Caliper Corporation

User's Guide

for the

SCAG Subregional Planning Model

June 2009

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Introduction

This User's Guide is designed to help you learn and use the SCAG Subregional Planning Model custom Add-in in TransCAD. This guide also provides guidance on properly creating inputs to the model, brief descriptions of all the models, documentation on all the utilities available in the model, and documentation on all input files, output files, and model parameters.

All of TransCAD's extensive GIS and modeling capabilities can be used to further modify and analyze the model inputs and outputs. As in the previous SCAG model, the model is an aggregate, 4-step feedback model for which the primary inputs are highway and transit networks, demographic and land use data at the TAZ level. The models consist of trip generation, trip distribution, mode choice, assignment and feedback, with several intermediate steps included such as highway skimming.

In this section you will learn some basic information about the models and how to setup and run the model in TransCAD. Detailed information on the utilities used for this model can be found in Appendix A. Brief model descriptions can be found in Appendix B. Detailed information about the input and output files and parameters can be found in Appendix C.

Model Overview

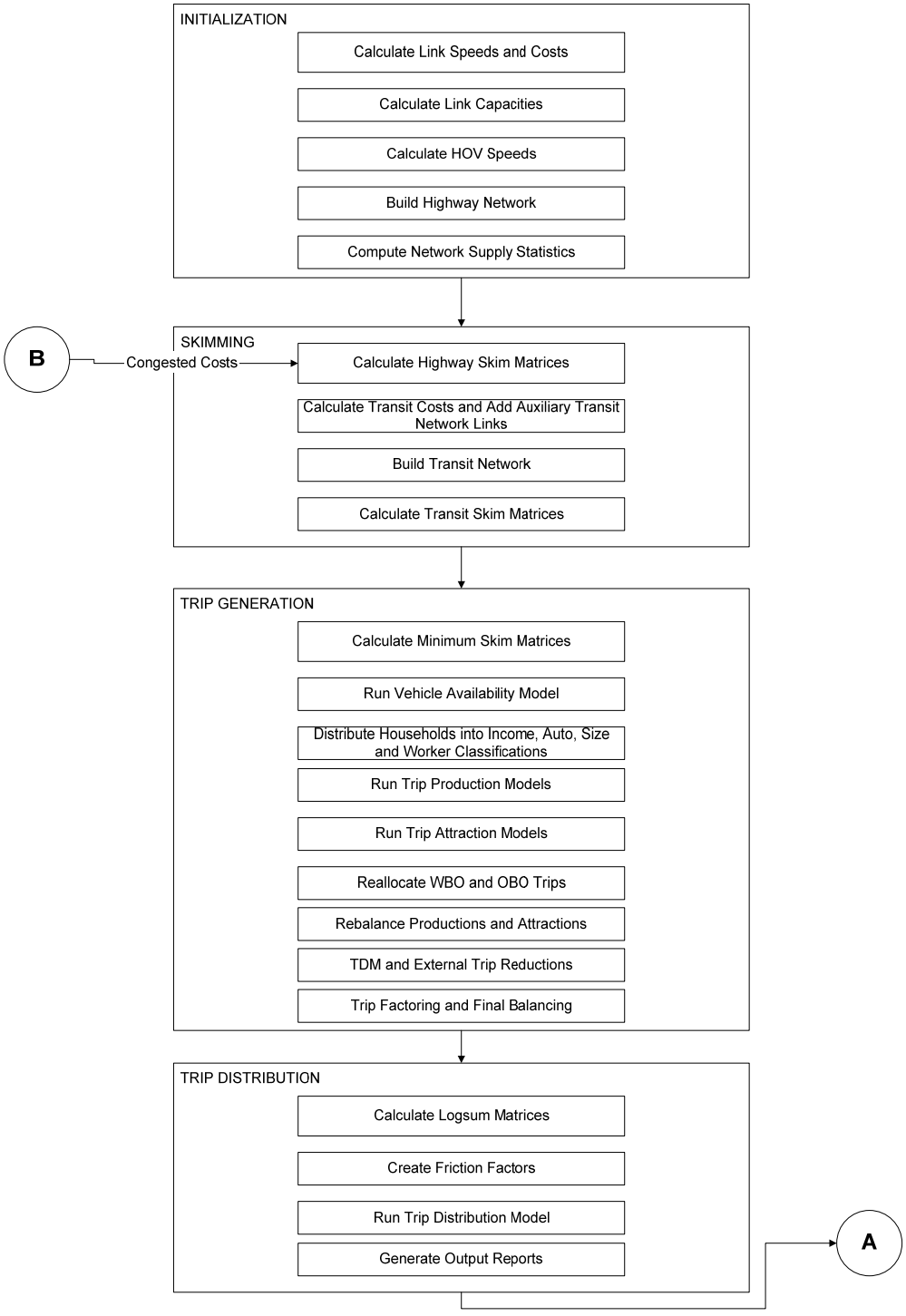
The Subregional Model consists of the following steps:

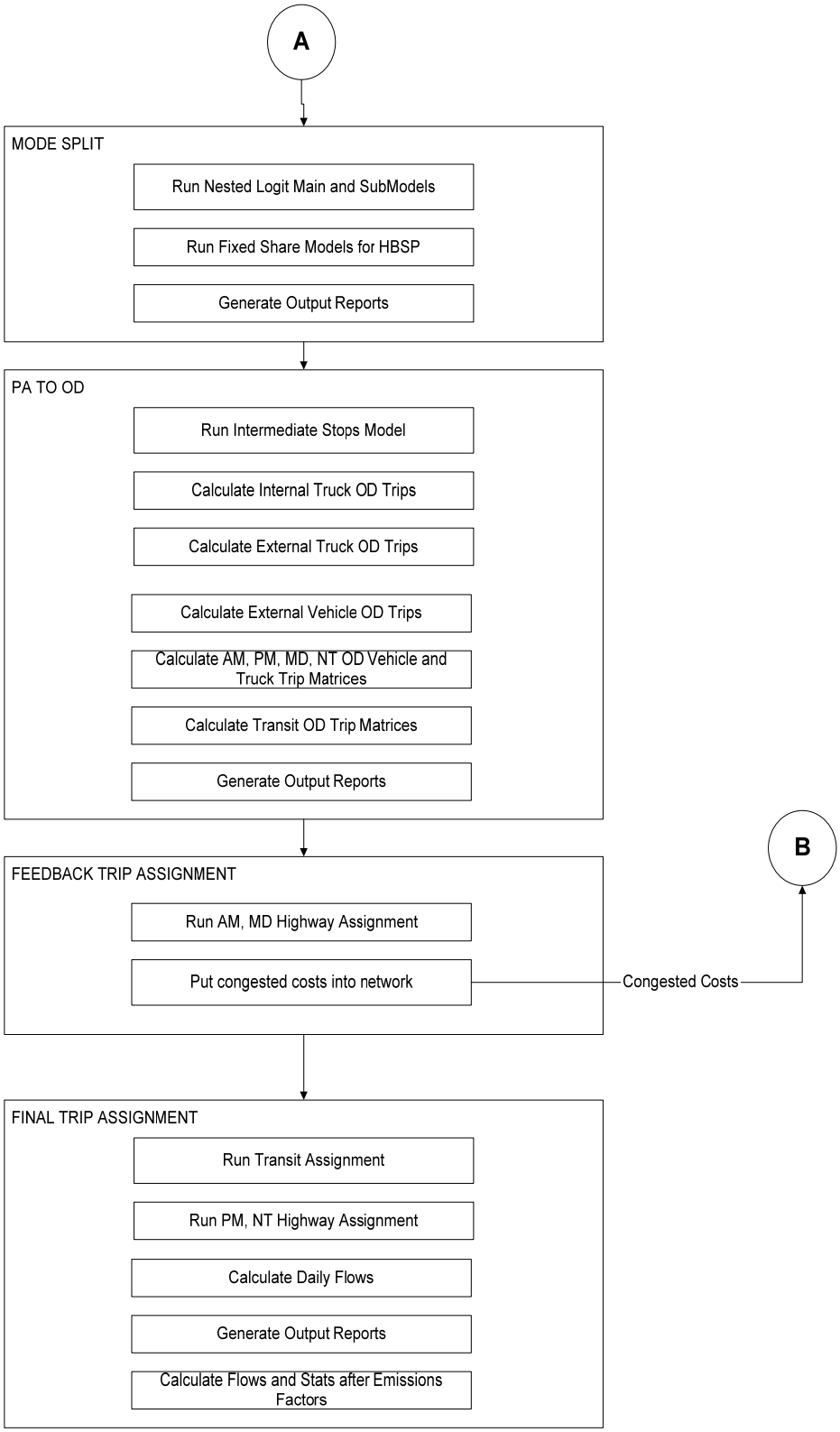
- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- PA to OD and Matrix Manipulation
- Trip Assignment

The model steps are functionally similar to the SCAG Regional Planning Model However, the subregional model takes a focused approach to modeling, in which zones in the subregion are disaggregated while zones outside of a subregion are aggregated. Since this focused model includes zonal aggregations outside of the subregion, models were developed to counteract trip loss due to zonal aggregations. Many of the models developed for the Sketch Plan Model were used for the Subregional Model. A full description of the additional models is available in the document "SCAG Subregion Model Final Report.pdf".

Each model step is broken down into various substeps and models. The following

two charts show the model steps and substeps the Subregional Model:




A
MODE SPLIT
Run Nested Logit Main and SubModels
Run Fixed Share Models for HBSP
Generate Output Reports
PA TO OD
Run Intermediate Stops Model
Calculate Internal Truck OD Trips
Calculate External Truck OD Trips
Calculate External Vehicle OD Trips
Calculate AM, PM, MD, NT OD Vehicle and Truck Trip Matrices
Calculate Transit OD Trip Matrices
Generate Output Reports
FEEDBACK TRIP ASSIGNMENT
Run AM, MD Highway Assignment
Put congested costs into network
Congested Costs
B
FINAL TRIP ASSIGNMENT
Run Transit Assignment
Run PM, NT Highway Assignment
Calculate Daily Flows
Generate Output Reports
Calculate Flows and Stats after Emissions Factors

Detailed information about each model step, along with associated model input and output files can be found in Appendix B.

Basics of the Custom Interface

The Add-in provides a custom interface that allows you to run the model with the click of a button, as well as provides features to store and create scenarios. You can generate and store any number of scenarios. For example, you may want to have a Year 2003 Scenario and a Year 2025 Scenario. Scenarios are defined by a scenario name, a set of input files, output files, and model parameters. There are special features in the Add-in to assist in setting up scenarios. Once you have setup a scenario, the model steps for that scenario can be run separately, run as a group, or run iteratively with feedback.

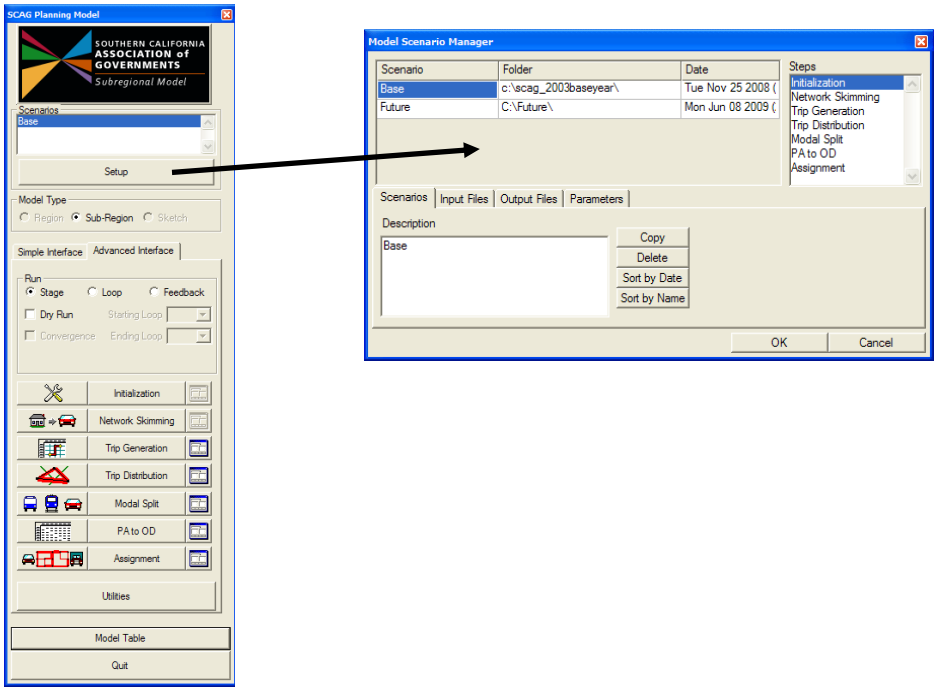
There are two key dialog boxes that are used to manage and run the model. These are shown below.

- The first is the main dialog box (called the SCAG Subregional Model dialog box), which appears when the Add-in is launched. From this dialog box, scenarios are selected and the models are run.

- The second dialog box is the Model Scenario Manager dialog box. This is invoked by clicking on the Setup button from the main dialog box. In this dialog box, the scenarios, input/output files, and parameters are managed. Here you can add, delete, sort, describe, and rename scenarios. Each scenario is defined by a set of input files, output files, and parameters. You can also enter and view the detailed information regarding the scenario. The dialog box will provide information for the Scenario and model Step. You can open input or output files, change input or output files, and view and change model parameters.

The rest of this User's Guide explains how to work with these dialog boxes to setup and run the SCAG Subregion Model.

Main Dialog Box ***Model Scenario Manager***



Installing the Add-in

The custom Add-in is packaged in an easy-to-install setup program. Before installing the Add-in, make sure to delete all other previous versions of the SCAG model that are installed on the computer. The setup program is called setup.exe. It is located on the CD provided and should be run from within Windows. It will prompt you for the directory in which TransCAD is located. Some files will be installed in this directory. The installer will then automatically install all model files to your chosen directory, with the default being the C:\SCAG_Subregion directory. When entering the directory name, make sure that there are no spaces or periods in the name. This step only needs to be run once per computer. After it is installed, running the Add-in is as simple as running TransCAD, and is described next.

Launching the Add-in

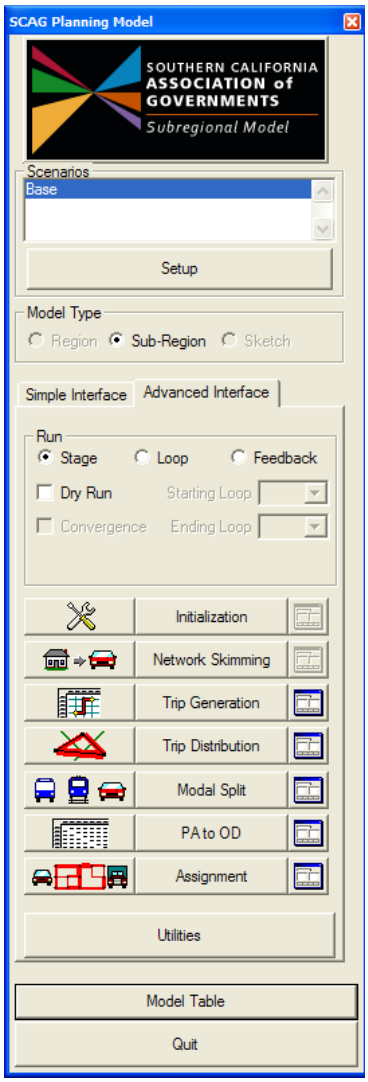
Once the Add-in is installed using the steps described above, the main dialog box is launched through the Tools-Add-ins feature in TransCAD.

To Launch the Add-in

1. If TransCAD is not running, launch TransCAD.

2. Choose Tools-Add-ins.

3. Choose SCAG Planning Model version 5 to display the SCAG Planning Model dialog box. All other functionalities for the Add-in are accessed through this main dialog box. (If you do not see SCAG Planning Model version 5 in the Add-ins window, click Cancel and INSTALL the Add-in by following the directions above.)


SCAG Planning Model
SOUTHERN CALIFORNIA
ASSOCIATION of
GOVERNMENTS
Subregional Model
Scenarios
Base
Setup
Model Type
Region
Sub-Region
Sketch
Simple Interface
Advanced Interface
Run
Stage
Loop
Feedback
Dry Run
Starting Loop
Convergence
Ending Loop
Initialization
Network Skimming
Trip Generation
Trip Distribution
Modal Split
PA to OD
Assignment
Utilities
Model Table
Quit

Working with the Base Scenario

In this section you will learn how to setup, run, and view outputs for the base scenario, which is the Base Year 2008 as defined by the SCAG Planning Model.

Setting up the Base Scenario

Before you can run the model, you have to first define a scenario. This means providing TransCAD the name of the scenario along with the set of input files, output file names, and parameters that define the scenario. This information is entered and viewed using the Model Scenario Manager dialog box. You can store any number of scenarios in the custom Add-in.

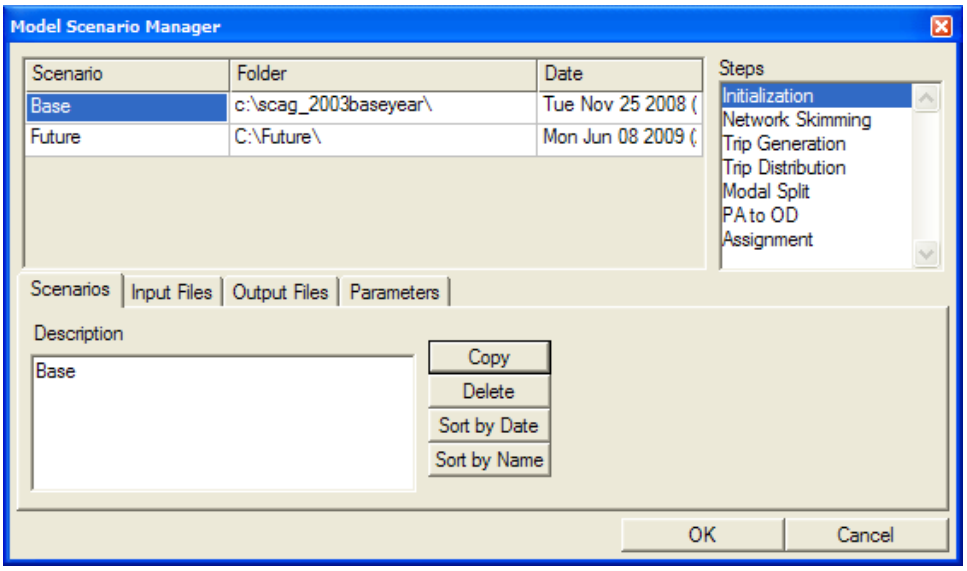
The Base Year 2008 is particularly straightforward to setup, because it is the default scenario provided with the custom Add-in (as defined in the SCAG_SUBREGION_2008.BIN file installed with the Add-in).

To Setup the Base Scenario

1. If the Add-in is not launched, launch it by following the instructions above to open the SCAG Planning Model dialog box.

2. From the SCAG Planning Model dialog box, click the Setup button to open the Model Scenario Manager dialog box. All input and output files and parameters for the base year are automatically set up. If you are setting up any Scenario other than the base scenario, you will have to modify at least the scenario directory, and perhaps some of the input files and parameters to match the scenario of interest. This is described later in the section on Working with Additional Scenarios.

3. If desired, provide a longer description of the scenario in the Description text box.



4. Click OK to save the settings of the scenario and close the Model Scenario Manager dialog box.

Now the base scenario is setup and ready to run. Note that the model steps are listed in the Steps text box and the directory listed for the scenario is the location to which the installation program installed the input and output files. If you want to view or modify any of the scenario settings (input/output files or parameters), you can do so by clicking on the corresponding tabs in the Model Scenario Manager dialog box (described under Modifying Scenarios, and Viewing and Analyzing Outputs from a Scenario).

Running the Base Scenario

Model steps are run from the SCAG Subregion Model dialog box. Each step can be run separately and also consecutively in feedback mode (either a single loop of feedback, or a user-specified number of iterations). Make sure you have exited the Model Scenario Manager dialog box (by clicking OK to update and save the settings for the scenario, or Cancel to retain).

To run the entire model in Feedback mode

1. From the SCAG Subregional Model dialog box, choose Base from the Scenarios selection box. (If you have not yet created the year 2008 base scenario, do so by following the instructions above.)

2. Make sure that the Advanced Interface tab is selected. Choose the Feedback radio button and make sure the starting loop is set to 1 and the ending loop is set to 5. Click on the Initialization button.

The entire 5-iteration feedback model is run.

To run a Specific Loop

1. From the SCAG Subregional Model dialog box, choose Base from the Scenarios selection box. (If you have not yet created the year 2008 base scenario, do so by following the instructions above.)

2. Make sure that the Advanced Interface tab is selected. Choose the Loop radio button, and choose the starting loop you wish to run. Click on the Initialization button.

All the model steps for the specified feedback loop are run.

To run User-Specified Base Scenario models

1. From the SCAG Subregion Model dialog box, choose Base from the Scenarios selection box. (If you have not yet created the year 2008 base scenario, do so by following the instructions above.)

2. Make sure that the Advanced Interface tab is selected and choose the Stage radio button.

3. Click on the picture button to the left of one of the step buttons (e.g. Initialization), and check or uncheck the sub-steps you wish to run.

4. Click the button that contains the model step name that you wish to run.

The custom Add-in will run only the model step that you clicked.

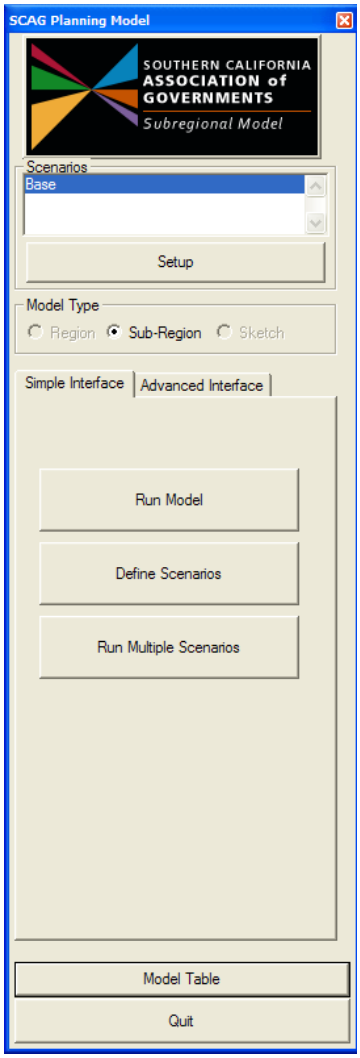
The Advanced Interface and the Simple Interface

The above steps illustrate the use of the model through the advanced interface. The advanced interface allows the user to invoke specific steps, substeps, and loops of the model. The advanced interface also allows the user to quickly view model outputs, which is described later. A simple interface is also available to users who wish to simply run the model in its default mode: with the default model steps and substeps, and the default number of loops.

To Run the Model using the Simple Interface

1. Choose Tools-Add-ins.

2. Choose SCAG Subregion Model to display the SCAG Subregion Model dialog box. Click on the Simple Interface tab.

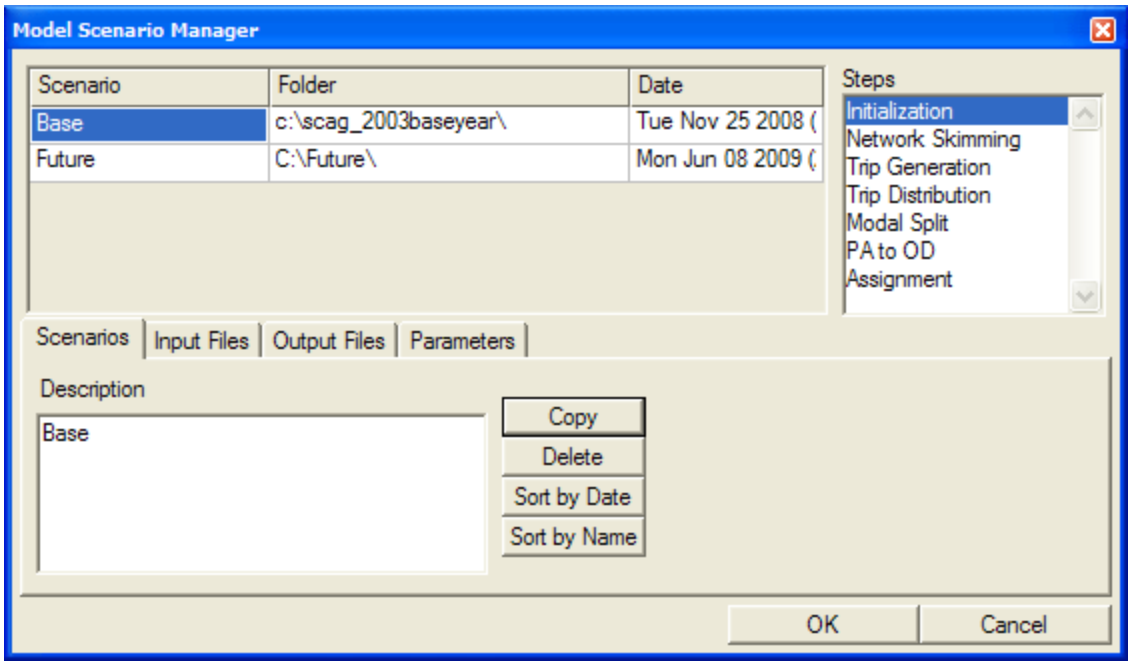


3. Make sure a scenario is highlighted, and click on the Run Model button.

The model is invoked using the default settings. The simple interface also allows the user to automatically define, and then run multiple scenarios. These two utilities are described in Appendix A.

Model Directory/File Structure

Every scenario, including the base scenario, will have all input and output files contained in a user specified model directory. This model directory is specified in the "Model Scenario Manager" dialog box of the planning model interface as shown below. The user can enter the folder used for each scenario directly in the Folder column:



All model scenario files are organized within various fixed subdirectory names as described by the following table:

Subdirectory	Description
Assign	Highway and transit assignment input and output files
Emission	Output files from emission postprocess
ExtHDT	Input and output files from External Heavy Duty Truck Model
ExtLM	Input and output files from external vehicle trips model
Geography	Input geographic area files (TAZ, CSA, County, Air Basin, Sub Air Basins, etc.)
Interim	Storage folder for interim files produced by the model
Msplit	Mode split input and output files
Networks	Input GIS highway and route system databases, input speed, capacity and performance lookup tables, and output networks and network supply statistics
ODTable	Input and Output files from PA to OD and Time of Day procedures
Reports	Output reports and logs from model runs
SED	Input and Outputs from TAZ SED tools
Skims	Output highway and transit skim and logsum matrices
Tripdist	Input and Output files from trip distribution models
Tripgen	Input and output files from trip generation models
Truck	Input and output files from internal truck generation, distribution and OD models
User	Files from User generated utilities

In general, most subdirectories have “Inputs”, “Outputs”, and “Reports” subdirectories within them. Files in the “Inputs” directory denote model input files for that model step. Files in the “Outputs” directory denote model outputs from that model step. Files in the “Reports” directory denote summary reports and aggregations. In most cases, input, output, and report filenames will remain consistent between scenario directories, with possible exceptions for the Highway GIS database, Transit GIS database, and the input demographics table. For a full description of model inputs,

outputs and parameters, see Appendix C.

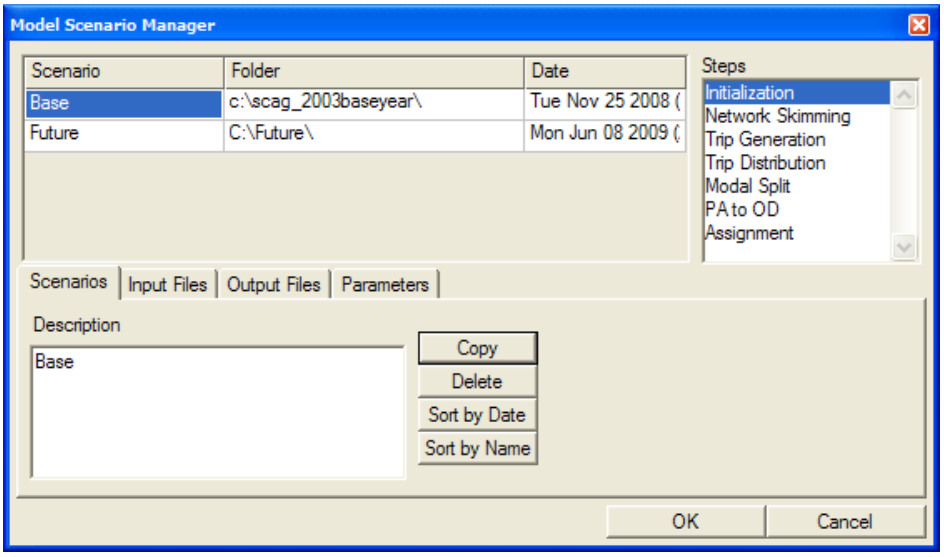
Viewing and Analyzing Inputs and Outputs for the Base Scenario

There are some quick view buttons in the Add-in's main dialog box, which aid in generating useful graphics. However, it is important to remember that the full functionality of TransCAD is available to perform further analysis, generate different graphics, or modify the default graphics. There are innumerable ways to analyze the data. Below are a few suggestions to get started viewing the output results. For more information, see the TransCAD User's Guide and Travel Demand Modeling with TransCAD manual.

To Open the Input or Output Files for any Model Step

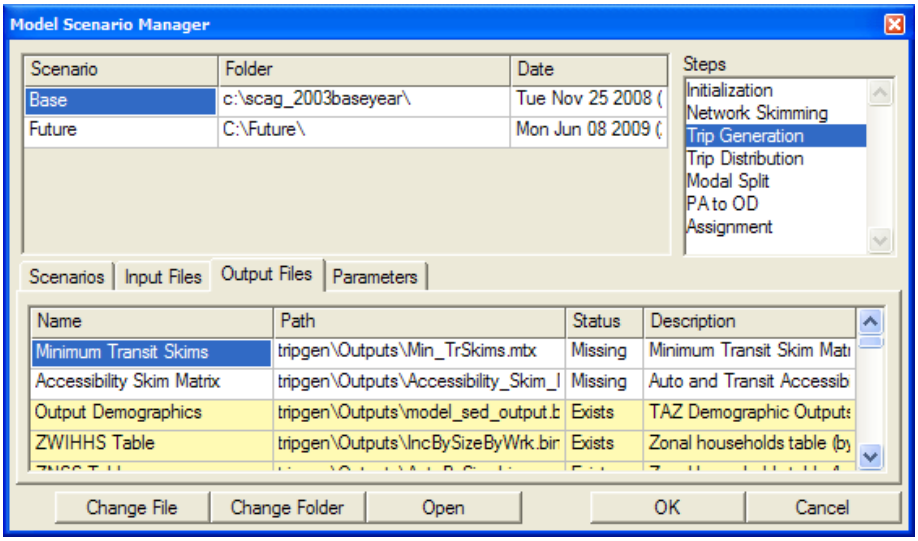
If you know the name and location of the file (detailed information on the files are provided in the model report documentation), you can always choose File-Open in the TransCAD menu, choose the file type you wish to view (Geographic File, Dbase table, Matrix, etc.) and choose the file you wish to open. Alternatively, you can open the files from the Input Files and Output Files tabs in the Model Scenario Manager dialog box of the Add-in. To use this approach:

1. Click the Setup button in the SCAG Planning Model main dialog box to open the Model Scenario Manager dialog box.



2. Select the Scenario and model Step of Interest.

3. Choose the Input Files or Output Files tab:



4. Select the files that you want to open (use Shift-click or Ctrl-click to select multiple files).

5. Click the Open button and the Add-in will open the files into TransCAD.

The Model Scenario Manager dialog box can be expanded by dragging on any of the corners. Each grid column can also be expanded or contracted by dragging. Each file is color coded by its status. Files that do not need attention are colored in white (existing input files and missing output files). Files that might need attention are colored in yellow (existing output files). Files definitely need attention are colored in red (missing input files and files that are in use). The file paths are relative paths that are based upon the path of the chosen scenario.

Note that each file appears **only once** in the entire set of tabs in the Model Scenario Manager dialog box, usually in the first model step for which it is used. Therefore, any file that is involved in more than one step (for example, a file may be an output of one step and an input to another step) will only appear under one model step.

The Report and Log files are also important model output results. The report file provides details about all TransCAD procedures that were invoked during the model run, provides details about all input and output files in the model run, and provides details on model steps invoked and model run times. The log file provides warning and other potential error messages. If a model run fails, usually the reason for the model failure can be found in the log file. Both the report and log files can be found in the REPORTS subdirectory of the model directory. The name of the report file will be

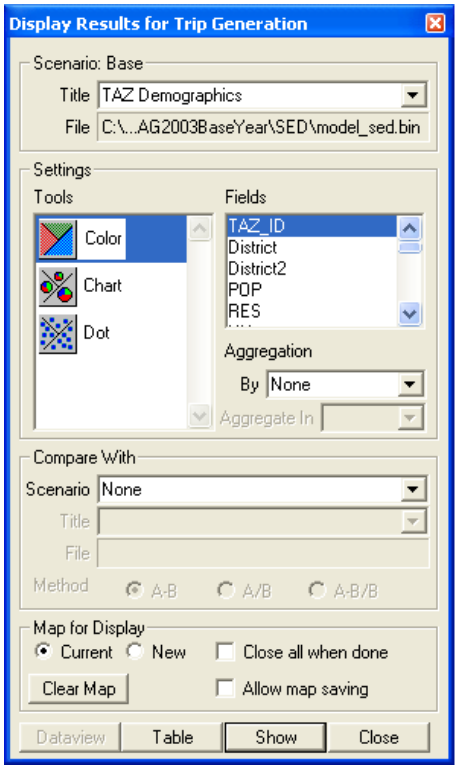
REPORT_<Date_Time_Year>.xml, and the name of the log file will be LOG_<Date_Time_Year>.xml. Each time the model or a portion of the model is run, separate log and report files will be generated. The XML files can be viewed using any web browser, and many hyperlinks are available to take the user quickly to a section of interest.

Displaying Results with the Quick View Buttons

After running a model, you can quickly view results using the  Quick View buttons. A quick view button exists after the Trip Generation, Trip Distribution, Modal Split, PA to OD and Assignment steps.

To Display Trip Generation Results using Quick View Buttons

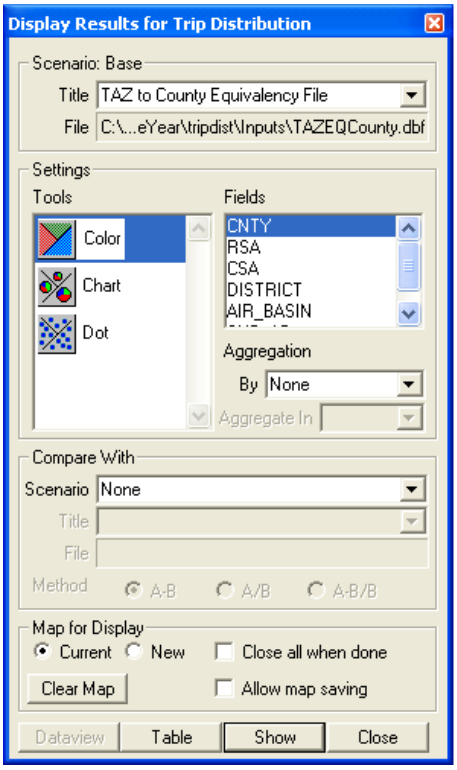
1. Click on  next to the Trip Generation step



2. Choose the table to display.
3. Choose the type of theme to display (color, chart or dot).
4. Choose the fields to display.
5. Click on the Show button to display a map of the results.

To Display Trip Distribution (Gravity) Results using Quick View Buttons

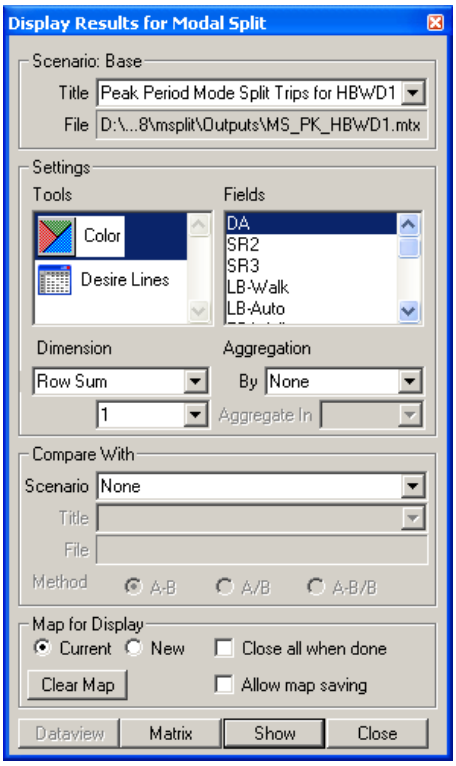
1. Click on  next to the Trip Distribution step.



2. Choose the table to display.
3. Choose the type of theme to display (color, chart or dot).
4. Choose the fields to display.
5. Click on the Show button to display a map of the results.

To Display Modal Split Results using Quick View Buttons

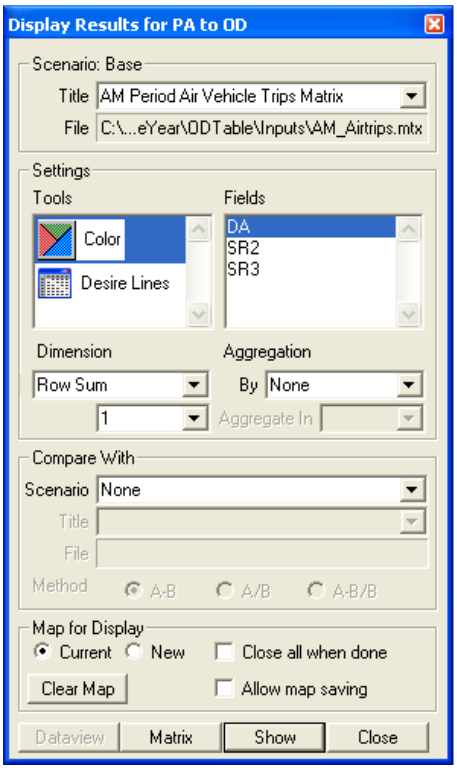
1. Click on  next to the Modal Split step.



2. Choose the table to display.
3. Choose the type of theme to display (Color or Desire Lines).
4. If Color is chosen, choose the field to display, choose the Dimension and ID and click on the Show button to display a map of the results.
5. If Desire Lines is chosen, choose your fields, click on  and Shift-click on the origin zones. Then click on the  and Shift-click on the destination zones. Click on the Show button to display a map of the results.

To Display PA to OD Results using Quick View Buttons

1. Click on  next to the PA to OD step.

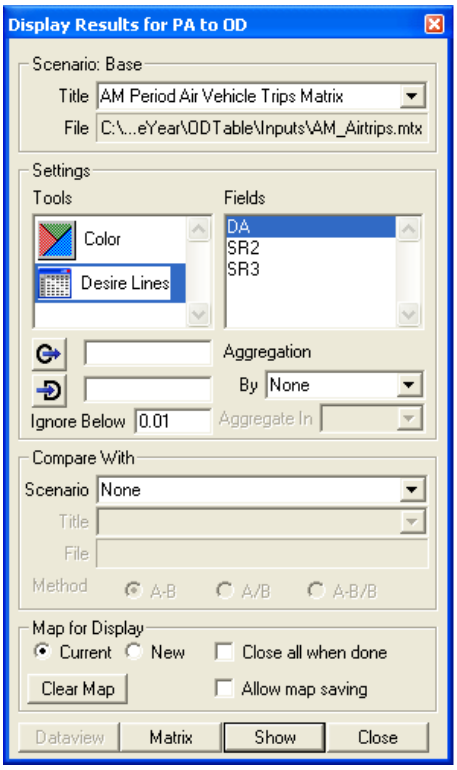


2. Choose the table to display.

3. Choose the type of theme to display (Color or Desire Lines)

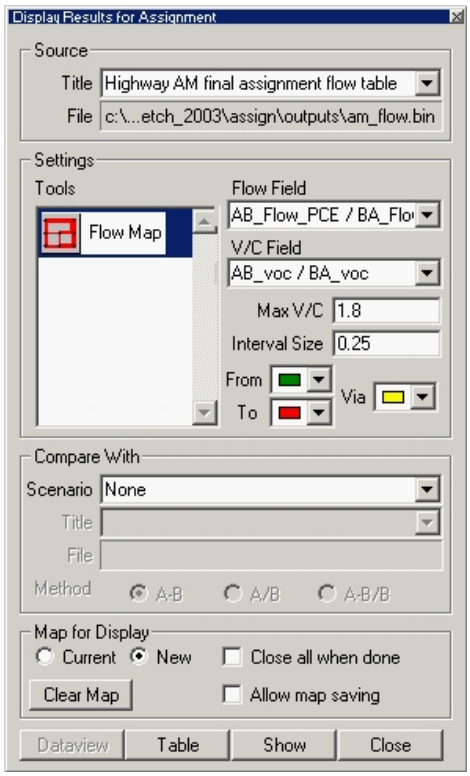
4. If Color is chosen, choose the field to display, choose the Dimension and ID and click on the Show button to display a map of the results.

5. If Desire Lines is chosen, choose your fields, click on  and Shift-click on the origin zones. Then click on the  and Shift-click on the destination zones. Click on the Show button to display a map of the results.



To Display Assignment Highway Flows using the Quick View Buttons

1. Click on  next to the Assignment step.
2. Choose one of the Highway Assignment Flow table titles.



3. Chose Flow and VOC fields, choose a max V/C ratio, interval V/C ratios, and colors to use to define low, middle and high V/C ratios.

4. Click on the Show button to display results.

Working with Additional Scenarios

Any number of scenarios beyond the Base Year 2008 can be setup, stored, and run using the Add-in.

Adding a Scenario

To Create an Additional Scenario

1. From the SCAG Subregional Model dialog box, click on the Setup button to open the Model Scenario Manager dialog box.

2. Choose an existing scenario to copy from, then click the Copy button. The Add-in will create a scenario named New Scen and add it (along with the current date and time) to the end of the list of scenarios in the dialog box.

3. Type in the new name of the scenario.

4. Enter a description for the scenario in the Description text box.

5. To change the directory for all input and output files (retaining the subdirectory structure), double-click the scenario Folder and choose the new directory.

It is assumed that all model input files will exist in the new model directory and subdirectories. By default, the added scenario is created using the settings for the scenario copied from, and so you may need to re-specify at least some of these settings to generate the scenario of interest. The next step describes how to do this.

Adding a Newly Created Scenario

If you wish to copy all model input files from an existing scenario to a new directory, you would run the Copy Scenario utility. Details on using the Copy Scenario utility can be found in Appendix A. After you copy the scenario, you would either add the scenario to the scenario list using the procedure above, or you can change the model table. Steps on working with or changing the model table are provided later in this document. You can then modify the demographics, highway and/or transit networks in the new directory as desired to reflect the new scenario.

Modifying Scenarios

A scenario is defined by the set of input files, output files, and parameters for which the model is to be run. Each step of the model has a different set of files and parameters. These settings are managed using the Model Scenario Manager dialog

box.

An important point in selecting the input files to use for a given scenario is that these files must match the input files provided for the default Base Year 2008. This means that:

- All table inputs (Demographics table, trip rates table, etc.) must contain the same field names as the original default files, must have the same number of records, and must be of the same file type.

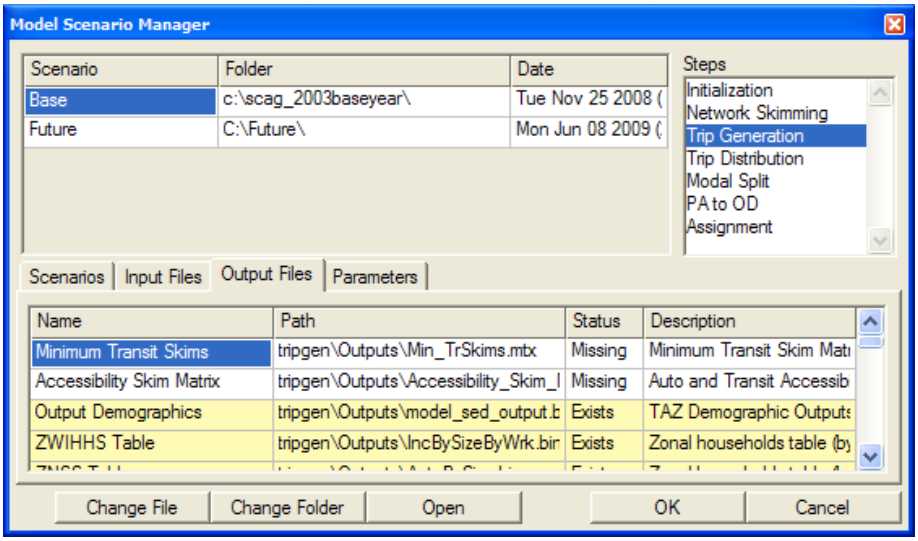
- Matrices must contain the IDs of the current SCAG centroid nodes found on the node layer of the highway database (IDs 1-4192). Currently, there are 4192 such nodes.

If any of these restrictions are violated, the Add-in will give you error messages if you attempt to run the model.

To Modify the Input Files, Output Files, or Parameters Used for a Scenario

1. From the Model Scenario Manager dialog box, select the scenario of interest from the list of scenarios and the model step of interest from the Steps selection box.

2. Choose the Input Files or Output Files tab:



3. Select the file that you want to modify and click the Change File button. Then choose or enter the new file you wish to replace with.

   This dialog box will automatically update to reflect the selections. To view a

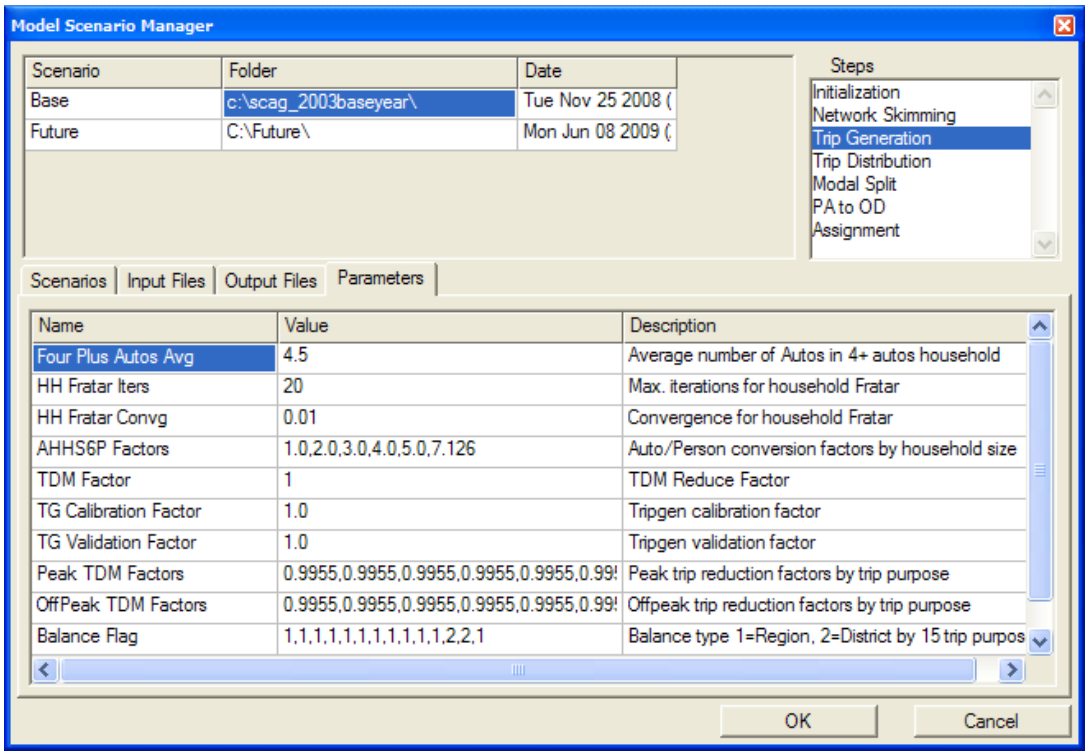
different model step or scenario, simply choose the scenario or step of interest. Only one Model Scenario Manager dialog box can be viewed at a time.

4. Use this dialog box to manage the input and output files as follows

To do this…	Do this…
View the list of input files	Click the Input Files tab, and all input files for the model step will be displayed along with their paths, status and description.
View the list of output files	Click the Output Files tab, and all output files for the step will be displayed along with their paths, status and description.
Check the status of a file	The Status column in the Input Files and Output Files tabs states whether a file Exists, is In Use, or is Missing. All of the input files must Exist in order for a model to be run. Any output files that Exists will be overwritten when a model is run.
Open a file	Either double click on the file, or select the file and click the Open button. Networks (.NET) and transit networks (.TNW) cannot be opened, but their geographic counterparts (.DBD line geographic files and .RTS route systems) can.
Change the file that is used	Select the file you want to change. Click on the Change File button. Select the file that you want to use, and click Open. All input files must match the structure of the input files provided with the Base Year 2008.
Change the folder of a step	To change the directory of a file, select it, click on the Change Folder button and select the directory. To change the directory for multiple files, use Shift-click or Ctrl-click to select multiple files first.

5. Use this dialog box to manage the parameters as follows

To do this…	Do this…
View parameters	Click the Parameters tab, and all parameters for the step will be listed with its value and description.
Change the parameter	Double-click the Value field for the required parameter and enter its new value. For parameters that are lists (e.g. AHHS6P Factors in the dialog box below), separate the elements in the list with commas.

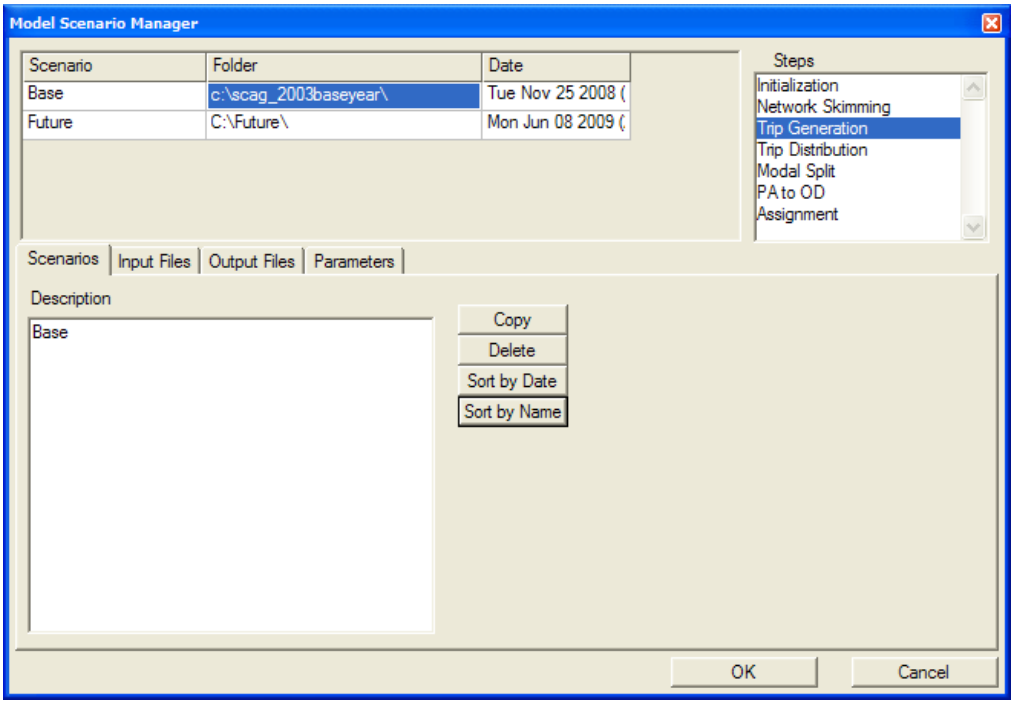


Managing Scenarios

Any number of scenarios can be stored in the Add-in. Scenarios can be added, deleted, and modified at will.

To Manage the Scenarios

1. From the SCAG Planning Model dialog box, click the Setup button to open the Model Scenario Manager dialog box and click on the Scenarios tab:



2. Use this dialog box to manage the scenarios as follows

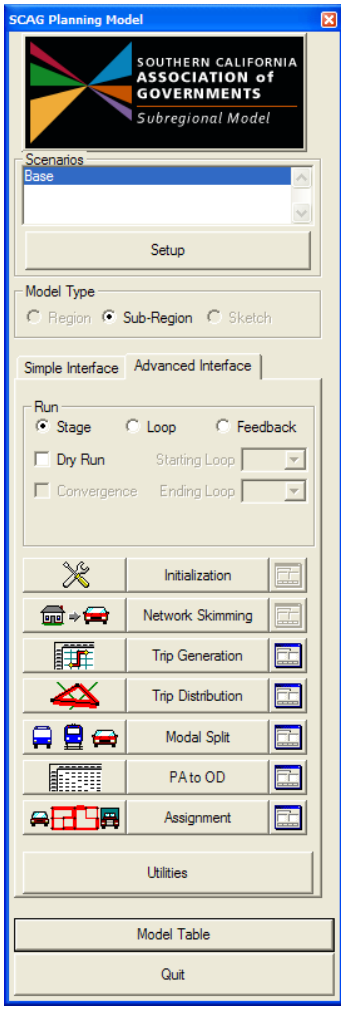
To do this…	Do this…
Add a new scenario	Choose a scenario to copy from, then click the Copy button. A scenario named New Scen will be added to the bottom of the list of scenarios along with a time stamp. This scenario will be setup with the same settings as the original scenario copied from.
Delete a scenario	Select the scenario you want to delete and click the Delete button.
Sort the scenarios by date	Click the Sort by Date button.
Sort the scenarios by name	Click the Sort by Name button.
Rename a scenario	Type in the new name of the Scenario in the Scenario column.
Change the default directory	Select the scenario for which you want to change the default directory for the input and output files, double-click on the Folder column, and select the directory. The directory for all input and output files for the scenario will be changed to this new directory.
Provide a description	Select the scenario for which you want to provide a description, and enter the description in the Description text box.
Save scenario settings	Click OK.

Running a Scenario

Running a scenario is no different than running the Year 2008 Base Scenario. However, the key to running a scenario that is not the default is to verify that the inputs are setup correctly. This means that all input files must exist, and they must have the same format as the default input files as described above in Modifying Scenarios. Another important point is that all existing Output files will be overwritten when the model is run.

