in TransCAD, and populate socio-economic data in a .bin file and then join the .bin file to your TAZ layer. Now you should be able to create TAZs using existing zone map and a street layer, or aggregating census blocks to TAZs.

## 9 Using Labels

Labels are used to identify the features in a layer by their names or other characteristics. For example, you might want to display road names on a map of your network roads, or some socio-economic data on a map of your TAZs.

To label the features in a layer, you choose a data field containing the information you want to see and a style in which the labels should be displayed. TransCAD provides two ways to label features: automatic labels and manual labels.

Automatic labels display the most effective combination of labels according to rules you set, such as whether labels can overlap, which labels have the highest priority, at what scales labels should display, and how labels should be aligned.

Manual labels are useful when you want to adjust the location or edit the text of any label to improve the appearance of your map, or if you want to embellish each individual label in a particular way.

You can also select map features and design labels for just those features. We are going to discuss this later in a different session when we talk about selection sets.

TransCAD also features an option to convert your automatic labels to manual labels. This way, you can let TransCAD do the bulk of the labeling work before you take over to make a few minor modifications.

You can change the default font for labels by choosing the *Edit-Preferences* command and going to the *Label/Legend* tab in the **User Preferences** dialog box. The default color for labels is the color that is used to display features in the layer.


## 9.1 Using Automatic Labels

When you use automatic labels, you let TransCAD decide exactly which features should be labeled and where the labels should be placed. You set up some ground rules:

- What font and style should be used for labels
- Whether labels overlap
- Which labels have the highest priority
- How labels should be aligned

Each time the map is drawn, TransCAD displays the combination of labels according to the rules you set.

To Label a Map Automatically


1. Choose the layer you want to label from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Choose a data field from the **Field** drop-down list in the **Labels** tab.
4. Make changes to the font as shown in the following table:

To do this...	Do this...
Change the font	Choose a font from the <b>Font</b> drop-down list
Change the size of the label	Choose a size from the <b>Size</b> drop-down list
To change the color	Choose a color from the <b>Color</b> drop-down list
Make the label bold	Check the <b>Bold</b> box
Make the label italic	Check the <b>Italic</b> box

5. Click **OK**.

TransCAD draws the map based on the current automatic label settings. When you change the map scale or center, TransCAD adjusts the labels as needed.

To Remove Automatic Labels

6. Choose the layer you want to label from the drop-down list on the toolbar.
7. Click  on the toolbar to display the **Automatic Labels** dialog box.
8. Click **Remove**. TransCAD removes the labels from the map.

## 9.2 Enhancing Automatic Labels

TransCAD lets you customize the way automatic labels are displayed in several ways:

- Change the position of labels
- Screen out or include duplicate labels
- Prevent labels from overlapping
- Limit the length of labels by wrapping words onto new lines
- Control the priority of labels within and across layers
- Choose the scale at which labels will appear
- Put a frame or shield around each label

### 9.2.1 Label Position

TransCAD lets you change the position of labels in several ways:

- Pick one of nine label positions
- Use Smart Alignment to adjust the position of labels
- Wrap the label over several shorter lines rather than one long line
- Stretch area labels to fill the areas they are associated with
- Control whether or not line labels are rotated to match the angle of the line

You can choose where to place labels around a point, around the midpoint of a line, and around the center of an area. Normally point feature labels are displayed to the upper right of the point, line feature labels are centered above the line, and area feature labels are centered within the area.

Sometimes labels are very long and you want to make them shorter. You can set a limiting number of characters in a line, and TransCAD will use word wrap to create a group of shorter lines. New lines will start after spaces in the label text. The group of lines will be left justified.

Smart Alignment helps TransCAD place labels so they line up with features better than they otherwise might. Smart Alignment behaves differently for each type of layer:

For this type of layer	Smart Alignment does this
Point	If the label priority is such that it would not be displayed at the default position, Smart Alignment attempts to label the point at other positions
Line	If the label would be placed at a bend in the line, Smart Alignment attempts to move the label so that it lines up with a straighter section of the line
Area	If the label does not fit completely within the boundaries of the area, Smart Alignment attempts to move the label so that it fits more completely within the area

You can stretch labels for area features so they fill the area with which they are associated. Labels are often stretched in printed maps to make it easier to distinguish labels that apply to states or countries from labels that apply to cities. If you choose to stretch labels, TransCAD increases the spacing between characters so that the label fits the area it describes.

Labels for line features are normally drawn at the same angle that the line feature is drawn. When you tell TransCAD not to allow label rotation, TransCAD draws all labels horizontally.

### To Change the Positions of Automatic Labels

1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.

2. Click  on the toolbar to display the **Automatic Labels** dialog box.

3. Make changes according to the table below:

To do this...	Do this...
Change the label position	Choose an option from the <b>Position</b> drop-down list
Use Smart Alignment	Check the <b>Smart Alignment</b> box
Limit the line length	Check the <b>Limit Lines To</b> box and type the number of characters in the edit box
Stretch area labels	Check the <b>Stretch</b> box
Make line labels horizontal	Make sure the <b>Allow Rotation</b> box is not checked

4. Click **OK**


TransCAD draws the map based on the current label position settings.