To Run a Scenario

1. Scenarios are run from the SCAG Planning Model dialog box:



2. Select the scenario you want to run from the list of scenarios, and use this dialog box to run models as follows:

To do this…	Do this…
Run the full model	Choose Feedback. Make sure Starting Loop is set to 1 and the Ending Loop is set to 5 and then click the Initialization button.
Run model loop	Choose Loop. Select the starting loop you wish to run and then click the Initialization button
Run one model step	Verify that all inputs for the model step exist. Choose Stage. Click on step you wish to run.
Skip a model step	Click on the picture button next to the step you want to skip to open the Stage Step Settings dialog box. Uncheck any sub-step you do not want to run and click OK.
View/modify scenario settings	Click Setup to open the Model Scenario Manager dialog box, and follow instructions above regarding setting up scenarios.
Exit the Add-in	Click Quit

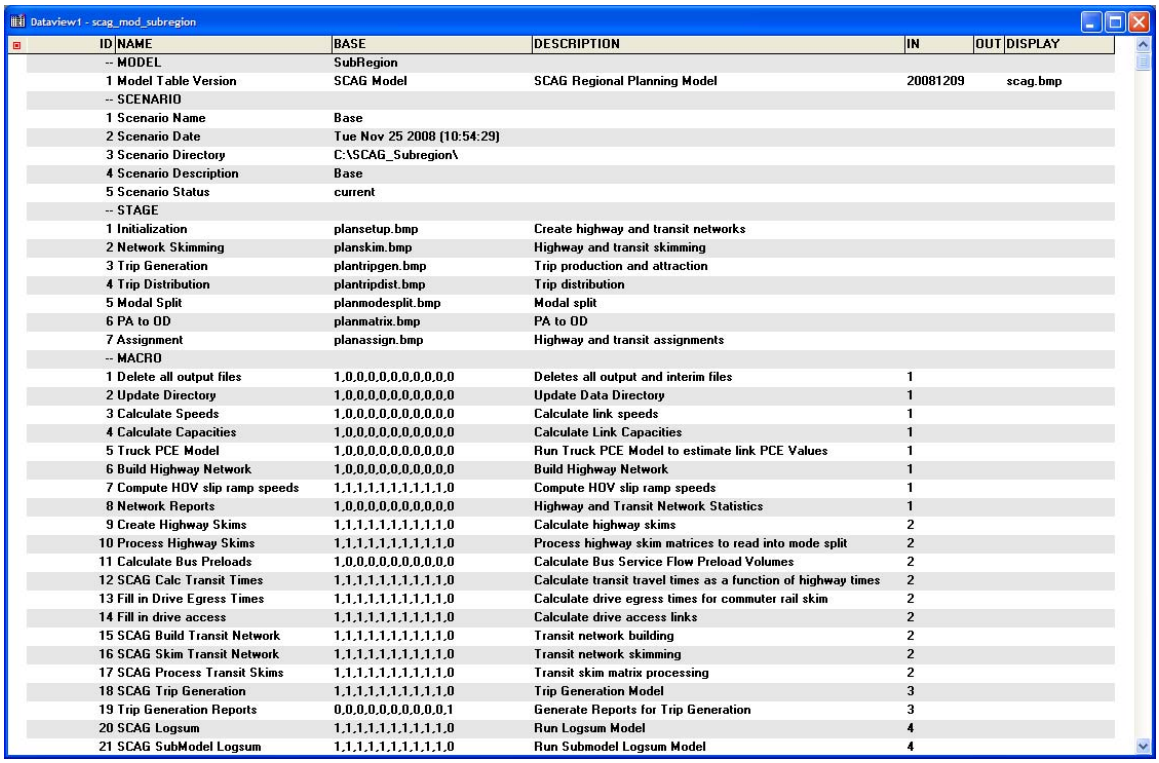
Viewing and Analyzing Outputs from a Scenario

Once the model is run, you can use all of TransCAD's functionality to view and analyze results. There are innumerable ways to perform these analyses, examples of which were provided under the heading Viewing and Analyzing Inputs and Outputs for the Base Scenario. For more information, see the TransCAD User's Guide and Travel Demand Modeling with TransCAD manual.

Working with the Model Table

The model table stores all the information about scenarios, and their input/output files and parameter values. The model table also stores information about the steps in the model, the GISDK macros that are invoked, and the order that they are invoked in. When you specify scenario names and input/output files and parameters, all changes are stored in the model table. You have the option to modify the contents of the model table directly. The model table is a fixed format binary file that can usually be found in the model directory. For the base year 2008, the model table is named scag_subregion_2008.bin. A screenshot of a portion of the model table is shown

below:



Dataview1 - scag_mod_subregion

ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY
--	MODEL	SubRegion				
1	Model Table Version	SCAG Model	SCAG Regional Planning Model	20081209		scag.bmp
--	SCENARIO					
1	Scenario Name	Base				
2	Scenario Date	Tue Nov 25 2008 (10:54:29)				
3	Scenario Directory	C:\SCAG_Subregion\				
4	Scenario Description	Base				
5	Scenario Status	current				
--	STAGE					
1	Initialization	plansetup.bmp	Create highway and transit networks			
2	Network Skimming	planskim.bmp	Highway and transit skimming			
3	Trip Generation	plantripgen.bmp	Trip production and attraction			
4	Trip Distribution	plantripdist.bmp	Trip distribution			
5	Modal Split	planmodesplit.bmp	Modal split			
6	PA to OD	planmatrix.bmp	PA to OD			
7	Assignment	planassign.bmp	Highway and transit assignments			
--	MACRO					
1	Delete all output files	1,0,0,0,0,0,0,0,0,0	Deletes all output and interim files	1		
2	Update Directory	1,0,0,0,0,0,0,0,0,0	Update Data Directory	1		
3	Calculate Speeds	1,0,0,0,0,0,0,0,0,0	Calculate link speeds	1		
4	Calculate Capacities	1,0,0,0,0,0,0,0,0,0	Calculate Link Capacities	1		
5	Truck PCE Model	1,0,0,0,0,0,0,0,0,0	Run Truck PCE Model to estimate link PCE Values	1		
6	Build Highway Network	1,0,0,0,0,0,0,0,0,0	Build Highway Network	1		
7	Compute HOV slip ramp speeds	1,1,1,1,1,1,1,1,1,0	Compute HOV slip ramp speeds	1		
8	Network Reports	1,0,0,0,0,0,0,0,0,0	Highway and Transit Network Statistics	1		
9	Create Highway Skims	1,1,1,1,1,1,1,1,1,0	Calculate highway skims	2		
10	Process Highway Skims	1,1,1,1,1,1,1,1,1,0	Process highway skim matrices to read into mode split	2		
11	Calculate Bus Preloads	1,0,0,0,0,0,0,0,0,0	Calculate Bus Service Flow Preload Volumes	2		
12	SCAG Calc Transit Times	1,1,1,1,1,1,1,1,1,0	Calculate transit travel times as a function of highway times	2		
13	Fill in Drive Egress Times	1,1,1,1,1,1,1,1,1,0	Calculate drive egress times for commuter rail skim	2		
14	Fill in drive access	1,1,1,1,1,1,1,1,1,0	Calculate drive access links	2		
15	SCAG Build Transit Network	1,1,1,1,1,1,1,1,1,0	Transit network building	2		
16	SCAG Skim Transit Network	1,1,1,1,1,1,1,1,1,0	Transit network skimming	2		
17	SCAG Process Transit Skims	1,1,1,1,1,1,1,1,1,0	Transit skim matrix processing	2		
18	SCAG Trip Generation	1,1,1,1,1,1,1,1,1,0	Trip Generation Model	3		
19	Trip Generation Reports	0,0,0,0,0,0,0,0,0,1	Generate Reports for Trip Generation	3		
20	SCAG Logsum	1,1,1,1,1,1,1,1,1,0	Run Logsum Model	4		
21	SCAG SubModel Logsum	1,1,1,1,1,1,1,1,1,0	Run Submodel Logsum Model	4		

The fields of the model table are described below:

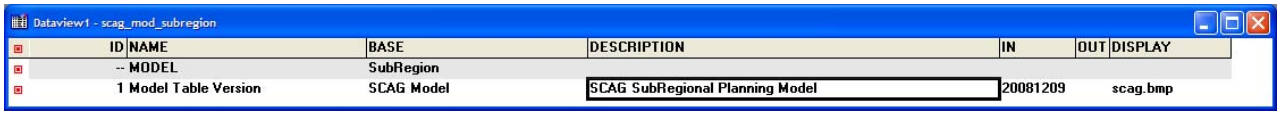
Field	Description
ID	Stage number or unique ID for each step or file or parameter
NAME	Name of scenario option or stage name or macro name or input/output name or parameter name, depending on the section
BASE	Value of the option or NAME in the base scenario
DESCRIPTION	Description of the scenario, stage, macro, file, or parameter
IN	Stage number that the macro or parameter is in, or stage number that the file is used as an input
OUT	Stage number that the file is used as an output
DISPLAY*	Allows file to be viewed through the output View Manager
<Scenario Fields>	Extra scenario fields describing the scenario and macros, files and parameters used for each scenario

* See FILE section for full description of DISPLAY field

The model table is organized into several sections. A description of each section

follows below:

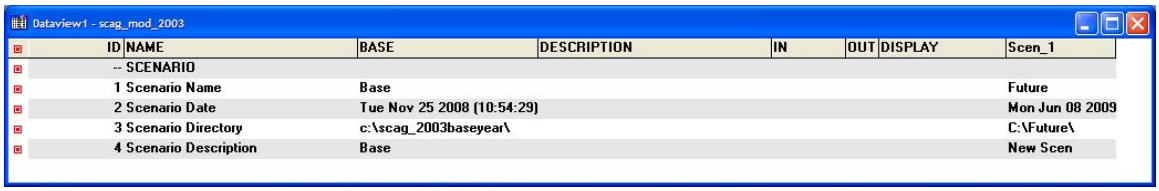
Model Section


Dataview1 - scag_mod_subregion

ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY
--	MODEL	SubRegion				
1	Model Table Version	SCAG Model	SCAG SubRegional Planning Model	20081209		scag.bmp

The MODEL section describes the basic name and type of the model. Under the BASE field, the keyword “SubRegion” denotes that this model table and the file contents in the inclusive directory are meant for the SubRegional Model. The model interface can also support a Sketch Plan version of the model and a Regional version of the model. Both alternate versions have their own unique parameters, options and files. By entering in “Sketch” or “Region” into the model table, the model code will automatically invoke the models specific to the Sketch or Regional models.

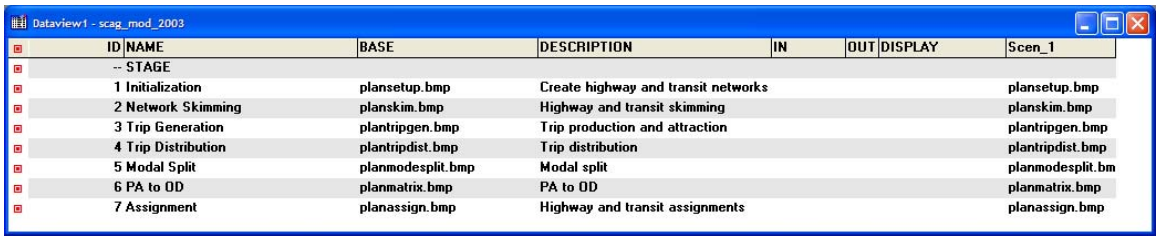
Scenario Section


Dataview1 - scag_mod_2003

ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY	Scen_1
--	SCENARIO						
1	Scenario Name	Base					Future
2	Scenario Date	Tue Nov 25 2008 (10:54:29)					Mon Jun 08 2009
3	Scenario Directory	c:\scag_2003baseyear\					C:\Future\
4	Scenario Description	Base					New Scen

The SCENARIO section describes specified scenarios. The entries in the BASE field describe the base scenario name, date of creation, base scenario folder, and base scenario description. For each scenario that is added after the base, there exists an extra field added after the “DISPLAY” field. Each added scenario will have a field name that describes the scenario, and will have records in that field that describe the name, date, directory folder and description of the scenario.

Stage Section


Dataview1 - scag_mod_2003

ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY	Scen_1
--	STAGE						
1	Initialization	plansetup.bmp	Create highway and transit networks				plansetup.bmp
2	Network Skimming	planskim.bmp	Highway and transit skimming				planskim.bmp
3	Trip Generation	plantripgen.bmp	Trip production and attraction				plantripgen.bmp
4	Trip Distribution	plantripdist.bmp	Trip distribution				plantripdist.bmp
5	Modal Split	planmodesplit.bmp	Modal split				planmodesplit.bm
6	PA to OD	planmatrix.bmp	PA to OD				planmatrix.bmp
7	Assignment	planassign.bmp	Highway and transit assignments				planassign.bmp

The STAGE section describes the stages in the model. These stages appear in the buttons in the main planning model dialog box. Each stage is assigned an ordered ID, a picture bitmap, and a description.

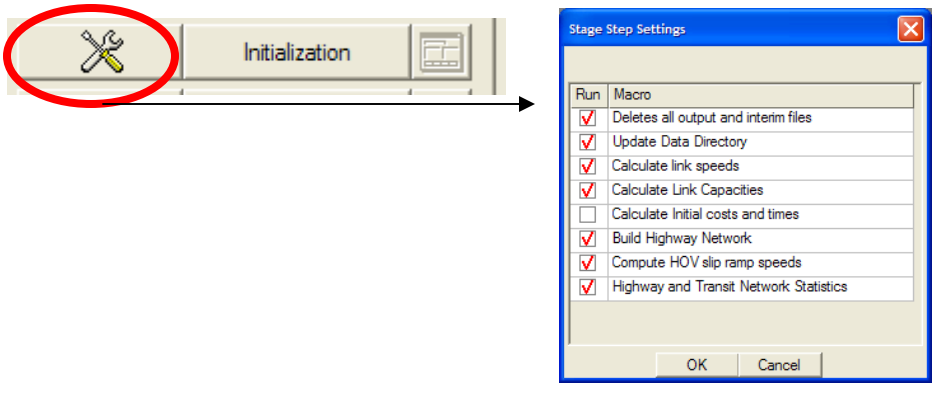
Macro Section

Dataview1 - scag_mod_2003

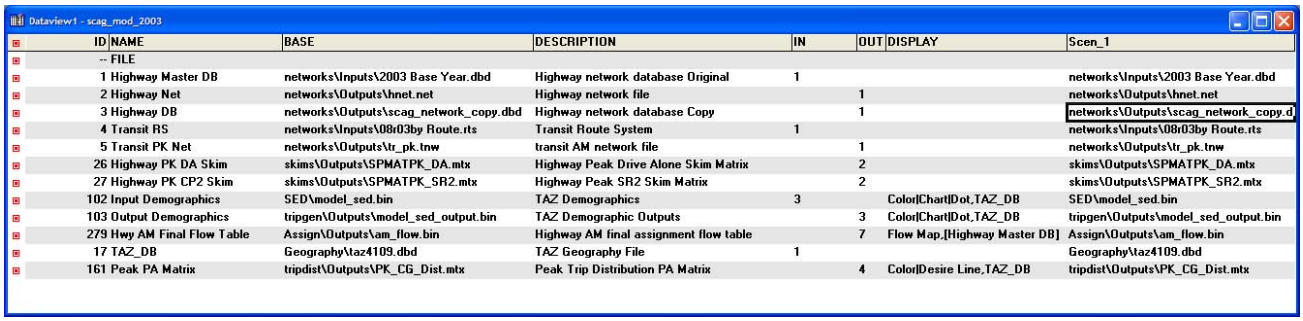
ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY	Scen_1
--	MACRO						
1	Delete all output files	1,0,0,0,0,0,0,0,0,0	Deletes all output and interim files	1			1,0,0,0,0,0,0,0,0,
2	Update Directory	1,0,0,0,0,0,0,0,0,0	Update Data Directory	1			1,0,0,0,0,0,0,0,0,
3	Calculate Speeds	1,0,0,0,0,0,0,0,0,0	Calculate link speeds	1			1,0,0,0,0,0,0,0,0,
4	Calculate Capacities	1,0,0,0,0,0,0,0,0,0	Calculate Link Capacities	1			1,0,0,0,0,0,0,0,0,
5	Reset Highway Costs and Times	0,0,0,0,0,0,0,0,0,0	Calculate Initial costs and times	1			0,0,0,0,0,0,0,0,0,
6	Build Highway Network	1,0,0,0,0,0,0,0,0,0	Build Highway Network	1			1,0,0,0,0,0,0,0,0,
7	Compute HOV slip ramp speeds	1,1,1,1,1,1,1,1,1,0	Compute HOV slip ramp speeds	1			1,1,1,1,1,1,1,1,1,
8	Network Reports	1,0,0,0,0,0,0,0,0,0	Highway and Transit Network Statistics	1			1,0,0,0,0,0,0,0,0,
9	Create Highway Skims	1,1,1,1,1,1,1,1,1,0	Calculate highway skims	2			1,1,1,1,1,1,1,1,1,
10	Process Highway Skims	1,1,1,1,1,1,1,1,1,0	Process highway skim matrices to read into mode split	2			1,1,1,1,1,1,1,1,1,
11	Fill in Drive Egress Times	1,1,1,1,1,1,1,1,1,0	Calculate drive egress times for commuter rail skim	2			1,1,1,1,1,1,1,1,1,
12	Fill in drive access	1,1,1,1,1,1,1,1,1,0	Calculate drive access links	2			1,1,1,1,1,1,1,1,1,
13	Calculate Bus Preloads	1,0,0,0,0,0,0,0,0,0	Calculate Bus Service Flow Preload Volumes	2			1,0,0,0,0,0,0,0,0,

The MACRO section specifies all of the macro names that are to be invoked in the model. The list of macro names is case sensitive and is specified in the NAME field. The macros are invoked in the order in which they appear in the model table. The BASE field contains information on whether or not the macro is invoked in a particular feedback loop. This information is coded as a string of ones (invoked) and zeroes (not invoked). In the example above, the macros “Delete all output files”, Update Directory”, and “Calculate Speeds” are all invoked in the first feedback loop, but not invoked in any loop thereafter. The last digit in the string instructs the model on the macros that are invoked in the “Final” feedback loop. If a user specifies an ending loop in the planning dialog box that is less than the maximum presented in the BASE field (e.g. 5 loops out of 10 maximum), the first 5 loops will be run with macros in accordance to the BASE field contents. After 5 loops are run, the Final loop is run with the macros that are turned on in the last column. You can also define which macros are run or ignored for each scenario in the <scenario> field (Scen_1 in the above example).

The “IN” field represents the stage number that the macro runs in. If the user clicks the Stage graphic to the left of the Stage button in the SCAG Planning Model dialog box, all macros within the stage will be displayed with the option to turn them on or off for that stage:



FILE Section



Dataview1 - scag_mod_2003

ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY	Scen_1
--	FILE						
1	Highway Master DB	networks\Inputs\2003 Base Year.dbd	Highway network database Original	1			networks\Inputs\2003 Base Year.dbd
2	Highway Net	networks\Outputs\hnet.net	Highway network file		1		networks\Outputs\hnet.net
3	Highway DB	networks\Outputs\scag_network_copy.dbd	Highway network database Copy		1		networks\Outputs\scag_network_copy.d
4	Transit RS	networks\Inputs\08r03by Route.rts	Transit Route System	1			networks\Inputs\08r03by Route.rts
5	Transit PK Net	networks\Outputs\tr_pk.tnw	transit AM network file		1		networks\Outputs\tr_pk.tnw
26	Highway PK DA Skim	skims\Outputs\SPMATPK_DA.mtx	Highway Peak Drive Alone Skim Matrix		2		skims\Outputs\SPMATPK_DA.mtx
27	Highway PK CP2 Skim	skims\Outputs\SPMATPK_SR2.mtx	Highway Peak SR2 Skim Matrix		2		skims\Outputs\SPMATPK_SR2.mtx
102	Input Demographics	SED\model_sed.bin	TAZ Demographics	3		Color|Chart|Dot,TAZ_DB	SED\model_sed.bin
103	Output Demographics	tripgen\Outputs\model_sed_output.bin	TAZ Demographic Outputs		3	Color|Chart|Dot,TAZ_DB	tripgen\Outputs\model_sed_output.bin
279	Hwy AM Final Flow Table	Assign\Outputs\am_flow.bin	Highway AM final assignment flow table		7	Flow Map,[Highway Master DB]	Assign\Outputs\am_flow.bin
17	TAZ_DB	Geography\taz4109.dbd	TAZ Geography File	1			Geography\taz4109.dbd
161	Peak PA Matrix	tripdist\Outputs\PK_CG_Dist.mtx	Peak Trip Distribution PA Matrix		4	Color|Desire Line,TAZ_DB	tripdist\Outputs\PK_CG_Dist.mtx

The FILE section specifies all the input and output files of the BASE and other scenarios, and the stage that the file is in. The NAME field contains an identifying name for the file. This name is also used in the GISDK code as a variable that will contain the file name. The BASE field contains the relative path and file name chosen. The full path will be the scenario directory plus the relative path. When you make changes to files in the Model Scenario Manager, the edits will be reflected in this section of the model table. Each file also has a description contained in the DESCRIPTION field. The IN field and the OUT field describe the first stage that the file will be used as input or output respectively. The stage coding in the table determines how the file will be presented in the Model Scenario Manager dialog box. In the GISDK macros, each file will be available for all stages and all macros, even if it is shown for only one stage. Each scenario can have its own set of input and output file name and location contained in the <scenario> fields.

The DISPLAY field lets you designate files that can be displayed using the Quick View buttons. The contents of the display field are:

<view theme type1>|<opt view theme type 2>|<opt view theme type 3> , Geography

As an example the demographics table denoted by the name “Input Demographics” has the following in the DISPLAY field:

Color|Chart|Dot,TAZ_DB

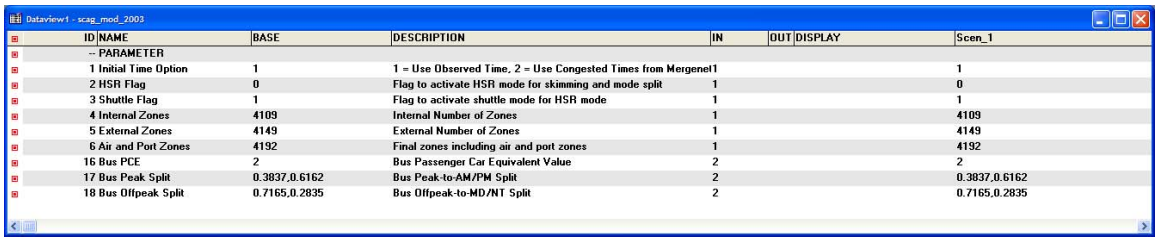
This is interpreted as follows: the numeric fields in the demographic table can be viewed as color, chart or dot themes. The table will be linked to geography named TAZ_DB (in this case TAZ_DB refers to Geography\taz4109.dbd). It is assumed that the first field of the file field displayed matches with the ID field of the geography.

As another example, Peak PA Matrix has the following in its DISPLAY field:

Color|Desire Line, TAZ_DB

In this case, the input is a matrix which can be viewed as a color theme by viewing a row, column, sum, or diagonal of the matrix. You can also view the matrix as Desire Lines. In either case, the matrix IDs are assumed to be consistent with the geographic IDs in TAZ_DB.

PARAMETER Section



Dataview1 - scag_mod_2003

ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY	Scen_1
--	PARAMETER						
1	Initial Time Option	1	1 = Use Observed Time, 2 = Use Congested Times from Mergenet	1			1
2	HSR Flag	0	Flag to activate HSR mode for skimming and mode split	1			0
3	Shuttle Flag	1	Flag to activate shuttle mode for HSR mode	1			1
4	Internal Zones	4109	Internal Number of Zones	1			4109
5	External Zones	4149	External Number of Zones	1			4149
6	Air and Port Zones	4192	Final zones including air and port zones	1			4192
16	Bus PCE	2	Bus Passenger Car Equivalent Value	2			2
17	Bus Peak Split	0.3837,0.6162	Bus Peak-to-AM/PM Split	2			0.3837,0.6162
18	Bus Offpeak Split	0.7165,0.2835	Bus Offpeak-to-MD/NT Split	2			0.7165,0.2835

The PARAMETER section specifies all the parameters of the model, their values in the BASE or other scenario, and the stage that the parameter is presented in. The NAME field contains an identifying name for the parameter. This name is also used in the GISDK code as a variable that will contain the parameter value. In the GISDK macros, each parameter will be available for all stages and all macros, even if it is shown for only one stage. The BASE field contains the value of the parameter. Each scenario can have its own unique parameter value stored in the <scenario> field(s). Parameter values separated by commas are treated as arrays in the GISDK macros.

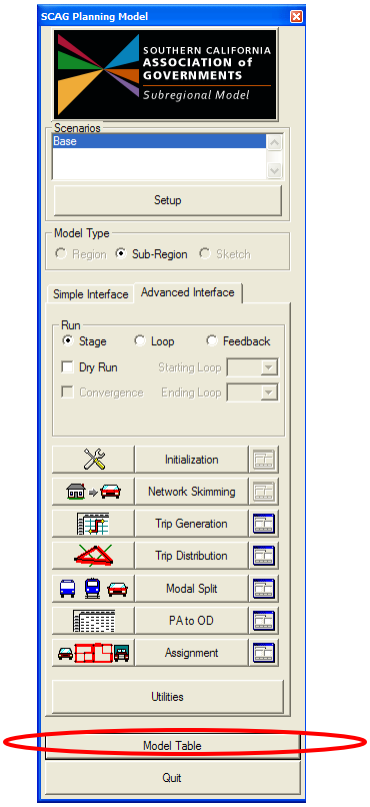
Model tables can be used to define special variants of the Regional Model. For example, a model table can be used to define a one-loop version of the model or can be defined to model a small network change where OD trip matrices do not change. The sections ‘Modeling Small Network Changes without Changing the OD Trip Matrices’ and ‘Performing a “One-Loop” Model Run’ under the chapter ‘Sample Model Run Procedures’ describe how to set up the model to run these situations including how to use the pre-built model tables.

Switching Model Tables

One strategy for setting up scenarios is to have a separate model directory for each scenario, and to have a unique model table for that directory. The model table will point that the model directory, and all parameters and file settings will be set up specifically for the scenario pertinent to that model directory. To support this approach, the planning model dialog box includes a button that can switch model tables, and load all of the parameters and files in that model table. In this manner, the entire model directory becomes self contained: the model directory can include not only all the model inputs, but with the model table, can include all parameters, run settings, and macros to run in a particular order.

To Switch to a Different Model Table

1. Open the Subregional Planning dialog box, then click on the Model Table button:



2. Choose the model table you wish to use. Sometimes the model directory information inside the model table is empty. If this is the case, you will be prompted for the model directory, which should be the directory that the model table is located in.

3. The model table will be switched to the new table. Make sure that the model table references to the correct model directory, files, and parameters by clicking on the Setup button, and reviewing all settings.

All future uses of the Subregional model dialog box will reference to the new model table.

It is important to note that many model year and/or scenario inputs provided by SCAG or other entities may come in this format: all model inputs in a directory with an included model table.

Preparing Input Data

This section of the User's Guide gives guidance on properly preparing input data for the Subregional Model. The first section describes the following utilities that are available in the Regional Model that let you automatically convert Regional model inputs into inputs that are consistent with the Subregional focused model, and to override custom socioeconomic inputs:

- Create Subregional Inputs
- Create Merged Subregion Zones
- Customizing Socioeconomic Inputs

The second section gives guidance on how to work with the highway and transit GIS inputs, and how to work with the TAZ and other input files into the Subregional Model.

Subregional Utilities

Creating Subregional Inputs

The Regional model contains a utility that automatically converts regional data inputs into subregional data inputs. The concept of the conversion is similar in context to that in the Sketch Plan model. Before the utility can be invoked, all existing input files for a Regional model scenario must exist. In addition, a subdirectory within your model directory entitled SUBREGION must exist. You must also select a scenario in your Regional Model planning dialog box.

The utility also requires the following input files within the SUBREGION directory:

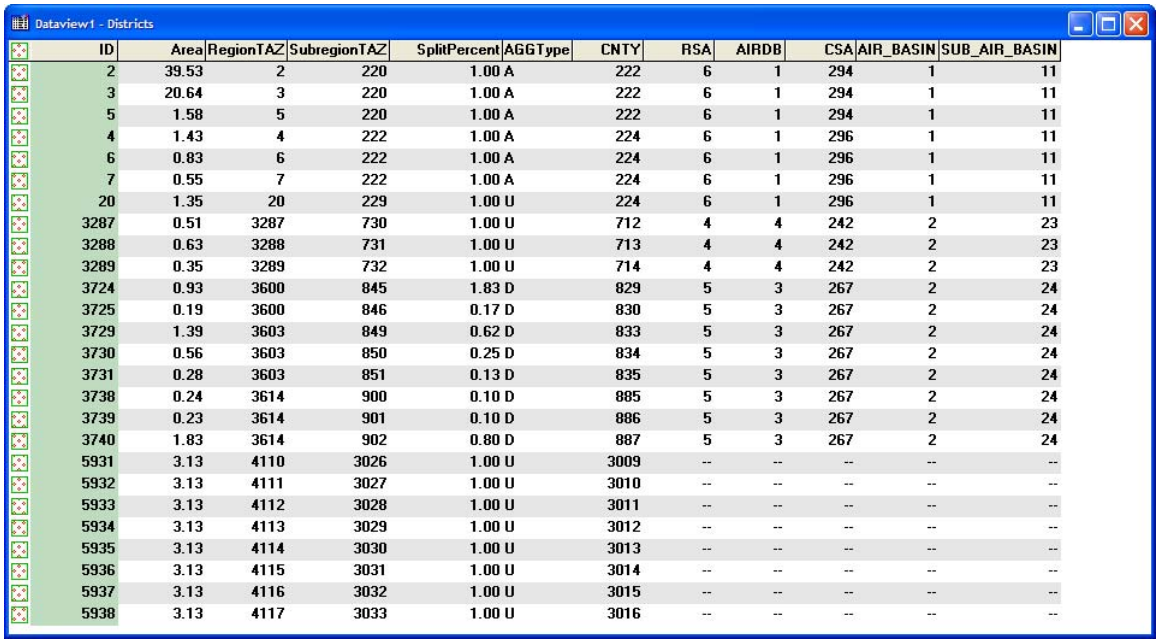
- AUTOAV_MODEL.ASC: The vehicle availability coefficients and constants input file normally found under Tripgen\Inputs. This file will be re-calibrated for the Subregional model, and will be copied into Tripgen\Inputs in the new subregion directory.
- FRICTION_FACTOR_PARAMETERS.BIN: The friction factor coefficients input file normally found under Tripdist\Inputs. This file will be re-calibrated for the subregional model, and will be copied into Tripdist\Inputs in the new subregion directory.
- MSTABLE_PK.BIN and MSTABLE_OP.BIN: The mode choice coefficients and constants table normally found under Msplit\Inputs.

This file will be re-calibrated for the subregion model, and will be copied into Msplit\Inputs in the new subregion directory.

- HPMS_FACTOR.BIN: The emissions factor table normally found under Assign\Inputs. This file will be re-calibrated for the sketch plan model, and will be copied into Assign\Inputs in the new subregion directory.

The most important input file is the merged TAZ and Subregion TAZ GIS file (called scagsplit4.dbd for the San Bernardino County example). This GIS area layer includes a record for each regional TAZ for areas outside of the subregion, and a record for each disaggregated TAZ for the area inside the subregion. Each zone contains information on the original Regional TAZ it is associated with, the Subregion TAZ number it is assigned to, the "aggregation type" of the TAZ, and the percentage split of the TAZ of the original Regional TAZ if it is inside the subregion. The following table and graphic describes required fields in the zone layer:

Fieldname	**Description**
ID	GIS ID of layer (autocalculated)
Area	GIS Area (autocalculated)
RegionTAZ	Original regional TAZ number of zone
SubregionTAZ	Assigned Subregion TAZ number
AGGType	Aggregation type of zone. Values are: A: Regional TAZ zone is to be aggregated into SubregionTAZ. Typically used for zones outside the subregion. U: Zone is to be left preserved and assigned a Subregion TAZ number. Typically used for zones bordering the subregion, for external and port zones, and for zones inside the subregion that are not split. D: Regional TAZ is to be disaggregated and assigned a Subregion TAZ number. Typically used for zones inside the subregion that are split.
SplitPercent	For AGGType "D", the percentage of the Subregion TAZ that is in the regional TAZ, for all other AGGTypes, the SplitPercent is 1.0
CNTY	County number that TAZ is in
RSA	RSA number that TAZ is in
CSA	CSA number that TAZ is in
AIR_BASIN	Air basin number that TAZ is in
SUB_AIR_BASIN	Sub air basin number that TAZ is in



Dataview1 - Districts

ID	Area	RegionTAZ	SubregionTAZ	SplitPercent	AGGType	CNTY	RSA	AIRDB	CSA	AIR_BASIN	SUB_AIR_BASIN
2	39.53	2	220	1.00	A	222	6	1	294	1	11
3	20.64	3	220	1.00	A	222	6	1	294	1	11
5	1.58	5	220	1.00	A	222	6	1	294	1	11
4	1.43	4	222	1.00	A	224	6	1	296	1	11
6	0.83	6	222	1.00	A	224	6	1	296	1	11
7	0.55	7	222	1.00	A	224	6	1	296	1	11
20	1.35	20	229	1.00	U	224	6	1	296	1	11
3287	0.51	3287	730	1.00	U	712	4	4	242	2	23
3288	0.63	3288	731	1.00	U	713	4	4	242	2	23
3289	0.35	3289	732	1.00	U	714	4	4	242	2	23
3724	0.93	3600	845	1.83	D	829	5	3	267	2	24
3725	0.19	3600	846	0.17	D	830	5	3	267	2	24
3729	1.39	3603	849	0.62	D	833	5	3	267	2	24
3730	0.56	3603	850	0.25	D	834	5	3	267	2	24
3731	0.28	3603	851	0.13	D	835	5	3	267	2	24
3738	0.24	3614	900	0.10	D	885	5	3	267	2	24
3739	0.23	3614	901	0.10	D	886	5	3	267	2	24
3740	1.83	3614	902	0.80	D	887	5	3	267	2	24
5931	3.13	4110	3026	1.00	U	3009	--	--	--	--	--
5932	3.13	4111	3027	1.00	U	3010	--	--	--	--	--
5933	3.13	4112	3028	1.00	U	3011	--	--	--	--	--
5934	3.13	4113	3029	1.00	U	3012	--	--	--	--	--
5935	3.13	4114	3030	1.00	U	3013	--	--	--	--	--
5936	3.13	4115	3031	1.00	U	3014	--	--	--	--	--
5937	3.13	4116	3032	1.00	U	3015	--	--	--	--	--
5938	3.13	4117	3033	1.00	U	3016	--	--	--	--	--

In terms of SubregionTAZ zone numbering, it is required that, like the Regional model, the zones be numbered from 1 to the maximum number of zones. The aggregated zones should be numbered first. In the San Bernardino example, these zones are numbered from 1 to 227. Next, the internal “AGGTYPE = U” zones should be numbered. For San Bernardino, these zones are from 228 to 842. Next, the “AGGTYPE = D” disaggregated zones should be numbered. For San Bernardino, these zones are from 843 to 3025. Lastly, the external zones, which are assigned “AGGTYPE = U” and are numbered from 4109 to 4192 in the Regional Model should be numbered. For San Bernardino, these zones are assigned to subregion zones 3026 to 3108. There is a separate utility available that assists in creating this merged Regional and Subregional TAZ layer. This utility is described later in this section of the User’s Guide.

The utility consists of the following subutilities:

- Create Subregion Databases and Matrices
- Create Subregion Zones
- Create Subregion Network
- Create Base Intra-Regional OD Matrix

Each of these subutilities is explained below:

Create Subregion Databases and Matrices

This subutility takes all input files from your selected regional model scenario, copies them onto a user-specified directory, creating similar sub-directories as necessary,

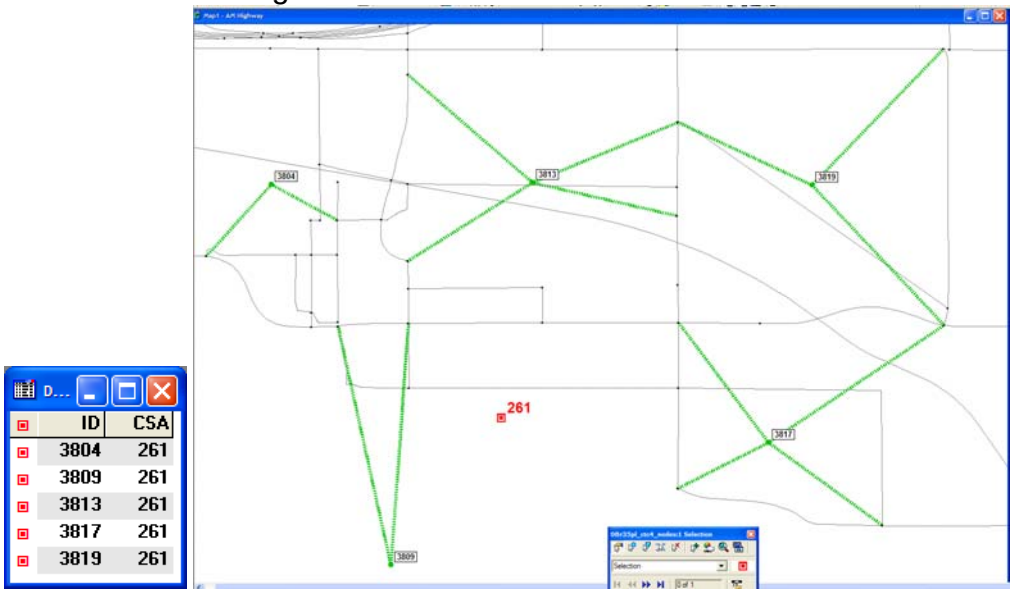
and then aggregates and disaggregates data tables and matrices as necessary based on the input GIS area layer and corresponding RegionTAZ, SubRegionTAZ, AGGTYPE, and SPLITPERCENT fields. The result is a dataset that is ready to run in the Subregion model, and is consistent with the level of aggregation and disaggregation specified in the correspondence table. In the San Bernardino example, the results are 3108 zone tables and 3108 by 3108 zone matrices. This option also takes all the input and output files and parameters specified in the scenario and creates a unique model table that replicates these values for sketch plan use

Create Subregion Zones

This subutility takes the input GIS area layer, and aggregates the appropriate zones according to the correspondence table. All the attributes in the TAZ layer will also be aggregated. The output will be a TAZ geographic file appropriate for the Subregion model.

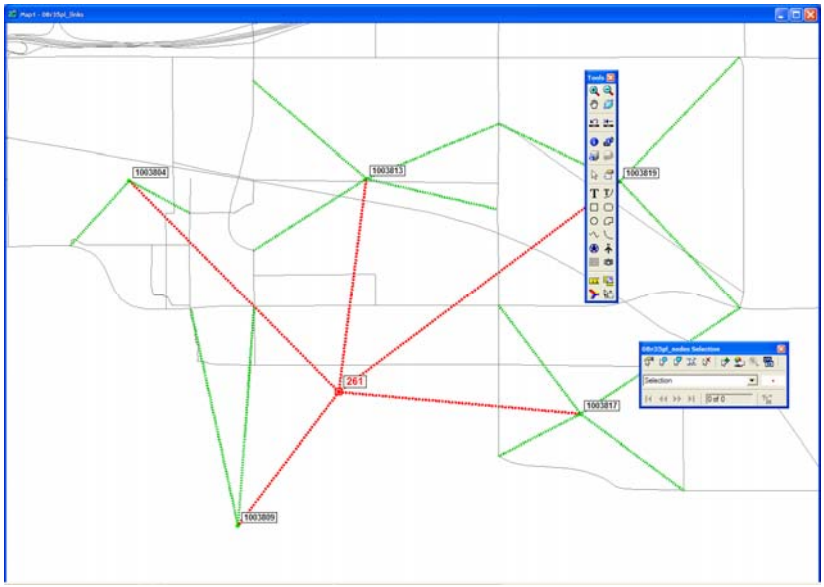
Create Subregion Network

This subutility creates a highway geographic file that is compatible with the Subregion model. The Regional Model geographic file in the scenario is used as the input. To make the network compatible, all centroid nodes and centroid connectors must be set so that they are compatible with the aggregated zones in the correspondence table for AGGTYPE = A. In this implementation, additional “centroid connectors” are created between the center of the aggregated zone and the original zone. As an example, the correspondence table associates several zones to CSA 261 as shown in the following table. The diagram shows the affiliated centroid nodes and connectors in the regional network.



ID	CSA
3804	261
3809	261
3813	261
3817	261
3819	261

The tool adds centroid connector links between CSA 261 and all of the zones it is associated with (3804, 3809, 3813, 3817 and 3819). Thus the skim path from CSA to CSA will go through two connector links at the beginning and end of the path. The node IDS of the CSAs will be automatically set by the utility, and the node IDs of the original zones will be renumbered in order to avoid any conflict. This design allows for network assignments to proceed from aggregated zone to aggregated zone, or from original zone to original zone, since the original centroid nodes have been retained. This feature comes in useful when assigning intra-regional trips to the network, which is described in the next section. The diagram below displays the network after the additional centroid connectors have been added, and the node IDs have been renumbered.



In addition, all non-centroid connector links were retained. All other attributes on all other links are similar to the regional network. This strategy was employed in order to make the sketch plan network as compatible as possible to the regional network. This makes it more likely that the Subregional model produces similar results with the regional model.

For zones and centroids that are of AGGTYPE = “U”, no transformations are performed. The original centroid node and centroid connector links are used. The centroid node is renumbered to the Subregion zone’s TAZ number.

For zones and centroids that are disaggregated (AGGTYPE = “D”), a new set of centroid connectors are created using TransCAD’s centroid connector tool. This utility creates a node at the disaggregated TAZ’s centroid location, and creates up to 4 connector links from the centroid location to the mid-point of nearby links. The utility

then deletes the original centroid connectors from the regional TAZs.

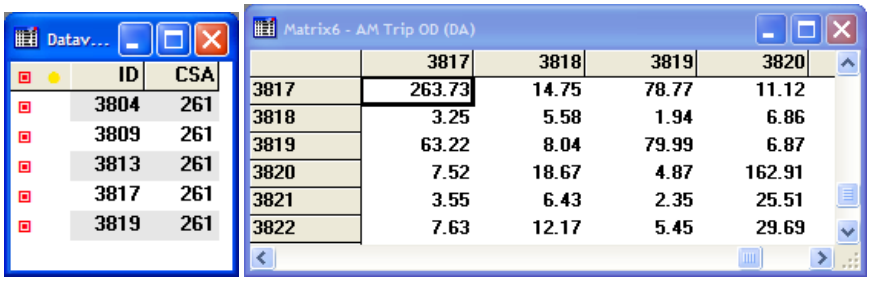
The subutility includes an added option that lets the user merge in a separate line GIS database into the network. This is usually a local street network within the subregion that is more detailed than the input Regional network. This local street network must not have any link segments that are common with the Regional network. If the local street network shares common road segments, they must be deleted beforehand, otherwise they will be duplicated in the merged network. In terms of attributes, the subutility will transfer any common field named attributes in the local street network to the merged network. For any fields that are not transferred over, the subutility will assume the lowest level facility types and lanes for the merged road segment.

Create Base Subregion Intra-Regional OD Matrices

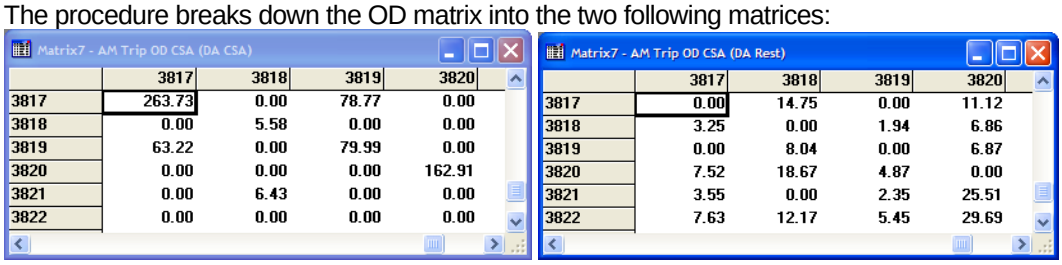
When centroids are aggregated from the Regional Model, a Subregional assignment will produce many more intrazonal trips. Taking the previous example, in the regional network, trips would be made from TAZ 3718 to TAZ 3804, and these trips would be assigned to the regional network. Once these TAZs are aggregated to CSA 261 however, these are considered intrazonal trips and are thus not assigned to the network. Potentially, this leads to an under-assignment of trips to a Subregion aggregated network. These kinds of trips are called Intra-Regional trips: trips that are interzonal in the regional network and are thus assigned in the Regional Model, but are considered intrazonal in the Sketch Plan Model.

This utility creates Intra-Regional OD trips from original TAZ to original TAZ for the base year and for areas where AGGTYPE = “A”. The Subregion model then uses these base OD trips to estimate Intra-Regional OD trips for the scenario using a growth factors methodology, then assigns these trips to the network. These trips then become a background flow preload for the Subregional assignment.

This procedure takes the AM, PM, MD and NT regional base year origin-destination matrices from the model as input. Each OD matrix contains 8 modes: Drive Alone, Shared Ride 2 HOV, Shared Ride 2 NonHOV, Shared Ride 3+ HOV, Shared Ride 3+ NonHOV, Light Truck, Medium Truck, and Heavy Truck. This procedure then breaks down each mode’s OD matrix into inter-regional vs. intra-regional trips using the correspondence table. As an example, consider the same correspondence table and the following OD matrix:



The procedure breaks down the OD matrix into the two following matrices:

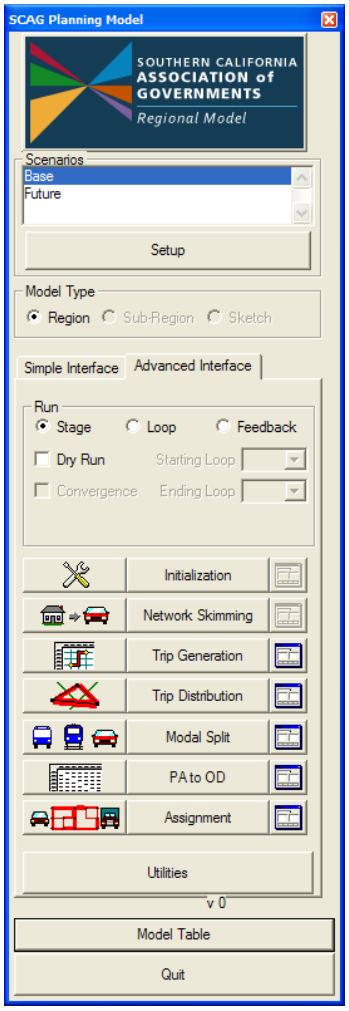


The “DA CSA” matrix represents all trips that both begin and end in the same CSA (region) (e.g. 3819-3817). These are considered intra-regional trips. The “DA Rest” matrix represents all trips that begin in one CSA and end outside of the CSA (e.g. 3817-3818). These are considered inter-regional trips.

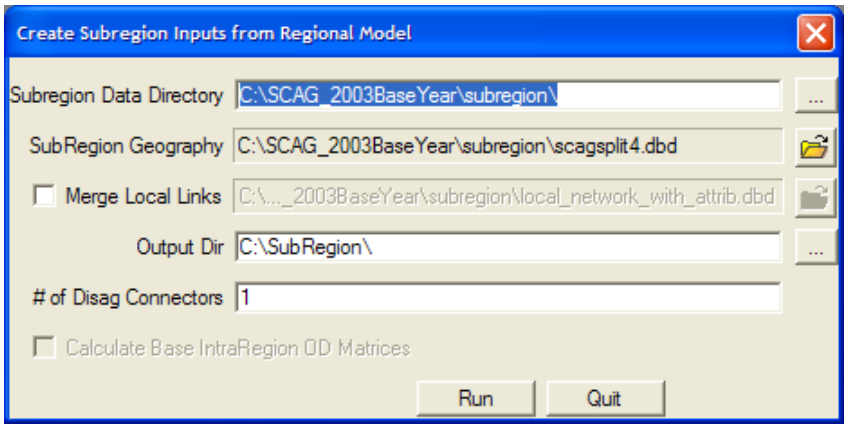
This utility is an option in the dialog box and should only be invoked to re-calculate the Intra-Region OD matrices from the base year. This option also assumes that the regional model output OD matrices have been created. They are in the ODTable\Outputs directory, and are named AM_OD.MTX, PM_OD.MTX, MD_OD.MTX and NT_OD.MTX. If these files do not exist, this utility option is not available. If this utility is not invoked, then it is assumed that the following Intra-Region OD matrices have already been created and exist in the Subregion directory: AM_Base_IntraRegion_OD.mtx, PM_Base_IntraRegion_OD.mtx, MD_Base_IntraRegion_OD.mtx, NT_Base_IntraRegion_OD.mtx. The dialog box will check for the presence of these files and will stop the procedure if these files do not exist.

To Create Subregional Inputs

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing “SCAG Regional Planning Model”.



2. Highlight the scenario you wish to create your sketch model data from, then click on the Utilities button and choose “Create Subregion Inputs” from the list of utilities:

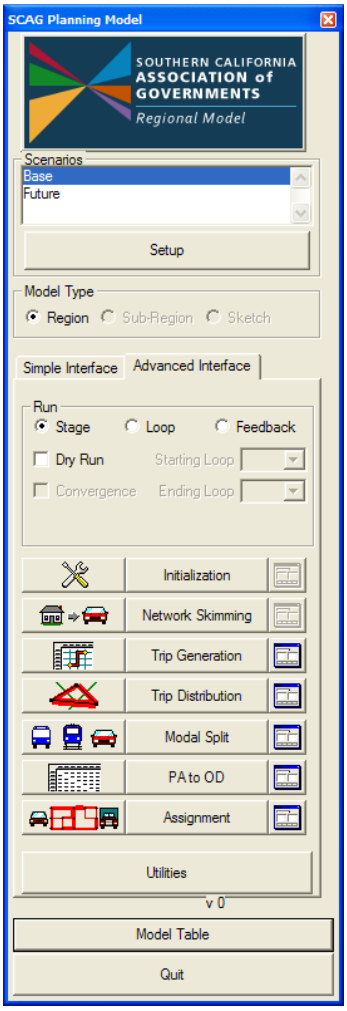


3. Enter in the directory that contains your subregion datasets.
4. Click  and choose the GIS area database that contains the merged Regional TAZs and Subregion TAZs.
5. Check Merge Local Links if you wish to merge in a local links database into the converted network. If you do, click  and choose the links database to merge
6. Click  and choose an output directory. In the same dialog box, you can also create a new directory if one does not yet exist.
7. Enter in the maximum number of centroid connectors you wish to add to every disaggregated zone in the subregion.
8. Choose to calculate base intraregion OD matrices if you wish.
9. Click Run.

The utility will create all the inputs for the Subregional model base in the directory you specified. The utility will also create a compatible model table in that subdirectory with all parameters copied from the regional model. The model table will be properly set to run the Subregional version of the model, and will have all zone number parameters renumbered to reflect the zones in the Subregional model. You are now ready to run the Subregional model using the newly created data.

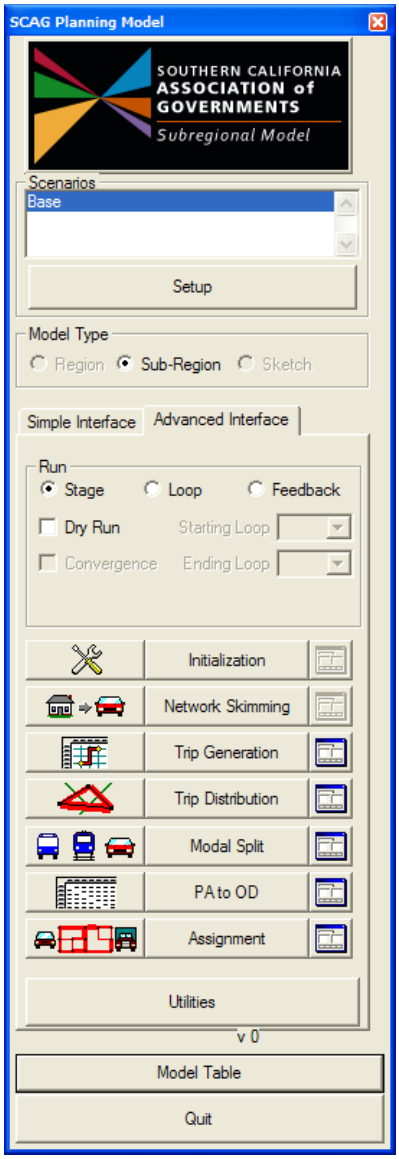
To Run the Subregional Model From a Regional Model Conversion

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing “SCAG Regional Planning Model”.



2. Click on the Model Table button and then choose the model table subregion_mod_2008.bin that is included in the output Subregion model directory you created in the Create Subregional Input directory.

3. The Planning Model dialog box will automatically switch to a Subregional Model dialog box, and the Model Type will switch from “Region” to “Sub-Region”



4. Choose Feedback as the Run type, choose 1 for the Starting Loop and 5 for the Ending loop, then click on the Initialization button to start running the model.

Creating Merged Subregion Zones

This utility creates the merged Region TAZ and Subregion TAZ GIS file that is used as an input to the Create Subregion Inputs utility. The utility takes three inputs:

1. The Regional TAZ layer with additional geography for the external zones
2. A TAZ layer just for the subregion where zones from the Regional TAZs have been split and disaggregated
3. A "buffer" distance

Each of these inputs are described in detail.

Regional TAZ Layer

The regional TAZ GIS file is similar to the TAZ layer taz4109.dbd that is found in the Geography subfolder of a model directory. This layer must contain the following field information described below:

Field	Description
CNTY	County Number
RSA	RSA Number
CSA	CSA Number
Air_Basin	Air Basin Number
Sub_Air_Basin	Sub Air Basin Number
ID	TAZ number

This input TAZ layer can be found in Subregion\Regional_TAZ_Layer.dbd. This file is identical to taz4109.dbd with the exception that geographic records have been added to it to model the external and port zones.

SubRegional TAZ Layer

The Subregion TAZ layer is a GIS area database that describes the TAZ geography within the subregion. This geographic file takes the regional TAZ geography as a starting basis, and disaggregates and splits the regional zones. It is required that these split and disaggregated zones will nest into the Regional Zones. There are no attribute fields required for this input file. An example of an input Subregional TAZ layer can be found under Subregion\subareataz.dbd

Buffer Distance

For this utility, the user can enter in a buffer distance around the subregion where TAZs will be preserved. As part of the focused approach to the subregion model, it is expected that zones within the subregion will be a disaggregation of regional TAZ zones. Areas that immediately surround the subregion will have zones that are the

same as the regional TAZs. Areas that are outside the immediate surroundings will have regional zones that are aggregated to a certain aggregation level, such as CSA's. The buffer distance lets the user decide the size of the surrounding area around the subregion where subregion TAZs are the same as regional TAZs. The default buffer distance is 10 miles, which was used for the San Bernardino example.