### 9.2.2 Duplicate Labels

Labeling a map can be very tricky because you want to include enough labels to identify key features of the map, without including so many labels that the map is hard to read. When TransCAD draws a map with automatic labels, it normally screens out duplicate labels.

You can also tell TransCAD to allow duplicate labels, but to space the duplicates a certain distance apart. For example, a map may allow duplicate labels, but space them at least 1 inch apart.

## To Show Duplicate Labels

1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Make changes according to the table below:

To do this...	Do this...
Label as many features as possible	Check <i>Allow Duplicates</i> and type "0" for the spacing
Allow duplicates some distance apart	Check <i>Allow Duplicates</i> and enter the desired spacing
Eliminate duplicate labels	Make sure <i>Allow Duplicates</i> is not checked

4. Click **OK**.

TransCAD draws labels according to the settings you chose.

### 9.2.3 Overlaps

TransCAD normally prevents labels from overlapping so the map is easier to read. This means that some features will be labeled and others will not. You can change the way TransCAD draws labels by:

- Setting a higher priority for certain layers or features
- Using alternate fields to label features
- Allowing labels to overlap

#### Label Priority

Label priority settings are used to make sure that the most important features on your map are labeled when you have chosen to prevent labels from overlapping. When you use these options, TransCAD decides which features to label and which ones to skip based on the priority you set.

- Layer Priority: choose from the drop-down list: Highest priority is 1, and 9 is the lowest. For example, if a map contains TAZs and Highways and your current focus is to show TAZs, you can help make sure that TAZs are labeled by assigning them a higher label priority than Highways.



- Priority among features in a layer: use a data field and choose the order from the drop-down list. For example, you can help make sure that roads with high capacity are labeled by setting priority based on higher values of capacity.

### Alt. (Alternate) Fields


You can specify an alternate field containing a shorter label for TransCAD to use when the regular label will not fit. For example, the abbreviations for Rhode Island (RI) and New Hampshire (NH) may fit on a map even though the state name is too long to fit.

When you choose an alternate field to substitute when labels overlap, TransCAD will try to fit the alternate field label when your first choice won't fit.

### Allow Overlaps

If you want, you can also choose to let TransCAD label all features, in all labeled layers, even if the labels overlap. If your map contains many features, however, labeling all features could make your map look messy.

### To Control How Labels are Drawn

1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Click the **Overlaps** tab to display the **Overlaps** page.
4. Make changes according to the table below:

To do this...	Do this...
Allow overlaps	Make sure the <i>Prevent Overlapping Labels</i> box is not checked; <b>this will affect all labeled layers</b>
Use an alternate field	Choose an alternate field from the <i>Alt. Field</i> drop-down list
Control priority across layers	Choose a priority setting from the <i>Layer Priority</i> drop-down list
Control priority within layers	Choose whether to draw labels first based on higher or lower values of a field, and choose the field, from the <i>Within the Layer Based On and the Values Of</i> drop-down lists

5. Click **OK**.


TransCAD draws the map based on the current label settings.

## 9.2.4 Using Autoscale with Labels

Just as you can set a layer so that it displays only at certain scales, you can set labels so they display only at certain scales. For example, you can arrange your map so that the labels turn on automatically when you zoom in past a certain scale. Doing so can help to make your map easier to read.


The scale of a map is the relationship between the size of each feature on the map and its actual size on the surface of the Earth. When you apply autoscaling to labels, you type the largest and smallest scale at which labels will be drawn. If you have set a largest value of 1:1,200 and a smallest value of 1:5,000,000, your labels will be drawn only when features are displayed at a size that falls between the largest and smallest values you set.

### To Use Autoscaling with Labels

1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Click the **Overlaps** tab to display the **Overlaps** page.
4. Choose the largest and smallest scales at which you want the labels to display from the **Largest** and **Smallest** drop-down lists.
5. Click **OK**.

TransCAD draws the map based on the current label settings.

### To Turn Off Autoscaling of Labels

1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Click the **Overlaps** tab to display the **Overlaps** page.
4. Click **Clear**.
5. Click **OK**.

TransCAD will label the layer at any map scale.


## 9.2.5 Frames and Shields

The frames option encloses each label in a frame or shield so that it stands out more clearly against features drawn behind the label.

When you use rectangle, rounded rectangle, or elliptical frames, you can choose the background style and color as well as the border width, style, and color. These frames adapt automatically to the font that is used for each label and the length of each label.


Shields add to your map by helping to distinguish different classes of highways. When you use one of the special highway shield styles, the colors of the shield are predetermined and cannot be changed. Shields automatically adapt in size based on the label font you are using and display up to three characters of text. Shields are best used for highway or route numbers.

#### To Add a Frame Around Automatic Labels

1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Click the **Frames** tab to display the **Frames** page.
4. Click the **Frames** radio button.
5. Choose a frame shape, style, and color.
6. Click **OK**.

TransCAD draws the labels with frames around them.

#### To Add Shields Around Automatic Labels


1. Choose the layer whose labels you want to change from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Click the **Frames** tab to display the **Frames** page.
4. Click the **Shields** radio button.
5. Choose a shield style.
6. Click **OK**.

TransCAD draws the labels with frames around them.

### 9.2.6 Using Field with Selected Format to Label a Map

You can apply formatting to the values of a **numeric data field** so that commas, decimals, and dollar signs appear the way you want. Then label your map using the field with desired format.

To Label a Map using a field with the Selected Format

1. Choose **Dataview-Column Settings**, or click  on the toolbar, or click **the right mouse button** on the dataview and choose **Column Settings**. TransCAD displays the **Column Settings** dialog box, which lists all column headings and display formats.
2. Choose a column from the list and choose a format from the **Format** drop-down list
3. Click **OK**. TransCAD displays the dataview with the new settings.
4. Label your map with the field.


**TIP**

To change existing labels reflecting the new column format settings, you need to display the **Automatic Labels** dialog box, reselect one of the settings (font color, for example), then click **Apply**. TransCAD draws the map with the labels using the new column format settings.

### 9.2.7 Using Multiple Fields Label

You can use more than one data field to label your map. TransCAD will display the value of each field in separate lines.

To Label a Map with Multiple Fields

1. Choose the layer you want to label from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Choose **Multiple Fields** from the **Field** drop-down list in the **Labels** tab, to display **Multiple Fields in Label** dialog box.
4. Choose the fields you want from the **Available Label** list
5. Click **Add** to add the fields to the **Selected Label** list
6. Click **OK** to close the **Multiple Fields in Label** dialog box
7. Select the appropriate settings you want
8. Click **OK**.

TransCAD draws the map with multiple fields labels

## 9.2.8 Using Formula Fields to Label a Map

You can use formulas to label features on a map with more than one data field. Simply create a formula field that combines two or more existing fields.

When you combine fields, they must all be strings, not numbers. To convert a number to a string, use the `String()` function. For example, suppose your TAZ layer has two numeric fields: **TOTDU** and **TOTEMP**. To label each TAZ with both data fields, create this formula:

```
string(TOTDU) + " " + string(TOTEMP)
```

This combines the **TOTDU** and **TOTEMP** into a single field, separated by a space.

To label features on a map using several fields that appear on more than one line, use a vertical bar in the formula to skip to the next line. For example, if you label a map with this formula:

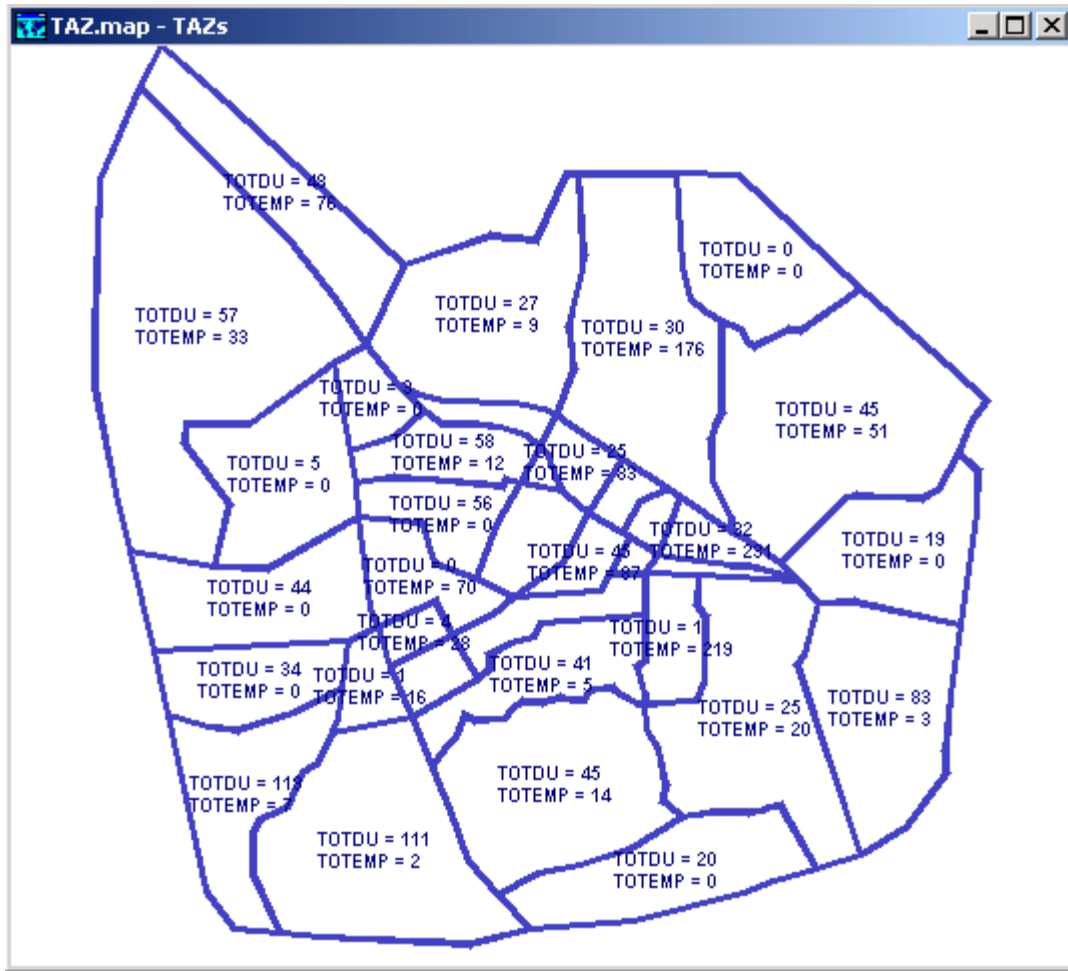
```
string(TOTDU) + "|" + string(TOTEMP)
```