The output is a merged Regional and Subregional GIS file that contains all the geography and attributes necessary as input to the "Create Subregion Inputs" utility. The attribute fields are listed below:

Fieldname	**Description**
ID	GIS ID of layer (autocalculated)
Area	GIS Area (autocalculated)
RegionTAZ	Original regional TAZ number of zone
SubregionTAZ	Assigned Subregion TAZ number
AGGType	Aggregation type of zone. Values are: A: Regional TAZ zone is to be aggregated into SubregionTAZ. Typically used for zones outside the subregion. U: Zone is to be left preserved and assigned a Subregion TAZ number. Typically used for zones bordering the subregion, for external and port zones, and for zones inside the subregion that are not split. D: Regional TAZ is to be disaggregated and assigned a Subregion TAZ number. Typically used for zones inside the subregion that are split.
SplitPercent	For AGGType "D", the percentage of the Subregion TAZ that is in the regional TAZ, for all other AGGTypes, the SplitPercent is 1.0
CNTY	County that TAZ is in
RSA	RSA that TAZ is in
CSA	CSA that TAZ is in
AIR_BASIN	Air basin that TAZ is in
SUB_AIR_BASIN	Sub air basin that TAZ is in

The utility automatically calculates and assigns RegionTAZ, SubregionTAZ, AGGType and SplitPercent values to the merged file. The numbering system for the SubregionTAZs are assigned as described below. The SubregionTAZ numbers begin with 1:

1. All zones that are aggregated are assigned the first SubregionTAZ number based upon increasing CSA's
2. All other zones in the Regional TAZ layer that are not aggregated

(AGGTYPE = “U”, or boundary zones) are assigned the next set of SubregionTAZ numbers.

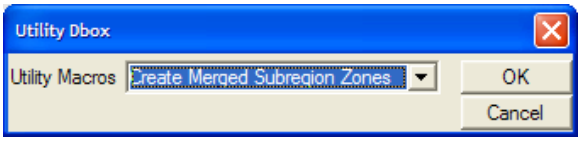
3. All subregion zones that are not disaggregated (AGGTYPE = “U”) are assigned the next set of SubregionTAZ numbers.
4. All subregion zones that are disaggregated (AGGTYPE = “D”) are assigned the next set of numbers
5. All external, air, and port zones are assigned the last set of SubregionTAZ numbers

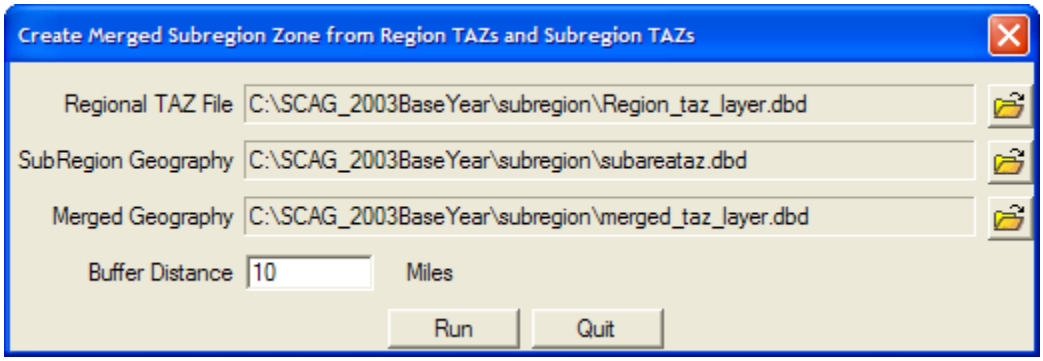
The SplitPercent is calculated geographically based upon the percentage area of the split zone that is within the original Regional zone. Users can manually adjust these percentages after the utility is finished.

To Create Merged Subregion Zones

1. Open the Regional Model dialog box, and click on the Utilities button, and choose “Create Merged Subregion Zones”.

2. Highlight the scenario you wish to create your sketch model data from, then click on the Utilities button and choose “Create Subregion Inputs” from the list of utilities:





3. Click  and choose the Regional TAZ geographic file.
4. Click  and choose the SubRegional TAZ geographic file.
5. Click  and enter in the output Merged Regional and Subregional geographic file.
6. Enter in a buffer distance.

7. Click Run.

The utility will merge the two geographic files together, create all necessary attribute fields, and automatically fill in the Regional TAZ, Subregional TAZ, Aggregation Type and SplitPercent fields. This geographic file can now be used as input into the Create Subregion Inputs utility.

Customizing Socio-Economic Inputs

By default, the Subregional model uses the Regional estimates of TAZ-based socio-economic data as inputs. For subregion zones that are disaggregated, the socioeconomic data will be disaggregated as well, based on area percentages. There is an optional method available that lets the user specify custom socioeconomic TAZ data for the subregion TAZs, or for any set of TAZs.

The main input is a table called override_dem.bin, which should be placed in the User directory of the Subregion model directory. This table can contain the following fields

Fieldname	**Description**
OVERTAZ	TAZ number to override demographic data
POPULATION	Override Population
HOUSEHOLDS	Override Households
EMPLOYMENT	Override Employment
KINDERGARTEN	Override K12 enrollment
COLLEGEENR	Override College enrollment

The OVERTAZ field is required. All other fields are optional, thus the user can choose to specify custom population and household demographics, but leave alone the employment and enrollment estimates. Since the SCAG model requires over 50 demographic and employment inputs into the model, the override method will fill in not only the direct demographic override, but will also estimate and calculate all related demographic fields. For example, the employment override will fill in not only the TotalEmp field, but will estimate and fill in all the sector employment fields and the income employment fields. The estimate will be based on the ratio of the override socioeconomic value to the original socioeconomic value. For example, if the override Household value for a TAZ is 100, and the original Household value is 50, then the ratio will the 100/50 or 2.0 and all household related fields will be multiplied by 2.0.

The override is invoked during the model run for the subregional model. The model first checks if the file User\OverRide_Dem.bin exists in the model directory. If this file exists, then the override procedure commences using the methodology described above. If the table does not exist, no override takes place. For the available 2003

dataset, there is a file in the User subdirectory called “OverRide_Dem2.bin” that contains county estimated household and employment override data. If you wish to run the model with these estimates, this table should be opened and saved to User\OverRide_Dem.bin.

Working with Model GIS Inputs

There are several main input components to the Subregional model:

1. Highway GIS databases
2. Transit GIS databases
3. TAZ level demographic and employment data
4. All other input data

To properly prepare input data, you would normally use the Copy Scenario utility to first make a full copy of a scenario’s input files into a user-specified directory, then create a new scenario that “points” to this new directory, and finally, modify the new directory files. Preparation guidance for each component is given below.

Preparing the Highway GIS Database

The highway GIS database is a critical input to the Regional Model. Critical fields in this database must be specified correctly in order for the model to run as desired. Errors in geographic or attribute coding may lead to model runtime errors.

When preparing the highway GIS database, we recommend the following order of coding and preparation:

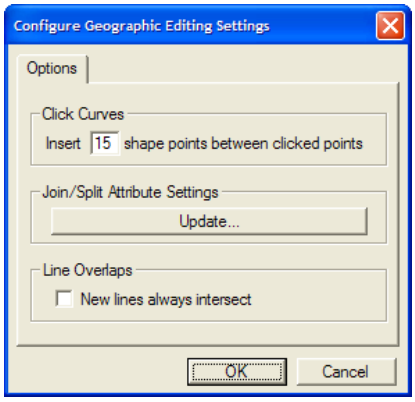
1. Code geographic edits (e.g. add/delete links, split/join links, define one-way links, etc.).
2. Code attribute edits.
3. Run the “Check Network Attributes” utility.
4. Specify the highway geographic file in the scenario interface.

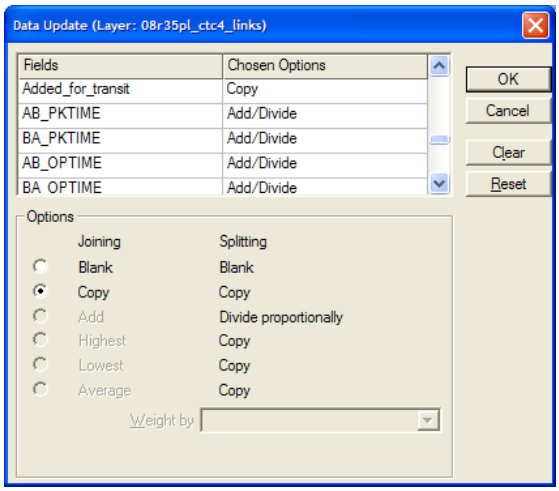
Coding Geographic Edits

To code the highway GIS database, you would use the standard TransCAD map editing toolbox and in various cases, the advanced line editing tools. These tools are found in the Tools-Map Editing menu. The TransCAD 5.0 User’s Guide provides comprehensive documentation on these functions starting on Page 570 in Chapter

24: Creating and Editing Geographic Files. In addition to this, the following is a compiled list of recommended editing procedures and tips. It is assumed that the user has a general familiarity with the TransCAD map editing tools prior to implementing these procedures.

- If your edits involve joining or splitting links, make sure that the map editing settings are set properly so that attribute data edits are handled correctly post-split or join. They are most likely already set up correctly, but should be reviewed before any line editing begins. To view these settings, open your highway GIS database, then choose Tools-Map Editing-Toolbox in the TransCAD menu to open the map editing toolbox. Then click on the  button, followed by the Update button.





The Chosen Options should all be either Copy or Add/Divide, depending on the attribute field

- When editing around centroid nodes, make sure that no centroid nodes are deleted. Nodes that are centroids can be identified using the query: '[Zone

Centroid] = "Y"'. The centroid nodes and their IDs are critical in defining skim matrices and assignments. If centroid connectors around a centroid are to be changed, it is recommended that you first add centroid connector links, then delete obsolete connector links, so that centroid nodes are not deleted in the process.

- The Edit Line Attributes  tool in the map editing toolbox is a useful tool to invoke after creating a new link, which copies attributes from an existing link to the new link. See page 575-577 in the TransCAD 5.0 Users Guide for more information on this tool.

- The quickest way to specify one-way links is to use the Set One Way Segments tool found in Tools-Map Editing-Set One Way Segments. Refer to page 578 in the User's Guide for information on this tool. In addition, we recommend that the coding (or topological) direction of one-way streets be the same as the flow direction. For example, if a link is to be one-way only from node A to node B, it should be topologically coded from A to B as well so that the value in TransCAD's DIR field will always be 1 for one-way links. For more information on one-way links, see Page 323 in the User's Guide.

- Periodic backups of the highway GIS database should be made in case earlier reversions need to be revived. The quickest method for backing up is to use the menu entry Tools-Geographic Utilities-Geographic File, then click on the Archive button to create a ZIP file of all highway database files. Each time you archive, you should enter in a different ZIP filename so that you have a history of backup files you can refer to if necessary.

- After geographic coding is complete, you should run the Check Network Connectivity tool found under Tools-Map Editing-Check Line Layer Connectivity. This tool will review the connectivity of the network and will highlight likely locations in the node layer where connectivity might be compromised. Of the selection sets that are created in the tool, the "Level 1" nodes are most likely to have connectivity issues, and should be checked one by one. If connectivity edits are warranted, you can use the Map Editing tool to fix individual connectivity issues. Page 577 of the User's Guide explains the connectivity tool in more detail.

Coding Attribute Edits

Once the highway GIS edits are completed, you should code the newly added links with proper attribute information. The Edit Line Attributes tool, described above, lets you quickly copy attributes from one link to another. The following is a list of recommended additional attribute editing tips and procedures.

- The first section of Appendix C describes all of the attribute fields of the highway link and node layers. For the link layer, the following fields are required to be filled in properly for the model:

  AB/BA_New_Facility_Type
  AB/BA_PostedSpeed
  AB/BA_AMLANES
  AB/BA_PMLANES
  AB/BA_MDLANES
  AB/BA_NTLANES
  Type1_Thru Lane, Type2_AUX_Lane and Type3_Other Fwy Lane for freeway links only
  MODE

  The model will utilize more attribute fields, but these are the bare minimum to code for a link. The facility type guide found in the parameter documentation should be followed when assigning a facility type to the link. The "Check Network Attributes" utility, described later, can be used to autofill other required model attribute fields.

- If the link is a toll link, the [AB TYPE] or [BA TYPE] field should be filled with the value 32. Toll costs should only be assessed at the toll entrance link. Other fields should be filled in accordance with the following table:

Toll Field	Value
[AB/BA TYPE]	**32**
[AB/BA TOLLV AM/MD/PM/NT]	**Fixed toll cost by time period in dollars**

- Link attributes should be filled in correctly in the AB or BA fields dependent on the link direction (DIR field) coding. See page 295 "Bidirectional Network Fields" in the User's Guide for information on AB/BA field coding. See page 323 for information on one-way links. If all one-way links are coded WITH the topological direction of the link (i.e. DIR=1 for all one-way links), then only the "AB" portion of the link attribute needs to be coded.

- The following fields are recommended to be filled in for GIS and identification purposes:

Project_ID, if applicable
Road Name
Route Name

- The following is a list of node fields that must be filled in for the model to work properly:

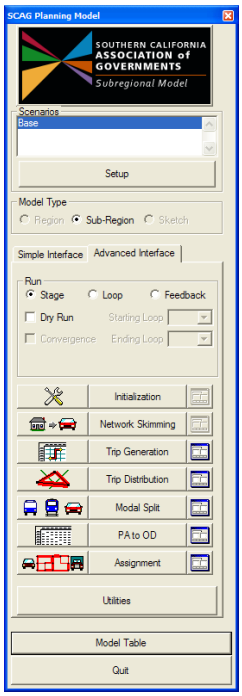
  [Zone Centroid] = 'Y' only for centroids
  CentroidCode = 1 only for centroids
  PARK = 1 only for Park and Ride lots
  PNR_DISTANCE, KNR_DISTANCE only for PNR lots

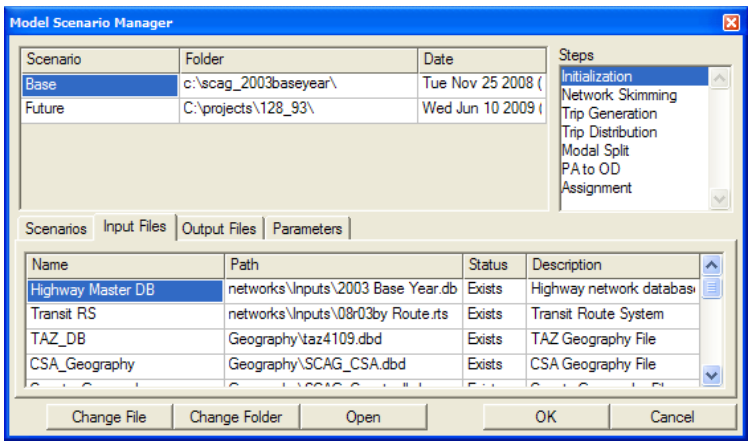
The Check Network Attributes Utility

After the highway geography and attribute edits are complete, the Check Network Attributes utility can be invoked to identify any link attributes that are not properly defined, and autofill non-essential attributes. Documentation for this utility can be found in Appendix A.

Specify the Highway GIS File in the Scenario Interface

After all Highway GIS checks are completed, the GIS file needs to be properly specified in the scenario interface. To specify the file in the planning model interface, first open the SCAG Subregion Model dialog box, click on the Setup button, then highlight the scenario of interest, highlight the Initialization step, and click on the Inputs tab:





As a last step, highlight the Highway Master DB parameter, click on the Change File button, and choose the finished Highway GIS file.

Preparing the Transit GIS Database

The transit GIS database is a critical input to the Regional Model. Critical fields in this database must be specified correctly in order for the model to run properly. Errors in geographic or attribute coding may lead to model runtime errors.

When preparing the transit GIS database, we recommend the following order of coding and preparation:

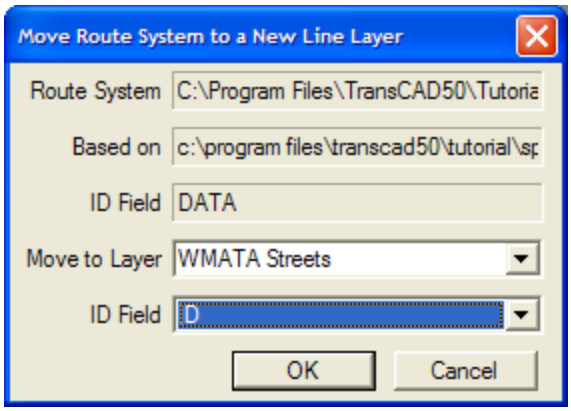
1. If necessary, move the route system to the desired line geographic file.
2. Make sure that the transit route system files are consistent with the highway GIS file.
3. Code route system geographic edits (e.g. add/edit routes, add/edit route stops etc.).
4. Code route and route stop attribute edits.
5. Run the "Fix Routes" utility.
6. Specify the transit route system file in the scenario interface.

Moving a Route System to Desired Geography

On occasion, it may be necessary to re-point a transit route system to a desired line geographic file. This can happen if you physically copy over a model directory to a new directory. If you open the route system in the new directory, you may notice that it is tied to the line geography from the old directory. Under these circumstances, you will need to "move" the route system over to the new directory's network geographic file. There is a menu function in TransCAD 5.0 that can be used for this purpose (note that if you use the Copy Scenario utility described in Appendix A, or if you use the utility to define or run multiple projects, the route system moves are included, and so you do not need to manually perform this step). To move a route system, you would:

1. Make sure that all files are closed in TransCAD, then open the line geographic file ([Highway Master DB]) that you want the transit route system to be associated with. Make sure that the route system itself is NOT open.

2. Choose ***Route Systems-Utilities-Move*** and then choose the route system to move.

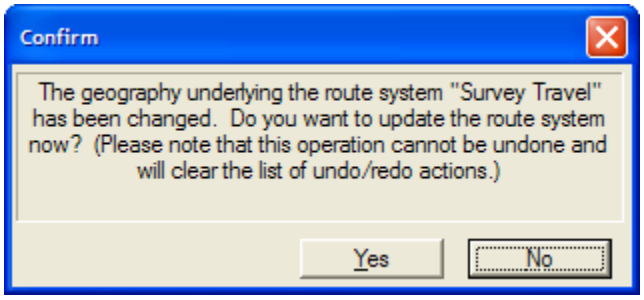


3. In the Move Route System to a New Line Layer dialog box, make sure the line layer is defined correctly and that the ID field is specified as “ID”. Click OK. The route system is moved over to the intended line geographic file.

Route System and Highway GIS File Consistency

The transit route system in the Regional model is dependent on the link IDs of the Highway GIS file. When geographic edits are made to the Highway GIS file, these IDs may change. Thus, the route system must be updated in order to ensure consistency with the highway GIS file. TransCAD provides a means of automatically updating the transit route system when highway geographic edits take place.

Whenever a transit route system is opened in TransCAD, it checks the associated Highway GIS file for recent geographic edits and their nature. If edits are found that are more recent than the transit route system, a message similar to the one shown below is shown to you, with the option to update the route system:



Once you update the route system, the route system is consistent with the Highway GIS file.

During the highway geography editing process, we recommend that you update the transit route system on a regular basis. To update the route system, simply open the route system on a map and TransCAD should automatically prompt you to update with the message above.

There are some highway geographic edits that may require more than a simple transit route system update. For example, if links are deleted where routes run over, the deleted link will leave a “gap” in the routes. In this and in similar cases, you will need to use the route editor to re-route and edit the affected routes.

Coding Route System Geographic Edits

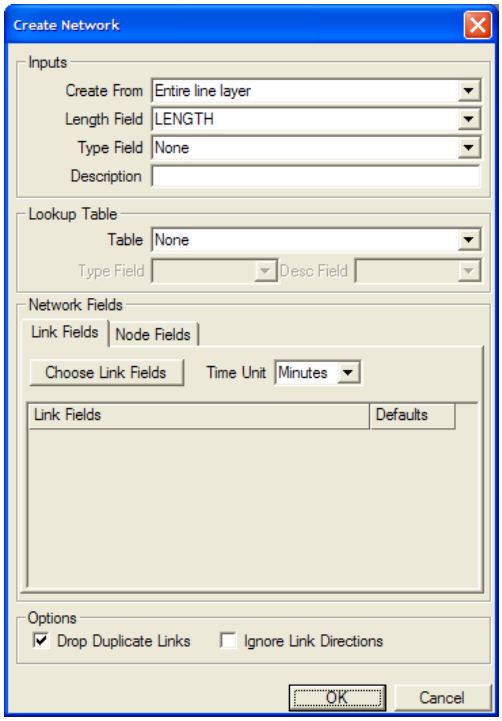
Transit route system geographic edits are done through the TransCAD Route System editor. To invoke the editor, make sure that your route system is on the map and is the current layer, and choose Route Systems-Editing Toolbox in the menu.

The editor requires a highway .NET file to assist in route editing, and may prompt you for one. If it does, choose the file HNET.NET in the NETWORKS\OUTPUTS directory.

If the route system's highway geographic file is different from the one used to create the HNET.NET file, you will need to manually recreate a TransCAD network .NET file in order to use the route editor. To create a .NET file:

1. Open the line geographic file the route system is based on

2. Choose Networks/Paths-Create Network from the menu.



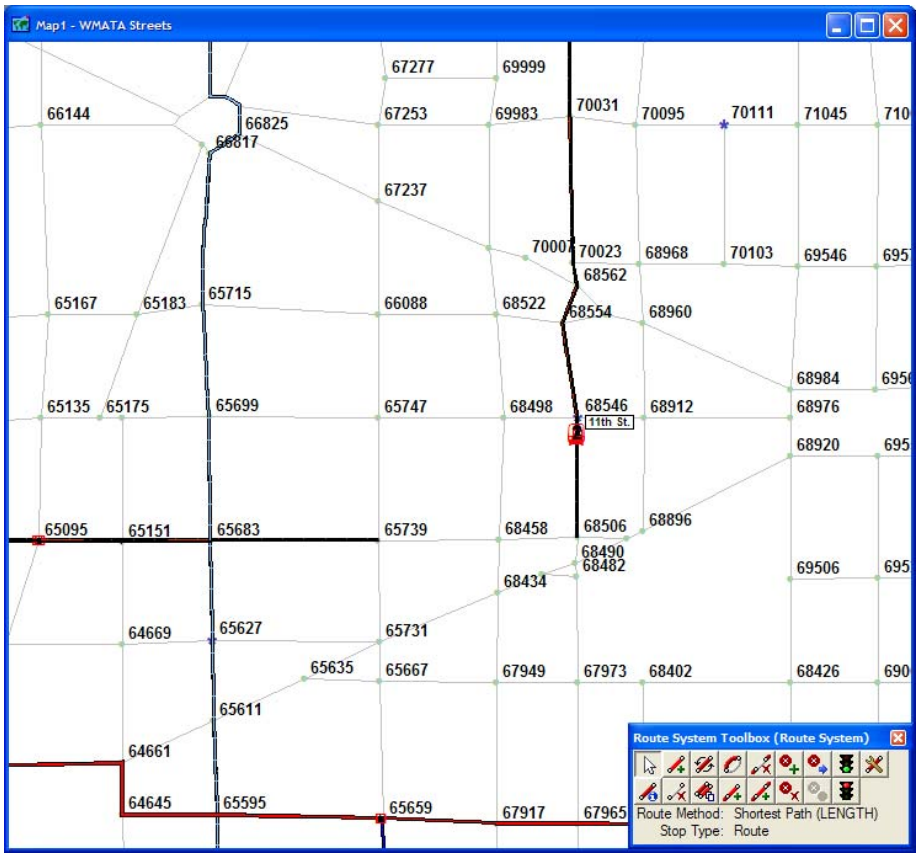
3. For route editing purposes, only the Length field is required, which is set to LENGTH by default. Click OK.

4. Enter a network filename and click OK.

The network has been created and is ready to be used by the route editor.

Documentation on using the route editor can be found in Chapter 16 of the TransCAD 5.0 User's Guide. The following is a short list of some route editing tips. These tips assume that you are familiar in general with transit route editing in TransCAD:

- When fixing a gap in a route, you can make use of either the “Insert Into Route” or “Realign Route” tools. The figure below illustrates a route with a gap from node 65739 to node 68506. Using the tool, you would click on 65739, then double-click on 68506 to fill the gap. Using the tool, you would click on a node before the beginning of the gap (e.g. 65683), then double-click on a node after the gap (e.g. 68546)



- When editing an exclusive right-of-way route (e.g. subway, commuter rail, high speed rail, etc.), route editing will be made easier if the .NET file used to aid in route editing be limited to only the highway links used by the route. For example, transit exclusive links in the regional network are coded up as MODE = 24. Thus, you can create a selection of these links, then use Network/Paths-Create to create a .NET file of only these links. During route editing, if you use this .NET file, then waypoints that you click will be constrained to these links.

- When coding route stops, make sure that no two consecutive route stops are near the same node ID. If that is the case, then you can use the route editor to

delete one of the route stops.

- After you are done with route editing, use the menu functions Route Systems-Reload, then Route Systems-Verify in order to check the validity of the transit route system. TransCAD will tell you of any issues that arise and will tell you the files you can open to review these issues. You would then use the route editing toolbox to resolve these issues and run Reload and Verify again to ensure that these issues are resolved.

Coding Route and Route Stop Attribute Edits

After the geographic edits are complete, you will need to fill in the route and route stop attribute edits correctly. The Initialization section of Appendix C describes all of the route and route stop attribute fields. The following route attributes are required for the model:

Route_ID – Automatically added during route editing
Route_Name – User specified during route editing
[Route Number/Name] – For reporting purposes
[Route Carrier] – For reporting purposes
PK_HEADWAY – missing or zero denotes no route availability
OP_HEADWAY – missing or zero denotes no route availability
MODE – See PDF file for description of modes

The following route stop attributes are required for the model:

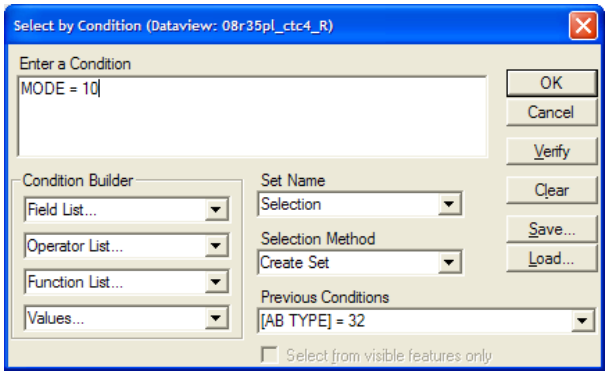
NODEID – Filled in when you do Transit-Tag Stops to Node or you use the Fix Routes utility
REALSTOP – Filled in when you use the Fix Routes utility
PK/OP_RailTime – Fill only for subway, commuter rail, or HSR routes. The time value for the last stop of a route can be left missing. This time reflects travel time from the "current" stop to the next stop.
FareZone – Fill in with 99 for all stops, or with actual fare zone numbers for commuter rail or high speed rail stops

The following tips are useful for editing route and route stop attributes:

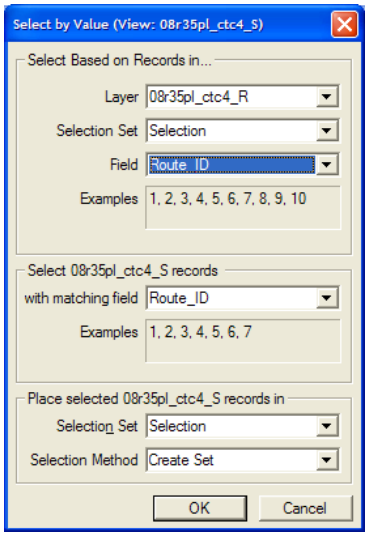
- In the route stop dataview, you can choose Dataview-Sort and sort by Route_ID, then Milepost to see the route stops sorted in route, then stop sequence order.

- You can delete a route stop by highlighting the stop(s) in the route stop dataview, then choosing Edit-Delete Records.

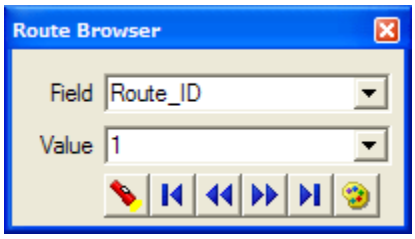
- If you want to select route stops associated with a selection of routes, first select the routes from the route layer, then use the menu entry Selection-Select by Value. For example, if you want to select all commuter rail stops (MODE = 10), first go to the route system dataview, choose Selection-Select By Condition, and enter the query "MODE = 10":



Next, switch over to the route stop dataview and choose Selection-Select by Value. Choose the route system layer and "Selection" as the layer and selection set, and choose Route_ID as the field. The result will be a selection set of route stops that reflect commuter rail:



To show just one route, you can use the Route Browser tool found under the Route System menu. To use this tool, first make sure that your current window is a map and your current layer is the route layer. Then choose Route Systems-Route Browser from the menu to open the Route Browser toolbox:



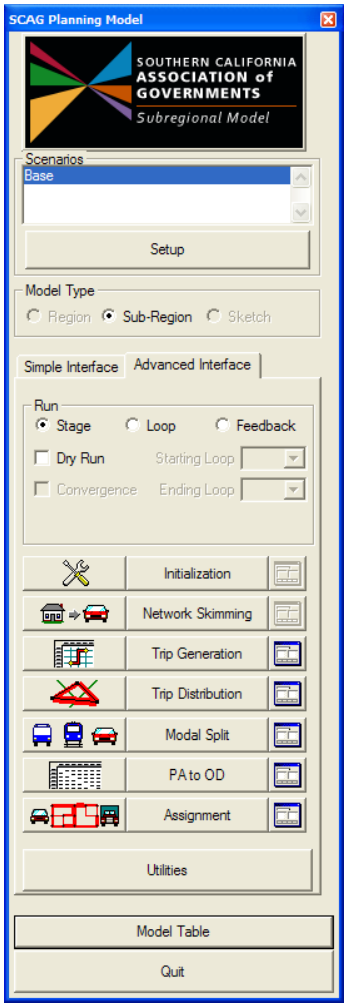
Then choose the route you wish to view by field (Route_ID and Route_Name are the most common), enter the value of the route, and click on the flashlight button to view the route and all of its stops.

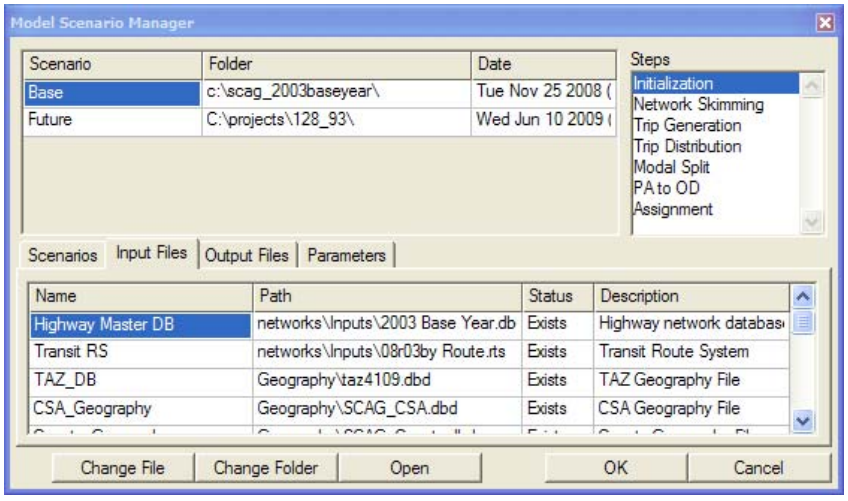
Running the Fix Routes Utility

Once all of the route and stop geography and their attributes have been coded, you should run the Fix Routes utility to check and fix the attributes if necessary. Documentation for this utility can be found in Appendix A.

Specify the Transit Route System in the Scenario Interface

After all Transit route system checks are completed, the route system file needs to be properly specified in the scenario interface. To specify the file in the planning model interface, first open the SCAG Planning Model dialog box, click on the Setup button, then highlight the scenario of interest, highlight the Initialization step, and click on the Input Files tab:


SCAG Planning Model
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS
Subregional Model
Scenarios
Base
Setup
Model Type
Region
Sub-Region
Sketch
Simple Interface
Advanced Interface
Run
Stage
Loop
Feedback
Dry Run
Starting Loop
Convergence
Ending Loop
Initialization
Network Skimming
Trip Generation
Trip Distribution
Modal Split
PA to OD
Assignment
Utilities
Model Table
Quit


Model Scenario Manager
Scenario
Folder
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Base
c:\scag_2003baseyear\
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Future
C:\projects\128_93\
Wed Jun 10 2009 (
Steps
Initialization
Network Skimming
Trip Generation
Trip Distribution
Modal Split
PA to OD
Assignment
Scenarios
Input Files
Output Files
Parameters
Name
Path
Status
Description
Highway Master DB
networks\Inputs\2003 Base Year.db
Exists
Highway network databas
Transit RS
networks\Inputs\08r03by Route.rts
Exists
Transit Route System
TAZ_DB
Geography\taz4109.dbd
Exists
TAZ Geography File
CSA_Geography
Geography\SCAG_CSA.dbd
Exists
CSA Geography File
Change File
Change Folder
Open
OK
Cancel

As a last step, highlight the Transit RS parameter, click on the Change File button, and choose the finished transit route system file.

Preparing TAZ Level Demographic and Employment Inputs

The model requires TAZ-level demographics and employment table as inputs. The fields required in the table can be found in the Trip Generation section of Appendix C. There is also a utility available that lets you construct this input using three excel spreadsheet files. This utility is called “Import SED”. Documentation on using this utility can be found in Appendix A. Once this utility creates the model input file, it needs to be specified in the model interface, using the same steps specified above. The input parameter file is titled “Input Demographics” and can be found in the Input Files tab for the Trip Generation step.

Preparing Other Input Data

In a majority of cases, scenario changes only involve highway, transit, and demographics changes. Most, if not all of the other model input files will remain consistent across all scenarios. Whenever you copy a scenario to a new directory, all the copied input files will have the same content as the originals and will thus not need to be changed.

If there is a need to change an input file, most of the time the edits can be made directly from within TransCAD. All of the model inputs can be opened in TransCAD using either the model interface or File-Open from the TransCAD menu.

Alternatively, tables can be modified in a secondary program, like Excel, and brought back into TransCAD. To export any table into Excel, choose File-Save As in the menu, then choose Excel as the file type and enter the output filename.

Once edits are performed and saved in Excel, they can be brought back into TransCAD. Choose File-Open, and choose Excel as the file type to open the edited Excel file. Then choose File-Save As to export the file into its original format.

If the changed file is not the same name as the original file, make sure that the updated filename is reflected in the model interface.

There are a few rules you should follow when modifying model input files:

- The modified file should always have the same field names and field types as the original, preferably in the same order. In general, it is acceptable to add more fields to the end of the table.
- The number of records and the values of the IDs of the modified file should be

the same as the original file.

- The modified file should always be in the same format as the original file. For example, if the original file is in DBASE format, the modified file should also be in DBASE format.

- The modified file should not contain any bad or illogical data. Bad data may lead to unpredictable model results.

Sample Model Run Procedures

This section of the model user's guide focuses on recommended model run procedures under the following circumstances:

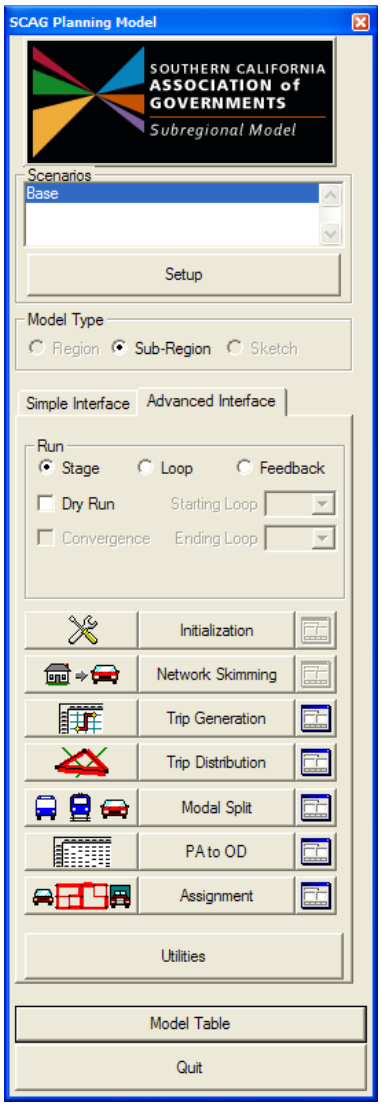
1. Adding more feedback loops to a model run
2. Modeling only input SED changes that are different than the "base" scenario
3. Modeling only small highway network changes from the "base" scenario when you assume that the OD trip matrices do not change
4. Performing a "one-loop" model run as a result of small-to-moderate highway or SED changes

Adding more Feedback Loops to a Model Run

By default, the Regional Model runs with 5 feedback loops. At the end of a model run, a file called Feedback_convergence.bin is created in the Assign\Outputs directory. This file summarizes several convergence measures such as highway and transit skim RMSE, OD RMSE and Flow RMSE differences between feedback iterations.

After reviewing a scenario's model results, you may decide that you wish to add more feedback loops to your run. To run the model for additional feedback loops, you would do the following:

1. Make sure that a full model run has been performed
2. Open the SCAG Subregion Model dialog box, set the Run Type to "Feedback", set the starting loop to the previous run's final loop plus one, and set the ending loop. In the following example, the model was previously run with 5 feedback loops, so the starting loop is set to 6 and the ending loop is set to 8.



3. Click on the Initialization button.

Modeling Only SED Changes

When modeling only SED changes, you need to prepare the input TAZ-level demographics and employment table. The fields required in the table can be found in the Trip Generation section of Appendix C. There is also a utility that lets you construct this input using three excel spreadsheet files. This utility is called “Import SED”. Documentation on using this utility can be found in Appendix A. Once this utility creates the model input file, it needs to be specified in the model interface. The input parameter file is titled “Input Demographics” and can be found in the Input Files tab for the Trip Generation step.

It is also advisable to copy the scenario to another directory using either the Copy

Scenario utility or Windows Explorer if you wish to compare scenario results. Make sure that the Input Demographics parameter file is set correctly in the copied scenario.

If the demographics changes are large compared to the "base", in most cases, the entire model will need to be re-run. Make sure that the model is run with the same number of feedback loops as the original model to ensure the consistency of results. If the demographics changes are small compared to the "base", you might consider performing only a "one" loop model run in order to minimize model running time. Steps to perform a "one" loop run are described later in this section.

Modeling Small Network Changes without Changing the OD Trip Matrices

Sometimes, you may wish to see the effect of a small network change that you may believe will not affect the OD trip patterns. Thus, the only model steps that you wish to run would be the regeneration of the highway network from the modified highway GIS data, and highway trip assignment. This model run would be much faster than a full model run. It is assumed here that the model run will be performed in the same scenario directory as the original in order to preserve all other output files, thus outputs of the model run will most likely overwrite previously created files. To model small network changes in this manner, you would:

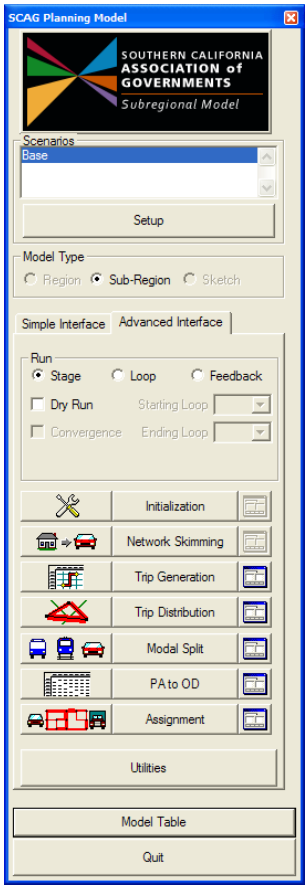
1. Make a backup copy or archive of the model directory's NETWORKS and ASSIGN subdirectories to preserve previous results. Alternatively, you can go into the scenario setup dialog boxes to change the output filenames of the output networks and assignment results.

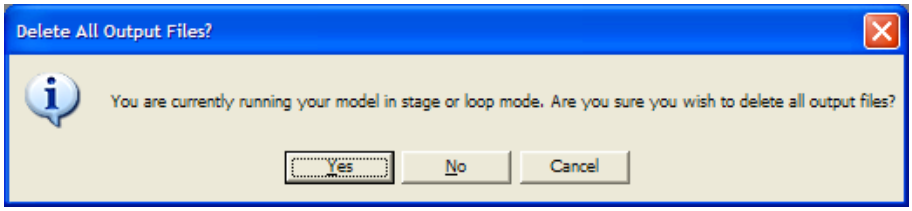
2. Make a copy and modify, or simply modify your Highway Master DB file to code your network changes.

3. Run the Check Network Attributes utility to ensure that network attributes are coded correctly.

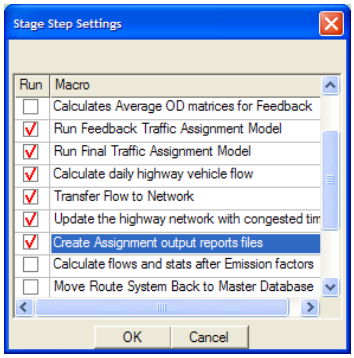
4. Make sure that your scenario setup points to the proper Highway Master DB.

5. Open your Subregion model dialog bbox, set your run type to Stage, and click only on the Initialization button. When the model asks you if you wish to delete all files, click "No". Running the Initialization step will re-create the highway .NET file to reflect the GIS file changes.





6. Click on the  button to the left of the Assignment button, and make sure that the following sub-steps are checked (see figure below). This will ensure that a "full" assignment is performed, and that assignment reports are generated. If you wish to run the emissions factoring model, make sure you also check "Calculate flows and stats after Emission factors".

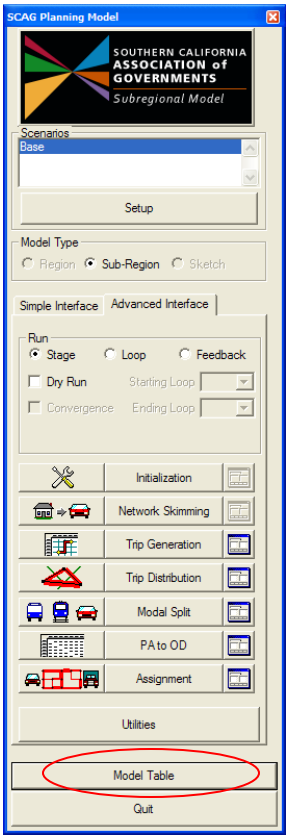


7. Click Close and then click the Assignment button. The highway assignment will be performed and highway report outputs will be generated. These can be compared with the original reports from the backup locations.

One alternate method to model small network changes is to use an alternate model table. In the base scenario directory, the table “small_network_delta.bin” contains only the steps and models necessary to automatically run the steps shown above. To model small network changes using the model table method, you would do the following:

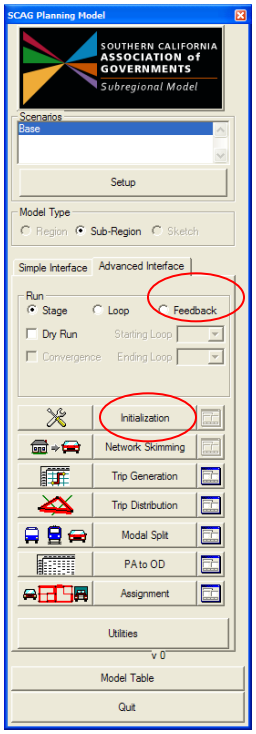
1. Perform steps 1, 2, and 3 above.

2. Click on the Model Table button in the planning dialog box to switch model tables, and choose “small_network_delta.bin”.



3. Make sure that your scenario setup points to the proper Highway Master DB.

4. If necessary, choose the model directory. Then in the SCAG Subregion Model dialog box, set the run to Feedback, make sure your starting loop is set to 1, and click on the Initialization button.



Performing a "One-Loop" Model Run

Sometimes, you may wish to explore a moderate highway, transit, or demographics change. The changes are not significant enough to warrant a full 5-loop model run, but they will most likely modify trip generation, distribution, mode split or OD results. Thus, to minimize model run time, you may wish to perform a "one-loop" model run, where you run the model with an "additional" loop after implementing the model changes. It is assumed that a full model run with the "base" scenario has already been performed.

If you wish to preserve all output files from your "base" scenario, use the Copy Scenario utility first to make a copy of the scenario, and then change the highway, transit and/or demographics on the copied files. Otherwise, if you wish to modify files on your base scenario directory, first make backup copies of all input and output files you wish to preserve and/or compare. A model run in this manner will overwrite previously created files.

A key step in performing a one-loop run is to transfer the congested costs from the original scenario network to the new scenario network. This allows the model to behave as if it were continuing the model run after a set number of feedback loops. The "Mergenet Run" utility described in Appendix A performs this function. You will also need to set a parameter to have the model run from congested costs instead of

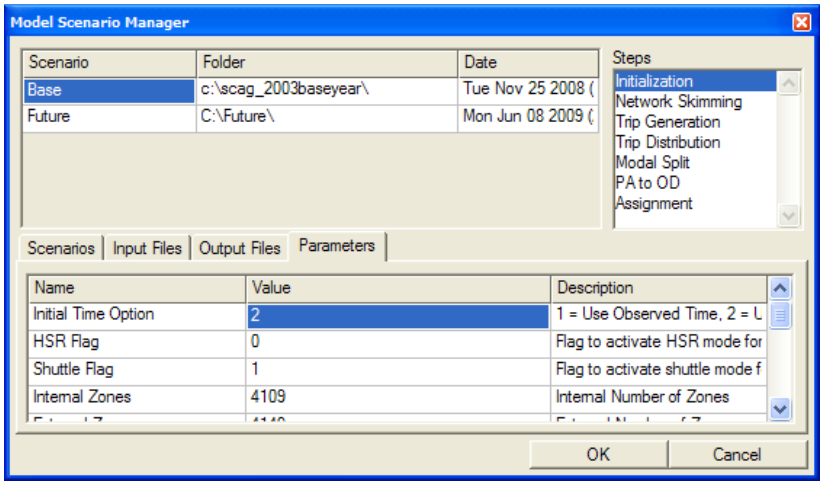
initial cost estimates. To perform a one-loop model run, you would:

1. Copy your scenario and modify input files from the copied directory, or modify input files directly from the scenario and make backup copies as necessary.

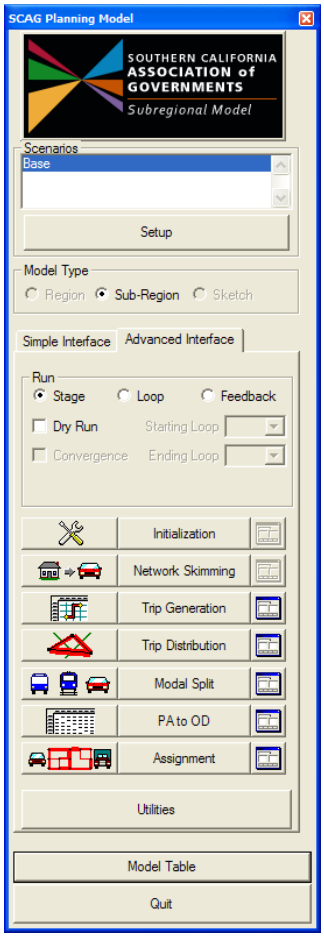
2. Run the "Mergenet Run" utility. For the source network choose the file "scag_network_copy.dbd" found under the base scenario's Networks\Outputs directory. For the target network, choose the new scenario's Highway Master DB file.

3. If necessary, go through the procedures outlined previously to prepare the Highway GIS file, the Transit GIS file and/or the TAZ Demographics/Employment inputs for the new scenario. Make sure that your input files in the project scenario dialog box all point to the proper files.

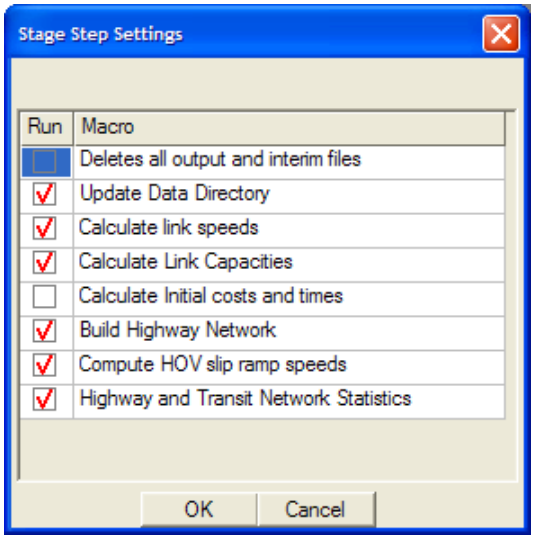
4. Open the SCAG Subregion Model dialog box, click on the Setup button, click on the Initialization step, click on Parameters, and make sure that the Initial Time Option is set to 2 for "2 = Use Congested Times from Mergenet".



5. Click OK to go back to the main SCAG Subregion Model dialog box. Set the run type to "Feedback". Set both the starting and ending loops one loop past the final loop of the previous model (e.g. set the loop to 6 if the base run was performed with 5 loops).



6. Click on the  button to the left of the Initialization button, and make sure that the following steps are checked:



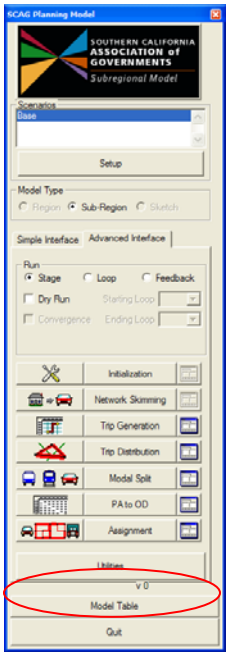
7. Click Close, and click on the Initialization button to start the model run.

   The model will run all steps for one loop, and then will perform all necessary report output procedures.

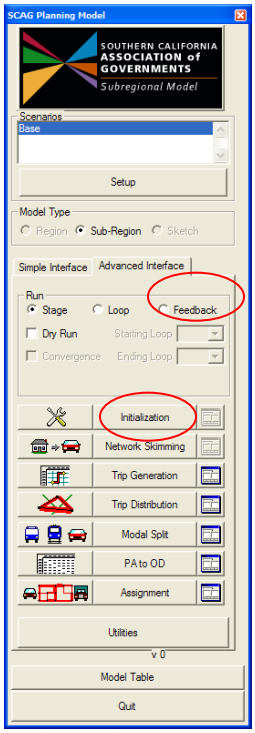
One alternate method to run a one-loop model run is to use an alternate model table. In the base scenario directory, the table “one_loop_model.bin” is automatically set up to run a one-loop model. To model small network changes using the model table method, you would do the following:

1. Perform steps 1, 2, and 3 above.

2. Click on the Model Table button in the planning dialog box to switch model tables, and choose the model table “one_loop_model.bin”.



3. If necessary, choose the model directory. Then in the Planning model dialog box, set the run type to “Feedback”, make sure your starting loop is set to 1, and click on the Initialization button.



Appendix A: Model Utilities

This section documents the utilities available in the SCAG Model. All of these utilities can be invoked by first opening the SCAG Planning Model dialog box, then clicking on the Utilities button. Unless specifically mentioned, all utilities will work on files based on the scenario currently specified in the Planning Model dialog box.

Remove Progress Bar

This utility removes any dangling progress bars within the TransCAD frame. On occasion, dangling progress bars will occur due to failed model runs or macro errors.

To Remove Progress Bars

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model Version 5".

2. Click on the Utilities button and click on Remove Progress Bar.

Any dangling progress bars will be removed if they are present.

Delete Transit Path Files

During a model run, the model will create the following transit path set files located in the Skims\Outputs directory: tr_pk_local.tps, tr_pk_express.tps, tr_pk_urban_rail.tps, tr_pk_commuter_rail.tps, tp_pk_drive_egress.tps, tr_op_local.tps, tr_op_express.tps, tr_op_urban_rail.tps, tr_op_commuter_rail.tps, tp_op_drive_egress.tps. These files improve the performance of transit assignment runs, but they often take up a lot of disk space. This utility will automatically delete these files from the directory.

To Delete Transit Path Files

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model Version 5".

2. Click on the Utilities button and click on Delete Transit Path Files.

All transit path files associated with the selected scenario will be deleted.

SED Importer

This utility converts demographic and employment data nominally stored in three Excel spreadsheet files into the input demographic table required by the model. When SCAG produces demographic and employment forecasts, they are typically represented by three separate spreadsheets: one for population and household data,

one for employment data, and one for parking data. Each spreadsheet is usually then exported into Comma Delimited text .csv files. The below table describes the column names for the population/housing spreadsheet:

Example file: MODEL03_PH_04APR07.csv

Field	Description
SEQ	TAZ Number
CNTY	County
TAZ_ID	Alternate TAZ Number
POP	Population
RES	Resident Population
HH	Households
GN	Group Quarters Population
HHSIZE_1	1 Person Households
HHSIZE_2	2 Person Households
HHSIZE_3	3 Person Households
HHSIZE_4PLUS	4+ Person Households
AGE5_17	Population Ages 5-17
AGE18_24	Population Ages 18-24
AGE16_64	Population Ages 16-64
AGE65_OVER	Population Ages 65 and over
HO18_24	Head of Household Age 18-24
HO25_44	Head of Household Age 25-44
HO45_64	Head of Household Age 45-64
HO65_OVER	Head of Household Age 65 and over
HH_W0	Households with 0 workers
HH_W1	Households with 1 worker
HH_W2	Households with 2 workers
HH_W3	Households with 3+ workers
WORKER	Total number of Workers
K12	Kindergarden – 12th grade enrollment
COLLEGE	College enrollment
MEDIAN	Median Income
HO<$25K	Households with < $25,000 annual income
MEDIAN25K	Median Income in < $25,000 income group
$25K<HO<$50K	Households with income $25,000 - $50,000
MEDIAN25_50	Median Income in $25,000-$50,000 income group
$50K<HO<$100K	Households with income $50,000 - $100,000
MEDIAN50_100	Median Income in $50,000-$100,000 income group
HO>$100K	Households with income > $100,000
MEDIAN_100	Median Income in > $100,000 group
TOTLOW_WORKER	Low Income Workers
TOTMED_WORKER	Medium Income Workers
TOTHIGH_WORKER	High Income Workers

The table below describes the field names for the employment spreadsheet:

Example file: MODEL03_EMP_04APR07.csv

Field	Description
SEQ	TAZ Number
CNTY	County
TAZ_ID	Alternate TAZ Number
TOT_EMP	Total employment
TOTLOW_EMP	Low Income employment
TOTMED_EMP	Medium Income employment
TOTHIG_EMP	High Income employment
AG_EMP	Agricultural employment
CONST_EMP	Construction employment
MANU_EMP	Manufacturing employment
WHOLE_EMP	Wholesale employment
RET_EMP	Retail employment
TRANS_EMP	Transportation employment
INFOR_EMP	Information services employment
FIRE_EMP	Financial-Real Estate employment
PROF_EMP	Professional employment
EDUC_EMP	Educational employment
ARTENT_EMP	Arts/Entertainment employment
OTHSER_EMP	Other Services employment
PUBADM_EMP	Public Administration employment

The table below describes the field names for the parking spreadsheet:
Example file: MODEL03_PARK_SEd.csv

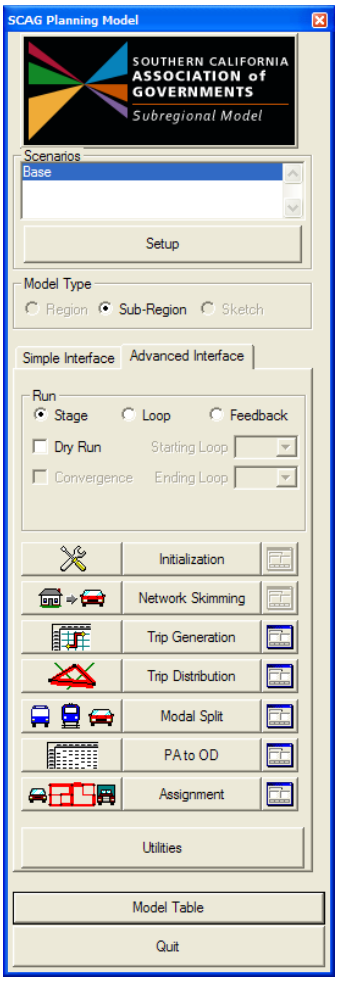
Field	Description
SEQ	TAZ Number
CNTY	County
TAZ_ID	Alternate TAZ Number
DAILYPARK	Daily parking cost
HOURLYPARK	Hourly parking cost
CBD	Central Business District flag
RSA	RSA Number
DISTRICT	District Number for balancing for HBW1, HBCU and HBO purposes
DISTRICT2	District 2 Number for balancing for other purposes
SUBAIRB	Sub Air Basin

These comma delimited files are normally found in the SED\Inputs directory of the model directory, or are provided by the SCAG forecasting staff.

When invoked, the SED importer prompts for the location of these three files, then prompts for the output model demographics table. The demographics table is usually in the SED directory and is usually named model_sed.bin.

To Import SED

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Subregion Model".



2. Click on the Utilities button and choose “SED Importer” from the list of utilities:

3. Choose the Population/Household file, then the Employment file, then the Parking file.
4. Choose the output demographics file, then click OK.

The utility produces the output table.

Mergenet Run

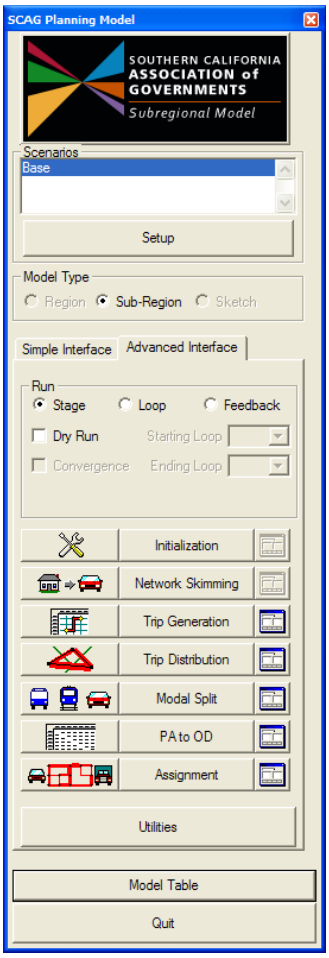
This procedure transfers peak and off-peak travel time and travel cost information from a source network to a target network. The source network will contain calculated peak and off-peak times from a model run, stored in the AB/BA_PKTIME, AB/BA_OPTIME, AB/BA_PKCOST and AB/BA_OPCOST fields. The target network will need to contain similar fields. The procedure will first calculate peak and off-peak speeds based on source link lengths, and then transfer speeds to calculate peak and off-peak times of the target links. It will then use the given value of time and auto operating cost information to calculate peak and off-peak costs.

After a model run, the geographic database **Networks\Outputs\scag_network_copy.dbd** will contain congested peak and offpeak travel times and costs stored in the AB/BA_PKTIME, AB/BA_OPTIME, AB/BA_PKCOST and AB/BA_OPCOST fields. This utility is used to transfer these times to an input highway geographic file, usually found in the Networks\Inputs directory. This utility is usually invoked when a user wishes to run a "1-loop" run of a model. In a typical application, after a user runs a full model run, she wishes to evaluate a small network change, but does not wish to execute a full model run again. In this case, the user would run this utility to transfer all costs from the full run network into the new network with the small change. The user would then invoke a 1-loop run of the model starting from these congested costs. Note that in this kind of model run, the user must properly set the "Initial Time Option" parameter in the Initialization stage of the model to 1. This parameter shows up as "1 = Use Observed Time, 2 = Use Congested Times from Mergenet".

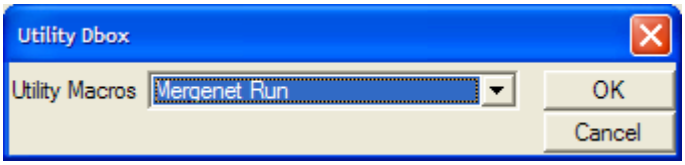
The Define Scenarios tool in the Sketch Plan Model also makes use of this utility, for defining multiple networks that have minor network changes. In this utilization, the Define Scenarios tool will create an additional network with the network changes specified by the user, then transfer all costs from the base network to the addition network using the mergenet utility.

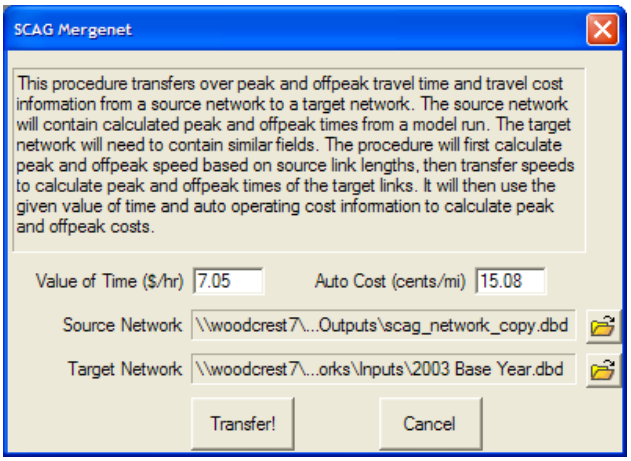
To Use the Mergenet Utility

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".



2. Click on the Utilities button and choose “Mergenet Run” from the list of utilities:





3. Enter the value of time and auto cost appropriate for the scenario to be run.
4. Click on the first button to choose the Source Network, and then click on the second button to choose the Target Network.
5. Click on the Transfer! Button.

Costs and times will be transferred from the source network to the target network. If there are any discrepancies in link IDs between the networks, they will be displayed at the end of the procedure. Note that this utility will overwrite existing values in the target network's time and cost fields.

TLD Macro

This procedure will calculate average trip lengths and travel times by trip purpose and time period, and will calculate trip length frequency distribution curves. The trip lengths and frequencies can be calculated with model Production/Attraction matrices, trip survey OD trip matrices, or CTPP OD trip matrices. In each of these cases, highway skim matrices from the model are used. Note that a model run must be completed before this utility can be invoked.

The procedure outputs several files:

TLDTABLE.CSV: This table shows the trip average time and distance by trip purpose and by county. This table is also produced by a model run. An example of this table is shown below:

Dataview1 - tldtable

TRIP_PURPOSE	AVERAGE_TIME	AVERAGE_DISTANCE	AVERAGE_TIME1	AVERAGE_DISTANCE1	AVERAGE_TIME2	AVERAGE_DISTANCE2	AVERAGE_TIME3
HBWD1 PK	22.21	11.13	20.41	11.41	20.20	9.94	19.06
HBWD2 PK	25.40	12.88	18.76	10.22	23.46	11.70	22.49
HBWD3 PK	27.02	13.92	23.34	13.31	23.27	11.40	26.03
HBWS1 PK	22.81	11.05	25.07	15.70	20.59	9.73	20.92
HBWS2 PK	25.14	12.86	18.29	9.46	22.37	11.02	23.57
HBWS3 PK	28.76	15.11	19.59	10.65	25.67	12.76	26.46
HBSP PK	14.28	7.02	14.37	7.52	12.15	5.89	13.53
HBSC PK	10.11	4.44	10.67	4.85	8.79	3.98	7.24
HBCU PK	19.32	9.23	21.72	10.68	16.68	7.81	19.09
HBSH PK	16.30	8.43	15.28	7.92	14.76	8.12	13.60
HBSR PK	20.79	11.18	15.15	8.78	17.56	9.34	20.56
HBO PK	19.04	10.13	18.92	10.92	16.45	8.74	17.17
OBO PK	15.60	7.77	36.33	27.63	13.22	6.35	13.86
WBO PK	21.07	11.05	42.36	31.30	19.25	9.87	20.66
HBWD1 OP	20.77	11.08	22.11	13.89	17.61	8.92	18.29
HBWD2 OP	25.43	14.60	16.65	8.73	22.63	12.42	21.06
HBWD3 OP	26.09	14.91	17.27	9.23	23.02	12.57	22.23
HBWS1 OP	23.22	12.94	46.31	35.89	20.83	11.46	20.06
HBWS2 OP	23.95	13.29	13.77	7.18	20.98	11.07	17.43
HBWS3 OP	28.08	16.33	52.20	39.27	23.14	11.99	28.97
HBSP OP	14.14	7.58	12.98	6.63	13.17	7.41	11.33
HBSC OP	9.10	4.16	11.30	5.53	8.00	3.92	6.60
HBCU OP	16.80	8.74	23.85	12.36	13.65	6.65	18.26
HBSH OP	14.85	7.62	18.18	9.77	12.52	6.42	12.64
HBSR OP	21.27	12.02	14.90	8.30	18.87	10.40	19.60
HBO OP	17.59	9.44	17.91	9.64	15.11	8.01	14.56
OBO OP	15.84	8.29	62.01	54.07	12.81	6.39	12.98
WBO OP	17.34	9.35	24.21	15.61	14.84	7.66	16.87

TLD_FREQUENCY_TABLE.XLS: This table shows the distance and time frequency distribution by trip purpose. An example of this table is shown below:

Dataview1 - tldtable

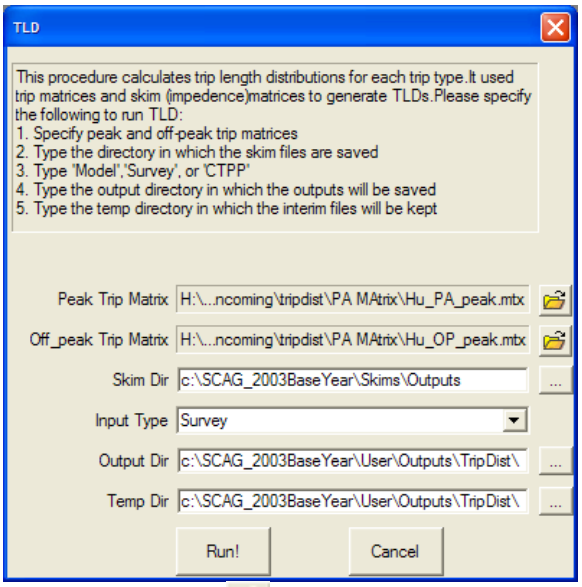
TRIP_PURPOSE	AVERAGE_TIME	AVERAGE_DISTANCE	AVERAGE_TIME1	AVERAGE_DISTANCE1	AVERAGE_TIME2	AVERAGE_DISTANCE2	AVERAGE_TIME3
HBWD1 PK	22.21	11.13	20.41	11.41	20.20	9.94	19.06
HBWD2 PK	25.40	12.88	18.76	10.22	23.46	11.70	22.49
HBWD3 PK	27.02	13.92	23.34	13.31	23.27	11.40	26.03
HBWS1 PK	22.81	11.05	25.07	15.70	20.59	9.73	20.92
HBWS2 PK	25.14	12.86	18.29	9.46	22.37	11.02	23.57
HBWS3 PK	28.76	15.11	19.59	10.65	25.67	12.76	26.46
HBSP PK	14.28	7.02	14.37	7.52	12.15	5.89	13.53
HBSC PK	10.11	4.44	10.67	4.85	8.79	3.98	7.24
HBCU PK	19.32	9.23	21.72	10.68	16.68	7.81	19.09
HBSH PK	16.30	8.43	15.28	7.92	14.76	8.12	13.60
HBSR PK	20.79	11.18	15.15	8.78	17.56	9.34	20.56
HBO PK	19.04	10.13	18.92	10.92	16.45	8.74	17.17
OBO PK	15.60	7.77	36.33	27.63	13.22	6.35	13.86
WBO PK	21.07	11.05	42.36	31.30	19.25	9.87	20.66
HBWD1 OP	20.77	11.08	22.11	13.89	17.61	8.92	18.29
HBWD2 OP	25.43	14.60	16.65	8.73	22.63	12.42	21.06
HBWD3 OP	26.09	14.91	17.27	9.23	23.02	12.57	22.23
HBWS1 OP	23.22	12.94	46.31	35.89	20.83	11.46	20.06
HBWS2 OP	23.95	13.29	13.77	7.18	20.98	11.07	17.43
HBWS3 OP	28.08	16.33	52.20	39.27	23.14	11.99	28.97
HBSP OP	14.14	7.58	12.98	6.63	13.17	7.41	11.33
HBSC OP	9.10	4.16	11.30	5.53	8.00	3.92	6.60
HBCU OP	16.80	8.74	23.85	12.36	13.65	6.65	18.26
HBSH OP	14.85	7.62	18.18	9.77	12.52	6.42	12.64
HBSR OP	21.27	12.02	14.90	8.30	18.87	10.40	19.60
HBO OP	17.59	9.44	17.91	9.64	15.11	8.01	14.56
OBO OP	15.84	8.29	62.01	54.07	12.81	6.39	12.98
WBO OP	17.34	9.35	24.21	15.61	14.84	7.66	16.87

If the input OD matrices are survey trips or CTPP trips, these tables can be used for validation/calibration purposes.

To Run The TLD Macro

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing “SCAG Planning Model version 5”.

2. Click on the Utilities button and choose “TLD Macro” from the list of utilities:



3. Click on the first  button to choose the peak trip matrix, and then click on the second  button to choose the off-peak trip matrix.
4. Enter in the Skim output directory that contains the highway skims.
5. Choose the Input Type (Model, Survey, or CTPP)
6. Enter in the Ouput Directory and the Temporary directory and click OK.

The trip length distribution procedures are invoked and the output files are created in the output directory.

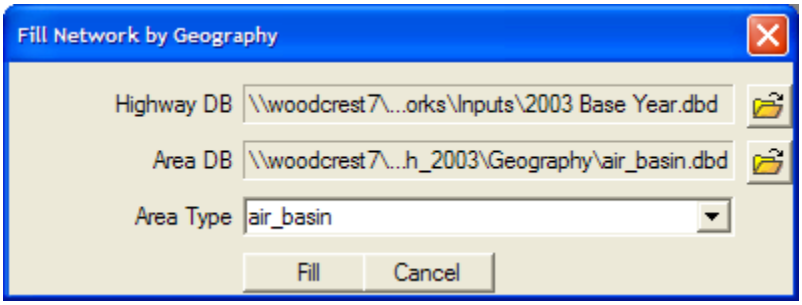
Fill Network with Geography

This procedure will automatically fill the required geographic attribute fields air_basin, sub_air_basin, County and TAZ. The procedure takes as input the highway geographic file input used for the model, the area polygon geographic file, and the area type to fill. The procedure then uses a geographic tagging process to fill each network link with its respective geographic ID. To fill all four geographic types, you will need to run this procedure four times. The network is typically found in the Networks/Inputs directory, and the area geographic files are typically found in the Geography directory. This is a recommended pre-processing highway network step before you run the model. Note that the “Check Network Attributes” utility also fills links with proper geographic attributes if they are missing.

To Use Fill Network With Geography

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

2. Click on the Utilities button and choose "Fill Network With Geography" from the list of utilities:



3. Click on the first  button to choose the Highway DB, then click on the second  button to choose the Area DB, then choose the Area Type. Make sure that the area type chosen is consistent with the area db.

4. Click OK.

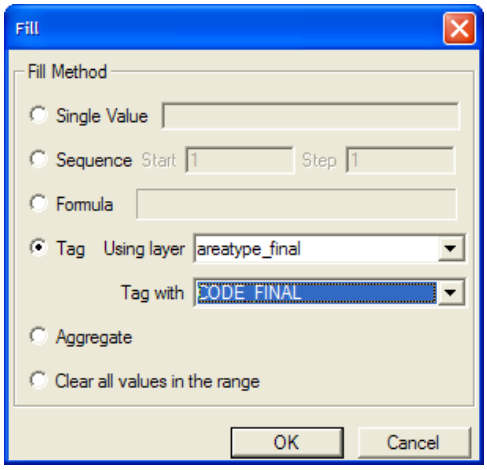
The procedure fills in the appropriate network attribute with the tagged geographic area ID.

For pre-processing purposes, after these four geographic fills are performed, the network links' area type must also be filled in. The procedure to perform this fill in the TransCAD interface is as follows:

1. Open the highway network database in a map.

2. Right click on your map, choose Add Layer and add the geographic file Geography\AreaType.dbd

3. Open a dataview of the highway line layer, highlight the **AB_AreaType** field, then choose Edit-Fill in the menu and click on Tag.



4. Choose “areatype_final” as the reference layer, and tag with the “CODE_FINAL” field.

5. Click OK. The AB_AreaType field is filled with the correct area type number.

6. Repeat steps 3 through 5 for the BA_AreaType field.

Calibrate Base Year MC Shares

This procedure will calibrate mode shares by trip matrix such that they will match target shares. The SCAG mode split model coefficients and constants are detailed in separate peak and off-peak inputs tables mstable_pk.bin and mstable_op.bin, located in the msplit\Inputs directory. The following table describes the fields in this table:

PK/OP Logit Coefficients (msplit\Inputs\mstable_xx.bin)

Field	Description
Variable	Logit coefficient or constant dependent on model
<Purpose>	Trip purpose coefficient or constant value: First 17 records represent coefficient values for main model Next 2 records (Theta1 and Theta2 represent logsum coefficients for the various nests Next 16 records (e.g. <Mode> Const) represent constant values by mode Next 5 records (e.g. NonWork Transit Submode <coeff>) represent coefficient values for submodel Next 11 records (e.g. NonWork Transit Submode <Mode> Const) represent constant values for submode by mode Next record (e.g. NonWork Transit Submode Theta2) represents logsum value for submode Last 6 records represent HSR Constant values

This utility will iteratively adjust the constant values in these tables such that the output mode shares will match target shares. The target shares are stored in separate tables by period and for the main and sub-models. Example target share tables for the main model are shown below. Each record represents a mode, and

each field represents the target shares for the trip purpose.

Dataview1 - MS_Target_PK

MODE	HBWD1_Target_PK	HBWD2_Target_PK	HBWD3_Target_PK	HBWS1_Target_PK	HBWS2_Target_PK	HBWS3_Target_PK	HBSH_Target_PK	HBSC_Target_PK	HBCU_Target_PK	HBOALL_Target_PK	WBO_Target_PK	OBO_Target_PK
School Bus	--	--	--	--	--	--	--	0.109200	--	--	--	--
DA	0.444700	0.739700	0.858400	0.450900	0.576500	0.681900	0.352600	0.018200	0.563400	0.317400	0.809700	0.299700
SR2	0.104000	0.137600	0.073700	0.185400	0.200900	0.191200	0.249600	0.199200	0.156800	0.247800	0.070200	0.273900
SR3	0.063200	0.047000	0.025600	0.129200	0.148700	0.096300	0.266100	0.330100	0.087400	0.294700	0.051300	0.310000
Generic	--	--	--	--	--	--	0.007700	0.021100	0.071400	0.015300	0.008200	0.009200
LB-Walk	0.189700	0.006000	0.004500	--	--	--	--	--	--	--	--	--
LB-Auto	0.009600	0.000400	0.000400	--	--	--	--	--	--	--	--	--
EB-Walk	0.018800	0.000600	0.000800	--	--	--	--	--	--	--	--	--
EB-Auto	0.006000	0.001400	0.003000	--	--	--	--	--	--	--	--	--
UR-Walk	0.026700	0.001200	0.002400	--	--	--	--	--	--	--	--	--
UR-Auto	0.047600	0.003000	0.005900	--	--	--	--	--	--	--	--	--
NM-Walk	0.069100	0.048400	0.013500	0.234500	0.074000	0.030700	0.119400	0.304700	0.103700	0.115800	0.059900	0.100100
NM-Bike	0.018100	0.012500	0.005900	--	--	--	0.004500	0.017500	0.017300	0.009100	0.000700	0.007100
CR-Walk-Walk	0.000188	0.000100	0.000001	--	--	--	--	--	--	--	--	--
CR-Auto-Walk	0.001400	0.001300	0.004400	--	--	--	--	--	--	--	--	--
CR-Walk-Auto	0.000300	0.000300	0.000100	--	--	--	--	--	--	--	--	--
CR-Auto-Auto	0.000700	0.000600	0.001400	--	--	--	--	--	--	--	--	--

Dataview2 - MS_Target_OP

MODE	HBWD1_Target_OP	HBWD2_Target_OP	HBWD3_Target_OP	HBWS1_Target_OP	HBWS2_Target_OP	HBWS3_Target_OP	HBSH_Target_OP	HBSC_Target_OP	HBCU_Target_OP	HBOALL_Target_OP	WBO_Target_OP	OBO_Target_OP
School Bus	--	--	--	--	--	--	--	0.139700	--	--	--	--
DA	0.410200	0.758700	0.856700	0.414200	0.579700	0.678400	0.415500	0.028600	0.611300	0.362600	0.642100	0.415800
SR2	0.135400	0.124400	0.079200	0.195800	0.231300	0.188800	0.251600	0.151500	0.126100	0.262500	0.144600	0.265500
SR3	0.052700	0.038900	0.030800	0.151200	0.103200	0.100800	0.220000	0.252800	0.073000	0.260900	0.081700	0.226300
Generic	--	--	--	--	--	--	0.007600	0.013100	0.065000	0.013900	0.000700	0.006700
LB-Walk	0.230800	0.005600	0.001700	--	--	--	--	--	--	--	--	--
LB-Auto	0.010200	0.000800	0.000100	--	--	--	--	--	--	--	--	--
EB-Walk	0.012100	0.000200	0.000100	--	--	--	--	--	--	--	--	--
EB-Auto	0.001400	0.000400	0.000300	--	--	--	--	--	--	--	--	--
UR-Walk	0.023400	0.001300	0.002200	--	--	--	--	--	--	--	--	--
UR-Auto	0.037200	0.003400	0.009400	--	--	--	--	--	--	--	--	--
NM-Walk	0.072500	0.055000	0.014700	0.238900	0.085800	0.032100	0.095700	0.385300	0.107000	0.091200	0.129900	0.080900
NM-Bike	0.013700	0.011000	0.004300	--	--	--	0.009600	0.029000	0.017600	0.008900	0.001700	0.004700
CR-Walk-Walk	0.000010	0.000100	0.000010	--	--	--	--	--	--	--	--	--
CR-Auto-Walk	0.000100	0.000100	0.000300	--	--	--	--	--	--	--	--	--
CR-Walk-Auto	0.000100	0.000100	0.000100	--	--	--	--	--	--	--	--	--
CR-Auto-Auto	0.000100	0.000100	0.000100	--	--	--	--	--	--	--	--	--

Example target share tables for the submodels are shown below.

Dataview4 - MS_Submode_Target_PK

MODE	HBWD1_Target_PK	HBWD2_Target_PK	HBWD3_Target_PK	HBSH_Target_PK	HBSC_Target_PK	HBCU_Target_PK	HBOALL_Target_PK	WBO_Target_PK	OBO_Target_PK
LB-Walk	--	--	--	0.893800	0.920000	0.636000	0.660100	0.659900	0.824600
LB-Auto	--	--	--	0.006600	0.008800	0.041800	0.019000	0.006500	0.003600
EB-Walk	--	--	--	0.000200	0.007200	0.088100	0.090400	0.315200	0.053200
EB-Auto	--	--	--	0.004500	0.001200	0.016200	0.011000	0.005300	0.001400
UR-Walk	--	--	--	0.071300	0.058200	0.072800	0.075700	0.002000	0.097700
UR-Auto	--	--	--	0.002600	0.002400	0.143400	0.140500	0.003900	0.005300
CR-Walk-Walk	--	--	--	0.000400	0.000600	0.000100	0.000200	0.000500	0.000200
CR-Walk-Auto	--	--	--	0.002400	0.000400	0.000001	0.000200	0.000400	0.002300
CR-Auto-Walk	--	--	--	0.011100	0.000600	0.000800	0.001600	0.005300	0.004700
CR-Auto-Auto	--	--	--	0.007200	0.000600	0.000800	0.001400	0.001000	0.007000

Dataview3 - MS_Submode_Target_OP

MODE	HBWD1_Target_OP	HBWD2_Target_OP	HBWD3_Target_OP	HBSH_Target_OP	HBSC_Target_OP	HBCU_Target_OP	HBOALL_Target_OP	WBO_Target_OP	OBO_Target_OP
LB-Walk	--	--	--	0.941600	0.952700	0.739800	0.810600	0.000581	0.884500
LB-Auto	--	--	--	0.008000	0.008600	0.038500	0.026400	0.000100	0.015600
EB-Walk	--	--	--	0.002900	0.029800	0.088300	0.061900	0.996200	0.073200
EB-Auto	--	--	--	0.013400	0.002000	0.009600	0.002200	0.000100	0.000100
UR-Walk	--	--	--	0.007100	0.001200	0.038500	0.032400	0.000140	0.018300
UR-Auto	--	--	--	0.009600	0.001800	0.083800	0.062500	0.000140	0.000100
CR-Walk-Walk	--	--	--	0.004600	0.000400	0.000200	0.001000	0.000083	0.000300
CR-Walk-Auto	--	--	--	0.001000	0.001100	0.000200	0.000400	0.001162	0.000800
CR-Auto-Walk	--	--	--	0.003100	0.001900	0.000500	0.001200	0.000083	0.003600
CR-Auto-Auto	--	--	--	0.008700	0.000600	0.000600	0.001300	0.001411	0.003500

The procedure first evaluates the mode share models to calculate the share of each mode for each trip purpose. Then, for each mode, the procedure compares the

calculated share with the target share and adjusts the mode constant based on the following formula:

newConstant = oldConstant + log(TargetShare/ModelShare)

You can choose to run the calibration on the main and/or submodels. You can also choose to run the calibration on the peak and/or offpeak models. You can also adjust your stopping criteria.

Stopping Criteria

The procedure iterates and keeps adjusting the constants until at least one of three stopping criteria is reached:

1. A user-defined fixed number of iterations.

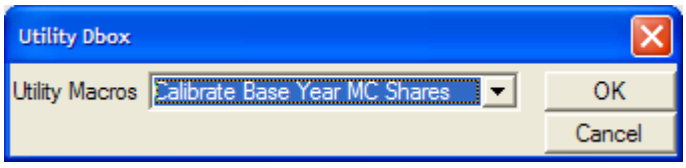
2. The percentage difference in mode share versus the target share is less than a user defined convergence value.

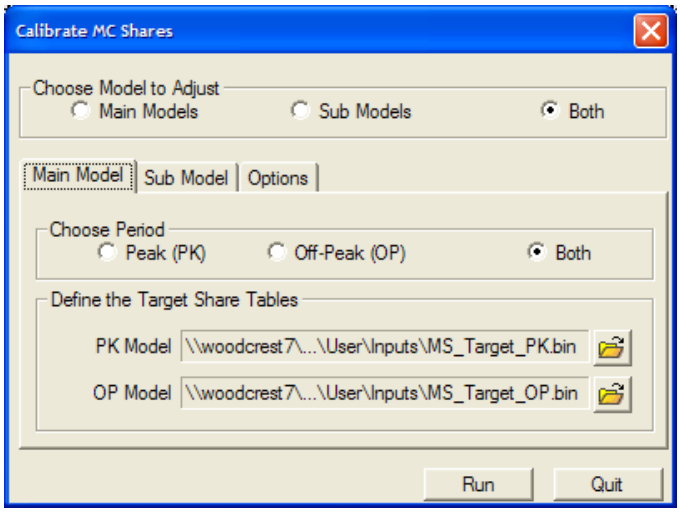
3. The new calculated constant is outside of a user-defined lower and upper bound. The bound is the percentage variation from the original constant. For example, if the original constant was 1.0 and the bound was 1000%, then the constant can vary plus or minus 1000%, or 10 in this case. Thus the absolute lower bound would be -9.0 and the upper bound would be +11.0.

To Calibrate Mode Shares

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

2. Click on the Utilities button and choose "Calibrate Base Year MC Shares" from the list of utilities:



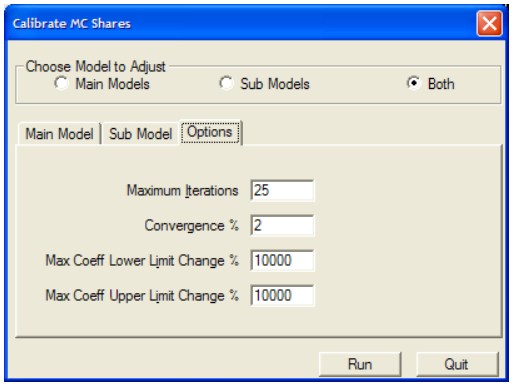


3. Choose the model to adjust and the period to adjust.

4. If the main model was chosen, choose the peak and/or offpeak target share tables.

5. If the submodel was chosen, click on the Submodel tab, and choose the peak and offpeak target submodel share tables.

6. Click on the Options tab and enter the maximum iterations, convergence percent, and upper and lower bound coefficient limits:

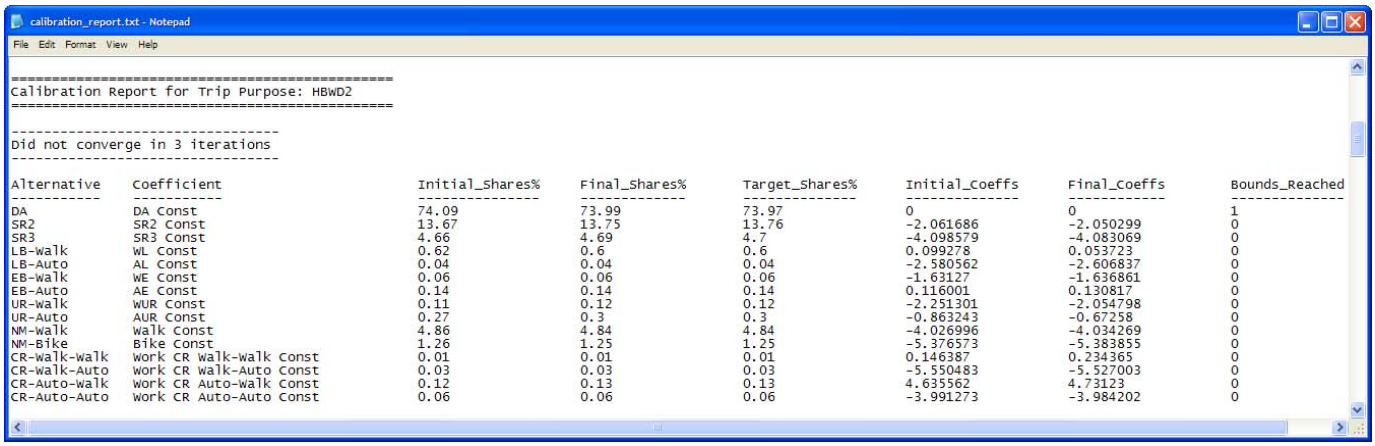


7. Click OK.

The procedure will iteratively run the mode split procedure and adjust the constants in the coefficients input table until the stopping criteria are reached.

After the procedure is finished, the text file CALIBRATION_REPORT.TXT is created in the msplit\Outputs directory. This file details the results of the calibration, including

the starting shares, ending shares, starting constants, ending constants, and how each mode and trip purpose terminated. A snippet of the report is shown below.



calibration_report.txt - Notepad

File Edit Format View Help

```
================================================
Calibration Report for Trip Purpose: HBWD2
================================================

-----------------------------------
Did not converge in 3 iterations
-----------------------------------

Alternative    Coefficient                 Initial_Shares%   Final_Shares%   Target_Shares%   Initial_Coeffs   Final_Coeffs   Bounds_Reached
-----------    -----------                 ---------------   -------------   --------------   --------------   ------------   --------------
DA             DA Const                    74.09             73.99           73.97            0                0              1
SR2            SR2 Const                   13.67             13.75           13.76            -2.061686        -2.050299      0
SR3            SR3 Const                   4.66              4.69            4.7              -4.098579        -4.083069      0
LB-Walk        WL Const                    0.62              0.6             0.6              0.099278         0.053723       0
LB-Auto        AL Const                    0.04              0.04            0.04             -2.580562        -2.606837      0
EB-Walk        WE Const                    0.06              0.06            0.06             -1.63127         -1.636861      0
EB-Auto        AE Const                    0.14              0.14            0.14             0.116001         0.130817       0
UR-Walk        WUR Const                   0.11              0.12            0.12             -2.251301        -2.054798      0
UR-Auto        AUR Const                   0.27              0.3             0.3              -0.863243        -0.67258       0
NM-Walk        Walk Const                  4.86              4.84            4.84             -4.026996        -4.034269      0
NM-Bike        Bike Const                  1.26              1.25            1.25             -5.376573        -5.383855      0
CR-Walk-Walk   Work CR Walk-Walk Const     0.01              0.01            0.01             0.146387         0.234365       0
CR-Walk-Auto   Work CR Walk-Auto Const     0.03              0.03            0.03             -5.550483        -5.527003      0
CR-Auto-Walk   Work CR Auto-Walk Const     0.12              0.13            0.13             4.635562         4.73123        0
CR-Auto-Auto   Work CR Auto-Auto Const     0.06              0.06            0.06             -3.991273        -3.984202      0
```

The procedure also preserves a backup of the original coefficients table in case the results are undesirable. The files are called mstable_pk_before_main_model_calibration.bin, mstable_pk_before_sub_model_calibration.bin, mstable_op_before_main_model_calibration.bin, and mstable_op_before_sub_model_calibration.bin. They are all located in the msplit\Inputs directory.

Check Network Attributes

This procedure checks to make sure that all highway network attributes are filled in correctly. The procedure takes the Highway Master DB specified in the currently selected scenario in the planning model dialog box, and performs a series of network checks. This is a highly recommended pre-processing step to check and ensure the validity of any input highway network.

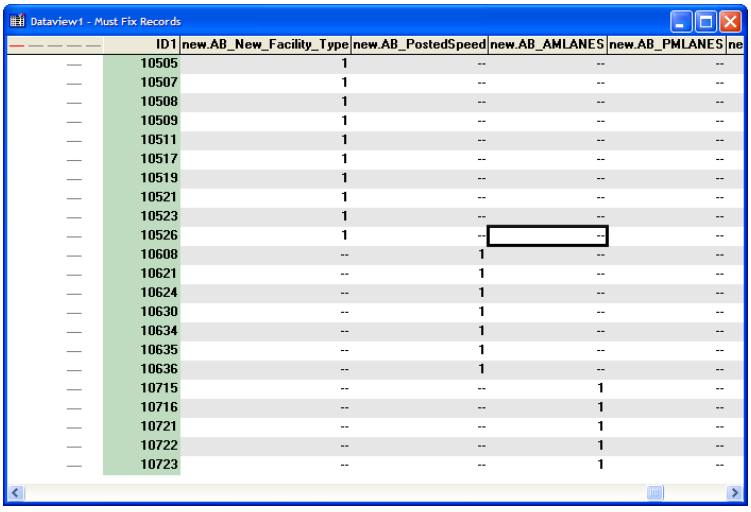
The first set of checks ensures that the following fields are filled in correctly: AB/BA_Facility_Type, AB/BA_PostedSpeed, and AB/BA_<Period>LANES. If any of these field values are missing for any link, the procedure will note them in a dataview of “must fix” records.

The second set of checks looks at the following network fields: [AB/BA TYPE], [AB/BA SERV TIME], [AB/BA TOLL LANES], [AB/BA TOLLV <Period>], AB/BA_<Period>PENALTY, AB/BA_<PK/OP>PARKCOST. If any links have missing values in these fields, a second dataview will note the missing value records, but the procedure will automatically replace the missing values with zero values so that the model run will accept them.

The third set of checks looks at the following fields: AB/BA_PK/OPTIME, AB/BA_PK/OPCOST. If any links have missing values in these fields, a dataview will note the missing value records, but the procedure will automatically calculate these values based on link area type and facility type values.

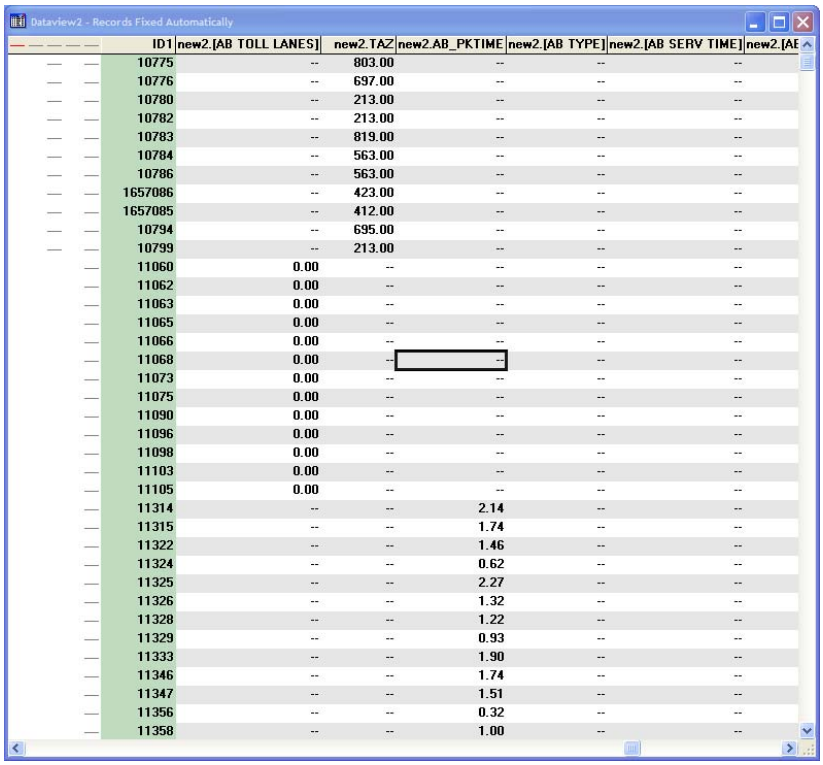
The last set of checks looks at the following geographic fields: County, TAZ, Air_Basin, Sub_Air_Basin, AB_AreaType, BA_AreaType. If any links have missing values in these fields, a dataview will note the missing value records, but the procedure will used the corresponding area files located in the Geography subdirectory of the model directory to automatically fill in missing values with the appropriate IDs from the area geographic files. For the geographic check, the utility assumes that the current geographic files exist in the Geography subfolder of the model directory: scag_county.dbd, taz4109.dbd, air_basin.dbd, sub_air_basin.dbd, areatype.dbd.

Once the procedure is completed, two databases are created: a “Must Fix Records” database and a “Records Fixed Automatically” database. The network and associated area files are opened on a map and the databases are joined to the highway network. The first joined dataview “Must Fix Records” displays the link records that must be fixed with the fields that must be filled in. In the example below, links with AB_Facility_Type, AB_PostedSpeed and AB_AMLANES which have missing values are marked with 1 and need to be filled in.



ID1	new.AB_New_Facility_Type	new.AB_PostedSpeed	new.AB_AMLANES	new.AB_PMLANES	ne
10505	1	--	--	--	
10507	1	--	--	--	
10508	1	--	--	--	
10509	1	--	--	--	
10511	1	--	--	--	
10517	1	--	--	--	
10519	1	--	--	--	
10521	1	--	--	--	
10523	1	--	--	--	
10526	1	--	--	--	
10608	--	1	--	--	
10621	--	1	--	--	
10624	--	1	--	--	
10630	--	1	--	--	
10634	--	1	--	--	
10635	--	1	--	--	
10636	--	1	--	--	
10715	--	--	1	--	
10716	--	--	1	--	
10721	--	--	1	--	
10722	--	--	1	--	
10723	--	--	1	--	

The second joined view “Records Fixed Automatically” displays the link records where missing data were filled in by the procedure. The dataview displays the data that were filled in. For the example below, missing toll lanes were filled in with “0”, missing TAZs were fill in with the tagged TAZ ID from the TAZ area geographic file, and missing peak times were calculated based on link facility type and area type values.



ID1	new2.[AB TOLL LANES]	new2.TAZ	new2.AB_PKTIME	new2.[AB TYPE]	new2.[AB SERV TIME]	new2.[AE
10775	--	803.00	--	--	--	
10776	--	697.00	--	--	--	
10780	--	213.00	--	--	--	
10782	--	213.00	--	--	--	
10783	--	819.00	--	--	--	
10784	--	563.00	--	--	--	
10786	--	563.00	--	--	--	
1657086	--	423.00	--	--	--	
1657085	--	412.00	--	--	--	
10794	--	695.00	--	--	--	
10799	--	213.00	--	--	--	
11060	0.00	--	--	--	--	
11062	0.00	--	--	--	--	
11063	0.00	--	--	--	--	
11065	0.00	--	--	--	--	
11066	0.00	--	--	--	--	
11068	0.00	--	--	--	--	
11073	0.00	--	--	--	--	
11075	0.00	--	--	--	--	
11090	0.00	--	--	--	--	
11096	0.00	--	--	--	--	
11098	0.00	--	--	--	--	
11103	0.00	--	--	--	--	
11105	0.00	--	--	--	--	
11314	--	--	2.14	--	--	
11315	--	--	1.74	--	--	
11322	--	--	1.46	--	--	
11324	--	--	0.62	--	--	
11325	--	--	2.27	--	--	
11326	--	--	1.32	--	--	
11328	--	--	1.22	--	--	
11329	--	--	0.93	--	--	
11333	--	--	1.90	--	--	
11346	--	--	1.74	--	--	
11347	--	--	1.51	--	--	
11356	--	--	0.32	--	--	
11358	--	--	1.00	--	--	

To Use Check Network Attributes

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing “SCAG Planning Model version 5”.

2. Make sure that your scenario and Highway Master DB are correctly chosen (Click on the Setup button to do this), then click on the Utilities button and choose “Check Network Attributes” from the list of utilities:

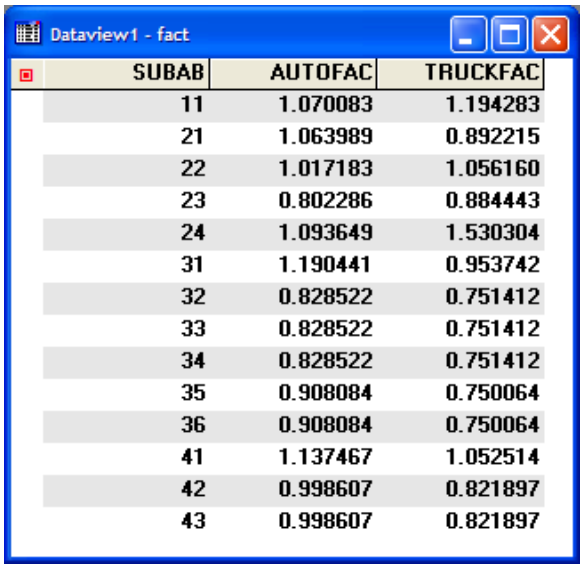
3. The utility will begin checking the attributes of the highway network. After the procedure has finished, the map and joined dataviews are displayed.

Emissions

The Emissions post-process utility takes the output vehicle trips from the model highway assignments, and adjusts the flows based on a user-specified ratios table

that varies by sub air basin. Based on the adjusted flows, updated congested times and costs are calculated, and adjusted assignment reports such as VMT, VHT, lodinfo, etc. are calculated. In addition, adjusted highway and transit skim matrices are computed. Note that this utility is also part of a standard model run.

The key input into this utility is the Emissions Factor table called HPMS_factor.bin, which is located in the Assign\Inputs directory. A sample table is shown below:



SUBAB	AUTOFAC	TRUCKFAC
11	1.070083	1.194283
21	1.063989	0.892215
22	1.017183	1.056160
23	0.802286	0.884443
24	1.093649	1.530304
31	1.190441	0.953742
32	0.828522	0.751412
33	0.828522	0.751412
34	0.828522	0.751412
35	0.908084	0.750064
36	0.908084	0.750064
41	1.137467	1.052514
42	0.998607	0.821897
43	0.998607	0.821897

The utility takes each network link, determines its sub-air basin, and adjusts auto vehicle flow by the AUTOFAC value and truck vehicle flow by the TRUCKFAC value. All resulting adjusted flow tables, report tables, and skim matrices are stored in the Emissions subfolder of the model directory. The utility recalculates the following files:

<period>_flow.bin
Assignment_statistics.csv
Intrazonal_county_report.csv
Intrazonal_TAZ_report.csv
IZVMT_County_Air_Basin.csv
IZVMT_County_SUBAB.csv
OP/PK_Auto/Walk_Generic.mtx*
SPMATOP/PK_Time.mtx
VMT_County_Air_Basin_HDT/HHDT/LHDT/MHDT/LM/TOTAL.csv
VMT_County_NonIZ_SubAB_TOTAL.csv
VMT_County_SUBAB_HDT/HHDT/LHDT/MHDT/LM/TOTAL.csv

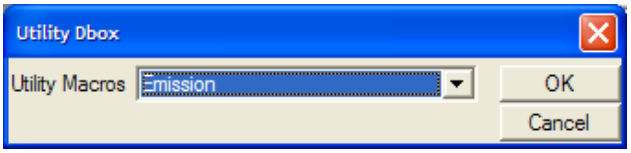
For the transit skim matrices denoted by "*", the skim type is neither Local, Express, Commuter Rail, etc. Instead, the transit network settings have been modified to

simulate a “generic” transit type, where the weight ratios for all transit modes are set to 1.0, and all modes are enabled, thus no modes are biased.

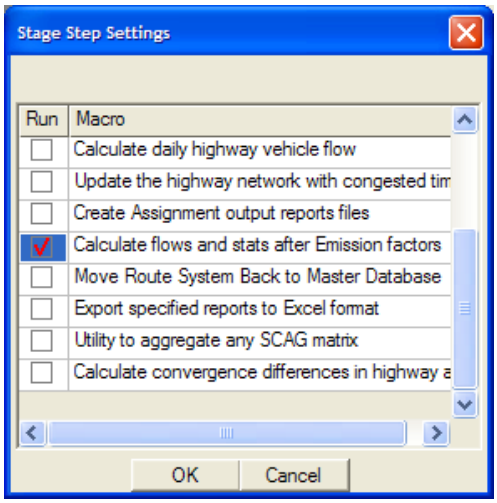
To Run the Emissions Utility

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing “SCAG Planning Model version 5”.

2. Make sure that all model output files have been created, then click on the Utilities button and choose “Emission” from the list of utilities.



Alternatively, you can click on the  button in the planning model dialog box, next to the Assignment button, then check only “Calculate flows and stats after Emission Factors”, then click on the Assignment button to run the utility:



Defining and Running New Scenarios

This utility lets the user automatically define and run multiple scenarios based on a limited set of demographic, network, and policy changes. In the standard planning interface, the user needs to perform the following steps in order to define and run each new scenario:

1. Copy all relevant model input files into a new model directory.

2. Manually make network geographic and attribute changes in the new model directory.

3. Manually make changes in the input socioeconomic table.

4. Review all other parameters and make policy changes.

5. Run the model, gather output reports, and compare with the base or other scenarios.

Defining Scenarios

The Define Scenarios tool organizes and automates the process of making network, policy, and demographic changes for multiple scenarios simultaneously. The dataset of an input highway network, transit network, demographic data, and other input data, is considered to be the "base scenario".

In addition, both the input highway and transit network is assumed to have a string field called "SKETCH_PROJECT_ID". For the highway network, links common to a potential scenario change will have the same SKETCH_PROJECT_ID. For the transit network, routes common to a potential scenario change will have the same SKETCH_PROJECT_ID. If you ran the automated utility in the regional model to create sketch plan input files, these fields will be automatically added to the network and route system files.

In the Define Scenarios utility, the user first adds scenarios and names them. Then, for each scenario, the user defines the demographic database that should be used for that scenario, and the network and policy changes that should be implemented. Every network and policy variable not specified is assumed to have the same value as the base scenario.

For demographic changes, the utility requires that the user create an updated demographics (SED) table with all household, employment and land use changes relevant for the scenario. The table must be in the exact same format as the input SED table in the base scenario. When the user defines a scenario, she can choose the updated SED table to use for the scenario.

For highway network changes, the utility reads all unique SKETCH_PROJECT_ID codes, and lists all codes available for the user to change. Changes to "All links" can also be chosen. The following actions can be performed for all links coded with a common project ID:

- The links can be disabled.

- The link attributes can be changed to a specified value.
- The user can add a fixed value to attributes.
- The user can subtract a fixed value from attributes.

The attributes that can be changed are:

- Facility Type
- Posted Speed
- Number of Lanes
- Speed Multiplier
- Capacity Multiplier

For transit network changes, the utility reads all unique SKETCH_PROJECT_ID codes, and lists all codes available for the user to change. Changes to “All Routes” can also be chosen. The following actions can be performed for all routes coded with a common project ID:

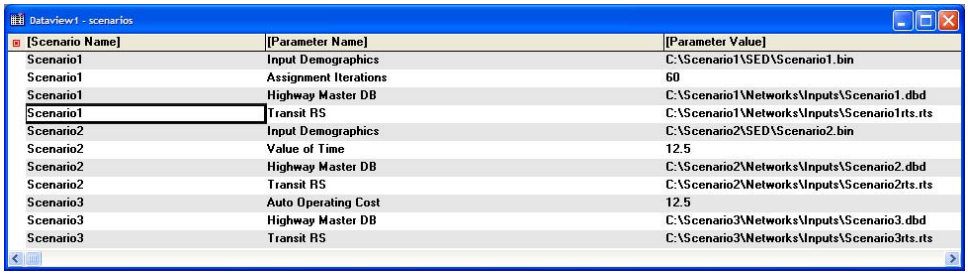
- The route can be disabled.
- The route attributes can be changed to a specified value.
- The user can add a fixed value to the route attributes.
- The user can subtract a fixed value from the route attributes.

The attributes that can be changed are:

- Peak Headway
- Off-peak Headway
- Mode

It is up to the user to make sure that the SKETCH_PROJECT_ID field is filled properly, and that changed attributes reflect valid values. Lastly, the utility lets the user save all scenario specifications into a settings file for easy future retrieval.

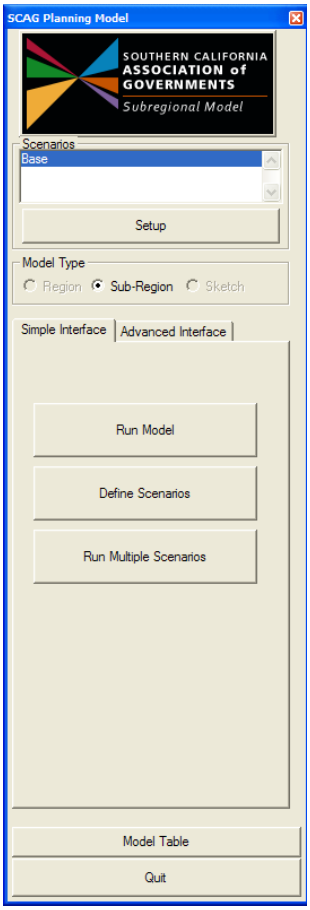
The utility will produce several outputs. First, if highway network changes are specified, the utility will produce a network geographic file that contains all implemented changes. The name of the geographic file will be similar to the scenario name and will be in the scenario directory. For example, if the scenario name is set to “Scenario1”, the geographic file will be placed in “Scenario1\Networks\Inputs\Scenario1.dbd”. Second, if transit network changes are specified, the utility will produce a route system transit network that contains all implemented changed. The same naming rule for the highway network applies for the route system. Third, the utility produces a scenario table. A scenario table lists all network, demographic, and parameter changes for all defined scenarios, and is used in a followup utility that lets a user automatically create and run multiple scenarios. An example scenario table is shown below:

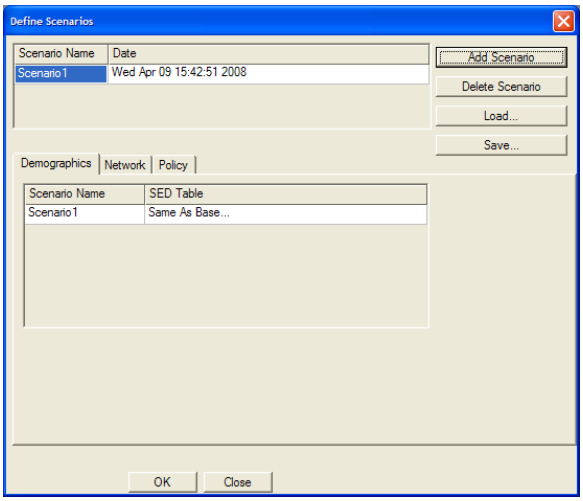


The [Scenario Name] field describes each scenario. The [Parameter Name] field describes the parameter name to change. The parameter names are based on the names in the model table. The [Parameter Value] field describes the value to assign to the parameter name for the scenario. All parameters not listed in this table will take on values similar to their values in the base scenario.

To Define Scenarios

1. Make sure you have a SKETCH_PROJECT_ID field in both your highway network and route system layer. Then Open the Sketch Plan Model dialog box by choosing Tools-Add-ins and choosing “SCAG Sketch Plan Model”. Then click on the “Define Scenarios” button. The utility will scan the SKETCH_PROJECT_ID fields and display the Define Scenarios dialog box:

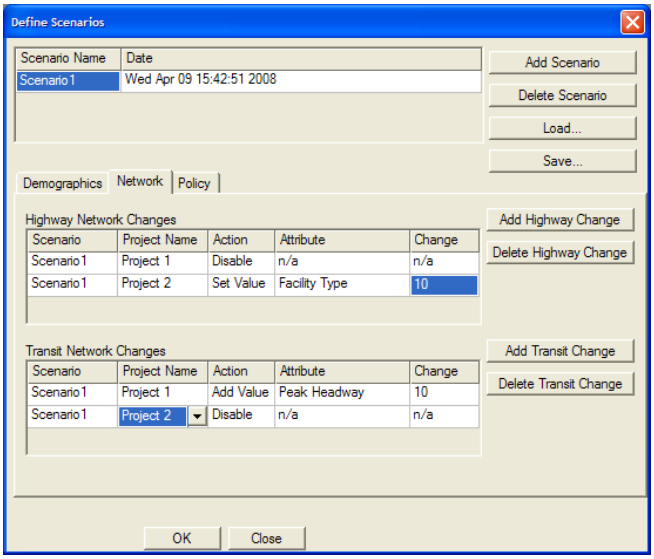




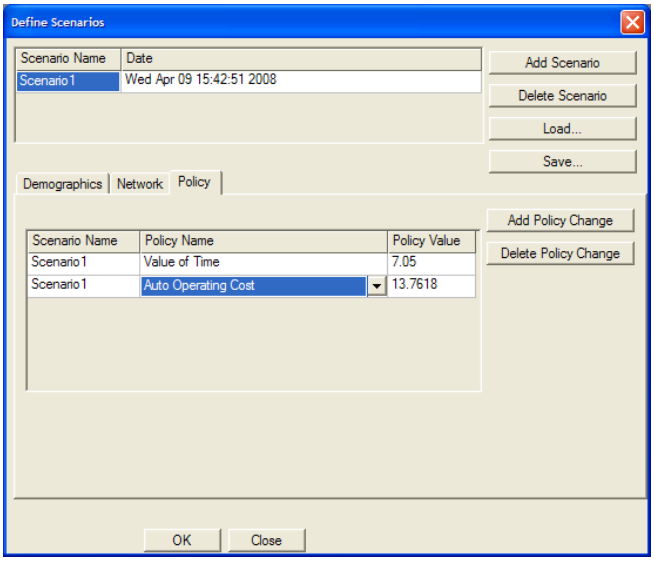
2. Click on the Add Scenario button to add a scenario, and then enter the scenario name in the Scenario Name column.