You will get labels that have the fields on two lines.


You can also wrap your data fields with some descriptions as this:

```
"TOTDU = " + String(TOTDU) + "|" + " TOTEMP = " + String(TOTEMP)
```

You will label your TAZ map as follows:



To Create a Formula Field Label

1. Choose the layer you want to label from the drop-down list on the toolbar.
2. Click  on the toolbar to display the **Automatic Labels** dialog box.
3. Choose **Formula...** from the **Field** drop-down list to display the **Formula** dialog box
4. Enter the following formula in the **Formula** box, for example: "**TOTDU = " + string(TOTDU) + "|" + " TOTEMP = " + string(TOTEMP)**"
5. Click **OK** to close the **Formula** dialog box
6. Click **OK** to close the **Automatic Labels** dialog box

TransCAD labels the map with the formula field, creates the formula field and, depending on whether you are looking at a dataview or a map, you see the following:

- If you are looking at dataview, TransCAD displays the formula field as the last column in the dataview.
- If you are looking at a map, TransCAD adds the formula field to the list of fields you can use in labeling and thematic mapping.

### 9.3 Using Manual Labels

When you use manual labels, you click on the features you want labeled one at a time. These labels are added to the map as freehand items, which you can edit, move, rotate, or customize using different fonts and colors.

As you zoom in and out on a map, manual labels retain the point size you set when you placed them or converted automatic to manual labels. You can change this behavior for individual manual labels so that they scale with the map when you zoom in or out.

You can also control how manual labels are located. When you click on a feature, TransCAD places each label either:


- At the point at where you clicked
- In the same place an automatic label would be placed (aligned with the feature)

It is generally a good idea to place manual labels for points and lines in the same place as an automatic label. This will ensure that the labels are consistently placed. For area layers, you may prefer to have the label located where you click. This is particularly important if only a portion of the area is visible and you want that area labeled.

You can convert all automatic labels to manual labels. This gives you more control over label placement, but maps with many manual labels will draw more slowly.

#### To Label a Map Manually

You use the **Manual Labels** tool to manually label the features in a map layer. The first time you use the **Manual Labels** tool for a layer, you fill in the **Manual Labels** dialog box to choose the data field, font, and style for each label.

1. Choose the layer to label from the drop-down list on the toolbar.
2. Click  in the toolbox to activate the **Manual Labels** tool.
3. Click on the map feature you want to label.
4. If this is the first time you have used the **Manual Labels** tool with this layer, the **Manual Labels** dialog box is displayed.
5. Choose a field to use to label features from the **Field** drop-down list.
6. Choose a label position from the **Position** drop-down list.




7. Make changes to the font as shown in the following table:

To do this...	Do this...
Change the font	Choose a font from the Font drop-down list
Change the size of the label	Choose a size from the Size drop-down list
Change the color	Choose a color from the Color drop-down list
Make the label bold	Check the Bold box
Make the label italic	Check the Italic box

8. Click **OK**. TransCAD labels the feature according to the settings you chose.
9. Continue clicking on features. A manual label is added for each one.


#### To Add a Frame or Shields to Manual Labels

Frames and shields can be applied to manual labels in the same way as automatic labels.

1. Click  to activate the **Pointer** tool, and double-click on a manual label to display the **Freehand Text** dialog box.
2. Click the **Frames** tab to display the **Frames** page.
3. Choose the **Frames** or **Shields** radio button.
4. Choose a frame or shield from the list.
5. Click **OK**.

TransCAD applies the frame or shield to manual labels

#### To Change Manual Label Settings


1. Choose the layer to label from the drop-down list on the toolbar.
2. Click  to display the **Automatic Labels** dialog box.
3. Click **Manual** to display the **Manual Labels** dialog box.
4. Choose the settings you want.
5. Click **OK**.

Any new labels that are added will have the new settings. Existing labels are unaffected.

#### TIP

You can also change manual label settings when adding a label by holding down the **Shift** key while clicking on the map with the manual labels tool.

## To Make Manual Labels Scale with the Map

1. Click  to activate the **Pointer** tool, and double-click on a manual label to display the **Freehand Text** dialog box.
2. Click the **Size/Alignment** tab to display the **Size/Alignment** page.
3. Choose the **Change text size when the map scale changes** radio button.
4. Click **OK**.