3. To set the demographics table for the scenario, click on the Demographics tab, click on the SED Table column in the cell for the scenario you wish to define, then choose “Choose File…” and select the SED table you wish to use. You can also optionally type in the file directly, or choose “Same As Base…” to use the same SED table as the base scenario.

4. To make highway or transit network changes, click on the Network tab. To make highway changes, click on the Add Highway Change button, choose the project name to modify, choose the action, choose the attribute to modify, and then enter the Change value. To make transit changes, click on the Add Transit Change button and add the transit change in a similar fashion. You can also delete changes by clicking on the scenario/project to delete, then clicking on the Delete Highway Change or Delete Transit Change button.



5. To make policy changes, click on the Policy tab, click on Add Policy Change, choose the Policy Name to change, and then enter the updated policy value. The Policy Value is initially filled with the default value from the base scenario. To delete a policy change, choose the Scenario Name/Policy and then click on Delete Policy Change.



6. To delete a scenario, highlight the scenario you wish to delete, then click on the Delete Scenario button. All demographic, network, and policy changes associated with the scenario are deleted.

7. If you wish to save all your edits in this dialog box, click the Save… button and enter a ScenarioDefine filename. You can later load your changes by clicking on the Load… button and choosing the saved .ScenarioDefine file.

8. Click OK.

The utility creates the highway and transit networks consistent with the changes, and creates the scenario table that is consistent with all demographics, network, and policy changes for all scenarios.

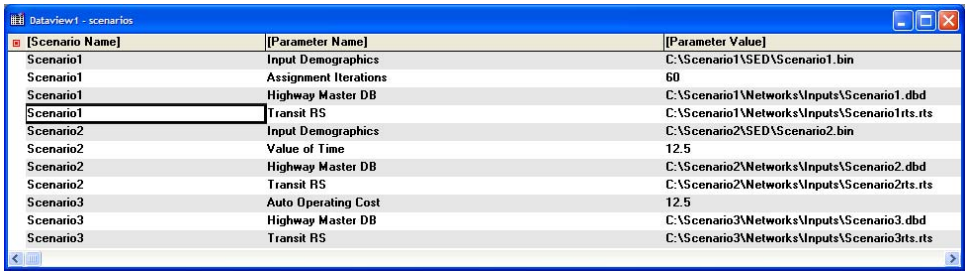
Running Multiple Scenarios

This utility performs the following functions:

- The utility takes the scenario table created from the Define Scenarios utility and copies all base scenario model input files to a new scenario directory. The scenario directory name is based on the scenario name in the scenario table.
- The utility applies all changes to each scenario specified in the scenario table.
- The utility creates new scenarios in the planning model dbox and lets the user run the model for all new scenarios.
- At the end of all the model runs, performance statistics from all scenarios are calculated and displayed for comparison purposes.

An example scenario table is shown below, and is equivalent to the scenario table

generated from the Define Scenarios utility:


Dataview1 - scenarios

[Scenario Name]	[Parameter Name]	[Parameter Value]
Scenario1	Input Demographics	C:\Scenario1\SED\Scenario1.bin
Scenario1	Assignment Iterations	60
Scenario1	Highway Master DB	C:\Scenario1\Networks\Inputs\Scenario1.dbd
Scenario1	Transit RS	C:\Scenario1\Networks\Inputs\Scenario1rts.rts
Scenario2	Input Demographics	C:\Scenario2\SED\Scenario2.bin
Scenario2	Value of Time	12.5
Scenario2	Highway Master DB	C:\Scenario2\Networks\Inputs\Scenario2.dbd
Scenario2	Transit RS	C:\Scenario2\Networks\Inputs\Scenario2rts.rts
Scenario3	Auto Operating Cost	12.5
Scenario3	Highway Master DB	C:\Scenario3\Networks\Inputs\Scenario3.dbd
Scenario3	Transit RS	C:\Scenario3\Networks\Inputs\Scenario3rts.rts

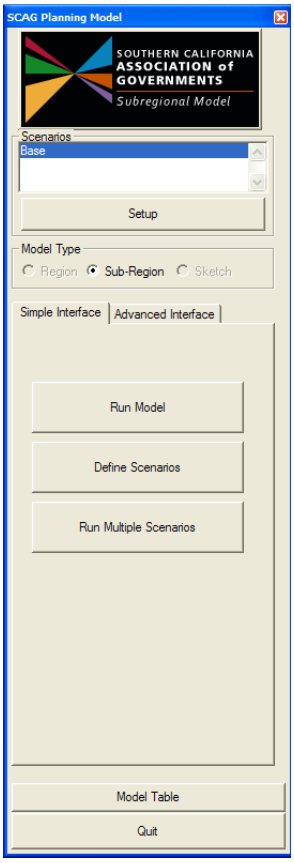
The [Scenario Name] field describes each scenario. The [Parameter Name] field describes the parameter name to change. The parameter names are based on the names in the model table. The [Parameter Value] field describes the value to assign to the parameter name for the scenario. All parameters not listed in this table will take on values similar to their values in the base scenario.

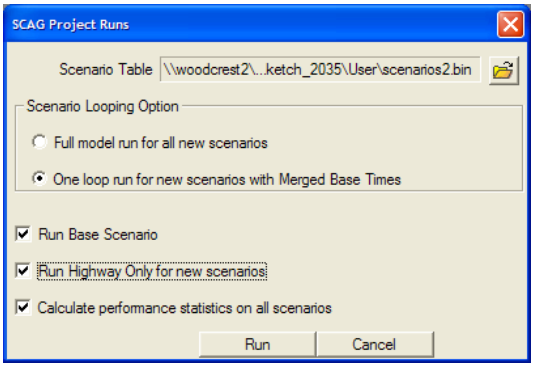
For the scenario model runs, the user can choose to perform either a full 5 feedback loop run, or a quicker one-loop run. In the one-loop run, the congested costs from the base scenario are merged into the scenario network, and the model runs just one feedback loop, using the congested costs as the starting point. This results in much shorter model run times. This feature assumes that the full model has been run for the base scenario.

The user can also choose to perform a “Highway Only” model run for the new scenarios. In this version of the model run, no transit modules are invoked (e.g. building, skimming, assignment, etc.). Instead, the transit skim matrix results from the base scenario are copied over to each new scenario. These skim matrices are used for every model component that requires them (e.g. trip distribution and mode split). This results in much shorter model run times.

To Run Multiple Scenarios

1. Make sure that a scenario table has been created. Then Open the Subregional Model dialog box, click on the Simple tab, then click on the “Run Multiple Scenarios” button. The utility will display the SCAG Project Runs dialog box:





2. Click on the  button to choose the scenario table, then choose the scenario looping option.

3. Check options if you wish to run the base scenario, if you wish to invoke the Highway Only option when running new scenarios and if you wish to calculate performance statistics.

4. Click on the Run button.

The utility creates all the new scenario input files in their respective directories, runs the model for the new scenarios, and displays the performance statistics comparing all invoked model runs. An example report is shown below. This file by default is located in the base scenario's User directory and is called "compare_assignment_statistics.csv".

Dataview1 - compare_assign_statistics

Scenario	STATISTIC	[AM PEAK]	[PM PEAK]	MIDDAY	NIGHT	TOTAL
Base Scenario	Average Speed (mph), L_AND_M	30.6	26.9	35.9	43.9	32.0
Scenario1	Average Speed (mph), L_AND_M	30.9	27.3	36.1	43.9	32.3
Scenario2	Average Speed (mph), L_AND_M	30.9	27.3	36.3	43.9	32.3
Scenario3	Average Speed (mph), L_AND_M	30.6	26.8	35.9	44.0	31.9
Base Scenario	Vehicle Miles Traveled ('000), L_AND_M	103664.9	176868.3	149528.3	80686.5	510748.1
Scenario1	Vehicle Miles Traveled ('000), L_AND_M	102009.8	172807.7	145823.0	79310.2	499950.7
Scenario2	Vehicle Miles Traveled ('000), L_AND_M	102490.7	173922.6	146832.6	79308.2	502554.0
Scenario3	Vehicle Miles Traveled ('000), L_AND_M	104782.3	178099.8	150181.4	81682.5	514746.0
Base Scenario	Vehicle Hours Traveled ('000), L_AND_M	3383.4	6568.4	4170.0	1837.0	15958.8
Scenario1	Vehicle Hours Traveled ('000), L_AND_M	3301.2	6322.5	4044.3	1807.0	15474.9
Scenario2	Vehicle Hours Traveled ('000), L_AND_M	3313.7	6380.9	4041.3	1807.1	15543.1
Scenario3	Vehicle Hours Traveled ('000), L_AND_M	3427.2	6655.6	4181.5	1856.3	16120.7
Base Scenario	Vehicle Hours Delay ('000), L_AND_M	970.6	2256.0	791.4	109.0	4127.0
Scenario1	Vehicle Hours Delay ('000), L_AND_M	914.2	2108.0	719.4	105.3	3846.9
Scenario2	Vehicle Hours Delay ('000), L_AND_M	925.0	2146.3	725.5	105.4	3902.2
Scenario3	Vehicle Hours Delay ('000), L_AND_M	975.5	2299.5	765.2	107.3	4147.6
Base Scenario	Average Speed (mph), HDT	38.0	32.3	41.2	55.5	41.9
Scenario1	Average Speed (mph), HDT	38.3	32.8	41.5	55.5	42.2
Scenario2	Average Speed (mph), HDT	38.2	32.6	41.7	55.5	42.2
Scenario3	Average Speed (mph), HDT	37.7	31.9	41.2	55.5	41.7
Base Scenario	Vehicle Miles Traveled ('000), HDT	5945.6	9272.1	15132.2	14582.6	44932.5
Scenario1	Vehicle Miles Traveled ('000), HDT	5940.7	9241.3	15131.5	14582.0	44895.6
Scenario2	Vehicle Miles Traveled ('000), HDT	5960.0	9288.2	15203.0	14581.9	45033.1
Scenario3	Vehicle Miles Traveled ('000), HDT	5947.5	9275.5	15146.0	14580.5	44949.5
Base Scenario	Vehicle Hours Traveled ('000), HDT	156.5	287.3	367.1	262.6	1073.6
Scenario1	Vehicle Hours Traveled ('000), HDT	155.0	281.4	364.4	262.8	1063.6
Scenario2	Vehicle Hours Traveled ('000), HDT	155.9	284.7	364.8	262.8	1068.1
Scenario3	Vehicle Hours Traveled ('000), HDT	157.8	290.4	367.6	262.6	1078.4
Base Scenario	Vehicle Hours Delay ('000), HDT	46.5	112.1	89.5	13.6	261.6
Scenario1	Vehicle Hours Delay ('000), HDT	45.4	107.7	87.1	13.7	253.9
Scenario2	Vehicle Hours Delay ('000), HDT	46.1	109.7	87.8	13.7	257.2
Scenario3	Vehicle Hours Delay ('000), HDT	47.7	114.6	89.9	13.5	265.8
Base Scenario	Average Speed (mph), ALL	31.0	27.2	36.3	45.4	32.6
Scenario1	Average Speed (mph), ALL	31.2	27.6	36.5	45.4	32.9
Scenario2	Average Speed (mph), ALL	31.3	27.5	36.8	45.4	33.0
Scenario3	Average Speed (mph), ALL	30.9	27.0	36.3	45.4	32.5
Base Scenario	Vehicle Miles Traveled ('000), ALL	109610.6	186140.4	164660.5	95269.2	555680.6
Scenario1	Vehicle Miles Traveled ('000), ALL	107950.5	182049.0	160954.5	93892.2	544846.3
Scenario2	Vehicle Miles Traveled ('000), ALL	108450.7	183210.7	162035.6	93890.1	547587.1
Scenario3	Vehicle Miles Traveled ('000), ALL	110729.9	187375.3	165327.4	96262.9	559695.5
Base Scenario	Vehicle Hours Traveled ('000), ALL	3539.9	6855.7	4537.1	2099.6	17032.3
Scenario1	Vehicle Hours Traveled ('000), ALL	3456.2	6603.8	4408.7	2069.7	16538.5
Scenario2	Vehicle Hours Traveled ('000), ALL	3469.6	6665.6	4406.1	2069.8	16611.2
Scenario3	Vehicle Hours Traveled ('000), ALL	3585.0	6946.1	4549.0	2118.9	17199.0
Base Scenario	Vehicle Hours Delay ('000), ALL	1017.2	2368.1	880.9	122.5	4388.7
Scenario1	Vehicle Hours Delay ('000), ALL	959.6	2215.7	806.4	119.0	4100.8
Scenario2	Vehicle Hours Delay ('000), ALL	971.1	2256.0	813.2	119.1	4159.4
Scenario3	Vehicle Hours Delay ('000), ALL	1023.3	2414.1	855.1	120.9	4413.4

Fix Routes

This utility checks to ensure that all transit network route and route stop attributes are filled in correctly. The utility performs the following checks:

1. The procedure checks the PK_Headway and OP_Headway fields in the route table for zero values, and resets them to missing. A missing value for a route headway denotes that the route should not be included during network building.

2. The procedure tags the route stop attribute field NODEID with the closest

node ID number for each stop. This ensures that the NODEID field is completely and properly filled out, as it is a critical field used during network building.

3. The procedure populates the REALSTOP route stop field. This field denotes whether a route stop should be in the transit network or not. To populate this field, the procedure orders route stops by route and stop order, and compares each route stop's NODEID field. If the procedure comes across two consecutive stops that have the same NODEID, it will designate one of the route stops to taken out of the network by setting it's REALSTOP value to 0. Due to network pathfinding requirements, two consecutive route stops cannot be tagged to the same node id, and this procedure helps prevent this from occurring.

To Use Fix Routes

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

2. Make sure that your scenario and transit route system are correctly chosen (Click on the Setup button to do this), then click on the Utilities button and choose "Fix Routes" from the list of utilities:

3. The Fix Routes utility will run automatically. After the procedure is finished, click on Close All to close the opened windows.

Copy Scenario

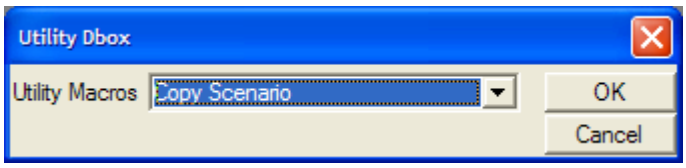
This procedure copies all input model files from a selected scenario to a user designated file directory, then copies the model table over to the new directory. All parameters associated with the scenario will be copied over as well. In addition, the copied transit route system will be re-associated with the new model directory.

To Copy a Scenario

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

2. Highlight the scenario you wish to copy, then click on the Utilities button and

choose “Copy Scenario” from the list of utilities:



3. Choose a new directory.

Appendix B: Description of Model Steps

The following table describes each model step and substep, and documents the input and output files associated with them. For a description of all input/output files and parameters, see Appendix C.

Step	Substep	Description	Input Files	Output Files
Initialization	Deletes all output and interim files	This step deletes all output files from the various output and interim directories. The step ensures a "clean" model run	None	None
	Update Data Directory	This step creates a copy of the line database, moves the route system over to the copied line database, and adds empty fields to be used by the model. In the subregional model, this step processes the socioeconomics override file and aggregates and disaggregates the SED table. Lastly, this macro runs the allocation model that chooses the representative P and A zone for each aggregated zone	Highway Master DB Transit RS Override_dem.bin	Highway DB Sed\model_sed_subregion.bin Interim\random_agg.bin
	Calculate Link Speeds	This step calculates link free flow and estimated congested speeds, times and costs based on lookup tables and other rules. Source data in the network comes from link facility types and area types. Calculates initial Truck link PCE values based upon roadway grades, truck densities, and congestion.	Highway DB Speed Table	Highway DB
	Calculate Link Capacities	This step calculates hourly and period capacities based on link area type and facility type applied to lookup tables, plus exceptions. This step also calculates Akcelik A and C parameters and auto operating costs	Highway DB Capacity Table VDF Table	
	Calculate Initial Costs and Times	Obsolete Step		
	Build Highway Network	This step builds and sets the TransCAD highway network .NET file after pre-processing is done to it with all necessary network fields.	Highway DB	Highway Net
	Calculte HOV slip ramp speeds	This step computes free flow speeds for HOV slip ramps (links into and out of HOV lanes) based on estimated congested speeds from the parallel general purpose link GP links. For links into the HOV lane, the speed is set similar to the incoming HOV link. For links out of the HOV lane, the speed is set similar to the congested speed of the general purpose merge link	Highway DB	Highway DB

Initialization	Highway and Transit Network Statistics	This step reports out the following highway statistics: lane miles, capacity miles, and centerline miles by facility type, link type, and sub air basin. The step also calculates the following transit statistics: # of routes, route miles, # of vehicles, and revenue miles	Highway DB Transit RS	Network Lane Miles <period> Network Capacity Miles <period> Network Centerline Miles Transit Supply Report
Network Skimming	Calculate Highway Skims	This step creates peak and offpeak Highway skim matrices for the Drive Alone, Shared Ride 2 and Shared Ride 3+ modes. In each case, the model disables links that the mode cannot access (e.g. disable HOV links for the DA mode) before performing the skim	Highway DB Highway Net	Highway Time PK Highway Time OP Highway <PK/OP> <DA/CP2/CP3> Skim
Network Skimming	Process Highway Skims to Read into Mode Split	This step also calculates cost and toll matrices for mode choice purposes.	Highway <PK/OP> <DA/CP2/CP3> Skim	Highway <PK/OP> <DA/CP2/CP3> Skim Highway <PK/OP> School Skim
	Calculate drive egress times for commuter rail skim	This step creates drive-egress links based on congested travel times from Metrolink stations (and High Speed Rail stations if they exist) to TAZ. Links are limited to a maximum drive egress parameter distance.	Highway DB	Highway DB Transit DB
	Calculate drive access links	This step creates drive access links from TAZ to nearby park-and-ride nodes based on congested travel times. The maximum distance to TAZ for each PNR station is coded at the PNR node.	Highway DB	Highway DB Transit DB
	Calculate Bus Service Flow Preload Volumes	This step takes route headway information from transit routes and bus passenger car equivalent parameter inputs, and converts it into bus preload volumes on the links layer. Volumes will then be used as a preload for highway assignment.	Highway DB Transit RS Highway Net	Highway DB Transit DB
	Calculate transit travel times as a function of highway times	This step takes congested auto costs and times and calculates congested bus times and costs from them using lookup table functions. This step calculates route initial wait times from input headways.	Highway DB Transit RS Transit Speed Curve Table Transit Speed Curve Lookup	Highway DB Transit RS Transit DB

Network Skimming	Transit Network Building	This step builds the generic Peak and offpeak transit network .TNW files given the transit route system data files processed from all preceding steps	Transit RS Transit DB Mode Xfer Table Mode Table	Transit PK Net Transit OP Net
	Transit Network Skimming	This step sets the transit network for each period and mode (e.g. Peak Walk-Local) based on local settings and field settings in the mode table. The macro then calculates transit skim matrices for each period and mode.	Transit RS Transit DB Mode Xfer Table Mode Table Fare Links Table Fare Matrix	Transit <PK/OP> <local/express/urban rail/commuter_rail/drive_eggress> network Transit <PK/OP> <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM
Trip Generation	Transit Skim Matrix Processing	This step takes the transit skim matrices from the previous step and performs matrix operations such that they can be used with the mode choice procedure. For example, costs are converted into cents, and local bus skims from several modes are aggregated into one matrix	Transit <PK/OP> <local/express/urban rail/commuter_rail/drive_eggress> network Transit <PK/OP> <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM	Transit <PK/OP> <local/express/urban rail/commuter_rail/drive_eggress> network Transit <PK/OP> <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM
	Trip Generation Model ("MinSkim")	This substep takes the peak transit skim matrices and "all walk" skim matrix calculates the minimum time for all matrices	Transit PK <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM Walk Skim Matrix	Minimum Transit Skims
	Trip Generation Model ("Create Demographics")	This substep copies the input demographics table and calculates taz-based auto and non-auto accessibility taz values based on auto and transit skims. These measures are input to the vehicle availability model	Input Demographics PUMA Supplement Table Minimum Transit Skim Highway PK DA Skim	Accessibility Skim Matrix Output Demographics
	Trip Generation Model ("VehicleAvailability")	This substep runs the vehicle availability model. The inputs are the demographics table and the skim matrices. The outputs are taz households split by autos, income and workers.	Output Demographics Highway PK DA Skim PUMA Table Minimum Transit Skims Auto Para Table	ZWIHHS Table ZNSS Table VEH Table Work by Autos Table Autos by IncSize Table

Trip Generation	Trip Generation Model ("HHClass and HHClass2")	This substep takes the demographics table and splits out households by autos, workers, size for HBW, income and autos for HBSC and HBCU, and income, workers and size for WBO. The procedure uses fratar method given PUMS base data of household distributes and future forecasts of one-way household distributions	Output Demographics	HBW Crossclass WBO Crossclass HBSC Crossclass
	Trip Generation Model ("prods1, prods2" and prods3")	This substep multiplies the household distribution tables by the trip rates table to estimate trip productions by trip purpose	HBW Prod Rates HBW CrossClass Autos by IncSize Table HBO Prod Rates HBSC CrossClass HBSC Prod Rates HBCU Prod Rates WBO CrossClass WBO Prod Rates	Final Productions
	Trip Generation Model ("attractions")	This substep calculates trip attractions by trip purpose by applying linear regression models to the employment and other demographics	Output Demographics	Final Attractions
	Trip Generation Model ("multiply trips by ratio")	This substep multiplies productions and attractions by input trip ratios that vary by purpose and sub air basin. The substep also reports out trips before and after the factoring.	TAZ County File Final Productions Final Attractions Production Ratios by SubAB Attraction Ratios by SubAB	Tripgen Status Report Table Final Productions Final Attractions Tripgen Status by SUBAB 0
	Trip Generation Model ("WBO_OBO_Reallocations")	This substep re-allocates trips for the WBO and OBO purposes. Productions are re-calculated from linear regression equations based on employment variables, and then re-balanced to total productions derived from the previous cross classification models. Total trips are reported out both before and after the reallocation	Final Productions Final Attractions	Final Productions Final Attractions Tripgen Status Report Table Tripgen Status by SUBAB 1 Tripgen Status by SUBAB 2
	Trip Generation Model ("TRP900")	This substep splits the all day trips into peak and offpeak period trips based on time of day factors, and reports out total peak and offpeak trips by trip purpose	Final Productions Final Attractions TOD Factors Model Districts	Offpeak Productions Offpeak Attractions Peak Productions Peak Attractions
	Trip Generation Model ("TG Factor")	This substep takes the total balanced productions and attractions, and factors by a preset calibration and validation parameter (currently 1.0 in both cases) in order to produce trips more in line with expected survey results. The factor makes up for all "unaccounted" trips in the model. Total trips before and after the factoring are reported.	Offpeak Productions Offpeak Attractions Peak Productions Peak Attractions TAZ County File	Offpeak Productions Offpeak Attractions Peak Productions Peak Attractions Tripgen Status by SUBAB 3 Tripgen Status Report Table

Trip Generation	Trip Generation Model ("TG Balance")	This substep balances productions and attractions together by either the entire study area or by designated region, dependenting on the trip purpose and/or user parameters. Total trips before and after the balancing are reported	Offpeak Productions Offpeak Attractions Peak Productions Peak Attractions Model Districts TAZ County File	Tripgen Status by SubAB 4 Offpeak Productions Offpeak Attractions Peak Productions Peak Attractions Tripgen Status Report Table
	Trip Generation Model ("TDM")	This substep first reduces external productions and attractions by trip purpose. The substep then imposes a "TDM" reduction factor to account for future TDM measures. A final trip balance is also performed. Total trips before and after the external reductions and TDM factoring are reported	Offpeak Productions Offpeak Attractions Peak Productions Peak Attractions IX Prods IX Attrs TAZ County File	Peak Balanced PA Offpeak Balanced PA Tripgen Status Report Table Tripgen Status by SUBAB 5 Tripgen Status by SUBAB 6
	Trip Generation Reports	This substep generates summary reports from the trip generation model. The reports are productions and attractions summarized by County, CSA, RSA and District.	Peak Balanced PA Offpeak Balanced PA TAZ County File Output Demographics	Demographics Report By County <CNTY/RSA/CSA/District> <PK/OP> Tripgen Report Autos by Size Report Autos by Workers Report Inc by Wrk by Size Report
Trip Distribution	Run Logsum Model	This step calculates logsum matrices for the HBWD purposes. The step makes a call to the mode split model with the option only to calculate logsum matrices without calculating probabilities. These logsum matrices provide an impedance input for the HBWD mode split models downstream.	Output Demographics Highway Time PK Highway Time OP Highway <PK/OP> <DA/CP2/CP3> Skim Highway <PK/OP> School Skim Transit <PK/OP> <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM <PK/OP> Logit Coefficients Highway Terminal Times School Terminal Times	<PK/OP> HBWD<1/2/3> Logsums

Trip Distribution	Run SubModel Logsum Model	This step calculates the logsum matrices generated by the submodel mode split models. The logsum matrices are then fed in as a cost variable in the main model. Submodel logsums are calculated for the HBSC, HBSH, HBCU, HBO, WBO and OBO purposes only.	Output Demographics Highway Time PK Highway Time OP Highway <PK/OP> <DA/CP2/CP3> Skim Highway <PK/OP> School Skim Transit <PK/OP> <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM <PK/OP> Logit Coefficients Highway Terminal Times School Terminal Times	<PK/OP> <HBSC/HBSH/HBCU/HBOALL/WBO/OBO> Logsums
	Process Logsum Matrices	This step calculates the statistics on the HBW logsums, calculating minimum, maximum, average and standard deviation of logsum values	<PK/OP> HBWD<1/2/3> Logsums	Logsum Statistics Report
	Create Friction Factors by County	This step takes an input table with gamma_a, gamma_b, gamma_c1, gamma_c2 and curve_change parameters that vary by period, trip purpose and county. For each period, purpose and county, it applies the appropriate factors in a modified gamma function in order to calculate friction factor matrices.	Friction Factor Parameters TAZ County File	Friction Factor Output Peak FF Matrix Offpeak FF Matrix
	Trip Distribution Model	This step applies the doubly-constrained gravity model to the balanced PA trips from the trip generation model using the friction factor matrices calculated in the previous step. The output are PA trip matrices by time period and trip purpose. The step then reallocates the HBW1,2, and 3 trip matrices from low, medium and high worker income groups to low, medium, and high household income groups. The step uses a worker-to-household income correspondence ratio table to perform the reallocation.	Peak Balanced PA Offpeak Balanced PA Peak FF Matrix Offpeak FF Matrix Trip K-Factors Worker to Household Income Highway <PK/OP> DA Skim <PK/OP> HBWD<1/2/3> Logsums	Peak PA Matrix Offpeak PA Matrix Peak PA HBW Work Matrix Offpeak PA HBW Work Matrix

Mode Split	Calculate trip distribution intrazonal trips	This step generates trip length and time distribution and average trip length and time reports from the results of the trip distribution model. This step also outputs total intrazonal trips by period and purpose, and reports aggregated trips by county, RSA, CSA, and district	Peak PA Matrix Offpeak PA Matrix Peak PA HBW Work Matrix Offpeak PA HBW Work Matrix Highway <PK/OP> DA Skim	TLD Table TLD Frequency Table Intrazonal TD Report <County/RSA/CSA/District> <PK/OP> Summary County_<PK/OP>_<Purpose>_Summary.csv
	Run Mode Split Model	This step runs the main and submodel nested logit mode choice models by period and trip purpose. The inputs are the PA matrices and coefficient tables, along with all the skim matrices. The outputs are period specific trip purpose matrices split up by mode. Optionally, this step will also run the TDM Shift model. This model uses an input "TDM Shift" table to move trips from one mode to another by mode, county, and trip purpose. This model will only be invoked if the file msplit\Inputs\tdm_shift.bin exists. For the HBSP trip purpose, fixed mode shares are used in lieu of the nested logit model.	Output Demographics Highway Time PK Highway Time OP Highway <PK/OP> <DA/CP2/CP3> Skim Highway <PK/OP> School Skim Transit <PK/OP> <Walk/Auto> <Local/Express/urban rail/commuter rail/drive egress> SKIM <PK/OP> Logit Coefficients Highway Terminal Times School Terminal Times Peak PA Matrix Offpeak PA Matrix Peak PA HBW Work Matrix Offpeak PA HBW Work Matrix Msplit\Inputs\tdm_shift.bin	<PK/OP> MS Model Summary <PK/OP> MS Model SubSummary <PK/OP> MS Model Summary CSV <PK/OP> MS Model SubSummary CSV <PK/OP> <Purpose> MC Trips <PK/OP> <Purpose> MC SubTrips <PK/OP> HBWS IS MC Trips
	Report Tables from Mode Split Model	This step summarizes the mode split results into several reports: Productions and attractions by mode and County Productions and attractions by mode and RSA Productions and attractions by mode and CSA Productions and attractions by mode and DISTRICT	<PK/OP> <Purpose> MC Trips <PK/OP> <Purpose> MC SubTrips <PK/OP> HBWS IS MC Trips	Mode Split <CNTY/RSA/CSA/District> <Prod/Attr> Summary
PA to OD	Run Intermediate Stops Model	This step runs the intermediate stops model, which divides up the HBW Strategic trip matrix into two matrices: an "origin to intermediate zone" matrix and an "intermediate zone-to-destination matrix". The model uses a distance and employment variable decay curve and a semi-gravity formulation to assign the intermediate zone. This step also combines all HBWD1,2,3 and HBWS1,2,3 matrices into HBWD and HBWS matrices.	<PK/OP> HBWS MC Trips	<PK/OP> HBWS IS MC Trips

PA to OD	Run SCAG Truck Generation, Distribution, PA to OD	This step runs the SCAG Truck trip generation model, which are linear regression rates based on employment variables for both the productions and attractions. The step then creates a pure highway distance skim as the impedance input to the distribution step. The distribution model is a simple semi-doubly constrained gravity model with a friction factor table used as inputs by truck purpose. Time of day factors by truck purpose are then used to convert the all-day PA trips into AM, PM, MD and NT OD truck trips. Report files from each step are also created.	Highway DB Highway Net Truck Friction Factors Truck Rates Table Hourly Table Highway PK DA Skim TAZ County File Truck Employment	Highway Distance Skim Truck PA Table Truck II PA Matrix Truck Trips by Sector Truck Trips by County Truck Trips by SubAB Truck Trip Frequency <AM/PM/MD/NT> Truck Trips
	Import External Truck Trips	This steps takes the external truck trip matrices created by the off-model external truck trip model, and integrates it into the model OD truck trip matrices.	Final External Truck Matrix <AM/PM/MD/NT> Truck Trips	<AM/PM/MD/NT> Truck Trips
	Convert PA trips to OD Trips	This step converts all the mode choice PA peak and offpeak trip matrices into AM,MD,PM and NT OD trip matrices. The step first uses departure and return rates by trip purpose and time period to convert the mode choice PA matrices into OD matrices. The OD matrices are summarized by purpose into DA, SR2 and SR3 trips. Then, input air trips, truck trips, port trips, and external trips are added to the OD trip tables to produce final OD trip matrices ready for assignment. This step also runs the HOV diversion model, which takes the HOV2 and HOV3+ trips and divides them into HOV used and non-HOV used trips For the subregional model, this step creates the intra-regional OD matrices from the diagonals of the aggregated zones.	<PK/OP> <Purpose> MC Trips <PK/OP> HBWS IS MC Trips Hourly Table <AM/PM/MD/NT> Truck Trips <AM/PM/MD/NT> Airtrips <AM/PM/MD/NT> Port Trips <AM/PM/MD/NT> XIIX Trips <AM/PM/MD/NT> XX Trips	<AM/PM/MD/NT> OD Trips Interim\<AM/MD/PM/NT>_CentroidOD.mtx ODTable\Outputs\<AM/MD/PM/NT>_Intraregional_OD.mtx
PA to OD	Report OD Trips	This step reports out total trips by time period, breaking down the trips by car type and truck type, external trips, ixxi trips, port trips, and air trips	<AM/PM/MD/NT> OD Trips <AM/PM/MD/NT> Truck Trips <AM/PM/MD/NT> Airtrips <AM/PM/MD/NT> Port Trips <AM/PM/MD/NT> XIIX Trips <AM/PM/MD/NT> XX Trips	OD Trip Report File
	Calculate Transit OD Matrices	This steps takes all of the transit trips from the mode choice PA peak and offpeak matrices and aggregates them by transit mode to create total peak and offpeak transit trip matrices	<PK/OP> <Purpose> MC Trips <PK/OP> <Purpose> MC SubTrips	<PK/OP> Transit Trip Matrix
	Calculate PNR Trips for Highway Assignment	Currently disabled		

PA to OD	Compute External Trips through Fratar	This step computes future year XI-IX and XX external trips by time period for DA, SR2 and SR3 modes. The step uses cordon counts estimates of external volumes along with base year XX and IX-XI trips and base year total OD matrices to project future year XI-IX and XX external trips. This step then also estimates IX and XI marginals by trip purpose to apply to future trip generation loops which reduce external trips. All additional inputs are provided in the EXTLM\Inputs directory	AM XX Trips Cordon_Counts.bin peak_pa_before_ix_reductions_2003.bin offpeak_pa_before_ix_reductions_2003.bin XX<AM/PM/MD/NT>_2003.mtx <AM/PM/MD/NT>XIIX_2_2003.mtx Ix_prods_2003.bin XI__attrs_2003.bin Unsurveyed_2003.bin Timeofday_2003.bin Paveh_2003.mtx Avo_2003.bin	<AM/PM/MD/NT> XIIX Trips <AM/PM/MD/NT> XX Trips IX Prods IX Attrs
Assignment	Run Transit Assignment	This step takes the transit OD matrices from the PA to OD step and assigns them onto the various modal transit networks. The outputs for each modal assignment are combined into one table which calculates total flows. Walk and drive access and egress flows are also estimated, along with transfer movements between transit modes.	Highway DB Transit RS Mode Table Mode Xfer Table <PK/OP> Transit Move Table	<PK/OP> Transit Move Matrix <PK/OP> Transit Summary Flow <PK/OP> Transit Summary Nontransit Flow <PK/OP> Transit Summary OnOff
	Transit PNR Transit flow to highway links	This step takes the link drive flows calculated from transit assignment and transfers them into preloaded flow for input into the highway assignment	<PK/OP> Transit Summary Nontransit Flow Highway DB	Highway DB Highway Net

Assignment	Create Transit Reports	This step creates the following transit reports: On/Offs, Passenger Miles, Passenger Hours, Total Run Time, by access mode and time period, and summary by route On/Offs, Passenger Miles, Passenger Hours, Total Run Time, by access mode and time period, and summary by mode On/Offs, Passenger Miles, Passenger Hours, Total Run Time, by access mode and time period, and summary by route carrier	Transit RS Highway DB <PK/OP> Transit Summary Flow <PK/OP> Transit Summary OnOff	Transit Route Report Transit Carrier Report Transit Mode_Carrier Report Transit Route Carrier_Route Report
	Calculate Average OD Matrices	This step calculates the average of trip OD matrices from previous feedback iterations. One of three options can be invoked in this step: Macro "Calculate Average OD MSA" averages OD matrices through a 1/iteration MSA step size Macro "Calculate Average OD Rolling" averages OD matrices through a ½ MSA step size Macro "Calculate OD No Average" disables OD averaging, but makes copies of previous iteration OD matrices in order to calculate feedback convergence	AM OD Trips MD OD Trips	AM OD Trips + "Iteration number" MD OD Trips + "Iteration number"
	Run Feedback Traffic Assignment Model	This step runs the AM and MD period multiclass traffic assignment. DA, SR2, SR3, Light Truck, Medium Truck and Heavy Truck trip matrices make up the classes for the assignment. Bus PCE and drive-to-transit flows are used as preloads into the assignment. A constrained Akcelik volume delay function is used calculate flow delays. Congested times and costs from the assignment results are fed into the peak and offpeak period times in the network to be used in the skimming modules for the next feedback loop. The Truck PCE option is also run for this step, as well as the HOV diversions during the midpoint and end of the assignment. For the subregional model, the intraregional, regular, and centroid assignments are also run here.	Highway DB Highway Net <AM/MD> OD Trips Interim\<AM/MD>_CentroidOD.mtx ODTable\Outputs\<AM/MD>_Intraregional_OD.mtx	Highway Net Highway AM Final Flow Table Highway MD Final Flow Table Assign\Outputs\<AM/MD>_Intraregion_flow.bin Assign\Outputs\<AM/MD>_Centroid_Flow.bin
	Run Final Traffic Assignment Model	This step runs the PM and NT period multiclass traffic assignment. DA, SR2, SR3, Light Truck, Medium Truck and Heavy Truck trip matrices make up the classes for the assignment. Bus PCE and drive-to-transit flows are used as preloads into the assignment. A constrained Akcelik volume delay function is used calculate flow delays. This step is only run in the final loop The Truck PCE option is also run for this step, as well as the HOV diversions during the midpoint and end of the assignment For the subregional model, the intraregional, regular, and centroid assignments are also run here..	Highway DB Highway Net <PM/NT> OD Trips Interim\<PM/NT>_CentroidOD.mtx ODTable\Outputs\<PM/NT>_Intraregional_OD.mtx	Highway Net Highway PM Final Flow Table Highway NT Final Flow Table Assign\Outputs\<PM/NT>_Intraregion_flow.bin Assign\Outputs\<PM/NT>_Centroid_Flow.bin

Assignment	Calculate daily highway vehicle flow	This step combines all of the period flow tables to calculate a daily flow table. The step calculates daily flow, VMT, and VHT from the period assignment tables.	Highway AM Final Flow Table Highway MD Final Flow Table Highway PM Final Flow Table Highway NT Final Flow Table	Hwy Day Final Flow Table
	Update the highway network with congested times and costs	This step is part of the feedback loop. It takes the calculated MSA time, Flow and Cost and updates the network. The MSA time will then be used as the cost field in the highway skimming step in the next loop. There is an option to invoke either a ½ step size (rolling average) or a 1/iteration step size for this method. The macro "update rolling average costs" invokes the ½ step size method. The macro "update msa costs" invokes the 1/iteration method.	Highway AM Final Flow Table Highway MD Final Flow Table	Highway Net

	Create Assignment output reports files	This step produces several report files from highway assignment results: lodinfo file by peak period intras file by peak period VMT by county and air basin Count vs. flow by screenline VMT, VHT, Count vs. Flow by facility type VMT, VHT, Count vs. Flow by facility group VMT, VHT, Count vs. Flow by Area Type VMT, VHT, Count vs. Flow by County VMT, VHT, Count vs. Flow by Volume Group VMT, VHT, Count vs. Flow by Number of Lanes Total VMT, VHT, Delay, and Average Speed by time period	Highway DB TAZ County File Hwy <AM/MD/PM/NT> Final Flow Table Hwy Day Final Flow Table MMA Counts Table	Intrazonal County Report Hwy <AM/MD/PM/NT> Lodinfo File Hwy <AM/MD/PM/NT> Intra File Hwy Intra Air-Basin VMT Report Hwy Intra Sub-Air-Basin VMT Report Hwy Air-Basin LM VMT Report Hwy Sub-Air-Basin LM VMT Report Hwy Air-Basin HDT VMT Report Hwy Sub-Air-Basin HDT VMT Report Hwy Air-Basin TOT VMT Report Hwy SubAB TOT VMT Report Hwy Sub-Air-Basin LHDT VMT Report Hwy Air-Basin MHDT VMT Report Hwy Sub-Air-Basin MHDT VMT Report Hwy Air-Basin HHDT VMT Report Hwy Sub-Air-Basin HHDT VMT Report Hwy Stats Report Intrazonal TAZ Report Screenlines by Freeway_Screenline Screenlines by Arterial_Screenline Screenlines by Total_Screenline Screenlines by Link Report Screenlines by Location Screenlines by Volume Group Screenlines by Facility_Type Screenlines by Facility_Group Screenlines by Area_Type Screenlines by County Screenlines by Lanes

Assignment	Calculate flows and stats after Emission factors	This step takes the output assignment flows from traffic assignment, and factors these flows by sub-area basin and flow type according to an input table. After the flows are re-calculated, congested times and speeds are re-calculated. Then the assignment report outputs, highway skims, and transit skims are recalculated. For the transit skim, only a “generic” mode skim is calculated, which includes all transit modes and sets weight factors for all modes to 1.0	Emissions Factors Highway <AM/MD/PM/NT> Final Flow Highway DB Highway Net	Highway <AM/MD/PM/NT/DAY> Final Flow EM Highway Net Highway Time <PK/OP> EM Highway DB Transit <PK/OP> <Auto/Walk> GENERIC Skim Hwy <AM/PM/MD/NT> Intra File EM Hwy <AM /PM/MD/NT> Lodinfo File EM Hwy Air-Basin LM VMT Report EM Hwy Sub-Air-Basin LM VMT Report EM Hwy Air-Basin LHDT VMT Report EM Hwy Sub-Air-Basin LHDT VMT Report EM Hwy Air-Basin MHDT VMT Report EM Hwy Sub-Air-Basin MHDT VMT Report EM Hwy Air-Basin HHDT VMT Report EM Hwy Sub-Air-Basin HHDT VMT Report EM Hwy Air-Basin HDT VMT Report EM Hwy Sub-Air-Basin HDT VMT Report EM Hwy Air-Basin NonIZ TOT VMT Report EM Hwy SubAB NonIZ TOT VMT Report EM Hwy Intra Air-Basin VMT Report EM Hwy Intra Sub-Air-Basin VMT Report EM Hwy Air-Basin TOT VMT Report EM Hwy SubAB TOT VMT Report EM Hwy Stats Report EM Intrazonal TAZ Report EM Intrazonal County Report EM

Assignment	Move Route System Back to Master Database	This step moves the route system back from the copy database (Highway DB) to the master database (Highway Master DB)	Transit RS	Transit RS
	Export specified reports to Excel format	This step exports any specified table to Excel format. The tables to export are read from User\Inputs\xls_converter.dbf and are noted either by file name (FILE type) or name in the model (MODEL type). The ouput XLS file is stored under the User\Inputs directory.	XLS Converter Table	Excel file in User\Inputs
	Utility to aggregate any SCAG matrix	This step takes any matrix from the model, aggregates it based on an input correspondence file, and converts it into CSV format. The matrices to export are read from User\Inputs\Matrix_aggregate.dbf (MODEL type refers to matrix file as defined by the model table) (FILE type refers to specific matrix file name) (CORR_TABLE) refers to the correspondence table as defined by the model table (MATRIX_ID) refers to the field in the correspondence table with the taz ids (AGG_ID) refers to the aggregation ID field in the correspondence table	Aggregate Control Table	Aggregated CSV files in the same directory as the input matrix

	Calculate convergence differences in highway and transit skim matrices	This step calculates the following feedback convergence statistics between each feedback iteration: Highway Skim RMSE and relative difference, AM trip OD matrix RMSE and relative difference, vehicle flow RMSE and relative difference, Skim*OD RMSE and relative difference, Transit Express Bus Skim RMSE and relative difference	Hwy PK DA Skim Transit PK Walk Express Skim AM OD Trips Skim and trip matrices for each feedback iteration	Assign\Outputs\Feedback_convergence.bin
	Clean up Files	This step deletes all interim and unnecessary files after the model run is complete	All files in interim directory All .tps files in skim directory All duplicate files used for convergence calculations	

Appendix C: SCAG Subregional Model Input Files, Output Files and Parameters

This appendix describes all the input and output files and parameters for each step of the SCAG Subregional Model. Most of these files are also found in the Regional version of the model.

Subregion Specific Files

Subregion File (User\Subregion.bin)

This file is created during the conversion utility that converts regional data inputs to subregional data inputs.

Fieldname	Description
ID	ID of table (autocalculated)
RegionTAZ	Original regional TAZ number of zone
SubregionTAZ	Assigned Subregion TAZ number
AGGType	Aggregation type of zone. Values are: A: Regional TAZ zone is to be aggregated into SubregionTAZ. Typically used for zones outside the subregion. U: Zone is to be left preserved and assigned a Subregion TAZ number. Typically used for zones bordering the subregion, for external and port zones, and for zones inside the subregion that are not split. D: Regional TAZ is to be disaggregated and assigned a Subregion TAZ number. Typically used for zones inside the subregion that are split.

Socioeconomics Override File (User\OverRide_Dem.bin)

This file is used to override the regional demographics inputs.

Fieldname	Description
OVERTAZ	TAZ number to override demographic data
POPULATION	Override Population
HOUSEHOLDS	Override Households
EMPLOYMENT	Override Employment
KINDERGARTEN	Override K12 enrollment
COLLEGEENR	Override College enrollment

Intraregional and Centroid Connector OD Files

File	Description
ODTable\Outputs\<AM/MD/PM/NT>_IntraRegion_OD.mtx	IntraRegion OD matrix that expands the intrazonal trips of the aggregated zones into the local TAZs
Assign\Outputs\<AM/MD/PM/NT>_Intraregion_flow.bin	Assigned intraregional trips from Intraregional assignment
Interim\<AM/MD/PM/NT>_CentroidOD.mtx	Trip matrix that shifts trips from superzone connector to local tazs
Assign\Outputs\<AM/MD/PM/NT>_Centroid_Flow.bin	Assigned shifted supercentroid connector onto local links

Allocation File (interim\random_agg.bin)

This file is a temporary file that is created by the model, and specifies for each aggregated taz, the allocated regional taz for production and attraction:

Fieldname	Description
AGGZONE	Aggregated Zone ID
RANDOM_P	Regional TAZ "picked" for this aggregated zone
RANDOM_A	Regional TAZ "picked" for this aggregated zone

Initialization

Network Link Attributes (Highway Master DB:scag_network_ver_30.dbd)

Field	Description
ID	Internal Line ID automatically generated by TransCAD
Length	GIS Length determined by TransCAD
Dir	0 = Two way street, 1 or –1 = One way street
AB/BA_Facility_Type	Link Facility Coding described in table below
AB/BA_PostedSpeed	Posted Speed Limit
AB/BA_<Period>LANES	Number of one-directional lanes by time period including all auxiliary, thru and other lanes
Type1_Thru Lane	Number of freeway thru lanes
Type2_Aux Lane	Number of freeway auxiliary lanes Type3_ther Fwy
Type3_Other Fwy Lane	Number of Other freeway lanes
Toll_flag	Flag field to indicate toll facility
TRUCK_CLIMB*	Flag field to indicate truck climbing link
HOV_FLAG	Flag field to indicate HOV link
Signals_Flag*	Flag field to indicate Advanced signals lane
Truck_Prohibit_Flag	Flag field to indicate a truck prohibition
Speed_Multiplier	Factor to multiply free flow speeds. Used for Smart Streets modeling.
Capacity_Multiplier	Factor to multiply capacity. Used for Smart Streets modeling.
RSA*	Link RSA
County	Link County
TAZ	Link TAZ
Air_Basin	Link Air Basin
Sub_Air_Basin	Link Sub Air Basin
AB/BA_Median_Split*	Code to indicate median split in link
AB/BA_AreaType	Link Area Type
MMA_Count*	Count ID Number
COUNTID*	Alternate Count ID Number
AB/BA_GradePercent*	Grade Percent calculated from USGS
AB/BAGrade*	Grade calculated from USGS

AB/BA TYPE	Toll Link type: 31 = Entering toll link 32 = Toll link 33 = Exiting toll link Calculated in model from TOLLDATA TRANPLAN file
AB and BA SERV TIME	Service time for type 32 links, calculated from TOLLDATA file
AB and BA TOLL LANES	Number of toll lanes for type 32 links, calculated from TOLLDATA file
AB and BA TOLLV AM, PM, MD, NT	Toll values for type 32 links, calculated from TOLLDATA file
CCSTYLE*	Color and line styling field for the links (not used for model)
WALKTIME	Link walk time
MODE	Link Mode: 1=drive agress, 2=highway, 4=access to rail, 24=rail, 26=parking cost link, 25=drive egress
AB/BA_<PK/OP>TIME	Peak and offpeak pre-calculated congested travel time
AB/BA_<AM/PM/MD/NT>PENALTY	Link time penalty assigned to HOV entrance links, otherwise zero
AB/BA_<AM/MD/PM>PARK	Flag field to indicate parking restriction on link by time period
AB/BA_<PK/OP>PARKCOST	Peak/Offpeak parking cost for link going into Urban Rail, Metrolink or HSR station
AB/BA_<PK/OP>COST	Peak and offpeak pre-cacluated congested cost
GRADE_<A/B/C/D/E/F/AVG>*	Grade Information from SCAG
SCREENLINE	Screenline Number
AB/BA/TOT_ADT	Total LM and HDT Count
AB/BA/TOT_MDV	LM Count
AB/BA/TOT_HD	HDT Count
PostMile_OrigID*	ID field from Caltrans Postmile database
PostMile_ObjectID*	ID field from Caltrans Postmile database
PostMile*	Caltrans Postmile
PEMS_Direction*	Direction from PEMS Database
PEMS_ID*	PEMS ID

* Denotes field that is not used in the model

The table below describes the link facility type coding:

Facility Type

1 - Freeways

10 – Freeway

2 - HOV

20 – HOV 2
21 – HOV 3+
22 – HOV – HOV Connector
23 – HOV Slip ramp OUT (Slip ramp from HOV to MF)
24 – HOV Slip ramp IN (Slip Ramp from MF to HOV)
25 - HOV-MF dummy links

3 - Expressway/Parkway

30 – Undivided
31 – Divided, Interrupted
32 – Divided, Uninterrupted

4 - Principal Arterial

40 – Undivided
41 – Divided
42 – Continuous Left Turn

5 - Minor Arterial

50 – Undivided
51 – Divided
52 – Continuous Left Turn

6 – Major Collector

60 – Undivided
61 – Divided
62 – Continuous Left Turn

7 - Minor Collector

70 – Undivided
71 – Divided
72 – Continuous Left Turn

8 – Ramps

80 – Freeway to Freeway Connector
81 – Freeway to arterial
82 – Arterial to freeway
83 – Ramp Distributor
84 – Ramp from Arterial to HOV
85 – Ramp from HOV to Arterial
86 – Collector distributor
87 – Shared HOV Ramps to MF
89 – Truck only

9 – Trucks

90 – Truck only

100 – Centroid connector

Flag fields:

Flag fields:

Auxiliary Flag:

0 or missing – none
1 – 1 auxiliary lane
2 – 2 auxiliary lanes
3 – 3+ auxiliary lanes

Truck Climbing Lanes flag:

0 – None
1 – 1 Truck Climbing Lane
2 – 2 Truck Climbing Lane
3 – 3 + Truck Climbing Lane

Toll flag:

0 – None
1 – Toll road
0 – None
1 – Signal and progression optimized streets
2 – Divided and signal optimized
3 – Continuous left-turn Lanes

HOV Operation flag:

0 – Standard HOV
1 – HOV AM Peak Only
2 – HOV PM Peak Only
3 – HOV AM & PM Peak Only

Truck Prohibition flag:

0 - Truck Not Prohibited
1 - Trucks Prohibited

Network Node Attributes (scag_network_ver_30.dbd)

Field	Description
ID	Internal Node ID automatically generated by TransCAD, nodes 1-3712 reflect the TAZ number
Longitude, Latitude*	Longitude and Latitude position of node automatically determined by TransCAD
Exit*	Interchange Exit Number
[Zone Centroid]	Y = Node is a zone centroid, N = not
CentroidCode	1= Centroid, any other value = not a centroid
CCSTYLE*	Style code for display purposes
PARK	1 = Park and Ride Node, 2 = Kiss and Ride Node
PNR_DISTANCE	Maximum allowable distance from centroid to PARK node
KNR_DISTANCE	Maximum allowable distance from centroid to KNR node
Transit_Node*	Flag field to denote node as part of a transit link (Urban Rail, CR, or HSR)
Freeway_Node*	Flag field to denote node as part of a freeway link
Arterial_Node*	Flag field to denote node as part of an arterial link
Toll_Node*	Flag field to denote node as part of a toll link
Intersection_Type*	Field to denote intersection type (Freeway, arterial, etc.)
Node_Type*	Field to denote node type
METROLINK_NODE	Flag field to denote Metrolink station node
[URBAN RAIL_NODE]	Flag field to denote Urban Rail station node
Air_Basin_Node*	Air Basin Number (filled in by utility)
Rampnode*	Obsolete
PostMile_OrigID*	Caltrans post mile ID
PostMile_ObjectID*	Caltrans postmile Object ID
PostMile*	Postmile value
Sub_air_basin_Node*	Subair Basin Number (filled in by utility)
County_Node*	County number (filled in by utility)
RSA_Node*	RSA Number (filled in by utility)
TAZ_Node*	TAZ Number (filled in by utility)
HSR_Node	Flag field to denote HSR station node

* Denotes fields not used in the model

Transit RS Attributes (SCAGRS_ver30.rts)

Field	Description
Route_ID	Route ID number internally generated by route editor
Route_Name	Unique route name assigned to route by user
Distance	Length of route in miles
Route Number/Name	Route Name originally from Transtar system
Route Headsign*	Sign on route vehicles from Transtar
Direction*	Direction of route from Transtar
Route Carrier	Route company from Transtar
Effective Date*	Date of operation from Transtar
Transit Type*	Type of route (obsolete)
PK_HEADWAY	Peak period headway (missing or zero indicates route not available during period)
OP_HEADWAY	OffPeak period headway (missing or zero indicates route not available during period)
MODE	Mode of route: 10: Commuter Rail 11: MTA Local Bus 12: MTA Express Bus 13: Urban Rail (MTA MetroRail) 14: Los Angeles County Express Bus 15: Los Angeles County Local Bus (Group 1) 16: Los Angeles County Local Bus (Group 2) 17: Los Angeles County Local Bus (Group 3) 18: Los Angeles County Local Bus (Group 4) 19: All Other Local Bus 20: All Other Express Bus 21: High Speed Rail (only in future networks) 22: MTA Rapid Bus
PK_INIT_WAIT	Peak Initial Wait Time (calculated by model)
OP_INIT_WAIT	OffPeak Initial Wait Time (calculated by model)

* Denotes fields not used in the model

Transit RS Route Stop Attributes (SCAGRS_ver30s.dbd)

Field	Description
ID	Stop ID generated by the route editor
Longitude	Stop longitude
Latitude	Stop latitude
Route_ID	Route ID of the stop consistent with the route layer
Pass_Count	If the route passes over the link more than once, the "pass" of the stop on the link, automatically calculated
Milepost	Milepost of the stop on the route, in miles
STOP_ID	Stop ID generated by the route editor
UserID*	Not Used
[Stop Number]*	From Transtar (Not Used)
[Special Access]*	From Transtar (Not Used)
[Turn Only]*	From Transtar (Not Used)
Timepoint*	From Transtar (Not Used)
Reordered*	From Transtar (Not Used)
NODEID	Node ID stop is associated with (generated by running Fix Routes utility)
AM_TIME*	Obsolete
AM_TRUETIME*	Obsolete
MD_TIME*	Obsolete
MD_TRUETIME*	Obsolete
REALSTOP	1=Include stop in transit network generation 0=Skip stop
PK_RAILTIME	Peak rail travel time from stop to next stop
OP_RAILTIME	OffPeak rail travel time from stop to next stop
[Transit Type]*	Obsolete
STRNODE	Obsolete
TruePhysicalID	Obsolete
Seq	Obsolete
VER25ID	Obsolete
SPEED	Speed of rail stop (not used)
[Next Milepost]	Next milepost of rail stop (not used)
DIST	Length from stop to next stop (not used)
Mode	Mode of stop (not used)
Route_Name	Route of stop (not used)
Station_Name	Station name of stop (not used)
Fare Zone	99 = non-commuter rail stop where fare is not zonal based All other numbers: Fare zone number as depicted in the fare matrix file

* Denotes fields not used in the model

TAZ_DB (Geography\taz4109.dbd)

Field	Description
ID	**TAZ Number**
Area	**Area in Square Miles**
CSA	**CSA Number**
ID:1	**Ignored**
AREA:1	**Ignored**
PERIMETER	**Ignored**
CNTY	**County Number**
RSA	**RSA Number**
AIRDB	**Air Basin**
TAZ2K	**Alternate TAZ Number**
SQ_MILE	
ACRE	
Air_Basin	**Air Basin**
Sub_Air_Basin	**Sub-Air Basin**

CSA_Geography (Geography\SCAG_CSA.dbd)

Field	Description
ID	**CSA Number**
Area	**Area**
CSA	**CSA Number**
First RSA	**Ignored**
CNTY	**County Number**

County_Geography (Geography\SCAG_County.dbd)

Field	Description
ID	**County Number**
Area	**Area**
ID:1	**Ignored**
AREA:1	**Ignored**
PERIMETER	**Ignored**
COUNTY_ID	**Ignored**
COUNTY	**Ignored**
NAME	**County Name**
POP97	**1997 Population**
POP25	**2025 Population**

RSA_Geography (Geography\SCAG_RSA.dbd)

Field	Description
ID	**RSA Number**
Area	**Area**
RSA	**RSA Number**

District_Geography (Geograph\SCAG_Districts.dbd)

Field	Description
ID	**District Number**
Area	**Area**
DISTRICT	**District Number**
CNTY	**County Number**

Speed Table (networks\Inputs\speed_table.bin)

Field	Description
ASSN_GRP	**Facility Type Number**
AREATYPE	**Area Type Number**
POSTSPEED	**Posted Speed**
R_SPEED	**Free Flow Speed**

Capacity Table (networks\Inputs\cap_complex.bin)

Field	Description
FACILITY_TYPE	Facility Type Number
AREA_TYPE	Area Type Number
CROSSING_LANES	Number of total crossing lanes at BNODE intersection
ON_LANES	Total number of two-way lanes
R_CAPACITY	Hourly capacity per lane

VDF Table (networks\Inputs\vdf_table.bin)

Field	Description
FacilityType	**Facility Type Number**
AreaType	**Area Type Number**
Lanes	**Number of Lanes**
R_Length	**Default length input into Akcelik Function**
R_AkcelikA	**Akcelik A parameter**
R_AkcelikC	**Akcelik C parameter**
R_BPR_Alpha	**BPR Alpha parameter**
R_BPR_Beta	**BPR Beta parameter**

MMA Counts Table (networks\Inputs\screenline_23.bin)

Field	Description
SCAG_SL_ID	**SCAG Screenline ID numer**
SCREENLINE	**Screenline**
TransCAD_ID	**TransCAD Link ID**
Type	**Link Type**
DIR	**Link direction**
Vol_Grp	**Screenline volume group number**
ON_STREET	**Street name screenline is on**
XSTREET	**Cross Street**
FACILITY_TYPE	**Link facility type**
SCRLANES	**Screenline number of lanes**
SCRAREATYPE	**Screenline area type**
SCRCOUNTY	**Screenline County**
AB_LM_COUNT	**Car vehicle count in AB direction**
BA_LM_COUNT	**Car vehicle count in BA direction**
AB_HDT_COUNT	**Truck vehicle count in AB direction**
BA_HDT_COUNT	**Truck vehicle count in BA direction**
Total_Link	**Total vehicle count in both directions**

Transit Speed Curve Table (networks\Inputs\speedCurve.bin)

Field	Description
CLASS	Curve equation number
HWY_L	Highway low speed
HWY_H	Highway high speed
TRN_L	Transit low speed
TRN_H	Transit high speed
SLOPE	Coefficient slope

Transit Speed Curve Lookup Table (networks\Inputs\spdCurveLkup.bin)

Field	Description
AT	Area Type
FT	Facility Type
LocalCurve	Curve equation number for local bus, transferred onto transit network
ExprsCurve	Curve equation number for express bus, transferred onto transit network
RapidCurve	Curve equation number for rapid bus, transferred onto transit network

Mode Table (networks\Inputs\modes_expand.bin)

Field	Description
MODE_NAME	Name of transit mode
MODE_ID	ID of transit mode
USE_LOCAL, EXPRESS, URBAN_RAIL, COMMUTER_RAIL, DRIVE_EGRESS, GENERIC, HSR, SHUTTLE, SHUTTLE_WALK, AUTO_SHUTTLE	Flag field to enable mode dependent on skim type
IMP_FLD	Use this link travel time field for this mode
RFAC_LOCAL, EXPRESS, COMMUTER_RAIL, URBAN_RAIL, DRIVE_EGRESS, GENERIC, HSR, SHUTTLE, SHUTTLE_WALK, AUTO_SHUTTLE	Mode factor to use for mode dependent on skim type
WAITFAC	Wait time weight by mode
XFERPEN	Transfer penalty by mode
WAITMAX_PK, OP	Maximum waiting time for Peak and Off-Peak periods
FARE_PK, OP	Transit fare for Peak, Off-Peak mode
FareMatrix_PK, OP	Fare matrix core to use in fare matrix for mode
FareType	1 = Use Flat Fare, 2 = Use Fare Matrix Fare

Mode Xfer Table (networks\Inputs\mode_xfer.bin)

Field	Description
FROM	From Mode
TO	To Mode
STOP	At stop
Prohibition	1 = Prohibit this mode-to-mode transfer
FARE_PK, OP	Fare paid for transfer

Fare Links Table (networks\Inputs\linkfares.bin)

Field	Description
FromNode	From Node ID
ToNode	To Node ID
MODE_L	Low Mode
MODE_H	High Mode
FARE	Fare charged for passing through nodes
ONEWAY	Ignored
COMMENTS	Ignored

Fare Matrix (networks\Inputs\FareMatrix.mtx)

Matrix	Description
METROLINK_PK	**Metrolink fares peak period**
METROLINK_OP	**Metrolink fares, off peak**
HSR_PK	**High speed rail fares, peak**
HSR_OP	**High speed rail fares, offpeak**

Truck Grade Factors (Assign\Inputs\truck_grade_factors.bin)

Field	Description
PERCENT_TRUCKS	**Percentage of vehicle flow that are trucks**
PERCENT_GRADE	**Percent grade of link**
LINK_LENGTH	**Truck Length of link, in miles**
R_LIGHT_HEAVY	**PCE Factor for light-heavy trucks**
R_MEDIUM_HEAVY	**PCE Factor for medium-heavy trucks**
R_HEAVY_HEAVY	**PCE Factor for heavy-heavy trucks**

Truck Congestion Factors (Assign\Inputs\truck_congestion_factors.bin)

Field	Description
PERCENT_TRUCKS	**Percentage of vehicle flow that are trucks**
VOC	**Congestion level of links (VOC Ratio)**
R_LIGHT_HEAVY	**PCE Factor for light-heavy trucks**
R_MEDIUM_HEAVY	**PCE Factor for medium-heavy trucks**
R_HEAVY_HEAVY	**PCE Factor for heavy-heavy trucks**

Truck Composite Factors (Assign\Inputs\truck_composite_factors.bin)

Field	Description
PERCENT_TRUCKS	**Percentage of vehicle flow that are trucks**
R_LIGHT_HEAVY	**PCE Factor for light-heavy trucks**
R_MEDIUM_HEAVY	**PCE Factor for medium-heavy trucks**
R_HEAVY_HEAVY	**PCE Factor for heavy-heavy trucks**

Output

Output Files from Initialization

File	Description
Highway Net	**Output highway .net network used for skims, assignments, etc.**
Highway DB	**Copy of highway geography with additional fields added and calculated by model**
Transit PK Net	**Output generic peak transit .tnw network**
Transit OP Net	**Output generic offpeak transit .tnw network**
Transit PK LOCAL Net	**Output peak transit .tnw network for walk and drive local skims and assignments**
Transit OP LOCAL Net	**Output offpeak transit .tnw network for walk and drive local skims and assignments**
Transit PK EXPRESS Net	**Output peak transit .tnw network for walk and drive express bus skims and assignments**
Transit OP EXPRESS Net	**Output offpeak transit .tnw network for walk and drive express skims and assignments**
Transit PK COMMUTER_RAIL Net	**Output peak transit .tnw network for walk and drive commuter rail skims and assignments**
Transit OP COMMUTER_RAIL Net	**Output offpeak transit .tnw network for walk and drive commuter rail skims and assignments**
Transit PK URBAN_RAIL Net	**Output peak transit .tnw network for walk and drive urban rail commuter rail skims and assignments**
Transit OP URBAN_RAIL Net	**Output offeak transit .tnw network for walk and drive urban rail skims and assignments**
Transit PK DRIVE_EGRESS Net	**Output peak transit .tnw network for walk and drive egress commuter rail skims and assignments**
Transit OP DRIVE_EGRESS Net	**Output off peak transit .tnw network for walk and drive egress commuter rail skims and assignments**
Transit PK GENERIC Net	**Output generic peak transit .tnw network for all modes skims and assignments**
Transit OP GENERIC Net	**Output generic offpeak transit .tnw network for all modes skims and assignments**
Transit PK HSR Net	**Output peak transit .tnw network for walk and drive high speed rail skims and assignments**
Transit OP HSR Net	**Output offpeak transit .tnw network for walk and drive high speed rail skims and assignments**
Transit PK SHUTTLE Net	**Output peak transit .tnw network for walk and drive shuttle access high speed rail skims and assignments**
Transit OP SHUTTLE Net	**Output off peak transit .tnw network for walk and drive shuttle access high speed rail skims and assignments**
Transit PK LOCAL TPS	**Transit peak local transit path set used to speed up transit assignments**
Transit OP LOCAL TPS	**Transit offpeak local transit path set used to speed up transit assignments**
Transit PK EXPRESS TPS	**Transit peak express transit path set used to speed up transit assignments**
Transit OP EXPRESS TPS	**Transit offpeak express transit path set used to speed up transit assignments**
Transit PK COMMUTER_RAIL TPS	**Transit peak commuter rail transit path set used to speed up transit assignments**
Transit OP COMMUTER_RAIL TPS	**Transit offpeak commuter rail transit path set used to speed up transit assignments**
Transit PK URBAN_RAIL TPS	**Transit peak urban rail transit path set used to speed up transit assignments**
Transit OP URBAN_RAIL TPS	**Transit offpeak urban rail transit path set used to speed up transit assignments**
Transit PK DRIVE_EGRESS TPS	**Transit peak drive egress commuter rail transit path set used to speed up transit assignments**
Transit OP DRIVE_EGRESS TPS	**Transit offpeak drive egress commuter rail transit path set used to speed up transit assignments**
Transit PK GENERIC TPS	**Transit peak all modes transit path set used to speed up transit assignments**
Transit OP GENERIC TPS	**Transit offpeak all modes transit path set used to speed up transit assignments**
Transit PK HSR TPS	**Transit peak high speed rail transit path set used to speed up transit assignments**
Transit OP HSR TPS	**Transit offpeak high speed rail transit path set used to speed up transit assignments**
Transit PK SHUTTLE TPS	**Transit peak high speed rail shuttle access transit path set used to speed up transit assignments**
Transit OP SHUTTLE TPS	**Transit offpeak high speed rail shuttle access transit path set used to speed up transit assignments**

Network Lane Miles AM/PM/MD/NT (networks\Outputs\Network_Lane_Miles_XX.csv)

Field	Description
FACTYPE	Facility Type
SSCAB	Network lanes miles in SSCAB sub air basin
SCAB LA	SCAB LA
SCAB Orange	SCAB Orange
SCAB Riverside	SCAB Riverside
SCAB San Bernardino	SCAB San Bernardino
MDAB LA	MDAB LA
MDAB Victor Valley	MDAB Victor Valley
MDAB Searles Valley	MDAB Searles Valley
MDAB SB Desert	MDAB SB Desert
MDAB Riv Desert	MDAB Riv Desert
MDAB Blythe	MDAB Blythe
SSAB Coachella	SSAB Coachella
SSAB Imperial West	SSAB Imperial West
SSAB Imperial East	SSAB Imperial East
TOTAL REGION	Network lane miles for entire region

Network Capacity Miles AM/PM/MD/NT (networks\Outputs\Network_Capacity_Miles_XX.csv)

Field	Description
FACTYPE	Facility Type
SSCAB	Network capacity miles in SSCAB sub air basin
SCAB LA	SCAB LA
SCAB Orange	SCAB Orange
SCAB Riverside	SCAB Riverside
SCAB San Bernardino	SCAB San Bernardino
MDAB LA	MDAB LA
MDAB Victor Valley	MDAB Victor Valley
MDAB Searles Valley	MDAB Searles Valley
MDAB SB Desert	MDAB SB Desert
MDAB Riv Desert	MDAB Riv Desert
MDAB Blythe	MDAB Blythe
SSAB Coachella	SSAB Coachella
SSAB Imperial West	SSAB Imperial West
SSAB Imperial East	SSAB Imperial East
TOTAL REGION	Network capacity miles for entire region

Network Centerline Miles (networks\Outputs\Network_Centerline_Miles.csv)

Field	Description
FACTYPE	Facility Type
SSCAB	Network centerline miles in SSCAB sub air basin
SCAB LA	SCAB LA
SCAB Orange	SCAB Orange
SCAB Riverside	SCAB Riverside
SCAB San Bernardino	SCAB San Bernardino
MDAB LA	MDAB LA
MDAB Victor Valley	MDAB Victor Valley
MDAB Searles Valley	MDAB Searles Valley
MDAB SB Desert	MDAB SB Desert
MDAB Riv Desert	MDAB Riv Desert
MDAB Blythe	MDAB Blythe
SSAB Coachella	SSAB Coachella
SSAB Imperial West	SSAB Imperial West
SSAB Imperial East	SSAB Imperial East
TOTAL REGION	Network centerline miles for entire region

Transit Supply Report (networks\Outputs\Transit_Supply.csv)

Field	Description
MODE	Mode ID
Peak_Routes	Number of routes in peak period
Offpeak_Routes	Number of routes in offpeak period
Peak_Vehicles	Number of vehicles in peak period
Offpeak_Vehicles	Number of vehicles in offpeak period
Peak_Centerline_Miles	Number of centerline miles in peak period
Offpeak_Centerline_Miles	Number of centerline miles in offpeak period
Peak_Revenue_Miles	Number of revenue miles in peak period
Offpeak_Revenue_Miles	Number of revenue miles in offpeak period

Parameters

Parameter	Description	Default Value
Initial Time Option	1 = Use Observed Time, 2 = Use Congested Times from Mergenet	2
HSR Flag	Flag to activate HSR mode for skimming and mode split	0
Shuttle Flag	Flag to activate shuttle mode for HSR mode	1
Internal Zones	Internal Number of Zones	4109
External Zones	Total number of zones including external zones	4149
Air and Port Zones	Final zones including air and port zones	4192
Walk Speed	Walk Speed in mph	2.5
Minimum Walk Time	Minimum centroid walk time	2
Auto Operating Cost	Auto Operating Cost in Cents/Mile	13.7618
CTOLL	Value of time in Dollars/Hour for ctoll	3
Value of Time	Value of time in Dollars/Hour	7.05
Intrazonal Neighbors	Number of Intrazonal Neighbors to calculate Intrazonal Travel Times	1
Intrazonal Factors	Intrazonal Factor to calculate Intrazonal Travel Times	0.5
Wait Stop Decrement	Denominator decrement in step function to calculate Initial Waiting Times	1

Highway DB (networks\Outputs\scag_network_copy.dbd): All fields described from Highway Master DB Plus:

Field	Description
AB/BA_Auto_Operating_Cost	Auto Operating Cost = Length * Auto Operating Cost Parameter
AB/BA_FFSPEED	Calculated free flow speed
AB/BA Observed Time	Initial "Congested" observed travel time Speed * 0.9 for AreaType = 1,2,3 Speed * 0.75 for all other Area Types
AB/BA_FreeTime	Calculated free-flow travel time = Length / FFSpeed * 60
AB/BA_HRCAPACITYAM/PM/MD/NT	Hourly capacity by time period = Hourly Capacity/lane * # Lanes by period
AB/BA CAPA AM/PM/MD/NT	Total Capacity by time period = Hourly Capacity * 3.0 for AM 4.0 for PM 6.0 for MD 10.0 for NT
DEFLAG_PK/OP	Drive Egress Flag = 1 for links that are drive-egress from Metrolink/HSR to TAZ
AB/BA_AM/PM/MD/NTBUSFLOW	Calculated transit flow * PCE by time period
AB/BA_Drive_Transit_Flow	Calculated Drive-to-Transit flow from transit assignment preloaded for highway assignment
AB/BA_AM/PM/MD/NT_Drive_Transit_Flow	Drive-transit_flow divided up by time period
AB/BA_AM/PM/MD/NT_Transit_Preload	Drive-transit flow plus bus flow preloaded for highway assignment
RAIL_TIME	Estimated Rail time used for transit (later overridden by stop-based rail time)
AB/BA_Akcelik_Length	Constrained link length used for Akcelik function
AB/BA_Constrained_FF_Time	Constrained free flow travel time based on constrained link length
AB/BA_Akcelik_A	Link Akcelik A Parameter
AB/BA_Akcelik_C	Link Akcelik C Parameter
AB/BA_AkLanes	Estimated number of lanes input for Akcelik function
AB/BA_BPRALPHA	Link BPR Alpha parameter

AB/BA_BPRBETA	Link BPR Beta parameter
SHUTTLETIME	For HSR, estimated link travel time for shuttlebus access to HSR
AB/BA_CROSSLANES	For capacity calculations, number of lanes crossing link perpendicularly
TOTLANES	AB_CROSSLANES + BA_CROSSLANES
Drive_Flag	Flag field to determine drive access link
AB/BA FT	Calculated facility type used for determining transit travel time as a function of auto time FT = 1 for Freeways FT = 2 for Collectors/Arterials FT = 6 for Centroid Connectors
AB/BA_Loc_Curve	Local curve number calculated from LocalCurve field in networks\inputs\spdcurvelkup.bin
AB/BA_Exp_Curve	Express curve number calculated from ExprsCurve field in networks\inputs\spdcurvelkup.bin
AB/BA_Rpd_Curve	Express curve number calculated from RapidCurve field in networks\inputs\spdcurvelkup.bin
AB/BA_Local/Express/Rapid_PK/OPTime	Calculated transit travel time based on congested auto time and factors determined by the transit curve lookup tables
AB/BA_FLOWPCE	Temporary holding field to store PCE flow by time period for Emissions model

Outputs

Transit Skim Matrices (PK/OP)

Matrix	Description	Default Value
Transit XX Walk LOCAL Skim	Transit XX Walk Local Skim Matrix	XX_Walk_Local.mtx
Transit XX Walk EXPRESS Skim	Transit XX Walk Express Skim Matrix	XX_Walk_Express.mtx
Transit XX Auto LOCAL Skim	Transit XX Auto Local Skim Matrix	XX_Auto_Local.mtx
Transit XX Auto EXPRESS Skim	Transit XX Auto Express Skim Matrix	XX_Auto_Express.mtx
Transit XX Walk Urban_Rail Skim	Transit XX Walk Urban Rail Skim Matrix	XX_Walk_Urban_Rail.mtx
Transit XX Auto Urban_Rail Skim	Transit XX Auto Urban Rail Skim Matrix	XX_Auto_Urban_Rail.mtx
Transit XX Walk Commuter_Rail Skim	Transit XX Walk Commuter Rail Skim Matrix	XX_Walk_Commuter_Rail.mtx
Transit XX Auto Commuter_Rail Skim	Transit XX Auto Commuter Rail Skim Matrix	XX_Auto_Commuter_Rail.mtx
Transit XX Walk_Drive_Egress Skim	Transit XX Walk Drive Egress Commuter Rail Skim Matrix	XX_Walk_Drive_Egress.mtx
Transit XX Auto_Drive_Egress Skim	Transit XX Auto Drive Egress Commuter Rail Skim Matrix	XX_Auto_Drive_Egress.mtx
Transit XX Auto GenericSkim	Transit XX Auto Generic Skim Matrix	XX_Auto_Generic.mtx
Transit XX Walk Generic Skim	Transit XX Walk Generic Skim Matrix	XX_Walk_Generic.mtx
Transit XX Walk HSR Skim	Transit XX Walk HSR Matrix	XX_Walk_HSR.mtx
Transit XX Auto HSR Skim	Transit XX Auto HSR Matrix	XX_Auto_HSR.mtx
Transit XX Walk HSR SHUTTLE Skim	Transit XX Walk HSR Shuttle Matrix	XX_Walk_HSR_Shuttle.mtx
Transit XX Auto HSR SHUTTLE Skim	Transit XX Auto HSR Shuttle Matrix	XX_Auto_HSR_Shuttle.mtx
	Transit XX Shuttle access walk egress matrix	XX_SHUTTLE_WALK.mtx
	Transit XX Auto access shuttle egress matrix	XX_AUTO_SHUTTLE.mtx

Note that HSR transit skims will only be output if the HSR Flag parameter is set to 1. The Shuttle-Walk and Auto-Shuttle skims will only be output if the Shuttle Flag parameter is set to 1.

The skim matrices all produce the following tables:

- Fare (fare paid in dollars)
- In-Vehicle Time (for all modes, in minutes)
- Initial Wait Time
- Transfer Wait Time (for second and subsequent boardings)
- Transfer Walk Time
- Access Walk Time
- Egress Walk Time
- Access Drive Time
- Drive Distance
- Time (In vehicle travel time by mode)
- All Non-Transit (total time – ivtt)
- All Walk
- Transit Cost (Fare + Drive Distance * Auto Operating Cost, in cents)
- All IVTT (total IVTT of mode type, e.g. Local Bus, Express Bus, etc.)

Highway Skim Matrices

Matrix	Description	Default Value
Highway PK DA Skim	Highway Peak Drive Alone Skim Matrix	SPMATPK_DA.mtx
Highway PK CP2 Skim	Highway Peak SR2 Skim Matrix	SPMATPK_SR2.mtx
Highway PK CP3 Skim	Highway Peak Drive Alone Skim Matrix	SPMATPK_SR3.mtx
Highway OP DA Skim	Highway Offpeak Drive Alone Skim Matrix	SPMATOP_DA.mtx
Highway OP CP2 Skim	Highway Offpeak SR2 Skim Matrix	SPMATOP_SR2.mtx
Highway OP CP3 Skim	Highway Offpeak SR3 Skim Matrix	SPMATOP_SR3.mtx
Highway PK DA School Skim	Highway Peak Drive Alone Skim Matrix for School Bus	SPMATPK_DA_School.mtx
Highway OP DA School Skim	Highway OffPeak Drive Alone Skim Matrix for School Bus	SPMATOP_DA_School.mtx
Highway Time PK	Highway Peak Time Only Skim Matrix for NHB Trips	SPMATPK_Time.mtx
Highway Time OP	Highway Off Peak Time Only Skim Matrix for NHB Trips	SPMATOP_Time.mtx

All skim matrices produce a Time table. In addition to Time, the Drive Alone matrices produce:

- GCost (Time + Distance*Auto Operating Cost/VOT + Toll/VOT)
- Length (Skimmed Length)
- Toll (Toll Cost)
- Cost (Auto Operating Cost)

In addition to the tables above, the CP2 and CP3 matrices produce a HOV_Time_Save (Time Drive Alone – Time HOV) table.

Logsum Matrices (PK/OP)

Matrix	Description	Default Value
XX HBWD1 Logsums	XX HBWD1 Logsums Matrix	XX_HBWD1_Logsums.mtx
XX HBWD2 Logsums	XX HBWD2 Logsums Matrix	XX_HBWD2_Logsums.mtx
XX HBWD3 Logsums	XX HBWD3 Logsums Matrix	XX_HBWD3_Logsums.mtx
XX HBSC Logsums	XX HBSC Logsums Matrix	XX_HBSC_Logsums.mtx
XX HBSH Logsums	XX HBSH Logsums Matrix	XX_HBSH_Logsums.mtx
XX HBCU Logsums	XX HBCU Logsums Matrix	XX_HBCU_Logsums.mtx
XX HBOALL Logsums	XX HBOALL Logsums Matrix	XX_HBOALL_Logsums.mtx
XX WBO Logsums	XX WBO Logsums Matrix	XX_WBO_Logsums.mtx
XX OBO Logsums	XX OBO Logsums Matrix	XX_OBO_Logsums.mtx

For the HBWD purposes, the logsum consists of the entire nested tree under the HBWD structures. This is used as input to the trip distribution gravity procedure for the HBWD purposes.

For the other purposes, the logsums consists of the transit subnests. These logsum matrices are used for input “impedances” for the generic transit mode for the non-HBW purposes.

Parameters

Parameter	Description	Default Value
Bus PCE	Bus Passenger Car Equivalent Value	2
Bus Peak Split	Bus Peak-to-AM/PM Split	0.3837,0.6162
Bus Offpeak Split	Bus Offpeak-to-MD/NT Split	0.7165,0.2835
Max Transfers	max. # of transfers	8
Max Path Time	max. weighted time (generalized cost) of transit path	999
Max Access Time	Maximum walk access travel time to transit	15
Max Egress Time	Maximum walk egress travel time to transit	12
Max Transfer Time	Maximum walk transfer time	10
Max Drive Distance	Maximum Drive distance to transit	15.5
Max Park Access Time	Maximum walk time from parking node to transit stop	5.1
Path Treshold	Path Threshold for combination	0.8
Drive Egress Cutoff	Drive Egress Cutoff Time	18
Skim Convergence	Model convergence criterion on skim RMSE	0

Trip Generation

Inputs

Walk Skim Matrix (tripgen\Inputs\Eds_Walk_Skim.mtx)

Matrix	Description
Shortest Path	Skimmed walk time from origin to destination TAZ

Input Demographics (SED\model_sed.bin)

Field	Description
SEQ #	TAZ Number
CNTY	County
TAZ_ID	Alternate TAZ Number
DISTRICT	District Number
DISTRICT2	District 2 Number
POP	Population
RES	Resident Population
HH	Households
GN	Group Quarters Population
HHSIZE_1	1 Person Households
HHSIZE_2	2 Person Households
HHSIZE_3	3 Person Households
HHSIZE_4PLUS	4+ Person Households
HHSIZE_4E	Alternate calculation of 4+ person households
AGE5_17	Population Ages 5-17
AGE18_24	Population Ages 18-24
AGE16_64	Population Ages 16-64
AGE65_OVER	Population Ages 65 and over
HO18_24	Head of Household Age 18-24
HO25_44	Head of Household Age 25-44
HO45_64	Head of Household Age 45-64
HO65_OVER	Head of Household Age 65 and over
HH_W0	Households with 0 workers
HH_W1	Households with 1 worker
HH_W2	Households with 2 workers
HH_W3	Households with 3+ workers
K12	Kindergarden – 12th grade enrollment
COLLEGE	College enrollment

Field	Description
MEDIAN	Median Income
HO<$25K	Households with < $25,000 annual income
MEDIAN25K	Median Income in < $25,000 income group
$25K<HO<$50K	Households with income $25,000 - $50,000
MEDIAN25_50	Median Income in $25,000-$50,000 income group
$50K<HO<$100K	Households with income $50,000 - $100,000
MEDIAN50_100	Median Income in $50,000-$100,000 income group
HO>$100K	Households with income > $100,000
MEDIAN_100	Median Income in > $100,000 group
LINC_WRK	Low Income Workers
MINC_WRK	Medium Income Workers
HINC_WRK	High Income Workers
TOT_EMP	Total employment
TOTLOW_EMP	Total low income employment
TOTMED_EMP	Total medium income employment
TOTHIG_EMP	Total high income employment
AG_EMP	Agricultural employment
CONST_EMP	Construction employment
MANU_EMP	Manufacturing employment
WHOLE_EMP	Wholesale employment
RET_EMP	Retail employment
TRANS_EMP	Transportation employment
INFOR_EMP	Information services employment
FIRE_EMP	Financial-Real Estate employment
PROF_EMP	Professional employment
EDUC_EMP	Educational employment
ARTENT_EMP	Arts/Entertainment employment
OTHSER_EMP	Other Services employment
PUBADM_EMP	Public Administration employment
DAILYPARK	Daily parking cost
HOURLYPARK	Hourly parking cost
CBD	Central Business District flag
RSA	RSA Number

AUTO PARA Table (tripgen\Inputs\ AutoAv_Model.asc)

Field	Description
Alternative	Number of Autos Alternative
CONST_IM	Logit constant for Imperial County
CONST_LA	Logit constant for LA County
CONST_OR	Logit constant for Orange County
CONST_RI	Logit constant for Riverside County
CONST_SB	Logit constant for San Bernardino County
CONST_VE	Logit constant for Ventura County
CINC1	Coefficient for low income group
CINC2	Coefficient for medium income group
CINC3	Coefficient for high income group
CWRK0	Coefficient for zero workers group
CWRK1	Coefficient for 1 worker group
CWRK2	Coefficient for 2 workers group
CWRK3p	Coefficient for 3 plus workers group
CSZE1	Coefficient for 1 person household group
CSZE2	Coefficient for 2 persons household group
CSZE3	Coefficient for 3 persons household group
CSZE4p	Coefficient for 4 plus persons household group
Pers16_64	Coefficient for head of household between 16 and 64 group
Pers65p	Coefficient for head of household > 65 group
EmpWithin30	Coefficient for employment within 30 minutes group
EmpWithin6m	Coefficient for employment within 6 miles group

PUMA Table (tripgen\Inputs\PUMA_Data.bin)

Field	Description
ID	TAZ Number
Puma_ID	PUMA Number
Total_HH_PUMS	Total households in PUMS area
IxWyHz	PUMS households with Income x (low, medium, high), Workers y (0, 1, 2, 3+) and size z (1, 2, 3, 4+)

PUMA Supplement Table (tripgen\Inputs\PUMA_Data_Supp.bin)

Field	Description
ZONE	TAZ Number
PUMA_ID	PUMA Number
PUMA_ID2	Second Puma Number
HH_W0CHILD	Households with zero children in PUMA
HH_W1CHILD	Households with 1 child
HH_W2CHILD	Households with 2 children
HH_W3PCHILD	Households with 3+ children
HH_W0COLL	Households with 0 college students
HH_W1COLL	Households with 1 college student
HH_W2COLL	Households with 2+ college students
TOTAL_HH_PUMS	Total households in PUMS area
IxWyHz	PUMS households with Income x (low, moderate, medium, high), Workers y (0, 1, 2, 3+) and size z (1, 2, 3, 4+)
PUMA5	PUMA 5 number
AxWyHz	PUMS households with Autos x (0,1,2,3+), Workers y (0, 1, 2, 3+) and size z (1, 2, 3, 4+)
IxHy	PUMS households with Income x (Low, Medium, High), and size y (1, 2, 3, 4+)
IxAy	PUMS households with Income x (Low, Medium, High), and autos y (1, 2, 3, 4+)
AGEx	PUMS households with Age x (0, 1, 2, 3)
PUMA5:1	PUMA 5 number repeat
IxAyWzHi	PUMS households with Income x (low, moderate, medium, high), Autos y (0, 1, 2, 3+) Workers z (0, 1, 2, 3+) and size i (1, 2, 3, 4+)
OLD_DIST	District Number
OLD_DIST2	District Number

HBW Prod Rates (tripgen\Inputs\HBW_Rates.bin)

Field	Description
Age	Age Category
Workers	Workers Category
Size	Household Size Category
R_HBWD	Home-based Work Direct trip rate
R_HBWS	Home-based Work Strategic trip rate

HBO Prod Rates (tripgen\Inputs\HBO_3D_Rates.bin)

Field	Description
VEHICLES	Vehicles Category
INCOME	Income Category
HH_SIZE	Household Size Category
R_HBSH_P	Home-based Shopping trip rate
R_HBSR_P	Home-based Social Recreational trip rate
R_HBSP_P	Home-based Serve Passenger trip rate
R_HBO_P	Home-based Other trip rate
R_OBO_P	Other-based Other trip rate

HBSC Prod Rates (tripgen\Inputs\HBSC_Rates.bin)

Field	Description
AGE	Age category
R_HBSC_P	Home-based School trip rate

HBCU Prod Rates (tripgen\Inputs\HBCU_Rates.bin)

Field	Description
INCOME	Income Category
AGE	Age Category
R_HBCU_P	Home-based College/University trip rate

WBO Prod Rates (tripgen\Inputs\WBO_Rates.bin)

Field	Description
WORKERS	Workers Category
HH_SIZE	Household Size Category
INCOME	Income Category
R_WBO_P	Work-based Other trip rate
Field_1	Ignored
Field_2	Ignored

School Allocation Table (tripgen\Inputs\school_allocation.bin)

Field	Description
ZONE	TAZ Number
PUMA_ID	PUMA number
[%KIDS IN HOK0]	Percentage of kids in 0 children households
[%KIDS IN HOK1]	Percentage of kids in 1 child households
[%KIDS IN HOK2]	Percentage of kids in 2 children households
[%KIDS IN HOK3]	Percentage of kids in 3+ children households

Production Ratios by SubAB (tripgen\Inputs\prod_trip_SUBAB_ratios.bin)

Field	Description
SUBAB	Sub-Air Basin
CountyNum	County Number
SUBABNum	Sub Air Basin Number
HBWD1	HBWD1 Ratio
HBWD2	HBWD2 Ratio
HBWD3	HBWD3 Ratio
HBWS1	HBWS1 Ratio
HBWS2	HBWS2 Ratio
HBWS3	HBWS3 Ratio
HBSC	HBSC Ratio
HBCU	HBCU Ratio
HBSH	HBSH Ratio
HBO	HBO Ratio
HBSR	HBSR Ratio
HBSP	HBSP Ratio
WBO	WBO Ratio
OBO	OBO Ratio

Attraction Ratios by SubAB (tripgen\Inputs\attr_trip_SUBAB_ratios.bin)

Field	Description
SUBAB	Sub-Air Basin
CountyNum	County Number
SUBABNum	Sub Air Basin Number
HBWD1	HBWD1 Ratio
HBWD2	HBWD2 Ratio
HBWD3	HBWD3 Ratio
HBWS1	HBWS1 Ratio
HBWS2	HBWS2 Ratio
HBWS3	HBWS3 Ratio
HBSC	HBSC Ratio
HBCU	HBCU Ratio
HBSH	HBSH Ratio
HBO	HBO Ratio
HBSR	HBSR Ratio
HBSP	HBSP Ratio
WBO	WBO Ratio
OBO	OBO Ratio

Model Districts (tripgen\Inputs\model_districts.bin)

Field	Description
[SEQ #]	TAZ Number
TAZ_ID	TAZ Alternate Number
DISTRICT	District Number for purposes not in DISTRICT2
DISTRICT2	District Aggregation used for HBWD1, HBWS1, HBCU and HBO District Balancing
DISTRICTR	District Aggregation used for non-school purpose
DISTRICTK	District Aggregation used for school purpose

TOD Factors (tripgen\Inputs\tod_fac.asc)

Field	Description
PURPOSE	Trip Purpose
PEAK	Percent peak trips of the entire day
OFFPEAK	Percent offpeak trips of the entire day
[Purpose Name]	Trip purpose name

IX Prods (ExtLM\Outputs\IX_Prods.bin)

Field	Description
TAZ	TAZ Number
HBW_PK	HBW_PK Trip Reductions
HBW_OP	HBW_OP Trip Reductions
HBCU_PK	HBCU_PK Trip Reductions
HBCU_OP	HBCU_OP Trip Reductions
HBSH_PK	HBSH_PK Trip Reductions
HBSH_OP	HBSH_OP Trip Reductions
HBSR_PK	HBSR_PK Trip Reductions
HBSR_OP	HBSR_OP Trip Reductions
HBO_PK	HBO_PK Trip Reductions
HBO_OP	HBO_OP Trip Reductions
NHB_PK	NHB_PK Trip Reductions
NHB_OP	NHB_OP Trip Reductions

IX Attrs (ExtLM\Outputs\XI_Attrs.bin)

Field	Description
TAZ	TAZ Number
HBW_PK	HBW_PK Trip Reductions
HBW_OP	HBW_OP Trip Reductions
HBCU_PK	HBCU_PK Trip Reductions
HBCU_OP	HBCU_OP Trip Reductions
HBSH_PK	HBSH_PK Trip Reductions
HBSH_OP	HBSH_OP Trip Reductions
HBSR_PK	HBSR_PK Trip Reductions
HBSR_OP	HBSR_OP Trip Reductions
HBO_PK	HBO_PK Trip Reductions
HBO_OP	HBO_OP Trip Reductions
NHB_PK	NHB_PK Trip Reductions
NHB_OP	NHB_OP Trip Reductions

Outputs

Minimum Transit Skims (tripgen\Outputs\Min_TrSkims.mtx)

Matrix	Description
PK_WALK_DRIVE_EGRESS	Peak Walk Drive Egress Time
PK_WALK_EXPRESS	Peak Walk Express Time
PK_WALK_LOCAL	Peak Walk Local Time
PK_WALK_URBAN_RAIL	Peak Walk Urban Rail Time
PK_WALK_COMMUTER_RAIL	Peak Walk Commuter Rail Time
PK_AUTO_DRIVE_EGRESS	Peak Auto Drive Egress Time
PK_AUTO_EXPRESS	Peak Auto Express Time
PK_AUTO_LOCAL	Peak Auto Local Time
PK_AUTO_URBAN_RAIL	Peak Auto Urban Rail Time
PK_AUTO_COMMUTER_RAIL	Peak Auto Commuter Rail Time
Min TT	Minimum of above times
Final_Minimum	Minimum of all times compared with All walk travel time

Accessibility Skim Matrix (tripgen\Outputs\Accessibility_Skim_Matrix.mtx)

Matrix	Description
Auto Accessibility	Auto accessibility calculation
Non- Auto Accessibility	Non-Auto Accessibility calculation

Output Demographics (tripgen\Outputs\model_sed_output.bin)

Field	Description
SEQ #	TAZ Number
CNTY	County
TAZ_ID	Alternate TAZ Number
DISTRICT	District Number
DISTRICT2	District 2 Number
POP	Population
RES	Resident Population
HH	Households
GN	Group Quarters Population
HHSIZE_1	1 Person Households
HHSIZE_2	2 Person Households
HHSIZE_3	3 Person Households
HHSIZE_4PLUS	4+ Person Households
HHSIZE_4E	Alternate calculation of 4+ person households
AGE5_17	Population Ages 5-17
AGE18_24	Population Ages 18-24
AGE16_64	Population Ages 16-64
AGE65_OVER	Population Ages 65 and over
HO18_24	Head of Household Age 18-24
HO25_44	Head of Household Age 25-44
HO45_64	Head of Household Age 45-64
HO65_OVER	Head of Household Age 65 and over
HH_W0	Households with 0 workers
HH_W1	Households with 1 worker
HH_W2	Households with 2 workers
HH_W3	Households with 3+ workers
K12	Kindergarden – 12th grade enrollment
COLLEGE	College enrollment
MEDIAN	Median Income

Field	Description
HO<$25K	Households with < $25,000 annual income
MEDIAN25K	Median Income in < $25,000 income group
$25K<HO<$50K	Households with income $25,000 - $50,000
MEDIAN25_50	Median Income in $25,000-$50,000 income group
$50K<HO<$100K	Households with income $50,000 - $100,000
MEDIAN50_100	Median Income in $50,000-$100,000 income group
HO>$100K	Households with income > $100,000
MEDIAN_100	Median Income in > $100,000 group
LINC_WRK	Low Income Workers
MINC_WRK	Medium Income Workers
HINC_WRK	High Income Workers
TOT_EMP	Total employment
TOTLOW_EMP	Total low income employment
TOTMED_EMP	Total medium income employment
TOTHIG_EMP	Total high income employment
AG_EMP	Agricultural employment
CONST_EMP	Construction employment
MANU_EMP	Manufacturing employment
WHOLE_EMP	Wholesale employment
RET_EMP	Retail employment
TRANS_EMP	Transportation employment
INFOR_EMP	Information services employment
FIRE_EMP	Financial-Real Estate employment
PROF_EMP	Professional employment
EDUC_EMP	Educational employment
ARTENT_EMP	Arts/Entertainment employment
OTHSER_EMP	Other Services employment
PUBADM_EMP	Public Administration employment
DAILYPARK	Daily parking cost
HOURLYPARK	Hourly parking cost
CBD	Central Business District flag
RSA	RSA Number
ZONE	Zone Number
PUMA_ID	PUMA Number
PUMA_ID2	PUMA Number
HH_W0CHILD	Households with zero children in PUMA
HH_W1CHILD	Households with 1 child
HH_W2CHILD	Households with 2 children
HH_W3PCHILD	Households with 3+ children
HH_W0COLL	Households with 0 college students
HH_W1COLL	Households with 1 college student
HH_W2COLL	Households with 2+ college students
TOTAL_HH_PUMS	Total households in PUMS area
IxWyHz	PUMS households with Income x (low, moderate, medium, high), Workers y (0, 1, 2, 3+) and size z (1, 2, 3, 4+)
PUMA5	PUMA 5 number
AxWyHz	PUMS households with Autos x (0,1,2,3+), Workers y (0, 1, 2, 3+) and size z (1, 2, 3, 4+)
IxHy	PUMS households with Income x (Low, Medium, High), and size y (1, 2, 3, 4+)
IxAy	PUMS households with Income x (Low, Medium, High), and autos y (1, 2, 3, 4+)
AGEx	PUMS households with Age x (0, 1, 2, 3)
PUMA5:1	PUMA 5 number repeat
IxAyWzHi	PUMS households with Income x (low, moderate, medium, high), Autos y (0, 1, 2, 3+) Workers z (0, 1, 2, 3+) and size i (1, 2, 3, 4+)
OLD_DIST	District
OLD_DIST2	District
Autos	Total Number of Autos
Veh/Person1	Vehicles/Person < 0.5
Veh/Person2	Vehicles/Person between 0.5 and 1
Veh/Person3	Vehicles/Person > 1
NONLA_Flag	Flag field for non LA zone
NA_A_Ratio	Non-Auto / Auto Accessibility Ratio

ZWIHHS Table (tripgen\Outputs\IncBySizeByWrk.bin)

Field	Description
TAZ	TAZ Number
InxWky_Szz	Number of Households with Income X (1,2,3), Workers Y (0,1,2,3+) and Size Z (1,2,3,4+)

ZNSS Table (tripgen\Outputs\AutoBySize.bin)

Field	Description
TAZ	TAZ Number
AutxHHSzy	Number of Households with Autos X (0,1,2,3,4+) and Size Y (1,2,3,4+)

VEH Table (tripgen\Outputs\HHAutoSummary.bin)

Field	Description
TAZ	TAZ Number
AutX	Number of Households with Autos X (0,1,2,3,4+)

Work By Autos Table (tripgen\Outputs\WrkByAutos.bin)

Field	Description
TAZ	TAZ Number
AutXWrkY	Number of Households with Autos X (0,1,2,3,4+) and Workers Y (0,1,2,3+)

Autos By IncSize Table (tripgen\Outputs\AutosIncSize.bin)

Field	Description
TAZ_ID	Alternate TAZ Number
County	County Number
TAZ	TAZ Number
HBO_VxIyHz	For HBO trip Calculation, number of Autos X by Income Y and Size Z

HBW CrossClass (tripgen\Outputs\HBW_CrossClassData.bin)

Field	Description
ID	TAZ Number
County	County
TAZ	TAZ Number
HBW_AxWyHz	For HBW trip calculation, number of Autos X by Workers Y and Size Z

WBO CrossClass (tripgen\Outputs\WBO_CrossClassData.bin)

Field	Description
TAZ_ID	Alternate TAZ Number
County	County
TAZ	TAZ Number
WBO_IxWyHz	For WBO trip calculation, Income X by Workers Y by Size Z

HBSC CrossClass (tripgen\Outputs\HBSC_CrossClassData.bin)

Field	Description
TAZ_ID	Alternate TAZ Number
County	County
TAZ	TAZ Number
HBSCAx	Number of Children in household X (0,1,2,3)
HBCUIxAy	Income X (1,2,3,4) by Autos Y (0,1,2+)

Final Productions (tripgen\Outputs\taz_hh_prods.dbf)

Field	Description
ID	TAZ Number
TAZID	Taz Number
HBWD1_P	Home-based Work Direct Low Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBSP_P	Home-based Serve Passenger Productions
HBO_P	Home-based Other Productions
OBO_P	Other-based Other Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
WBO_P	Work-based Other Productions
ELD_1	Ignored
ELD_2	Ignored

Final Attractions (tripgen\Outputs\taz_attractions.dbf)

Field	Description
ID	TAZ Number
TAZID	Alternate TAZ Number
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBSP_A	Home-based Serve Passenger Attractions
HBO_A	Home-based Other Attractions
OBO_A	Other-based Other Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
WBO_A	Work-based Other Attractions

Peak Productions (tripgen\Outputs\peak_prod.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
IX_P	Internal-External Productions

Peak Attractions (tripgen\Outputs\peak_attr.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
IX_A	Internal-External Attractions

OffPeak Productions (tripgen\Outputs\offpeak_prod.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
IX_P	Internal-External Productions

OffPeak Attractions (tripgen\Outputs\offpeak_attr.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
IX_A	Internal-External Attractions

Peak Balanced PA (tripgen\Outputs\peak_pa.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions

Field	Description
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions

OffPeak Balanced PA (tripgen\Outputs\ofpk_pa.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions

Demographics Report By County (tripgen\Outputs\Demographics_by_County.csv)

Field	Description
CNTY	County
POP	Population

Field	Description
RES	Resident Population
HH	Households
GN	Group Quarters Population
HHSIZE_1	1 Person Households
HHSIZE_2	2 Person Households
HHSIZE_3	3 Person Households
HHSIZE_4E	Alternate calculation of 4+ person households
AGE5_17	Population Ages 5-17
AGE18_24	Population Ages 18-24
AGE16_64	Population Ages 16-64
AGE65_OVER	Population Ages 65 and over
HO18_24	Head of Household Age 18-24
HO25_44	Head of Household Age 25-44
HO45_64	Head of Household Age 45-64
HO65_OVER	Head of Household Age 65 and over
HH_W0	Households with 0 workers
HH_W1	Households with 1 worker
HH_W2	Households with 2 workers
HH_W3	Households with 3+ workers
K12	Kindergarden – 12th grade enrollment
COLLEGE	College enrollment
HO<$25K	Households with < $25,000 annual income
$25K<HO<$50K	Households with income $25,000 - $50,000
$50K<HO<$100K	Households with income $50,000 - $100,000
HO>$100K	Households with income > $100,000
LINC_WRK	Low Income Workers
MINC_WRK	Medium Income Workers
HINC_WRK	High Income Workers
TOT_EMP	Total employment
TOTLOW_EMP	Total low income employment
TOTMED_EMP	Total medium income employment
TOTHIG_EMP	Total high income employment
AG_EMP	Agricultural employment
CONST_EMP	Construction employment
MANU_EMP	Manufacturing employment
WHOLE_EMP	Wholesale employment
RET_EMP	Retail employment
TRANS_EMP	Transportation employment
INFOR_EMP	Information services employment
FIRE_EMP	Financial-Real Estate employment
PROF_EMP	Professional employment
EDUC_EMP	Educational employment
ARTENT_EMP	Arts/Entertainment employment
OTHSER_EMP	Other Services employment
PUBADM_EMP	Public Administration employment

Tripgen Status Report Table (tripgen\Outputs\tripgen_status_report.csv)

Field	Description
Status	Trips at various stages in trip generation
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSH_P	Home-based Shopping Productions
HBSP_P	Home-based Serve Passenger Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions

Field	Description
OBO_P	Other-based Other Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
WBO_P	Work-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Serve Passenger Attractions
HBSP_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
OBO_A	Other-based Other Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
WBO_A	Work-based Other Attractions
TOTAL_P	Total Productions
TOTAL_A	Total Attractions

Tripgen Status By Subab X (tripgen\Outputs\tripgen_by_subab_X_before_ratio.csv)

Field	Description
SUB_AB	Sub Air Basin
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSH_P	Home-based Shopping Productions
HBSP_P	Home-based Serve Passenger Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
OBO_P	Other-based Other Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
WBO_P	Work-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSH_A	Home-based Shopping Attractions
HBSP_A	Home-based Serve Passenger Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
OBO_A	Other-based Other Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
WBO_A	Work-based Other Attractions
TOTAL_P	Total Productions
TOTAL_A	Total Attractions

CNTY PK/OP Tripgen Report (tripgen\Outputs\county_xx_tripgen_report.xls)

Field	Description
CNTY	County
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions
TOTAL_PRODUCTIONS	Total Productions
TOTAL_ATTRACTIONS	Total Attractions

RSA PK/OP Tripgen Report (tripgen\Outputs\rsa_xx_tripgen_report.xls)

Field	Description
RSA	RSA
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions

Field	Description
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions
TOTAL_PRODUCTIONS	Total Productions
TOTAL_ATTRACTIONS	Total Attractions

CSA PK/OP Tripgen Report (tripgen\Outputs\csa_xx_tripgen_report.xls)

Field	Description
CSA	CSA
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions
TOTAL_PRODUCTIONS	Total Productions
TOTAL_ATTRACTIONS	Total Attractions

District PK/OP Tripgen Report (tripgen\Outputs\district_xx_tripgen_report.xls)

Field	Description
DISTRICT	District
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions

Field	Description
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions
TOTAL_PRODUCTIONS	Total Productions
TOTAL_ATTRACTIONS	Total Attractions

Autos by Size Report (tripgen\Outputs\Autos_by_Size_Report.csv)

Field	Description
CNTY	County Number
AutXHHSzY	Households by Autos X (0,1,2,3,4+) by Size Y (1,2,3,4+)
AutX	Households by Autos X (0,1,2,3,4+)
HHSzX	Households by Size X (1,2,3,4+)
TOTAL_HH	Total Households

Autos by Workers Report (tripgen\Outputs\Autos_by_Workers_Report.csv)

Field	Description
CNTY	County Number
AutXWrkY	Households by Autos X (0,1,2,3,4+) by Workers Y (0,1,2,3+)
AutX	Households by Autos X (0,1,2,3,4+)
WrkX	Households by Workers X (0,1,2,3+)
TOTAL_HH	Total Households

Inc by Wrk by Size Report (tripgen\Outputs\Inc_by_workers_by_size_Report.csv)

Field	Description
CNTY	County Number
InXWkY_SzZ	Households by Income X (1,2,3) by Workers Y (0,1,2,3+) by Size Z (1,2,3,4+)
InX	Households by Income X (1,2,3)
WkX	Households by Workers X (0,1,2,3+)
SzX	Households by Size X (1,2,3,4+)
TOTAL_HH	Total Households

Peak/Offpeak PA before IX reductions (tripgen\Outputs\peak/offpeak_pa_before_IX_reductions.bin)

Field	Description
SEQ	TAZ Number
TAZ_ID	Alternate TAZ Number
HBWD1_P	Home-based Work Direct Low Income Productions
HBWD2_P	Home-based Work Direct Medium Income Productions
HBWD3_P	Home-based Work Direct High Income Productions
HBWS1_P	Home-based Strategic Low Income Productions
HBWS2_P	Home-based Strategic Medium Income Productions
HBWS3_P	Home-based Strategic High Income Productions
HBSC_P	Home-based School Productions
HBCU_P	Home-based College/University Productions
HBSH_P	Home-based Shopping Productions
HBSR_P	Home-based Social-Recreational Productions
HBO_P	Home-based Other Productions
HBSP_P	Home-based Serve Passenger Productions
WBO_P	Work-based Other Productions
OBO_P	Other-based Other Productions
HBWD1_A	Home-based Work Direct Low Income Attractions
HBWD2_A	Home-based Work Direct Medium Income Attractions
HBWD3_A	Home-based Work Direct High Income Attractions
HBWS1_A	Home-based Strategic Low Income Attractions
HBWS2_A	Home-based Strategic Medium Income Attractions
HBWS3_A	Home-based Strategic High Income Attractions
HBSC_A	Home-based School Attractions
HBCU_A	Home-based College/University Attractions
HBSH_A	Home-based Shopping Attractions
HBSR_A	Home-based Social-Recreational Attractions
HBO_A	Home-based Other Attractions
HBSP_A	Home-based Serve Passenger Attractions
WBO_A	Work-based Other Attractions
OBO_A	Other-based Other Attractions

Parameters

Parameter	Description	Default Value
Four Plus Autos Avg	Average number of Autos in 4+ autos household	4.5
HH Fratar Iters	Max. iterations for household Fratar	20
HH Fratar Convg	Convergence for household Fratar	0.01
AHHS6P Factors	Auto/Person conversion factors by household size	1.0,2.0,3.0,4.0,5.0,7.126
TDM Factor	TDM Reduce Factor	1
TG Calibration Factor	Tripgen calibration factor	1
TG Validation Factor	Tripgen validation factor	1
Peak TDM Factors	Peak trip reduction factors by trip purpose	.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996
OffPeak TDM Factors	Offpeak trip reduction factors by trip purpose	.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996,.9996
Balance Flag	Balance type 1=Region, 2=District by 15 trip purposes, repeat WBO for last purp	1,1,1,1,1,1,1,1,1,1,1,2,2,1
HH4 Option	1 = Use HHSize4Plus, 2 = Use HHSize4E	2

Inputs

Worker to Household Income (tripdist\Inputs\Worker_to_Household_Income.bin)

Field	Description
TAZ	TAZ Number
COUNTY_TRACT	County and Tract Number
LOW_WORK-LOW_HH	Percent of low income workers in low income households
LOW_WORK-MED_HH	Percent of low income workers in medium income households
LOW_WORK-HIGH_HH	Percent of low income workers in high income households
MED_WORK-MED_HH	Percent of medium income workers in medium income households
MED_WORK-HIGH_HH	Percent of medium income workers in high income households

Trip K-Factors – K-factors from district to district input to Gravity model tripdist\Inputs\Kfactor.mtx)