From now on, TransCAD will scale the label with the map when you zoom in and out.

## To Control How Manual Labels Are Placed

1. Choose **Edit-Preferences**, or click the right mouse button anywhere inside the TransCAD frame except on a window and choose **Preferences**, to display the **User Preferences** dialog box.
2. Click the **Label/Legend** tab to display the **Label/Legend/Info** page.
3. Make the change to the placement of manual labels as shown in the following table:


To place manual labels...	Click...
At the location of the cursor	<i>At Cursor</i>
At a defined offset from the centerpoint of a chosen feature	<i>Just Like Automatic Labels</i>

4. Click **OK**.

From now on, TransCAD will place manual labels with the new setting.

## To Move Manual Labels


Manual labels can be moved around the map individually or in groups.

1. Click  to activate the **Pointer** tool, and select one or more manual labels.
2. Position the cursor over one of the selected items (but not on one of the handles).
3. Press and hold down the mouse button. Borders appear around all the selected items.
4. Drag the items to a new location, and release the mouse button.

TransCAD draws the labels in their new location.

## To Edit Manual Labels



Most freehand items can be edited in place to change the style or other attributes of the item. To edit a freehand item:

1. Click  to activate the **Pointer** tool, and select a manual label, and double-click on any of the selected label to display **Freehand Text** dialog box.
2. Change the settings.
3. Click **OK**.

TransCAD draws the item with the changes.

### To Rotate Manual Labels

Manual labels can be rotated to any desired angle if it is set to change size when the map scale changes.

1. Click  to activate the **Pointer** tool, and double-click on a manual label to display the **Freehand Text** dialog box.
2. Click the **Freehand/Layout** tab to display the **Freehand/Layout** page.
3. Choose the **Change size of freehand items when page size changes** radio button.
4. Click **OK** to close the **Freehand Text** dialog box.
5. Click  to activate the **Pointer** tool, and select a manual label on the map.
6. Position the cursor over the rotation handle.
7. Press and hold down the mouse button on the handle. A border appears around the item.
8. Drag the handle until the border is shown at the desired angle, and release the mouse button.


TransCAD draws the item in its new location.

#### TIP

You can enter an angle in the **Angle** edit box on **Size/Alignment** page as well.

### To Delete Manual Labels

Manual labels can be deleted from the map individually or in groups.

1. Click  to activate the **Pointer** tool, and select one or more manual labels.
2. Press the **Del** key or Click the **right mouse** button on the labels and choose **Delete**.
2. Click **Yes** to delete the labels if TransCAD displays a dialog box to confirm the deletion.

The selected labels are deleted from the map.

## Converting Automatic Labels to Manual Labels

Most of your labeling needs can be handled with automatic labels. However, if you need to make detailed adjustments to some or all of the labels, or if you want to add more labels, you can convert the automatic labels to manual labels.

Converting your automatic labels to manual labels converts all the labels that are currently visible on the screen, and turns off automatic labeling of those layers. Maps with many labels will draw more slowly.

Save this step for last, because once you have converted to manual labels, you cannot convert them back to automatic labels.

To Convert to Manual Labels

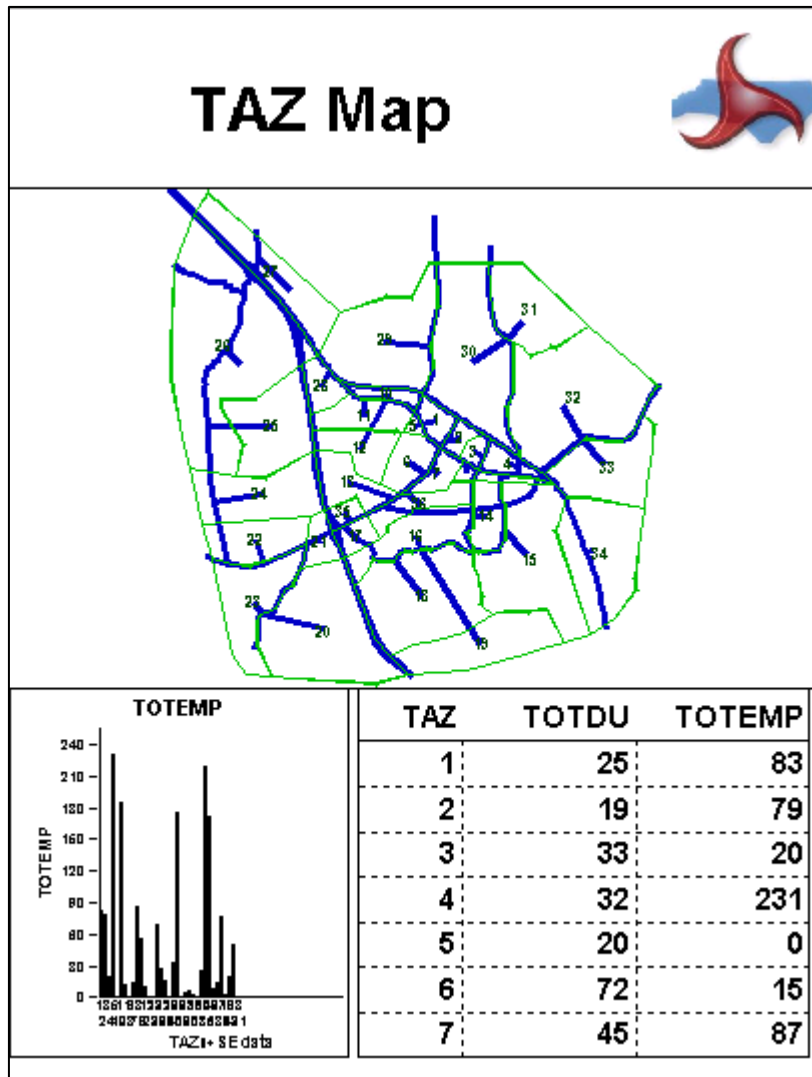
1. Choose **Map-Convert Labels**. TransCAD asks you to confirm that you want to convert to manual labels.
2. Click **Yes**.

TransCAD converts all visible automatic labels to manual labels.

## 9.4 Summary

In this session, we have discussed how to use automatic and manual labels to identify your map features. Now you should be able to label your map with data to provide more information on the map and make it easier to read.

## 10 Creating and Using Layouts



### *What you will learn in this session:*

- How to create a layout
- Why layouts are useful
- How to edit a layout to create presentation quality plots and figures for Traffic count map, thoroughfare plan maps, deficiencies map, etc.

What is a layout?

A TransCAD layout is an arrangement of maps, dataviews, matrix views, figures (including charts, prism maps, and 3D maps), text, and freehand drawings.







Why layouts are useful?

- A layout lets you print out a map with legend.
- A layout lets you combine multiple maps, dataviews, matrix views, text, figures, or hand drawings together and print them out on a single sheet of paper.
- A layout lets you print out a single map or figure on multiple sheets of paper when your map is large and has lots of data.
- A layout lets you print out a map with detailed labels.
- A layout can serve as a template for reports or production work.

## 10.1 Printing a Map with Legend

You use layout when you want to print out a map with a legend because the legend will not be printed out with a regular TransCAD map.

To Print a Map with Legend

1. Choose **File-New**, click  on the toolbar, or click the right mouse button anywhere inside the TransCAD frame except on a window and choose **New**. TransCAD displays the **New File** dialog box.
2. Choose **Layout** from the list of file types.
3. Click **OK** to create a new layout.
4. Choose **File-Properties**, click  on the toolbar, or click the right mouse button anywhere on the layout window except on an item and choose **Properties**. TransCAD displays the **Layout Properties** dialog box.
5. Select a printer, page size and orientation in the **Layout Properties** dialog box.
6. Click **OK** to close the **Layout Properties** dialog box.
7. Open the map you want to print in TransCAD and design it so it looks the way you want.
8. Click on  to display the map legend.
9. Make the layout window the active window.
10. Click  in the toolbox to activate the **Place** tool.
11. Drag a rectangle in the layout to show where you want to place the map. TransCAD displays the **Add to Layout** dialog box.
12. Choose the map to place in the layout from the scroll list.
13. Click **OK**. TransCAD draws the map with the legend in the layout at the location you specified.
14. Click  in the toolbox to activate the **Pointer** tool.
15. Click on the legend to drag it to the place that you want it to be.
16. Click  on to print the layout.





### TIP

You need to design a map and legend the way you want before placing them in a layout. The map and legend that you see in the TransCAD window are what you'll get in your layout except the map labels which will be covered later in this session.

## 10.2 Printing a Map with Tables and Figures

A layout lets you to combine multiple maps, dataviews, matrix views, text, figures, or hand drawings together and print them out on a single sheet of paper.

To Print a Map with Tables and Figures

1. Choose **File-New**, click  on the toolbar, or click the right mouse button anywhere inside the TransCAD frame except on a window and choose **New**. TransCAD displays the **New File** dialog box.
2. Choose **Layout** from the list of file types.
3. Click **OK** to create a new layout.
4. Choose **File-Properties**, click  on the toolbar, or click the right mouse button anywhere on the layout window except on an item and choose **Properties**. TransCAD displays the **Layout Properties** dialog box.
5. Select a printer, page size and orientation in the **Layout Properties** dialog box.
6. Click **OK** to close the **Layout Properties** dialog box.
7. Open the map you want to print in TransCAD and design it so it looks the way you want.
8. Open a data table you want to print together with the map in the layout.
9. Open a figure file you want to print together with the map in the layout.
10. Make the layout window the active window.
11. Click  in the toolbox to activate the **Place** tool.
12. Drag a rectangle in the layout to show where you want to place the map. TransCAD displays the **Add to Layout** dialog box.
13. Choose the map to place in the layout from the scroll list.
14. Click **OK**. TransCAD draws the map in the layout at the location you specified.
15. Repeat step 11 to place the data table and the figure in the layout.
16. Click on  to print the layout.

### TIP





The data in a layout are live. You do not need to replace the data table after changing the data.