Matrix	Description
School KFactor	School KFactors
HBSR-Kfactor	HBSR KFactors (Usually 1.0)
HBO-Kfactor	HBO KFactors (Usually 1.0)
OBO-Kfactor	OBO KFactors (Usually 1.0)
HBW-Kfactor	HBW KFactors (Usually 1.0)

TAZ County File (tripdist\Inputs\TAZEQCounty.dbf)

Field	Description
ID	TAZ Number
CNTY	County Number
RSA	RSA Number
CSA	CSA Number
DISTRICT	District Number
AIR_BASIN	Air Basin Number
SUB_AB	Sub Air Basin Number

Friction Factor Parameters (tripdist\Inputs\Friction_Factor_Parameters.bin)

Field	Description
PERIOD	Time Period (PK, OP)
PURPOSE	Trip Purpose
COUNTY	County Name
GAMMA_A	“A” parameter value in gamma distribution function
GAMMA_B	“B” parameter value in gamma distribution function (negative value assumed)
GAMMA_C1	“C” parameter value in first interval of curve in gamma distribution function (negative value assumed)
GAMMA_C2	“C” parameter value in second interval of curve in gamma distribution function (negative value assumed)
CURVE_CHANGE	Time or Cost point where curve changes from C1 parameter to C2 parameter

Outputs

Peak/OffPeak FF Matrix (tripdist\Outputs\xx_Friction_Factors.mtx)

Matrix	Description
HBWD1FF	Home-based Work Direct Low Income Friction Factors
HBWD2FF	Home-based Work Direct Medium Income Friction Factors
HBWD3FF	Home-based Work Direct High Income Friction Factors
HBWS1FF	Home-based Strategic Low Income Friction Factors
HBWS2FF	Home-based Strategic Medium Income Friction Factors
HBWS3FF	Home-based Strategic High Income Friction Factors
HBSPFF	Home-based Serve Passenger Friction Factors
HBSCFF	Home-based School Friction Factors
HBCUFF	Home-based College/University Friction Factors
HBSHFF	Home-based Shopping Friction Factors
HBSRFF	Home-based Social-Recreational Friction Factors
HBOFF	Home-based Other Friction Factors
OBOFF	Other-based Other Friction Factors
WBOFF	Work-based Other Friction Factors
HBWD1Logsum	Home-based Work Direct Low Income Logsums
HBWD2Logsum	Home-based Work Direct Medium Income Logsums
HBWD3Logsum	Home-based Work Direct High Income Logsums

Friction Factor Output (tripdist\Outputs\Friction_Factor_Output_Table.csv)

Field	Description
IMPEDANCE	
<Purp>_<County>_<Period>_FF	Trip Purpose by County by Peak/Offpeak period Friction Factors by Interval
<Purp>Logsum_<Period>_PK_FF	Trip Purpose by County by Peak/Offpeak period Logsum based Friction Factors by Interval

Peak/OffPeak PA HBW Work Matrix (tripdist\Outputs\xx_HBW_CG_Dist.mtx)

Matrix	Description
HBWD1	Home-based Work Direct Low Income Worker Trips
HBWD2	Home-based Work Direct Medium Income Worker Trips
HBWD3	Home-based Work Direct High Income Worker Trips
HBWS1	Home-based Strategic Low Income Worker Trips
HBWS2	Home-based Strategic Medium Income Worker Trips
HBWS3	Home-based Strategic High Income Worker Trips

Peak/Off Peak PA Matrix (tripdist\Outputs\xx_CG_Dist.mtx)

Matrix	Description
HBWD1	Home-based Work Direct Low Income Household Trips
HBWD2	Home-based Work Direct Medium Income Household Trips
HBWD3	Home-based Work Direct High Income Household Trips
HBWS1	Home-based Strategic Low Income Household Trips
HBWS2	Home-based Strategic Medium Income Household Trips
HBWS3	Home-based Strategic High Income Household Trips
HBSP	Home-based Serve Passenger Trips
HBSC	Home-based School Trips
HBCU	Home-based College/University Trips
HBSH	Home-based Shopping Trips
HBSR	Home-based Social-Recreational Trips
HBO	Home-based Other Trips
WBO	Work-based Other Trips
OBO	Other-based Other Trips
HBOAL	All Home-based Other (HBO + HBSR) Trips

Logsum Statistics Report (tripdist\Outputs\Logsum_Statistics_Report.csv)

Field	Description
Logsum Matrix	Logsum Matrix
Minimum	Minimum value in matrix
Maximum	Maximum value in matrix
Average	Average value in matrix
Standard_Deviation	Standard Deviation in matrix
Cells_less_than_Zero	Number of cells in matrix less than zero

Intrazonal TD Report (tripdist\Outputs\Intra_file.csv)

TLD Table (tripdist\Outputs\tldtable.csv)

Field	Description
TRIP_PURPOSE	Trip Purpose Name
AVERAGE_TIME	Average travel time
AVERAGE_DISTANCE	Average travel distance
AVERAGE_LOGSUM	Average logsum value
AVERAGE_TIME_<County>	Average time in county
AVERAGE_DISTANCE_<County>	Average distance in county
AVERAGE_LOGSUM_<County>	Average logsum in county

TLD Frequency Table (tripdist\Outputs\tld_frequency_table.csv)

Field	Description
TIME	Interval
<Purp>_DIST_FREQ_<Period>	Trip purpose frequency in distance interval by period
<Purp>_DIST_CUM_<Period>	Trip purpose cumulative frequency in distance interval
<Purp>_TIME_FREQ_<Period>	Trip purpose frequency in time interval
<Purp>_TIME_CUM_<Period>	Trip purpose cumulative frequency in time interval
<Purp>_LOGSUM_FREQ_<Period>	Trip purpose frequency in logsum interval by period
<Purp>_LOGSUM_CUM_<Period>	Trip purpose cumulative frequency in logsum interval by period

Distribution Summary Matrices

Matrix	Description	Default Value
County OP Summary	County Offpeak Distribution Summary	TripDist\Outputs\County_OP_TD_Summary.mtx
County PK Summary	County Peak Distribution Summary	TripDist\Outputs\County_PK_TD_Summary.mtx
RSA OP Summary	RSA Offpeak Distribution Summary	TripDist\Outputs\RSA_OP_TD_Summary.mtx
RSA PK Summary	RSA Peak Distribution Summary	TripDist\Outputs\RSA_PK_TD_Summary.mtx
CSA OP Summary	CSA Offpeak Distribution Summary	TripDist\Outputs\CSA_OP_TD_Summary.mtx
CSA PK Summary	CSA Peak Distribution Summary	TripDist\Outputs\CSA_PK_TD_Summary.mtx
District OP Summary	District Offpeak Distribution Summary	TripDist\Outputs\District_OP_TD_Summary.mtx
District PK Summary	District Peak Distribution Summary	TripDist\Outputs\District_PK_TD_Summary.mtx

Each matrix contains the following tables: HBWD1, HBWD2, HBWD3, HBWS1, HBWS2, HBWS3, HBSP, HBSC, HBCU, HBSH, HBSR, HBO, OBO, WBO, Total, HBWTOT, HBNWTOT, NHBTOT

Parameters

Parameter	Description	Default Value
Logsum Option	1 = time then logsum, 2 = logsum only, 3 = time only	1
Gravity Iterations	Maximum number of Gravity Iterations	25
Gravity Convergence	Gravity Convergence Criteria	0.1

Inputs

Highway Terminal Times (msplit\Inputs\TerminalTime.mtx – variable based on area type)

School Terminal Times (msplit\Inputs\TerminalTimeSchoolBus.mtx- 2 minutes for all zones)

PK/OP Logit Coefficients (msplit\Inputs\mstable_xx.bin)

Field	Description
Variable	Logit coefficient or constant dependent on model
<Purpose>	Trip purpose coefficient or constant value: First 17 records represent coefficient values for main model Next 2 records (Theta1 and Theta2 represent logsum coefficients for the various nests Next 16 records (e.g. <Mode> Const) represent constant values by mode Next 5 records (e.g. NonWork Transit Submode <coeff>) represent coefficient values for submodel Next 11 records (e.g. NonWork Transit Submode <Mode> Const) represent constant values for submode by mode Next record (e.g. NonWork Transit Submode Theta2) represents logsum value for submode Last 6 records represent HSR Constant values

TDM Shift Table (Optional) (msplit\Inputs\tdm_shift.bin)

Field	Description
Period	**Shift for Peak of offpeak period**
Purpose	**Trip purpose**
County	**County Name**
MODE_FROM	**Modes for trips to shift from**
MODE_TO	**Modes for trips to shift to**
PERCENT_SHIFT	**Percent of trips to shift from "MODE_FROM" to "MODE_TO"**

Outputs

PK/OP MS Model Summary (msplit\Outputs\MS_Summary_xx.bin) and

PK/OP MS Model Summary CSV (msplit\Outputs\MS_Summary_xx.csv)

Field	Description
MODE	Mode split mode
<Purpose>_SUM_<Period>	Trip purpose total trips by period
<Purpose>_SPLIT_<Period>	Trip purpose mode split by period

PK/OP MS Model SubSummary (msplit\Outputs\MS_Submode_Summary_xx.bin) and PK/OP MS Model SubSummary CSV (msplit\Outputs\MS_Summary_xx.csv)

Field	Description
MODE	Submodel mode
<Purpose>_SUM_<Period>	Trip purpose total trips by period
<Purpose>_SPLIT_<Period>	Trip purpose mode split by period

PK/OP HBWDy MC Trips (msplit\Outputs\MS_xx_HBWDy.mtx)

Matrix	Description
DA	Drive Alone trip matrix
SR2	Shared Ride 2 trip matrix
SR3	Shared Ride 3+ trip matrix
LB-Walk	Local Bus Walk Access trip matrix
LB-Auto	Local Bus Auto Access trip matrix
EB-Walk	Express Bus Walk Access trip matrix
EB-Auto	Express Bus Auto Access trip matrix
UR-Walk	Urban Rail Walk Access trip matrix
UR-Auto	Urban Rail Auto Access trip matrix
NM-Walk	Walk mode trip matrix
NM-Bike	Bike mode trip matrix
CR-Walk-Walk	Commuter Rail Walk Access Walk Egress trip matrix
CR-Auto-Walk	Commuter Rail Auto Access Walk Egress trip matrix
CR-Walk-Auto	Commuter Rail Walk Access Auto Egress trip matrix
CR-Auto-Auto	Commuter Rail Auto Access Auto Egress trip matrix
HSR-Walk-Walk	HSR Walk Access Walk Egress trip matrix (Optional)
HSR-Auto-Walk	HSR Auto Access Walk Egress trip matrix (Optional)
HSR-Walk-Shuttle	HSR Walk Access Shuttle Egress trip matrix (Optional)
HSR-Shuttle-Shuttle	HSR Shuttle Access Shuttle Egress trip matrix (Optional)
HSR-Shuttle-Walk	HSR Shuttle Access Walk Egress trip matrix (Optional)
HSR-Auto-Shuttle	HSR Auto Access Shuttle Egress trip matrix (Optional)

Note that HSR Trips will only be output if the HSR Flag parameter is set to 1. The Shuttle-Walk and Auto-Shuttle trips will only be output if the Shuttle Flag parameter is set to 1.

PK/OP HBWSy MC Trips (msplit\Outputs\MS_xx_HBWSy.mtx)

Matrix	Description
NM-Walk	Walk mode trip matrix
DA	Drive Alone trip matrix
SR2	Shared Ride 2 trip matrix
SR3	Shared Ride 3+ trip matrix

Mode Split Trip Matrices

Matrix	Description	Default Value
PK HBSC MC Trips	Peak Period Mode Split Trips for HBSC	msplit\Outputs\MS_PK_HBSC.mtx
PK HBSH MC Trips	Peak Period Mode Split Trips for HBSH	msplit\Outputs\MS_PK_HBSH.mtx
PK HBCU MC Trips	Peak Period Mode Split Trips for HBCU	msplit\Outputs\MS_PK_HBCU.mtx
PK HBOALL MC Trips	Peak Period Mode Split Trips for HBOALL	msplit\Outputs\MS_PK_HBOALL.mtx
PK WBO MC Trips	Peak Period Mode Split Trips for WBO	plit\Outputs\MS_PK_WBO.mtx
PK OBO MC Trips	Peak Period Mode Split Trips for PBO	msplit\Outputs\MS_PK_OBO.mtx
OP HBSC MC Trips	Offpeak Period Mode Split Trips for HBSC	msplit\Outputs\MS_OP_HBSC.mtx
OP HBSH MC Trips	Offpeak Period Mode Split Trips for HBSH	msplit\Outputs\MS_OP_HBSH.mtx
OP HBCU MC Trips	Offpeak Period Mode Split Trips for HBCU	msplit\Outputs\MS_OP_HBCU.mtx
OP HBOALL MC Trips	Offpeak Period Mode Split Trips for HBOALL	msplit\Outputs\MS_OP_HBOALL.mtx
OP WBO MC Trips	Offpeak Period Mode Split Trips for WBO	msplit\Outputs\MS_OP_WBO.mtx
OP OBO MC Trips	Offpeak Period Mode Split Trips for PBO	msplit\Outputs\MS_OP_OBO.mtx
PK HBWD MC Trips	Peak Period Mode Split Trips for HBWD (sum of HBWD1,2,3)	msplit\Outputs\MS_PK_HBWD.mtx
PK HBWS MC Trips	Peak Period Mode Split Trips for HBWS (sum of HBWS1,2,3)	msplit\Outputs\MS_PK_HBWS.mtx
OP HBWD MC Trips	OffPeak Period Mode Split Trips for HBWD (sum of HBWD1,2,3)	msplit\Outputs\MS_OP_HBWD.mtx
OP HBWS MC Trips	OffPeak Period Mode Split Trips for HBWS (sum of HBWS1,2,3)	msplit\Outputs\MS_OP_HBWS.mtx
PK HBSP MC Trips	Peak Period Mode Split Trips for HBSP	msplit\Outputs\MS_PK_HBSP.mtx
OP HBSP MC Trips	OffPeak Period Mode Split Trips for HBSP	msplit\Outputs\MS_OP_HBSP.mtx
PK HBWS IS MC Trips	Peak Period Home-Based Work Strategic Intermediate Stops Trips	msplit\Outputs\HBWS_IS_PK_Trips.mtx
OP HBWS IS MC Trips	OffPeak Period Home-Based Work Strategic Intermediate Stops Trips	msplit\Outputs\HBWS_IS_OP_Trips.mtx

Each matrix contains the following modes:

- DA
- SR2
- SR3
- Generic – This represents “generic” transit trips (LB, EB, UR, CR) to be fed into submodel
- NM-Walk
- NM-Bike

Mode Split Sub Trip Matrices

Matrix	Description	Default Value
PK HBWD1 MC SubTrips	Peak Period Mode Split SubTrips for HBWD1	msplit\Outputs\MS_PK_Sub_HBWD1.mtx
PK HBWD2 MC SubTrips	Peak Period Mode Split SubTrips for HBWD2	msplit\Outputs\MS_PK_Sub_HBWD2.mtx
PK HBWD3 MC SubTrips	Peak Period Mode Split SubTrips for HBWD3	msplit\Outputs\MS_PK_Sub_HBWD3.mtx
PK HBSC MC SubTrips	Peak Period Mode Split SubTrips for HBSC	msplit\Outputs\MS_PK_Sub_HBSC.mtx
PK HBSH MC SubTrips	Peak Period Mode Split SubTrips for HBSH	msplit\Outputs\MS_PK_Sub_HBSH.mtx
PK HBCU MC SubTrips	Peak Period Mode Split SubTrips for HBCU	msplit\Outputs\MS_PK_Sub_HBCU.mtx
PK HBOALL MC SubTrips	Peak Period Mode Split SubTrips for HBOALL	msplit\Outputs\MS_PK_Sub_HBOALL.mtx
PK WBO MC SubTrips	Peak Period Mode Split SubTrips for WBO	msplit\Outputs\MS_PK_Sub_WBO.mtx
PK OBO MC SubTrips	Peak Period Mode Split SubTrips for OBO	msplit\Outputs\MS_PK_Sub_OBO.mtx
OP HBWD1 MC SubTrips	OffPeak Period Mode Split SubTrips for HBWD1	msplit\Outputs\MS_OP_Sub_HBWD1.mtx
OP HBWD2 MC SubTrips	Offpeak Period Mode Split SubTrips for HBWD2	msplit\Outputs\MS_OP_Sub_HBWD2.mtx
OP HBWD3 MC SubTrips	Offpeak Period Mode Split SubTrips for HBWD3	msplit\Outputs\MS_OP_Sub_HBWD3.mtx
OP HBSC MC SubTrips	Offpeak Period Mode Split SubTrips for HBSC	msplit\Outputs\MS_OP_Sub_HBSC.mtx
OP HBSH MC SubTrips	Offpeak Period Mode Split SubTrips for HBSH	msplit\Outputs\MS_OP_Sub_HBSH.mtx
OP HBCU MC SubTrips	Offpeak Period Mode Split SubTrips for HBCU	msplit\Outputs\MS_OP_Sub_HBCU.mtx

OP HBOALL MC SubTrips	Offpeak Period Mode Split SubTrips for HBOALL	msplit\Outputs\MS_OP_Sub_HBOALL.mtx
OP WBO MC SubTrips	Offpeak Period Mode Split SubTrips for WBO	msplit\Outputs\MS_OP_Sub_WBO.mtx
OP OBO MC SubTrips	Offpeak Period Mode Split SubTrips for OBO	msplit\Outputs\MS_OP_Sub_OBO.mtx
PK HBWD MC SubTrips	Peak Period Mode Split Submodel Trips for HBWD (sum of HBWD1,2,3)	msplit\Outputs\MS_PK_Sub_HBWD.mtx
OP HBWD MC SubTrips	OffPeak Period Mode Split Submodel Trips for HBWD (sum of HBWD1,2,3)	msplit\Outputs\MS_OP_Sub_HBWD.mtx

Each matrix contains the following modes:

- LB-Walk
- LB-Auto
- EB-Walk
- EB-Auto
- UR-Walk
- UR-Auto
- CR-Walk-Walk
- CR-Walk-Auto
- CR-Auto-Walk
- CR-Auto-Auto
- HSR-Walk-Walk (Optional)
- HSR-Auto-Walk (Optional)
- HSR-Walk-Shuttle (Optional)
- HSR-Shuttle-Shuttle (Optional)
- HSR-Shuttle-Walk (Optional)
- HSR-Auto-Shuttle (Optional)

Note that HSR Trips will only be output if the HSR Flag parameter is set to 1. The Shuttle-Walk and Auto-Shuttle trips will only be output if the Shuttle Flag parameter is set to 1.

Production/Attraction Mode Split Summary Tables

Table	Description	Default Value
Mode Split CNTY Prod Summary	Mode Split Productions summary by county	msplit\Outputs\MS_County_Productions_Summary.csv
Mode Split RSA Prod Summary	Mode Split Productions summary by RSA	msplit\Outputs\MS_RSA_Productions_Summary.csv
Mode Split CSA Prod Summary	Mode Split Productions summary by CSA	msplit\Outputs\MS_CSA_Productions_Summary.csv
Mode Split District Prod Summary	Mode Split Productions summary by District	msplit\Outputs\MS_District_Productions_Summary.csv
Mode Split CNTY Attr Summary	Mode Split Attractions summary by county	msplit\Outputs\MS_County_Attractions_Summary.csv
Mode Split RSA Attr Summary	Mode Split Attractions summary by RSA	msplit\Outputs\MS_RSA_Attractions_Summary.csv
Mode Split CSA Attr Summary	Mode Split Attractions summary by CSA	msplit\Outputs\MS_CSA_Attractions_Summary.csv
Mode Split District Attr Summary	Mode Split Attractions summary by District	msplit\Outputs\MS_District_Attractions_Summary.csv

Each table includes the following fields:

- MODE_PURPOSE-Mode name and trip purpose
- *AreaType*_x_TOTAL-Total trips by county/RSA,District,etc.
- *AreaType*_x_SHARE-Mode share by county, RSA, District, etc.
- TOTAL_TOTAL-Total trips for region
- TOTAL-SHARE-Mode share for region

Parameters

Parameter	Description	Default Value
Submodel Switch	1 = Run Mode Split Submodels, 0 = Skip Submodels	1
HOV3 Occupancy	HOV3 Car Occupancies for the 12 trip purposes	3.572,3.572,3.572,3.314,3.314,3.314,3.094,3.543,3.443,3.595,3.602,3.654
Park Duration	Average Parking Duration in hours for HBSH, HBO, WBO, OBO Purpose	1.022,2.082,1.802,1.089
HBSP Peak Splits	Peak HBSP Splits for DA, SR2, SR3, LB-Walk, NM-Walk and NM-Bike Modes	0.259, 0.291, 0.309, 0.0, 0.139, 0.002
HBSP OffPeak Splits	OffPeak HBSP Splits for DA, SR2, SR3, LB-Walk, NM-Walk and NM-Bike Modes	0.259, 0.291, 0.309, 0.0, 0.139, 0.002
HBSP HOV3 Occupancy	HBSP HOV3 Occupancy	3.48

Inputs

Hourly Table (ODTable\Inputs\hourly.bin)

Field	Description
HOUR	Time period
<Purpose>_DEP	Trip purpose departure rate percentage (e.g. AM, PM percentage of peak period)
<Purpose>_RET	Trip purpose return rate percentage (e.g. AM, PM percentage of peak period)

Truck Employment (Truck\Inputs\2003 SCAG TAZ EMPLOYMENT_04-05.bin)

Field	Description
TAZ_ID	TAZ Number
COUNTY_FIP	County FIP code
HHLD	Households
AG_F_F	Agricultural Employment
MIN	Mining Employment
CONSTRUCTION	Construction Employment
RETAIL	Retail Employment
GOVT	Government Employment
MANF	Manufacturing Employment
TRANSP	Transportation Employment
UTILITIES	Utilities Employment
WHOL	Wholesale Employment
SERV	Service Employment
TOT_EMP	Total Employment

Truck Friction Factors (Truck\Inputs\truckii.bin)

Field	Description
TIME	Time interval
WHOLE_LTRK_FF	Wholesale light truck friction factors
WHOLE_MTRK_FF	Wholesale medium truck friction factors
WHOLE_HTRK_FF	Wholesale heavy truck friction factors
NW_LTRK_FF	Non-wholesale light truck friction factors
NW_MTRK_FF	Non-wholesale medium truck friction factors
NW_HTRK_FF	Non-wholesale heavy truck friction factors

Truck Rates Table (Truck\Inputs\truckrates.bin)

Field	Description
Category	Household/Employment category
LTRK_RATE	Light truck trip rate
MTRK_RATE	Medium truck trip rate
HTRK_RATE	Heavy truck trip rate

Final External Truck Matrix (ExtHDT\Outputs\FINAL_EI_IE_EE_TRUCKS.mtx)

Matrix	Description
total lhdt	Total internal and external light truck trips
total mhdt	Total internal and external medium truck trips
total hhdt	Total internal and external heavy truck trips

Trips Matrices

Matrix	Description	Default Value
AM Airtrips	AM Period Airport Vehicle Trips Matrix	ODTable\Inputs\AM_Airtrips.mtx
PM Airtrips	PM Period Airport Vehicle Trips Matrix	ODTable\Inputs\PM_Airtrips.mtx
MD Airtrips	MD Period Airport Vehicle Trips Matrix	ODTable\Inputs\MD_Airtrips.mtx
NT Airtrips	NT Period Airport Vehicle Trips Matrix	ODTable\Inputs\NT_Airtrips.mtx
AM XIIX Trips	AM Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\AMXIIX_2.mtx
PM XIIX Trips	PM Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\PMXIIX_2.mtx
MD XIIX Trips	MD Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\MDXIIX_2.mtx
NT XIIX Trips	NT Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\NTXIIX_2.mtx
AM XX Trips	AM Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\XXAM.mtx
PM XX Trips	PM Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\XXPM.mtx
MD XX Trips	MD Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\XXMD.mtx
NT XX Trips	NT Period XI-IX Trips Matrix by SOV, HOV2 and HOV3+	EXTLM\Outputs\XXNT.mtx
AM Port Trips	AM Period Truck Port Trips Matrix	ExtHDT\Outputs\AM_Port_Trips.mtx
PM Port Trips	PM Period Truck Port Trips Matrix	ExtHDT\Outputs\PM_Port_Trips.mtx
MD Port Trips	MD Period Truck Port Trips Matrix	ExtHDT\Outputs\MD_Port_Trips.mtx
NT Port Trips	NT Period Truck Port Trips Matrix	ExtHDT\Outputs\NT_Port_Trips.mtx

2003 Input Files for External Trip Calculations

File	Description	Default Value
2003 IX Matrices	2003 Input AM/PM/MD/NT IX Trip Matrices	EXTLM\Inputs\AM/PM/MD/NTXIIX_2_2003.mtx
2003 XX Matrices	2003 Input AM/PM/MD/NT XX Trip Matrices	EXTLM\Inputs\XXAM/PM/MD/NT_2003.mtx
XI Attractions 2003	XI Trip reductions for 2003 that are deleted for trip generation for the first loop	EXTLM\Inputs\XI_Attrs_2003.bin
IX Productions 2003	IX Trip reductions for 2003 that are deleted for trip generation for the first loop	EXTLM\Inputs\IX_Prods_2003.bin
PA Before Reductions 2003	Peak and offpeak PA trips before IX trip reductions for 2003	EXTLM\Inputs\peak/offpeak_pa_before_ix_reductions.bin
Unsurveyed Zones	Correspondence between unsurveyed cordon stations and external zone they are assigned to	EXTLM\Inputs\unsurveyed_2003.bin
Time of Day 2003	External Departure/Return rate by trip purpose based on external survey	EXTLM\Inputs\timeofday_2003.bin
Survey PA Trips for 2003	Surveyed PA external trip matrix for 2003 by trip purpose	EXTLM\Inputs\paveh_2003.mtx
External Cordon Counts	Future year estimated versus base 2003 actual two way cordon counts on external stations	EXTLM\Inputs\Cordon_counts.bin
Vehicle Occupancy	Surveyed 2003 external vehicle occupancy factors by trip purpose	EXTLM\Inputs\avo_2003.bin

Outputs

Highway Distance Skim (Truck\Outputs\spmat_distance.mtx)

Truck PA Table (Truck\Outputs\truck_pa.bin)

Field	Description
TAZ	
<Category>_<L/M/H>TRK_<P/A>	Category Light/Medium/Heavy Truck trip Productions or Attractions
NW_<L/M/H>TRK_<P/A>	Non-Warehouse Light/Medium/Heavy Truck trip Productions or Attractions
<L/M/H>TRK_<P/A>	Total Light/Medium/Heavy Truck trip Productions or Attractions

Truck II PA Matrix (Truck\Outputs\truck_pa.mtx)

Matrix	Description
WHOLE_LTRK	Wholesale light truck trips
WHOLE_MTRK	Wholesale medium truck trips
WHOLE_HTRK	Wholesale heavy truck trips
NW_LTRK	Non-Wholesale light truck trips
NW_MTRK	Non-Wholesale medium truck trips
NW_HTRK	Non-Wholesale heavy truck trips
LTRK	Total light truck trips
MTRK	Total medium truck trips
HTRK	Total heavy truck trips

Trip Tables

Table	Description	Default Value
Truck Trip Lengths	Truck Average Trip Lengths	Truck\Outputs\Truck_Average_TL.csv
Truck Trip Frequency	Truck Trip Length Frequencies	Truck\Outputs\Truck_TLD_Frequency.csv
Truck Trips by County	Truck Trips by County Report	Truck\Outputs\Trucks_by_County.csv
Truck Trips by SubAB	Truck Trips by Sub AirBasin Report	Truck\Outputs\Trucks_by_Sub_Air_Basin.csv
Truck Trips by Sector	Truck Trips by Employment Sector Report	Truck\Outputs\Trucks_by_Sector.csv
OD Trip Report File	OD Trip Summary Report by Time Period	ODTable\Outputs\OD_Trip_Report.csv

Trip Matrices

Matrix	Description	Default Value
AM OD Trips	Total AM Period OD Trips Matrix by DA, SR2, SR3+, LTRK, MTRK, HTRK	ODTable\Outputs\AM_OD.mtx
PM OD Trips	Total PM Period OD Trips Matrix by DA, SR2, SR3+, LTRK, MTRK, HTRK	ODTable\Outputs\PM_OD.mtx
MD OD Trips	Total MD Period OD Trips Matrix by DA, SR2, SR3+, LTRK, MTRK, HTRK	ODTable\Outputs\MD_OD.mtx
NT OD Trips	Total NT Period OD Trips Matrix by DA, SR2, SR3+, LTRK, MTRK, HTRK	ODTable\Outputs\NT_OD.mtx

Parameters

Parameter	Description	Default Value
Port Trips Auto Option	1 = Include Auto Port Trips in SOV Matrix, 2 = Do not Include	1
Light Truck Factor	Light Truck Factor	1
Medium Truck Factor	Medium Truck Factor	1
Heavy Truck Factor	Heavy Truck Factor	1

Inputs

PK/OP Transit Movement Table (Assign\Inputs\xx_tr_move.bin)

Field	Description
FROM_LINE	From Route ID to use to track transfer movement
ALIGHT_STOP	Optional Stop ID of alighting transfer
BOARD_STOP	Optional Stop ID of boarding transfer
TO_LINE	To Route ID to use to track transfer movement

Emissions Factors Table (Assign\Inputs\HPMS_factor.bin)

Field	Description
SUBAB	Sub Air Basin
AUTOFAC	Auto volume factor to use for sub air basin
TRUCKFAC	Truck volume factor to use for sub air basin

XLS Converter Table (User\Inputs\XLS_Converter.dbf)

Field	Description
TYPE	Type of file to convert: MODEL = Use file defined in model table, FILE = Use exact file name defined in converter table
TABLE	If TYPE = MODEL, then put in table name as defined in the model table If TYPE = FILE, put in relative table file name

Aggregate Control Table (User\Inputs\Matrix_Aggregate.dbf)

Field	Description
TYPE	Type of file to convert: MODEL = Use file defined in model table, FILE = Use exact file name defined in converter table
MATRIX	If TYPE = MODEL, then put in matrix to aggregate as defined in the model table If TYPE = FILE, put in relative matrix file name
CORR_TABLE	Correspondence table that contains the matrix ID field and the aggregation field
MATRIX_ID	Matrix ID field in correspondence table to use
AGG_ID	Aggregation field in correspondence table to use

Outputs

Matrices

Matrix	Description	Default Value
PK Transit Move Matrix	Peak Transit Assignment Movement Output Matrix	Assign\Outputs\pk_tr_move.mtx
OP Transit Move Matrix	Offpeak Transit Assignment Movement Output Matrix	Assign\Outputs\op_tr_move.mtx
PK Transit Trips	Peak Transit Trips OD Matrix by transit mode	ODTable\Outputs\PK_Transit_Trips.mtx
OP Transit Trips	OffPeak Transit Trips OD Matrix by transit mode	ODTable\Outputs\OP_Transit_Trips.mtx
Highway Time PK EM	Highway Peak Time Skim Matrix for Emissions analysis	Emission\SPMATPK_Time.mtx
Highway Time OP EM	Highway Off Peak Time Skim Matrix for Emissions analysis	Emission\SPMATOP_Time.mtx

Tables

Table	Description	Path
Hwy AM Final Flow Table	Highway AM final assignment flow table	Assign\Outputs\am_flow.bin
Hwy PM Final Flow Table	Highway PM final assignment flow table	Assign\Outputs\pm_flow.bin
Hwy MD Final Flow Table	Highway MD final assignment flow table	Assign\Outputs\md_flow.bin
Hwy NT Final Flow Table	Highway NT final assignment flow table	Assign\Outputs\nt_flow.bin
Hwy Day Final Flow Table	Highway Daily final assignment flow table	Assign\Outputs\day_flow.bin
Hwy Air-Basin LM VMT Report	Hwy VMT by Air Basin by County for L and M Vehicles	Assign\Outputs\vmt_County_Air_Basin_LM.csv
Hwy Sub-Air-Basin LM VMT Report	Hwy VMT by Sub Air Basin by County for L and M Vehcles	Assign\Outputs\vmt_County_SubAB_LM.csv
Hwy Air-Basin LHDT VMT Report	Hwy VMT by Air Basin by County for Light HDT Vehicles	Assign\Outputs\vmt_County_Air_Basin_LHDT.csv
Hwy Sub-Air-Basin LHDT VMT Report	Hwy VMT by Sub Air Basin by County for Light HDT Vehicles	Assign\Outputs\vmt_County_SubAB_LHDT.csv
Hwy Air-Basin MHDT VMT Report	Hwy VMT by Air Basin by County for Medium HDT Vehicles	Assign\Outputs\vmt_County_Air_Basin_MHDT.csv
Hwy Sub-Air-Basin MHDT VMT Report	Hwy VMT by Sub Air Basin by County for Medium HDT Vehicles	Assign\Outputs\vmt_County_SubAB_MHDT.csv
Hwy Air-Basin HHDT VMT Report	Hwy VMT by Air Basin by County for Heavy HDT Vehicles	Assign\Outputs\vmt_County_Air_Basin_HHDT.csv
Hwy Sub-Air-Basin HHDT VMT Report	Hwy VMT by Sub Air Basin by County for Heavy HDT Vehicles	Assign\Outputs\vmt_County_SubAB_HHDT.csv
Hwy Air-Basin HDT VMT Report	Hwy VMT by Air Basin by County for All HDT Vehicles	Assign\Outputs\vmt_County_Air_Basin_HDT.csv
Hwy Sub-Air-Basin HDT VMT Report	Hwy VMT by Sub Air Basin by County for All HDT Vehicles	Assign\Outputs\vmt_County_SubAB_HDT.csv
Hwy Air-Basin NonIZ TOT VMT Report	Hwy VMT by Air Basin by County for Non Intra-Zonal Total Vehcles	Assign\Outputs\vmt_County_NonIZ_AB_TOTAL.csv
Hwy SubAB NonIZ TOT VMT Report	Hwy VMT by Sub Air Basin by County for Non Intra-Zonal Total Vehicles	Assign\Outputs\vmt_County_NonIZ_SubAB_TOTAL.csv
Hwy Intra Air-Basin VMT Report	Intrazonal Hwy VMT by Air Basin by County	Assign\Outputs\IZvmt_County_Air_Basin.csv
Hwy Intra Sub-Air-Basin VMT Report	Intrazonal Hwy VMT by Sub Air Basin by County	Assign\Outputs\IZvmt_County_SubAB.csv
Hwy Air-Basin TOT VMT Report	Hwy VMT by Air Basin by County for Total Vehcles	Assign\Outputs\vmt_County_Air_Basin_TOTAL.csv
Hwy SubAB TOT VMT Report	Hwy VMT by Sub Air Basin by County for Total Vehicles	Assign\Outputs\vmt_County_SubAB_TOTAL.csv
Hwy Stats Report	Hwy VMT and VHT assignment statistics by time period	Assign\Outputs\assignment_statistics.csv
Intrazonal TAZ Report	Hwy Intrazonal VMT and VHT by TAZ Statistics	Assign\Outputs\Intrazonal_TAZ_Report.csv
Intrazonal County Report	Hwy Intrazonal VMT and VHT by County Statistics	Assign\Outputs\Intrazonal_County_Report.csv
PK Transit Summary Flow	Peak Transit Summary Flow Table	Assign\Outputs\PK_Transit_Summary_Flow.bin
PK Transit Summary Nontransit Flow	Peak Transit Summary Non-Transit Link Flow Table	Assign\Outputs\PK_Transit_Summary_Walk.bin
PK Transit Summary OnOff	Peak Transit Summary On-Off Table	Assign\Outputs\PK_Transit_Summary_OF.bin
OP Transit Summary Flow	OffPeak Transit Summary Flow Table	Assign\Outputs\OP_Transit_Summary_Flow.bin
OP Transit Summary Nontransit Flow	OffPeak Transit Summary Non-Transit Link Flow Table	Assign\Outputs\OP_Transit_Summary_Walk.bin
OP Transit Summary OnOff	OffPeak Transit Summary On-Off Table	Assign\Outputs\OP_Transit_Summary_OF.bin
Transit Route Report	Transit Report by routes	Assign\Outputs\Transit_Route_Report.csv
Transit Mode Report	Transit Report by Mode	Assign\Outputs\Transit_Mode_Report.csv
Transit Carrier Report	Transit Report by Route Carrier	Assign\Outputs\Transit_Carrier_Report.csv
Transit Mode_Carrier Report	Transit Report by Mode and Route Carrier	Assign\Outputs\Transit_Mode_Carrier_Report.csv
Transit Route Carrier_Route Report	Transit Report by Route Carrier and Route	Assign\Outputs\Transit_RouteCarrier_Route_Report.csv
Hwy AM Final Flow Table EM	Highway AM final assignment flow table after emissions factors	Emission\am_flow.bin
Hwy PM Final Flow Table EM	Highway PM final assignment flow table after emissions factors	Emission\pm_flow.bin
Hwy MD Final Flow Table EM	Highway MD final assignment flow table after emissions factors	Emission\md_flow.bin

Table	Description	Path
Hwy NT Final Flow Table EM	Highway NT final assignment flow table after emissions factors	Emission\nt_flow.bin
Hwy Day Final Flow Table EM	Highway Daily final assignment flow table after emissions factors	Emission\day_flow.bin
Hwy Air-Basin LM VMT Report EM	Hwy VMT by Air Basin by County for L and M Vehicles	Emission\vmt_County_Air_Basin_LM.csv
Hwy Sub-Air-Basin LM VMT Report EM	Hwy VMT by Sub Air Basin by County for L and M Vehcles after emissions factors	Emission\vmt_County_SubAB_LM.csv
Hwy Air-Basin LHDT VMT Report EM	Hwy VMT by Air Basin by County for Light HDT Vehicles after emissions factors	Emission\vmt_County_Air_Basin_LHDT.csv
Hwy Sub-Air-Basin LHDT VMT Report EM	Hwy VMT by Sub Air Basin by County for Light HDT Vehicles after emissions factors	Emission\vmt_County_SubAB_LHDT.csv
Hwy Air-Basin MHDT VMT Report EM	Hwy VMT by Air Basin by County for Medium HDT Vehicles after emissions factors	Emission\vmt_County_Air_Basin_MHDT.csv
Hwy Sub-Air-Basin MHDT VMT Report EM	Hwy VMT by Sub Air Basin by County for Medium HDT Vehicles after emissions factors	Emission\vmt_County_SubAB_MHDT.csv
Hwy Air-Basin HHDT VMT Report EM	Hwy VMT by Air Basin by County for Heavy HDT Vehicles after emissions factors	Emission\vmt_County_Air_Basin_HHDT.csv
Hwy Sub-Air-Basin HHDT VMT Report EM	Hwy VMT by Sub Air Basin by County for Heavy HDT Vehicles after emissions factors	Emission\vmt_County_SubAB_HHDT.csv
Hwy Air-Basin HDT VMT Report EM	Hwy VMT by Air Basin by County for All HDT Vehicles after emissions factors	Emission\vmt_County_Air_Basin_HDT.csv
Hwy Sub-Air-Basin HDT VMT Report EM	Hwy VMT by Sub Air Basin by County for All HDT Vehicles after emissions factors	Emission\vmt_County_SubAB_HDT.csv
Hwy Air-Basin NonIZ TOT VMT Report EM	Hwy VMT by Air Basin by County for Non Intra-Zonal Total Vehcles after emissions factors	Emission\vmt_County_NonIZ_AB_TOTAL.csv
Hwy SubAB NonIZ TOT VMT Report EM	Hwy VMT by Sub Air Basin by County for Non Intra-Zonal Total Vehicles after emissions factors	Emission\vmt_County_NonIZ_SubAB_TOTAL.csv
Hwy Intra Air-Basin VMT Report EM	Intrazonal Hwy VMT by Air Basin by County after emissions factors	Emission\IZvmt_County_Air_Basin.csv
Hwy Intra Sub-Air-Basin VMT Report EM	Intrazonal Hwy VMT by Sub Air Basin by County after emissions factors	Emission\IZvmt_County_SubAB.csv
Hwy Air-Basin TOT VMT Report EM	Hwy VMT by Air Basin by County for Total Vehcles after emissions factors	Emission\vmt_County_Air_Basin_TOTAL.csv
Hwy SubAB TOT VMT Report EM	Hwy VMT by Sub Air Basin by County for Total Vehicles after emissions factors	Emission\vmt_County_SubAB_TOTAL.csv
Screenlines by Freeway_Screenline	Freeway Flow Vs Count Report for cars and trucks	Assign\Outputs\Screenlines_Freeway.csv
Screenlines by Arterial_Screenline	Arterial Flow Vs Count Report for cars and trucks	Assign\Outputs\Screenlines_Arterial.csv
Screenlines by Total_Screenline	Total Flow Vs Count Report for cars and trucks	Assign\Outputs\Screenlines_Total.csv
Screenlines by Link Report	Screenlines by link id flow vs. count report	Assign\Outputs\screenlines_by_link.csv
Screenlines by Location	Screenlines by screenline location ID report	Assign\Outputs\screenlines_by_location.csv
Screenlines by Volume Group	Screenlines by location by volume group report	Assign\Outputs\screenlines_by_Volume_Group.csv
Hwy Stats Report EM	Hwy VMT and VHT assignment statistics by time period after emissions factors	Emission\assignment_statistics.csv
Screenlines by Facility_Type	Hwy VMT, VMT and Flow vs Count Statistics by Facility Type	Assign\Outputs\Screenlines_Facility_Type.csv
Screenlines by Facility_Group	Hwy VMT, VMT and Flow vs Count Statistics by Facility Group	Assign\Outputs\Screenlines_Facility_Group.csv
Screenlines by Area_Type	Hwy VMT, VMT and Flow vs Count Statistics by Area Type	Assign\Outputs\Screenlines_Area_Type.csv
Screenlines by County	Hwy VMT, VMT and Flow vs Count Statistics by County	Assign\Outputs\Screenlines_County.csv
Screenlines by Lanes	Hwy VMT, VMT and Flow vs Count Statistics by Lane Group	Assign\Outputs\Screenlines_Lanes.csv
Intrazonal TAZ Report EM	Hwy Intrazonal VMT and VHT by TAZ Statistics after emissions factors	Emission\Intrazonal_TAZ_Report.csv
Intrazonal County Report EM	Hwy Intrazonal VMT and VHT by County after emissions factors Statistics	Emission\Intrazonal_County_Report.csv
Hwy AM Intra File	Hwy AM Intra File for input into air quality models	Assign\Outputs\intra.am
Hwy PM Intra File	Hwy PM Intra File for input into air quality models	Assign\Outputs\intra.pm
Hwy MD Intra File	Hwy MD Intra File for input into air quality models	Assign\Outputs\intra.md
Hwy NT Intra File	Hwy NT Intra File for input into air quality models	Assign\Outputs\intra.nt

Table	Description	Path
Hwy AM Lodinfo File	Hwy AM Lodinfo File for input into air quality models	Assign\Outputs\Lodinfo.am
Hwy PM Lodinfo File	Hwy PM Lodinfo File for input into air quality models	Assign\Outputs\Lodinfo.pm
Hwy MD Lodinfo File	Hwy MD Lodinfo File for input into air quality models	Assign\Outputs\Lodinfo.md
Hwy NT Lodinfo File	Hwy NT Lodinfo File for input into air quality models	Assign\Outputs\Lodinfo.nt
Hwy AM Intra File EM	Hwy AM Intra File for input into air quality models after emissions factors	Emission\intra.am
Hwy PM Intra File EM	Hwy PM Intra File for input into air quality models after emissions factors	Emission\intra.pm
Hwy MD Intra File EM	Hwy MD Intra File for input into air quality models after emissions factors	Emission\intra.md
Hwy NT Intra File EM	Hwy NT Intra File for input into air quality models after emissions factors	Emission\intra.nt
Hwy AM Lodinfo File EM	Hwy AM Lodinfo File for input into air quality models after emissions factors	Emission\Lodinfo.am
Hwy PM Lodinfo File EM	Hwy PM Lodinfo File for input into air quality models after emissions factors	Emission\Lodinfo.pm
Hwy MD Lodinfo File EM	Hwy MD Lodinfo File for input into air quality models after emissions factors	Emission\Lodinfo.md
Hwy NT Lodinfo File EM	Hwy NT Lodinfo File for input into air quality models after emissions factors	Emission\Lodinfo.nt

The output flow tables have the following fields:

Field	Description
ID1	**Link ID field that is linkable to the ID field of the highway dbd file**
AB_Flow_PCE/BA_Flow_PCE, Tot_Flow_PCE	**PCE-weighted total flow**
AB_Time/BA_Time, Max_Time	**Congested travel time**
AB_VOC/BA_VOC, Max_VOC	**Volume-to-Capacity ratio**
AB/BA_V_Dist_T, TOT_V_Dist_T	**Link Vehicle Miles Traveled**
AB/BA_VHT, Tot_VHT	**Vehicle Hours Travelled**
AB/BA_Speed	**Congested Speed**
AB/BA_VDF	**Congested total cost**
AB/BA_MSA_Cost	**Congested MSA cost fed back into skimming**
AB/BA_MSA_Time	**Congested MSA time fed back into skimming**
AB/BA_Flow_Class Mode=DA, SR2 HOV, SR3 HOV, SR2 NONHOV, SR3 NONHOV, LIGHT TRUCK, MEDIUM TRUCK, HEAVY TRUCk	**Link flow by vehicle class**
AB/BA_Flow, Tot_Flow	**Raw Vehicle flow without the PCE weights**
AB/BA_Flow_Transit_Preload	**Calculated fixed transit preload flow**
AB/BA_Flow_Light/Medium_Heavy Truck_PCE	**Light,Medium,Heavy truck PCE flow**

The screenline tables generally have the following fields:

Field	Description
<link type>	**Type of link being aggregated to the screenline level (e.g. by screenline, by facility type, by area type, etc.)**
COUNT_LOCATIONS	**Number of count records for that link type**
L_AND_M_COUNT	**Vehicle count for cars and light and medium duty vehicles**
L_AND_M_MODEL	**Model flow for cars and light and medium duty vehicles**
L_AND_M_PERCENT	**Percent difference between count and model (count – model) / count * 100**
L_AND_M_RMSE	**Percent RMSE difference between count and model**
HDT_COUNT	**Vehicle count for light-heavy, medium-heavy and heavy-heavy trucks**
HDT_MODEL	**Vehicle flow for light, medium, and heavy trucks**
HDT_PERCENT	**Percent differences between count and model (count – model) / count * 100**
HDT_RMSE	**Percent RMSE difference between count and model**
TOTAL_COUNT	**Total vehicle count**
TOTAL_MODEL	**Total model vehicle flow**
TOTAL_PERCENT	**Percent difference between count and model (count – model) / count * 100**
TOTAL_RMSE	**Percent RMSE difference between count and model**
VMT	**Total VMT for screenline links**
VHT	**Total VHT for screenline links**
AVG_SPEED	**VMT/VHT – calculated average speed**

Feedback Closure Statistics Table (Assign\Outputs\Feedback_convergence_outputs.bin)

Field	Description
Feedback_iteration	**Feedback loop iteration**
LOV_SKIM_RMSE	**Highway AM DA Skim matrix RMSE difference between successive iterations**
LOV_SKIM_CHANGE	**Highway AM DA Skim matrix relative difference between successive iterations**
OD_RMSE	**AM DA trip matrix RMSE difference between successive iterations**
OD_CHANGE	**AM DA trip matrix relative difference between successive iterations**
FLOW_RMSE	**Total link flow RMSE difference between successive iterations**
FLOW_CHANGE	**Total link flow relative difference between successive iterations**
SKIM_OD_RMSE	**Skim Matrix * OD Matrix RMSE difference**
SKIM_OD_CHANGE	**Skim Matrix * OD Matrix relative difference**
TRANSIT_SKIM_RMSE	**PK Walk Express skim matrix RMSE difference**
TRANSIT_SKIM_CHANGE	**PK Walk Express skim matrix relative difference**

Parameters

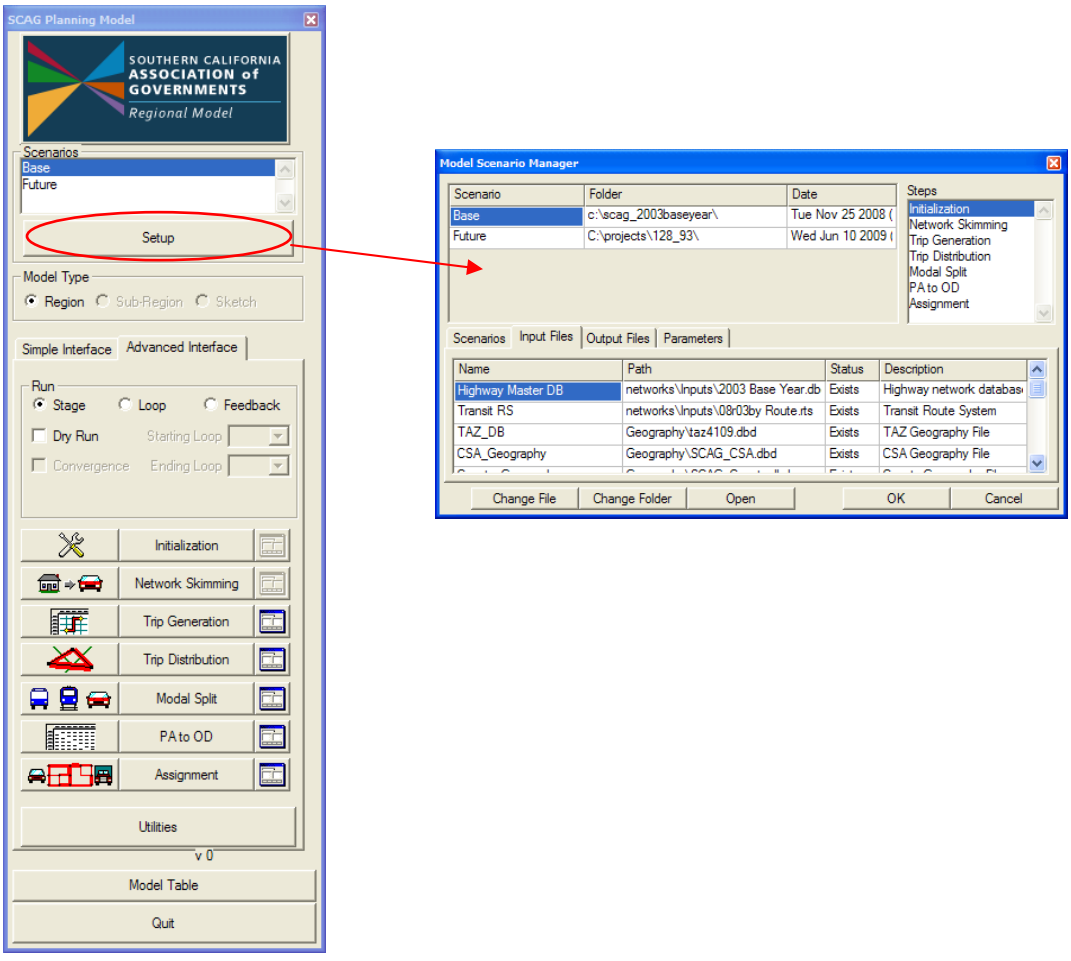
Parameter	**Description**	**Default Value**
Maximum Screenline Number	Maximum number of Screenlines	23
Light Truck PCE	Light Truck Passenger Car Equivalent Factor	1.2
Medium Truck PCE	Medium Truck Passenger Car Equivalent Factor	1.5
Heavy Truck PCE	Heavy Truck Passenger Car Equivalent Factor	2.0
Assignment Iterations	Maximum traffic assignment iterations	40
Assignment Convergence	Assignment convergence	.01
Transit Peak to AM PM	Transit Peak to AM, PM period Drive Flow Allocation	0.3837,0.6163
Transit OffPeak to MD NT	Transit OffPeak to MD, NT period Drive Flow Allocation	0.7165,0.2835
Assign Convergence	Model convergence criterion on highway assignment RMSE	0
VDF Function	VDF to use, 1=Unconstrained Akcelik, 2=Constrained Akcelik, 3=BPR	2
UROAD Factor	UROAD Factor to adjust capacities	1
Fratar Flag	Flag variable used to optionally run external trips matrix calculator	0

Appendix D: Models and Features Developed for Version 5 Model

This appendix documents the models and features developed for Version 5 of the Regional Model that are also included in the Subregional Model. Some of the models and features have been previously described earlier in this User's Guide, and have been integrated into the overall documentation.