### 10.3 Printing a Single Map on Multiple Sheet of Paper

When you have a map or a figure that is too big to fit on a single sheet of paper, you can use layout to print it out on multiple sheets of paper.





To Print a Map on Multiple Sheet of Paper

1. Choose **File-New**, click  on the toolbar, or click the right mouse button anywhere inside the TransCAD frame except on a window and choose **New**. TransCAD displays the **New File** dialog box.
2. Choose **Layout** from the list of file types.
3. Click **OK** to create a new layout.
4. Choose **File-Properties**, click  on the toolbar, or click the right mouse button anywhere on the layout window except on an item and choose **Properties**. TransCAD displays the **Layout Properties** dialog box.
5. Select a printer, page size and orientation in the **Layout Properties** dialog box.
6. Setup dimensions for paper sheets
7. Click **OK** to close the **Layout Properties** dialog box.
8. Open the map you want to print in TransCAD and design it so it looks the way you want.
9. Make the layout window the active window.
10. Click  in the toolbox to activate the **Place** tool.
11. Drag a rectangle in the layout to show where you want to place the map. TransCAD displays the **Add to Layout** dialog box.
12. Choose the map to place in the layout from the scroll list.
13. Click **OK**. TransCAD draws the map in the layout at the location you specified.
14. Click on  to print the layout.

## 10.4 Printing a Map with Detailed Labels

When you have map with many detailed labels, such as road names in a road map, you can print out your map with labels that are easier to read by using a layout.


To Print a Map with Detailed Labels

1. Choose **File-New**, click  on the toolbar, or click the right mouse button anywhere inside the TransCAD frame except on a window and choose **New**. TransCAD displays the **New File** dialog box.
2. Choose **Layout** from the list of file types.
3. Click **OK** to create a new layout.
4. Choose **File-Properties**, click  on the toolbar, or click the right mouse button anywhere on the layout window except on an item and choose **Properties**. TransCAD displays the **Layout Properties** dialog box.
5. Select a printer, page size and orientation in the **Layout Properties** dialog box.
6. Click **OK** to close the **Layout Properties** dialog box.
7. Open the map you want to print in TransCAD and design it so it looks the way you want.
8. Label your map features with **Prevent overlapping labels** option.
9. Make the layout window the active window.
10. Click  in the toolbox to activate the **Place** tool.
11. Drag a rectangle in the layout to show where you want to place the map. TransCAD displays the **Add to Layout** dialog box.
12. Choose the map to place in the layout from the scroll list.
13. Choose **Use actual point sizes** option.
14. Click **OK**. TransCAD draws the map in the layout at the location you specified.
15. Click  on to print the layout.

## 10.5 Saving and Opening Layouts


You can save a layout in a layout file if you want to use it later. When you save a layout, TransCAD automatically saves all of the maps, figures, dataviews, and matrix views that are part of the layout. When you open the layout again, TransCAD restores all the maps, figures, dataviews, and matrix views to their original appearance.

To Save a Layout

1. Choose **File-Save**, click  on the toolbar, or click the right mouse button anywhere on a layout except on an item and choose **Save**.
2. If you are saving the layout for the first time, TransCAD displays the **Save As** dialog box.
3. Type a file name for the layout file.
4. Click **Save**.

TransCAD saves the layout to a file on disk. TransCAD layout files always have the extension .LAY.

To Open a Saved Layout


1. Choose **File-Open** or  click on the toolbar to display the **File Open** dialog box.
2. Choose **Map, Dataview, Figure, Layout** as the file type.
3. Choose a layout file from the list.
4. Click **Open**.

TransCAD opens the file and displays the layout.

## 10.6 Using a Layout as a Map Template

A layout can serve as a template for map production work. For example, you can use layout to print out maps of different areas with a similar look. You can set up a standard presentation page, add a DOT logo or other design elements in your layout.

To Use a Layout as a Map Template

1. Create a new layout.
2. Design the layout by placing maps, tables, figures and etc in the layout.
3. Save the layout template into a layout file.
4. Open the layout template whenever you want to use it.
5. Click  in the toolbox to activate the *Pointer* tool.
6. Click on a map item in the layout.
7. **Right mouse click** then choose *replace* to displays the **Add to Layout** dialog box.
8. Choose a map to replace in the layout from the scroll list.
9. Click **OK**. TransCAD place the map in the layout at the location the template map was at.
10. Repeat step 5 for other tables and figures

A new layout is created using the template.

## 10.7 Moving Around a Layout

You can use TransCAD tools and commands to move around your layout and to see it at different sizes.

The following are the commands you use to see the layout at different sizes:

Command	What It Does
<i>Layout-Entire Layout</i>	Displays the whole layout
<i>Layout-Actual Size</i>	Displays the layout at the size it will be printed
<i>Layout-Previous Size</i>	Displays the layout at the last size

These commands are also available on the Layout context-sensitive menu, displayed when you click the right mouse button anywhere on a layout except on a frame or freehand item.

To See the Entire Layout

1. Choose *Layout-Entire Layout*, click the right mouse button anywhere on a layout except on an item and choose *Entire Layout*, or choose *All* from the drop-down list on the toolbar.

TransCAD displays the entire layout within the Layout window.

To See the Layout in Actual Size

1. Choose *Layout-Actual Size*, or click the right mouse button anywhere on a layout except on an item and choose *Actual Size*.

TransCAD displays as much of the layout as will fit in the Layout window at actual size.

To See the Layout in its Previous Size

1. Choose *Layout-Previous Size*, or click the right mouse button anywhere on a layout except on an item and choose *Previous Size*.

TransCAD displays the layout at the size it was before the last size change.


## 10.8 Using the Rulers and the Snap Grid

The rulers and the snap grid help you position items in exact locations on the page.

You can choose to enable or disable snapping of layout items to the snap grid. If snapping is enabled, the following things occur:

- When you move any layout item, TransCAD places the item so that the upper-left corner is positioned at the nearest grid point.
- When you re-size any layout item, TransCAD adjusts the corner or edge you move so that it is positioned at the nearest grid point.

To Set Up the Rulers and Snap Grid

1. Click  on the toolbar, or click the right mouse button anywhere on a layout except on an item and choose **Options**. TransCAD displays the **Layout Options** dialog box.
2. Choose options and settings based on the following table:











To do this...	Do this...
Display rulers along the top and left edges	Check the <b>Show Rulers</b> box
Show the snap grid for positioning items	Check the <b>Display the Snap Grid</b> box
Snap items to the snap grid	Check the <b>Snap Items to Grid</b> box
Set the snap grid units	Choose the units from the <b>Units</b> drop-down list
Set the interval for grid points	Choose the interval from the <b>Mark Every</b> drop-down list

3. Click **OK**.

TransCAD displays the layout with the options that you chose.

## 10.9 Placing Freehand Items in a Layout

Freehand items include text, symbols, lines, circles, rectangles, and other graphics. You create freehand items on a layout using the drawing tools in the main toolbox. Here is a quick summary of the drawing tools and how they work:

Tool Name		How to use it
Text		Drag a rectangle in the layout, type the text you want and press Enter. Type a vertical bar " " to skip to another line.
Curved Text		Click on each point along the curve, double-click to end it, type the text you want, and press Enter.
Rectangle		Drag a rectangle in the layout, or hold the Shift key to drag a square.
Rounded Rectangle		Drag a rectangle in the layout, or hold the Shift key to drag a square with rounded corners.
Circle		Drag an ellipse in the layout, or hold the Shift key to drag a circle.
Polygon		Click on each corner of the polygon, and double-click to close it (the first and last points connect automatically).
Line		Click on each point along the line, and double-click to end it.
Curve		Click on each point along the curve, and double-click to end it.
Bitmap		Drag a rectangle on the map, then choose a bitmap (.BMP) file or JPEG (.JPG) file.
Symbol		Click on the layout, and then choose a symbol.

You can also hold the **Ctrl** key to drag a rectangle, rounded rectangle, or circle from its center.


**Note that North arrows cannot be placed in a layout, only on a map.**

## 10.10 Moving, Editing, and Arranging Layout Items

Sometimes you may want to edit, move, resize, or delete an item in a layout.


### To Move Layout Items

Items in a layout can be moved individually or in groups. To move layout items:

1. Click  in the toolbox to activate the *Pointer* tool, and select one or more items.
2. Position the cursor over one of the selected items (but not on one of the handles).
3. Press and hold down the mouse button. Borders appear around all the selected items.
4. Drag the items to a new location, and release the mouse button.

TransCAD draws the items in their new location.


### To Change the Size of a Layout Item

1. Click  in the toolbox to activate the *Pointer* tool, and select one or more items.
2. Position the cursor over one of the editing handles.
3. Press and hold down the mouse button on the handle. A border appears around the item.
4. Drag the handle until the border is the correct size, and release the mouse button.

TransCAD draws the item in the new size.

### To Rotate a Text or Symbol Item

Text and symbol items can be rotated to any desired angle using the mouse. To rotate a text or symbol item:

1. Click  in the toolbox to activate the *Pointer* tool, and click on an item to select it.
2. Position the cursor over the rotation handle.
3. Press and hold down the mouse button on the handle. A border appears around the item.
4. Drag the handle until the border is shown at the desired angle, and release the mouse button.

TransCAD draws the item in its new location.

Rotated items normally align themselves to the nearest 5-degree angle. This automatic alignment makes it easy to place text vertically, horizontally, or diagonally. To rotate items more precisely, hold the Ctrl key while dragging the rotation handle.


### To Delete Items from a Layout



Layout items can be deleted individually or in groups.

1. Click the right mouse button on a freehand item and choose **Delete**. TransCAD displays a dialog box to confirm the deletion.
2. Click **Yes** to delete the freehand item or **No** to cancel the deletion.

- OR -

1. Click  in the toolbox to activate the **Pointer** tool, and select one or more items.
2. Press the **Del key**, or choose **Edit-Delete** and click **Yes** to confirm the deletion.

TransCAD deletes the selected items from the layout.