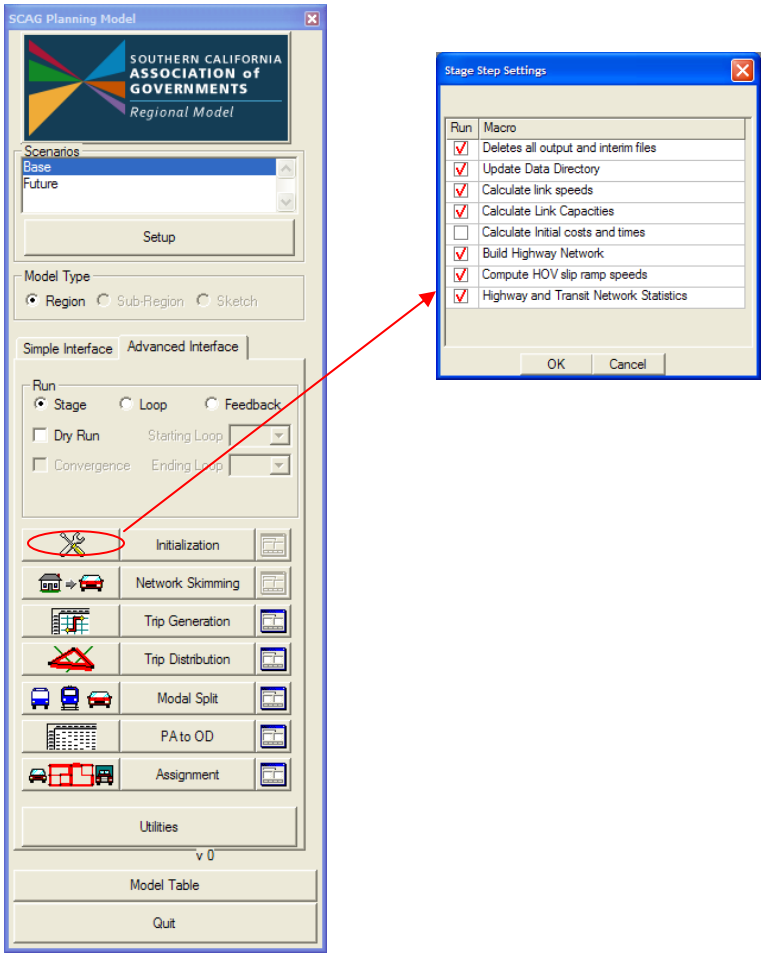
New Model Interface

The Regional Model has been moved to an updated interface that takes advantage of TransCAD's grid view objects. Unlike the previous version, the planning model dialog box and model scenario manager are now controlled by just 2 dialog boxes:

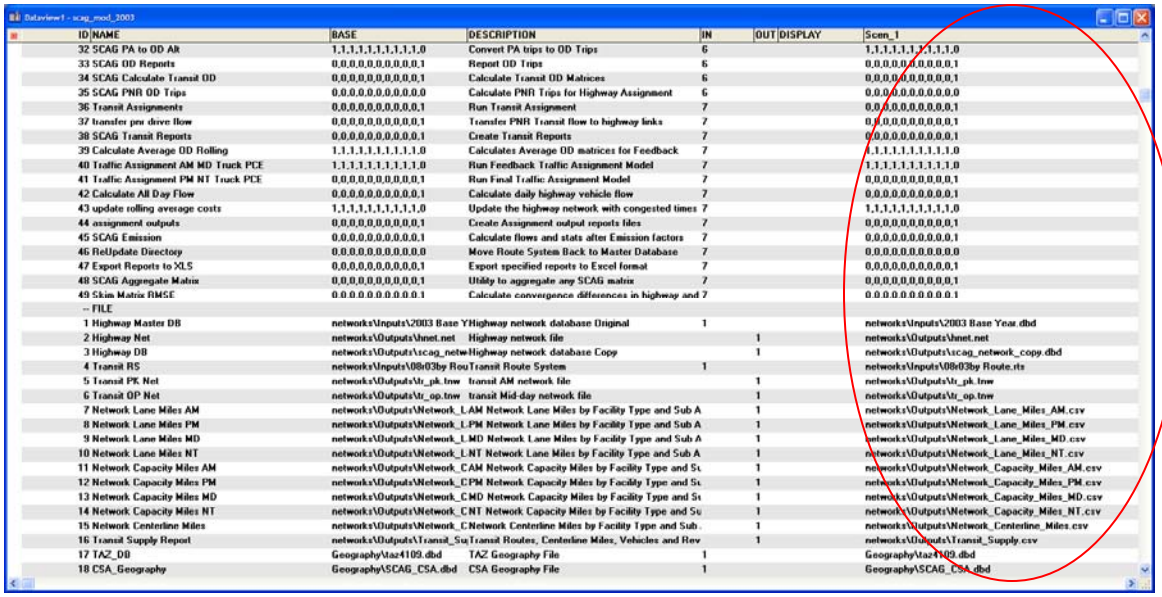


Model steps, input and output files, and parameters are now contained in one dialog box. All columns are now expandable, and the entire dialog box is expandable as

well, which helps make the names and paths more readable. Also, the substeps are contained in a grid view, and there is no limit on the number of substeps that can be defined in a step:



The storage of scenario information has been made more transparent. Scenarios are now stored as extra fields directly in the model table:



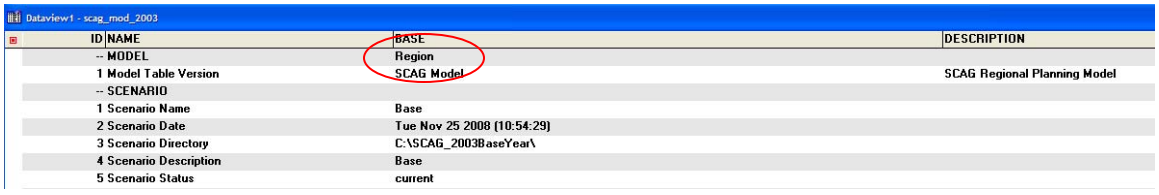
ID	NAME	BASE	DESCRIPTION	IN	OUT	DISPLAY	Scen_1
32	SCAG PA to OD Alt	1,1,1,1,1,1,1,1,1,1,0	Convert PA trips to OD Trips	6			1,1,1,1,1,1,1,1,1,1,0
33	SCAG OD Reports	0,0,0,0,0,0,0,0,0,0,1	Report OD Trips	6			0,0,0,0,0,0,0,0,0,0,1
34	SCAG Calculate Transit OD	0,0,0,0,0,0,0,0,0,0,1	Calculate Transit OD Matrices	6			0,0,0,0,0,0,0,0,0,0,1
35	SCAG PNR OD Trips	0,0,0,0,0,0,0,0,0,0,0	Calculate PNR Trips for Highway Assignment	6			0,0,0,0,0,0,0,0,0,0,0
36	Transit Assignments	0,0,0,0,0,0,0,0,0,0,1	Run Transit Assignment	7			0,0,0,0,0,0,0,0,0,0,1
37	transfer pnr drive flow	0,0,0,0,0,0,0,0,0,0,1	Transfer PNR Transit flow to highway links	7			0,0,0,0,0,0,0,0,0,0,1
38	SCAG Transit Reports	0,0,0,0,0,0,0,0,0,0,1	Create Transit Reports	7			0,0,0,0,0,0,0,0,0,0,1
39	Calculate Average OD Rolling	1,1,1,1,1,1,1,1,1,1,0	Calculates Average OD matrices for Feedback	7			1,1,1,1,1,1,1,1,1,1,0
40	Traffic Assignment AM MD Truck PCE	1,1,1,1,1,1,1,1,1,1,0	Run Feedback Traffic Assignment Model	7			1,1,1,1,1,1,1,1,1,1,0
41	Traffic Assignment PM NT Truck PCE	0,0,0,0,0,0,0,0,0,0,1	Run Final Traffic Assignment Model	7			0,0,0,0,0,0,0,0,0,0,1
42	Calculate All Day Flow	0,0,0,0,0,0,0,0,0,0,1	Calculate daily highway vehicle flow	7			0,0,0,0,0,0,0,0,0,0,1
43	update rolling average costs	1,1,1,1,1,1,1,1,1,1,0	Update the highway network with congested times	7			1,1,1,1,1,1,1,1,1,1,0
44	assignment outputs	0,0,0,0,0,0,0,0,0,0,1	Create Assignment output reports files	7			0,0,0,0,0,0,0,0,0,0,1
45	SCAG Emission	0,0,0,0,0,0,0,0,0,0,1	Calculate flows and stats after Emission factors	7			0,0,0,0,0,0,0,0,0,0,1
46	ReUpdate Directory	0,0,0,0,0,0,0,0,0,0,0	Move Route System Back to Master Database	7			0,0,0,0,0,0,0,0,0,0,0
47	Export Reports to XLS	0,0,0,0,0,0,0,0,0,0,1	Export specified reports to Excel format	7			0,0,0,0,0,0,0,0,0,0,1
48	SCAG Aggregate Matrix	0,0,0,0,0,0,0,0,0,0,1	Utility to aggregate any SCAG matrix	7			0,0,0,0,0,0,0,0,0,0,1
49	Skim Matrix RMSE	0,0,0,0,0,0,0,0,0,0,1	Calculate convergence differences in highway and	7			0,0,0,0,0,0,0,0,0,0,1
--	FILE						
1	Highway Master DB	networks\Inputs\2003 Base Y	Highway network database Original	1			networks\Inputs\2003 Base Year.dbd
2	Highway Net	networks\Outputs\hnet.net	Highway network file		1		networks\Outputs\hnet.net
3	Highway DB	networks\Outputs\scag_netw	Highway network database Copy		1		networks\Outputs\scag_network_copy.dbd
4	Transit RS	networks\Inputs\08r03by Rou	Transit Route System	1			networks\Inputs\08r03by Route.rts
5	Transit PK Net	networks\Outputs\tr_pk.tnw	transit AM network file		1		networks\Outputs\tr_pk.tnw
6	Transit OP Net	networks\Outputs\tr_op.tnw	transit Mid-day network file		1		networks\Outputs\tr_op.tnw
7	Network Lane Miles AM	networks\Outputs\Network_LAM	Network Lane Miles by Facility Type and Sub A		1		networks\Outputs\Network_Lane_Miles_AM.csv
8	Network Lane Miles PM	networks\Outputs\Network_LPM	Network Lane Miles by Facility Type and Sub A		1		networks\Outputs\Network_Lane_Miles_PM.csv
9	Network Lane Miles MD	networks\Outputs\Network_LMD	Network Lane Miles by Facility Type and Sub A		1		networks\Outputs\Network_Lane_Miles_MD.csv
10	Network Lane Miles NT	networks\Outputs\Network_LNT	Network Lane Miles by Facility Type and Sub A		1		networks\Outputs\Network_Lane_Miles_NT.csv
11	Network Capacity Miles AM	networks\Outputs\Network_CAM	Network Capacity Miles by Facility Type and St		1		networks\Outputs\Network_Capacity_Miles_AM.csv
12	Network Capacity Miles PM	networks\Outputs\Network_CPM	Network Capacity Miles by Facility Type and St		1		networks\Outputs\Network_Capacity_Miles_PM.csv
13	Network Capacity Miles MD	networks\Outputs\Network_CMD	Network Capacity Miles by Facility Type and St		1		networks\Outputs\Network_Capacity_Miles_MD.csv
14	Network Capacity Miles NT	networks\Outputs\Network_CNT	Network Capacity Miles by Facility Type and Su		1		networks\Outputs\Network_Capacity_Miles_NT.csv
15	Network Centerline Miles	networks\Outputs\Network_C	Network Centerline Miles by Facility Type and Sub		1		networks\Outputs\Network_Centerline_Miles.csv
16	Transit Supply Repost	networks\Outputs\Transit_Su	Transit Routes, Centerline Miles, Vehicles and Rev		1		networks\Outputs\Transit_Supply.csv
17	TAZ_DB	Geography\taz4109.dbd	TAZ Geography File	1			Geography\taz4109.dbd
18	CSA_Geography	Geography\SCAG_CSA.dbd	CSA Geography File	1			Geography\SCAG_CSA.dbd

The scenario file and step information can be changed from the planning dialog box interface or in the model table directly. More detailed information on using the new interface and it's features can be found in the beginning of this user's guide.

Integration of Regional, Subregional, and Sketch Plan Models

Version 5 of the SCAG model integrates the Regional, Subregional and Sketch Plan Models into one common interface and one common set of GISDK macros. This eases the updating and migration process of these three major models. If models, data, and/or code for the Regional model are updated, they are then also automatically updated for both the Subregional and Sketch Plan models. This is done with minimal requirements in identifying the portions of the subregional and sketch plan code, data, and models to update.

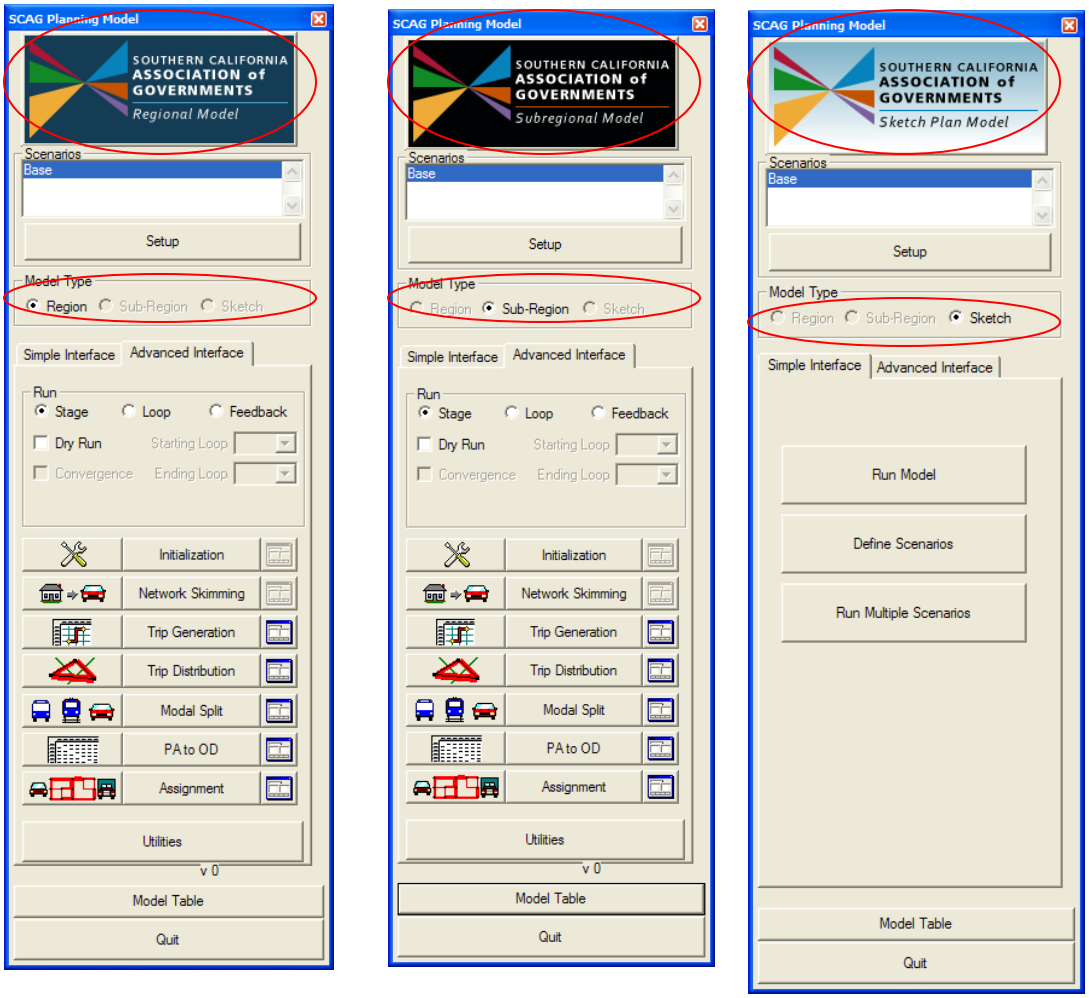
Since both the Subregional and Sketch Plan models contain some models and datasets that are unique, the type of model to run (Regional, Subregional, or Sketch Plan) needs to be identified. This identification is performed in the first section of the model table:



ID	NAME	BASE	DESCRIPTION
--	MODEL	Region	
1	Model Table Version	SCAG Model	SCAG Regional Planning Model
--	SCENARIO		
1	Scenario Name	Base	
2	Scenario Date	Tue Nov 25 2008 (10:54:29)	
3	Scenario Directory	C:\SCAG_2003BaseYear\	
4	Scenario Description	Base	
5	Scenario Status	current	

In the BASE field for the "MODEL" record, you would enter either "Region" for the Regional model, "Subregion" for the Subregional model, or "Sketch" for the Sketch Plan model. The model interface will read this choice and then set up the planning model dialog box with the unique default settings depending on the model type. The

planning dialog box will also identify the model type:



Once the model type is set, the model will run all the macros and utilities unique to that model type with datasets that are unique as well. The model will also run all models common to all the model types. It is assumed that all input files in the subdirectory that the model table is stored is consistent with the requirements of the model type.

Modularization of GISDK Code

The GISDK code that runs the Regional Model has been divided across more modules, macros, and GISDK files. With this division of the GISDK code, individual macros are more easily understood in their smaller components. The GISDK file names are also more descriptive. The full list of GISDK files in the Regional Model is presented below. The files are generally in the order that they are invoked in the model. In all, there are 62 GISDK files that comprise the Regional Model.

GISDK File	Description
dbox_ui.rsc	These macros define the planning model dialog box and call the model scenario manager
dbox_supplements.rsc	These macros control the report and log files created for each model run, and produce a list of all files and parameters used for a model run
Init_initialization_macros.rsc	These macros create initial directories, create necessary fields in the network, copy scenario input files, and prepare the demographics table if the sketch or subregional model are run
Init_speed_and_capacity.rsc	These macros calculate network free flow speeds and link capacities and volume delay parameters. These macros also calculate speeds on HOV links.
Init_sketch_macros.rsc	These macros, invoked only when the sketch or subregion model are run, choose a representative zone for each aggregated zone.
Init_truck_pce.rsc	These macros calculate truck link PCE values based on link grades, truck percent mixes, and levels of congestion
Init_network_reports.rsc	These macros calculate link supply summaries such as total lane miles, capacity models, total route miles, etc.
Skim_highway_build_and_skims.rsc	These macros build the highway network and produce highway skim matrices.
Skim_transit_preprocess.rsc	These macros produce drive access and egress links. These macros also calculate transit travel times and bus preload volumes.
Skim_transit_build_and_skims.rsc	These macros build and skim the transit networks.
Tripgen_preprocess.rsc	These macros calculate the minimum transit and walk times for input into vehicle availability, calculate accessibility, and integrate the demographic table with the PUMS table
Tripgen_vehicle_availability.rsc	These macros calculate the vehicle availability model
Tripgen_hh_classifications.rsc	These macros estimate households by the various classifications: income, size, autos, and workers
Tripgen_compute_productions.rsc	These macros calculate trip productions by purpose by multiplying the household trip rates by the household categories.
Tripgen_compute_attractions.rsc	These macros calculate trip attractions by the various linear regression models.

Tripgen_factors_tdm_balancing.rsc	These macros factor the PA trips, reduce trips through TDM, and balance the trips so that productions are equal to attractions
Tripgen_reports.rsc	These macros summarize the trip generation results and produce csv text reports.
Tripgen_utilities.rsc	These macros provide support utilities for the trip generation models.
Tripdist_logsums.rsc	These macros calculate skim logsums by trip purpose.
Tripdist_create_friction_factors.rsc	These macros calculate friction factor matrices using the special friction factor functions, and either the logsums, cost, or skim matrices, depending on the trip purpose.
Tripdist_gravity.rsc	These macros run the gravity model on the trip purposes to produce production/attraction trip matrices.
Tripdist_reports.rsc	These macros calculate average trip lengths and times, intrazonal trips, and trip length frequency curves by trip purpose.
Modechoice_nested_logit_model.rsc	These macros run the nested logit model that produces trip matrices by mode and purpose.
Modechoice_tdm_shift.rsc	These macros shift proportions of trips between modes.
Modechoice_reports.rsc	These macros produce mode choice summary reports.
TimeofDay_intermediate_stops.rsc	These macros run the intermediate stops model, which break down the HBWS trips into HBI (intermediate zones) and IBW trip matrices.
TimeofDay_truck_model.rsc	These macros run the truck generation, distribution, gravity, and time-of-day models.
TimeofDay_external_truck_model.rsc	These macros integrate the external truck trips produced from the external truck model into the truck trip matrices.
TimeofDay_PA_to_highway_od.rsc	These macros convert the peak and offpeak PA trip matrices into AM, PM, MD and NT auto and truck vehicle trip matrices. These macros also integrate the truck trips, air and port trips, and external trips into the OD matrices
TimeofDay_PA_to_transit_od.rsc	These macros convert the PA trip matrices into transit passenger trip matrices
TimeofDay_PNR_OD.rsc	Macros in development and not integrated into model
TimeofDay_reports.rsc	These macros report out total trips by time period

TimeofDay_sketch_macros.rsc	These macros create intra-regional trip matrices for aggregated zones for the sketch and subregional model
Assign_HOV_models.rsc	These models calculate HOV time savings for each time period and run the HOV diversion model.
Assign_external_trips.rsc	These models calculate external trip matrices by expanding from base matrices
Assign_truck_macros.rsc	These models update link PCE values from assignment flow results of truck mixtures and congestion
Assign_traffic_assignment.rsc	These models average OD trip matrices, run the time period highway assignments, and calculate daily flows
Assign_rolling_average_feedback.rsc	These macros calculate average feedback flows using the ½ step MSA method
Assign_msa_feedback.rsc	These macros calculate average feedback flows using the 1/iteration MSA method
Assign_highway_reports.rsc	These macros calculate assorted highway assignment summary reports
Assign_sketch_assignment.rsc	These macros calculate preloads for the intraregional, regular, and supercentroid assignments for the sketch and subregional model
Assign_transit_assignment.rsc	These macros run the transit assignment models and produce transit ridership and boarding results
Assign_transit_reports.rsc	These macros calculate transit ridership summaries by mode, carrier, and other summary measures.
Assign_emissions_postprocess.rsc	These macros run the emissions postprocess routines that recalculates flows, times and skims.
Utilities_dbox.rsc	These macros define the Utilities dialog box
Utilities_SED_importer.rsc	These macros create the input SED table from 3 separate csv files
Utilities_mergenet_run.rsc	These macros transfer congested speeds and times from a source to a target network
Utilities_TLD_calculations.rsc	These macros compute average trip lengths and trip length frequences for model, survey or CTPP data
Utilities_fill_network_with_taz_geography.rsc	These macros calculate taz and other geographic attributes for each network link.
Utilities_modechoice_calibrate.rsc	These macro calibrate the mode choice constants so that mode shares match target shares.
Utilities_external_trucks.rsc	These macros run the external trucks model

Utilities_external_model.rsc	These macros calculate the external trips matrices
Utilities_create_sketch_inputs.rsc	These macros convert regional model input data into datasets compatible with the sketch model
Utilities_create_subregion_inputs.rsc	These macros convert regional model input data into datasets compatible with the subregion model
Utilities_highway_network_check.rsc	These macros perform data checks on the network to ensure that attributes are correctly filled out.
Utilities_transit_network_check.rsc	These macros perform data checks on the route system
Utilities_scenario_utilities.rsc	These macros contain code to define scenarios, run multiple scenarios, copy scenarios, and contain other scenario-based utilities
Utilities_misc_utilities.rsc	These macros contain miscellaneous support utilities and macros
Utilities_truck_pce_utilities.rsc	These macros calculate roadway grade and combined grades for each link
Utilities_Calibrate_Distribution.rsc	These macros calibrate the distribution model such that average trip lengths match the survey and the trip length frequency matches the survey.

Feedback Convergence

The Regional Model supports different options and methods for feedback calculation. The model also calculates different feedback closure methods and presents the results in an output table.

MSA Flow Averaging

In the feedback process, the assigned vehicle flows are averaged using the Method of Successive Averages (MSA). For the MSA method, link average flows are calculated using the following formula:

$$FlowAvg_n = FlowAvg_{n-1} + StepSize(Flow_n - FlowAvg_{n-1})$$

Where:

$FlowAvg_n$ = MSA average flow for feedback iteration n
$Flow_n$ = volume flow directly from assignment

The StepSize can vary based on the methodology. The most common methodology is to use a StepSize of 1/feedback_iteration, which would translate into the following

example:

$$FlowAvg_2 = FlowAvg_1 + \frac{Flow_2 - FlowAvg_1}{2}$$

$$FlowAvg_3 = FlowAvg_2 + \frac{Flow_3 - FlowAvg_2}{3}$$

$$FlowAvg_4 = FlowAvg_3 + \frac{Flow_4 - FlowAvg_3}{4}$$ and so on…

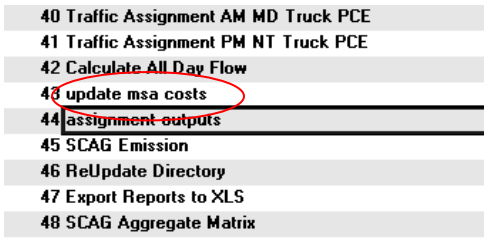
Using 1/feedback_iteration as the step size, the flow results from the later iterations contribute less to final flow averages compared to the earlier iteration flows. As a default, the SCAG Regional model uses constant StepSize = ½, which yields the following set of functions:

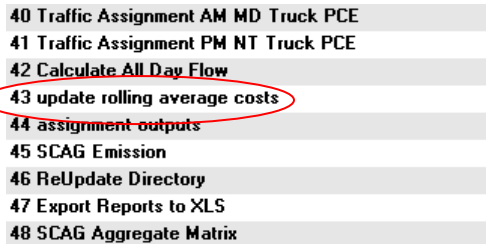
$$FlowAvg_2 = FlowAvg_1 + \frac{Flow_2 - FlowAvg_1}{2}$$

$$FlowAvg_3 = FlowAvg_2 + \frac{Flow_3 - FlowAvg_2}{2}$$

$$FlowAvg_4 = FlowAvg_3 + \frac{Flow_4 - FlowAvg_3}{2}$$ and so on…

The 1/feedback_iteration step MSA is contained within the macro “update msa costs”. The ½ step MSA method is contained within the macro “update rolling average costs”. The macro to use can be defined in the NAME field of the model table as shown below:





The model macro should be defined between the “Calculate All Day Flow” and “assignment outputs” macros.

OD Matrix Averaging

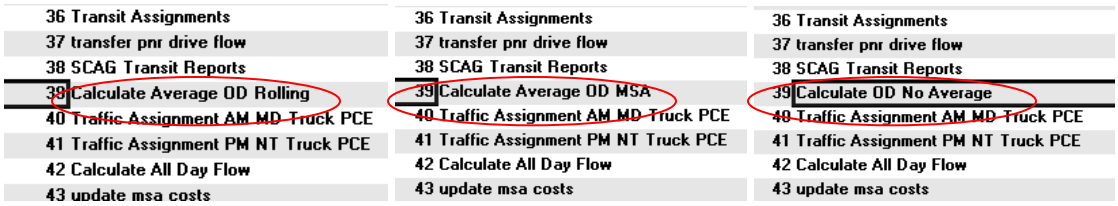
The Regional Model supports the averaging of OD trip matrices between feedback iterations along with MSA averaging of vehicle flow. The averaging method of the OD matrix should be consistent with the averaging method of flows. There are 3 alternate macros that control OD matrix averaging in the model, and one of them can be placed in the model table. The macros are:

“Calculate Average OD MSA”: OD averaging using the 1/feedback_iteration MSA step size

“Calculate Average OD Rolling”: OD averaging using the ½ MSA step size

“Calculate OD No Average”: Perform no OD matrix averaging

The choice of macro should appear in the model table between the “SCAG Transit Reports” and the “Traffic Assignment” macros.



Feedback Closure Calculation

During the model run, AM skims and OD matrices from each feedback loop are preserved. At the end of the full run, these matrices are compared to calculate various feedback closure statistics. The statistics are stored in the file Assign\Outputs\Feedback_convergence_outputs.bin. The fields of this table are described below:

Field	Description
Feedback_iteration	Feedback loop iteration
LOV_SKIM_RMSE	Highway AM DA Skim matrix RMSE difference between successive iterations
LOV_SKIM_CHANGE	Highway AM DA Skim matrix relative difference between successive iterations
OD_RMSE	AM DA trip matrix RMSE difference between successive iterations
OD_CHANGE	AM DA trip matrix relative difference between successive iterations
FLOW_RMSE	Total link flow RMSE difference between successive iterations
FLOW_CHANGE	Total link flow relative difference between successive iterations
SKIM_OD_RMSE	Skim Matrix * OD Matrix RMSE difference
SKIM_OD_CHANGE	Skim Matrix * OD Matrix relative difference
TRANSIT_SKIM_RMSE	PK Walk Express skim matrix RMSE difference
TRANSIT_SKIM_CHANGE	PK Walk Express skim matrix relative difference

HOV Diversion Model

The Regional Model contains an “HOV Diversion” model which assigns trips between HOV and parallel Mainline facilities based on cost and travel time savings attributes of the alternative facilities. After the mode choice model determines the HOV trips for each trip purpose, the HOV Diversion model splits these trips into trips that use the HOV facilities and trips that use only the mainline facilities.

The following function was used to determine the HOV split:

$$P(HOV) = \frac{1}{1 + e^{at}}$$

Where

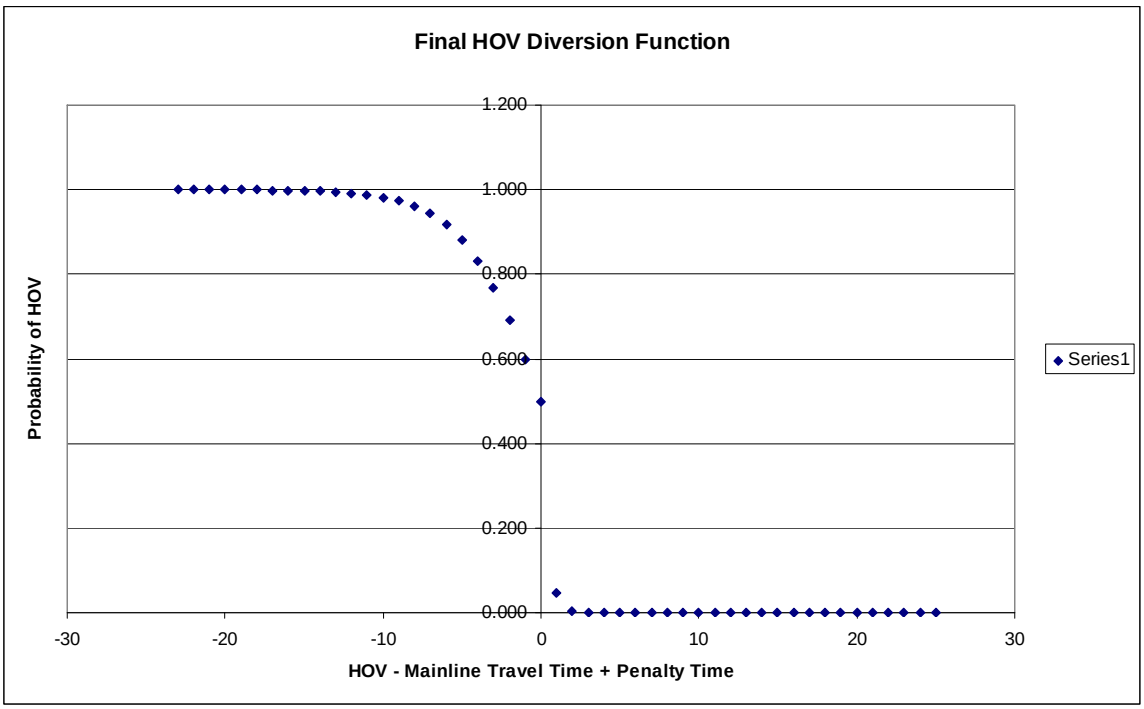
P(HOV) = Probability of choosing the HOV facility over the mainline facility

t = HOV travel time – Mainline travel time + Penalty Time

a = calibrating parameter a1 for t > 0 and a2 for t < 0

a1 = ~ 3, a2 = ~0.4

A graphical representation of this function is shown below:



In this diversion function, the difference in travel time is modified by a penalty time. The penalty time is placed to model users' reluctance to enter the HOV facility unless the HOV time savings is greater than a certain threshold. The calibration parameter is also different in the regime where there is no HOV time savings (e.g. HOVTime – MainTime > 0). The steeper curve models the extreme reluctance of users to utilize the HOV facility when there is no travel time savings or even a negative travel time savings. Both the travel time penalty and the a1 and a2 parameters are calibrated so that HOV flows match counts by time period.

The HOV Diversion model is applied to the time period specific HOV2 and HOV3+ trip matrices output by the time of day models. This creates extra trip matrices to load in the highway assignment. The following vehicle classes and the link types they are excluded from are listed below:

Vehicle Class	Exclusion Links
Drive Alone	All HOV links
HOV2 – Use HOV	All Mainline parallel links
HOV2 – Non-HOV	HOV 3+ only links
HOV3+ - Use HOV	None
HOV3+ - Non-HOV	All HOV Links
Light Trucks	All HOV links and truck exclusion links
Medium Trucks	All HOV links and truck exclusion links
Heavy Trucks	All HOV links and truck exclusion links

The diversion model is applied at every feedback loop just before assignment with the previous loop's congested time, and at around the midpoint of the assignment routine. There are no extra input or output files or parameters associated with the HOV diversion model, as the diversion parameters are hardcoded into the GISDK code. However, there are extra trip matrices produced in the matrix files, and after assignment, extra class flows are produced in the assignment flow tables.

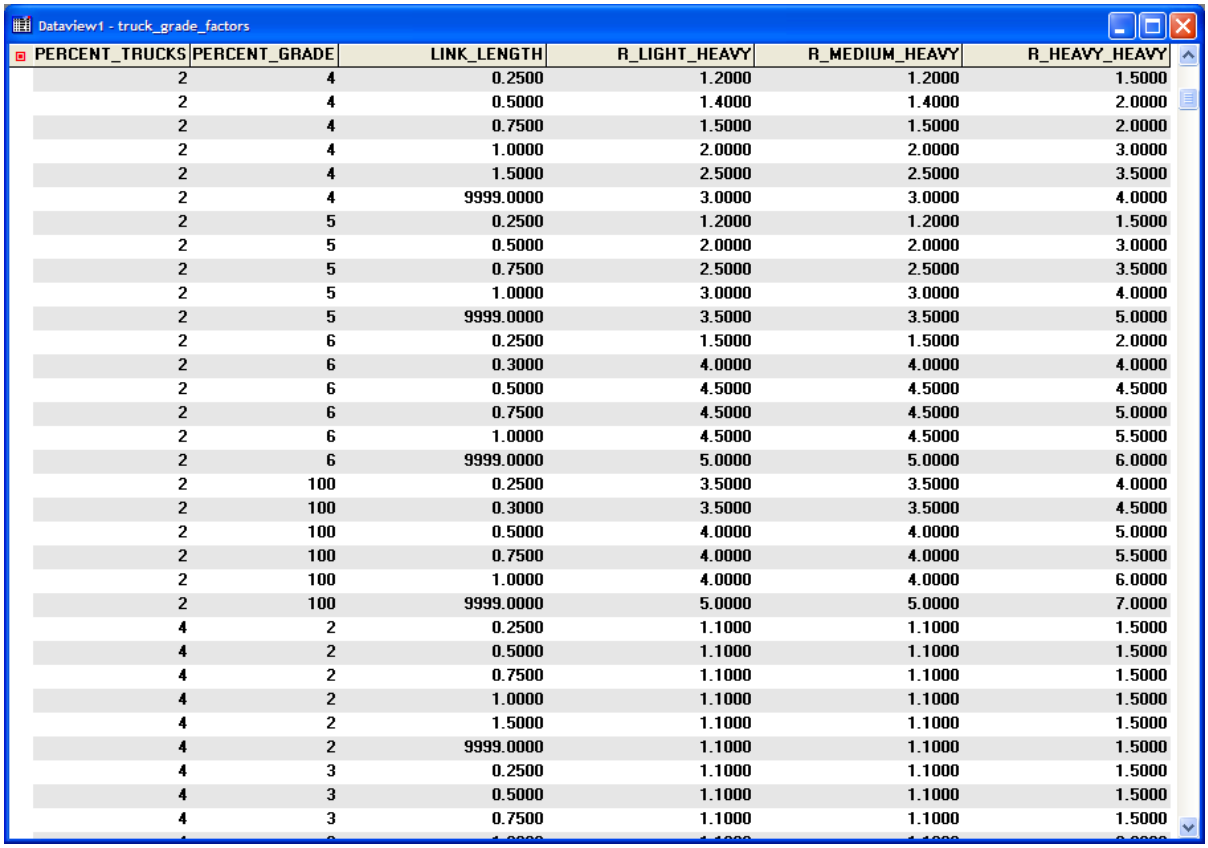
Truck PCE Model

The Truck PCE Model estimates link-based passenger car equivalencies for light, medium, and heavy duty trucks. The PCE values by link are based upon the following variables:

- Truck link length, in miles
- Truck percent grade of link
- Percentage of trucks on link
- Congestion on link

Truck link length is based on the GIS link length and the accumulation of links that have high grades. It is calculated by a pre-processing utility that is described later. Truck percent grade is also calculated by a pre-processing utility that is described later. Percent trucks and link congestion are continually calculated at each feedback loop during the traffic assignment stage. The PCE rates are input via three lookup tables: a truck grade factors table, a truck congestion factors table, and a truck composite factors table. Example tables are shown below and their field descriptions follow:

[Truck Grade Factors] table: Assign\Inputs\truck_grade_factors.bin

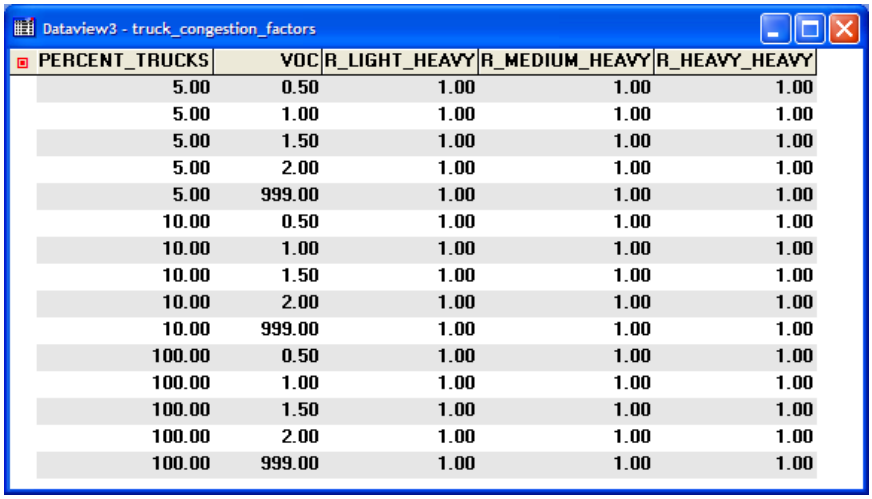


Dataview1 - truck_grade_factors

PERCENT_TRUCKS	PERCENT_GRADE	LINK_LENGTH	R_LIGHT_HEAVY	R_MEDIUM_HEAVY	R_HEAVY_HEAVY
2	4	0.2500	1.2000	1.2000	1.5000
2	4	0.5000	1.4000	1.4000	2.0000
2	4	0.7500	1.5000	1.5000	2.0000
2	4	1.0000	2.0000	2.0000	3.0000
2	4	1.5000	2.5000	2.5000	3.5000
2	4	9999.0000	3.0000	3.0000	4.0000
2	5	0.2500	1.2000	1.2000	1.5000
2	5	0.5000	2.0000	2.0000	3.0000
2	5	0.7500	2.5000	2.5000	3.5000
2	5	1.0000	3.0000	3.0000	4.0000
2	5	9999.0000	3.5000	3.5000	5.0000
2	6	0.2500	1.5000	1.5000	2.0000
2	6	0.3000	4.0000	4.0000	4.0000
2	6	0.5000	4.5000	4.5000	4.5000
2	6	0.7500	4.5000	4.5000	5.0000
2	6	1.0000	4.5000	4.5000	5.5000
2	6	9999.0000	5.0000	5.0000	6.0000
2	100	0.2500	3.5000	3.5000	4.0000
2	100	0.3000	3.5000	3.5000	4.5000
2	100	0.5000	4.0000	4.0000	5.0000
2	100	0.7500	4.0000	4.0000	5.5000
2	100	1.0000	4.0000	4.0000	6.0000
2	100	9999.0000	5.0000	5.0000	7.0000
4	2	0.2500	1.1000	1.1000	1.5000
4	2	0.5000	1.1000	1.1000	1.5000
4	2	0.7500	1.1000	1.1000	1.5000
4	2	1.0000	1.1000	1.1000	1.5000
4	2	1.5000	1.1000	1.1000	1.5000
4	2	9999.0000	1.1000	1.1000	1.5000
4	3	0.2500	1.1000	1.1000	1.5000
4	3	0.5000	1.1000	1.1000	1.5000
4	3	0.7500	1.1000	1.1000	1.5000

Field	Description
PERCENT_TRUCKS	Percentage of vehicle flow that are trucks
PERCENT_GRADE	Percent grade of link
LINK_LENGTH	Truck Length of link, in miles
R_LIGHT_HEAVY	PCE Factor for light-heavy trucks
R_MEDIUM_HEAVY	PCE Factor for medium-heavy trucks
R_HEAVY_HEAVY	PCE Factor for heavy-heavy trucks

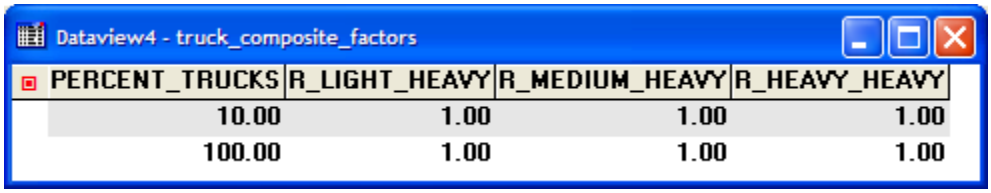
[Truck Congestion Factors] table: Assign\Inputs\truck_congestion_factors.bin



PERCENT_TRUCKS	VOC	R_LIGHT_HEAVY	R_MEDIUM_HEAVY	R_HEAVY_HEAVY
5.00	0.50	1.00	1.00	1.00
5.00	1.00	1.00	1.00	1.00
5.00	1.50	1.00	1.00	1.00
5.00	2.00	1.00	1.00	1.00
5.00	999.00	1.00	1.00	1.00
10.00	0.50	1.00	1.00	1.00
10.00	1.00	1.00	1.00	1.00
10.00	1.50	1.00	1.00	1.00
10.00	2.00	1.00	1.00	1.00
10.00	999.00	1.00	1.00	1.00
100.00	0.50	1.00	1.00	1.00
100.00	1.00	1.00	1.00	1.00
100.00	1.50	1.00	1.00	1.00
100.00	2.00	1.00	1.00	1.00
100.00	999.00	1.00	1.00	1.00

Field	Description
PERCENT_TRUCKS	Percentage of vehicle flow that are trucks
VOC	Congestion level of links (VOC Ratio)
R_LIGHT_HEAVY	PCE Factor for light-heavy trucks
R_MEDIUM_HEAVY	PCE Factor for medium-heavy trucks
R_HEAVY_HEAVY	PCE Factor for heavy-heavy trucks

[Truck Composite Factors] table: Assign\Inputs\truck_composite_factors.bin



PERCENT_TRUCKS	R_LIGHT_HEAVY	R_MEDIUM_HEAVY	R_HEAVY_HEAVY
10.00	1.00	1.00	1.00
100.00	1.00	1.00	1.00

Field	Description
PERCENT_TRUCKS	Percentage of vehicle flow that are trucks
R_LIGHT_HEAVY	PCE Factor for light-heavy trucks
R_MEDIUM_HEAVY	PCE Factor for medium-heavy trucks
R_HEAVY_HEAVY	PCE Factor for heavy-heavy trucks

The factors are multiplicative, thus the grade factors are multiplied by the congestion factors, and then by the composite factors. The PCE factors are calculated and updated at various points during the model run:

1. At the beginning of the model with the assumption of no congestion and no truck mixtures

2. After the first 10 iterations of an assignment run to update the factors within

assignment

3. At the end of the assignment run

Points 2 and 3 are performed for each feedback loop. During the 10 iterations of point 2, the flows are saved, then they are fed into the assignment continuation of point 3 as a warm start such that the assignment does not need to start from free flow times.

Grade percents are placed into the TRUCK_GRADE field in the input [Highway Master DB] file. These truck grades are pre-calculated using a couple of utilities, which are described in the next section.

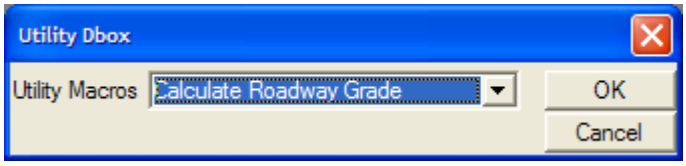
Truck Grade Percent Utilities

There are 2 utilities that are used to calculate truck grade percents. The first utility is called “Calculate Roadway Grade”. This utility calculates the percent grade for each link. The utility, when invoked, polls the USGS web server which gives out the elevation information for each coordinate when requested. The utility obtains the elevation of each link’s end node using the web server, and then calculates the percent grade from the elevation data. The grade information is stored in the ABGRADE and BAGRADE field in the [Highway Master DB] file. This utility will only fill in links that do not already have existing ABGRADE and BAGRADE values. This utility only needs to be invoked if there are substantial new links coded in the highway network.

To Run the "Calculate Roadway Grade Utility

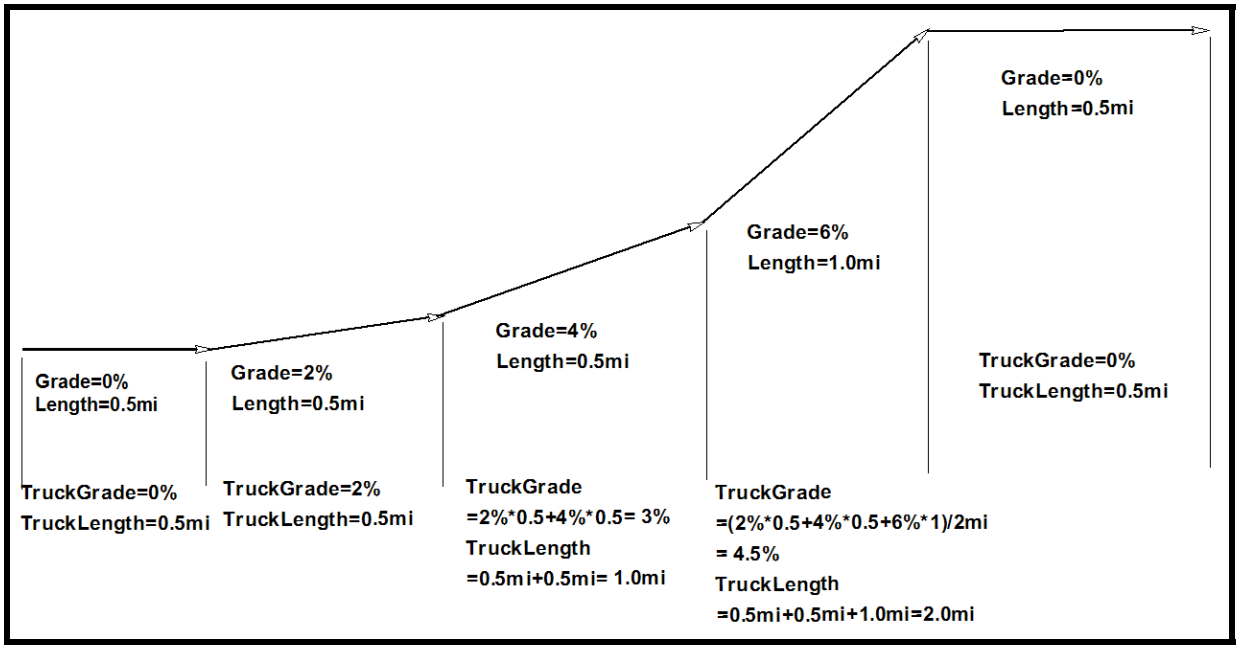
1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

2. Make sure that your scenario and [Highway Master DB] are correctly chosen, click on the Utilities button, and choose "Calculate Roadway Grade" and click OK.



   The utility will be invoked and the two grade fields will be filled.

The second utility takes the grade information produced by "Calculate Roadway Grades" and calculates grade percents and truck link lengths for freeway links. The truck grade accounts for the accumulation and averaging of high grade sections over an extended sequence of links. The truck link length estimates the total length of segment that experiences the accumulated grade. For all freeway links where the road grade is less than 2%, the truck grade is equal to the road grade and the truck link length is the road length. For links where the road grade is greater than 2%, first the sequence of all connected links that are > 2% are isolated. Then, from the start of the link to the end of the link, the link truck grade is the accumulated length-weighted grade of each link in the sequence. The truck link length is the accumulated length of the links in the sequence. An example of this calculation for some example freeway links is shown in the following graphic:



The 2% grade link is the first link in the sequence. For the link with the 4% raw grade, the truck grade is the weight of the previous link's grade (2%) and the current grade's link (4%), which is 3%. For the link with the 6% grade, the truck grade for that link is the length weighted average of all link grades in the sequence, which is:

(2%*0.5mi + 4%*0.5mi + 6%*1mi) / (0.5mi + 0.5mi + 1mi) = 4.5%

The truck link length is the sum of all lengths in the sequence, which is 0.5+0.5+1mi = 2.0 mi. The first and last links are out of the sequence since their grades are < 2%, thus their truck grades and lengths are the same as their raw grades and lengths.

To Run the "Calculate Truck Length and Grade" Utility

3. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

4. Make sure that your scenario and [Highway Master DB] are correctly chosen, click on the Utilities button, and choose "Calculate Truck Length and Grade" and click OK.

The utility will be invoked and the truck link length and grade fields will be filled.

Startup and Cleanup Macro

A new startup routine was added that ensures that all required directories are created within the scenario directory before the model is invoked. This is done to ensure that there are no model errors due to missing directories. This capability was added to the "Update Directory" macro within the file Init_initialization_macros.rsc.

A new cleanup macro was added at the end of the model run, which deletes all interim and unnecessary files created during the model run. This macro is called "SCAG clean up files" and is in the file Assign_postprocess_statistics.rsc. The following files are deleted with this macro:

- All files from the interim directory
- All transit path .tps files from Skims\Outputs
- All saved skims and OD matrices from each feedback iteration used to calculate the feedback closure statistics

Redesigned Output Directories

The model output directories were divided into separate Outputs and Reports directories. Raw model outputs are now stored in the Outputs directory, and summary reports, most likely Excel and CSV files, are now stored in the Reports directory. As an example, the following directory structure now exists in the Assign directory:

Assign\Inputs
Assign\Outputs
Assign\Reports

All raw assignment outputs are placed in the Assign\Outputs directory (e.g. AM, PM, MD, NT, Daily flows). All reports are placed in Assign\Reports (e.g. screenline and VMT reports).

Respecified Network Output Files

In the previous version of the Regional Model, the input [Highway Master DB] file is copied to an output directory (usually Networks\Outputs\scag_network_working.dbd) and all future model calculations are performed on the copied file, which is identified as [Highway DB] in the model. In the new version, the input [Highway Master DB] file is broken down into more output GIS files, depending upon the model task. In addition the highway .NET output file that is used for network analysis is now a separate .NET file for each time period. This is done to make manual interactive assignments easier to run. Below is a list of the additional highway GIS files that are created, their locations, and their purpose.

Network	Location	Description
Highway DB	Networks\Outputs\scag_network_working.dbd	Working highway GIS file used for most network-related model calculations. Used mostly for highway skimming and assignment
Transit DB	Networks\Outputs\scag_network_transit.dbd	Working highway GIS file used for transit purposes. Additional drive access and egress links are created in this network. Used for transit skimming and assignment.
Assign Results DB	Assign\Outputs\scag_network_loaded.dbd	Final highway network GIS file that contains output loaded flows, congested travel times and VOC ratios for each time period.
Highway AM Net	Networks\Outputs\hnet_am.net	AM .NET file used for peak skimming and AM assignment

Highway PM Net	Networks\Outputs\hnet_pm.net	PM .NET file used for peak skimming and PM assignment
Highway MD Net	Networks\Outputs\hnet_md.net	MD .NET file used for peak skimming and MD assignment
Highway NT Net	Networks\Outputs\hnet_nt.net	NT .NET file used for peak skimming and NT assignment

Volume Delay Parameters Lookup Table

In the Volume Delay Parameters lookup table ([VDF Table] in the model table, or networks\inputs\vdf_table.bin), an additional classification has been added. In addition to both Akcelik and BPR parameters being variable by facility type and area type, the new version of the Regional Model allows variation of parameters by number of lanes, following Dowling Associate's recommendations. Most of the variation in parameters by number of lanes would apply to freeway links. The following table lists the full fields of the VDF Table:

VDF Table (networks\Inputs\vdf_table.bin)

Field	Description
FacilityType	Facility Type Number
AreaType	Area Type Number
Lanes	Number of Lanes
R_Length	Default length input into Akcelik Function
R_AkcelikA	Akcelik A parameter
R_AkcelikC	Akcelik C parameter
R_BPR_Alpha	BPR Alpha parameter
R_BPR_Beta	BPR Beta parameter

Calibrate Distribution Model Utility

This utility will automatically calibrate the GAMMA_B, GAMMA_C1, and GAMMA_C2 parameters in the friction factors parameters table so that the model gravity results match closely with survey data. The utility takes two input files: survey average trip lengths and time, and survey trip length frequencies by trip purpose. If survey trip matrices are available, the trip lengths table and trip length frequencies table can be calculated using the "Calculate TLD Macro" utility. For more information on this utility, see "Appendix A: Model Utilities".

The two other inputs into the "Calibrate Distribution" utility are automatically created by a model run: model average trip lengths and times ([TLD Table] or tripdist\Reports\tldtable.csv), and trip length frequencies ([TLD Frequency Table] or tripdist\Reports\tld_frequency_table.csv). The utility compares the model average trip lengths with the survey average trip lengths. The utility also compares the model and survey trip length frequencies. The utility then adjusts GAMMA_B, GAMMA_C1 and GAMMA_C2 parameters in [Friction Factor Parameters] or tripdist\Inputs\Friction_Factor_Parameters.bin based on these differences. The utility then runs the model gravity procedure to calculate updated production/attraction matrices, trip length averages, and trip length frequencies, and compares and adjusts

again. The utility iterates between running the gravity procedure and adjusting parameters for a fixed number of user-specified iterations.

The utility outputs a table that tracks, for each iteration, the estimated parameters, the survey vs. average trip lengths, and coincidence statistic between survey and model trip length frequency distributions. The table fields are described below:

Distribution Calibration Table (User\Distrib_Calib_results.bin)

Field	Description
Purpose	Trip Purpose
B_PK	Gamma_B parameter for the peak period
C1_PK	Gamma_C1 parameter for the peak period
C2_PK	Gamma_C2 parameter for the peak period
B_OP	Gamma_B parameter for the offpeak period
C1_OP	Gamma_C1 parameter for the offpeak period
C2_OP	Gamma_C2 parameter for the offpeak period
SURV_DIST_PK	Survey average trip distance for peak period
MODEL_DIST_PK	Model average trip distance for offpeak period
SURV_TIME_PK	Survey average trip time for peak period
MODEL_TIME_PK	Model average trip time for offpeak period
SURV_DIST_OP	Survey average trip distance for peak period
MODEL_DIST_OP	Model average trip distance for offpeak period
SURV_TIME_OP	Survey average trip time for peak period
MODEL_TIME_OP	Model average trip time for offpeak period
COINCIDENCE_PK	Coincidence ratio between peak survey and model trip length frequency curves
COINCIDENCE_OP	Coincidence ratio between offpeak survey and model trip length frequency curves
COINCIDENCE_TOT	Coincidence ratio between total survey and model trip length frequency curves

The coincidence ratio calculates the similarity between two trip length frequency curves and is a commonly used calibration measurement in distribution calibration. The formula for calculating the coincidence ratio is:

$$Ratio = \frac{\sum_{300\,\min}^{i=1} \min\left(\frac{Survfreq_i}{\sum Survfreq}, \frac{Modelfreq_i}{\sum Modelfreq}\right)}{\sum_{300\,\min}^{i=1} \max\left(\frac{Survfreq_i}{\sum Survfreq}, \frac{Modelfreq_i}{\sum Modelfreq}\right)}$$

Where

Ratio = Coincidence Ratio

$Survfreq_i$ = Trips in survey in minute i

$\sum Survfreq$ = Total sum of trips in survey

$Modelfreq_i$ = Trips in model in minute i

$\sum Modelfreq$ = Total sum of trips in model.

A coincidence ratio of at least 0.8 is generally desired, depending on the trip purpose.

The adjustment process compares the model average trip length with the survey average trip length and adjusts the parameters based upon the following formula:

$$DiffATL = \frac{ModelATL - SurvATL}{SurvATL}$$

$$Gamma\_B_{new} = Gamma\_B_{old} * (1 + DiffATL / 2)$$

$$Gamma\_C1_{new} = Gamma\_C1_{old} * (1 + DiffATL / 2)$$

$$Gamma\_C2_{new} = Gamma\_C2_{old} * (1 + DiffATL / 2)$$

where:

$DiffATL$ = Percent difference in average trip lengths
$ModelATL$ = Model average trip length
$SurvATL$ = Survey average trip length

The adjustment process also calculates the total trips within the first 15 minutes for both the survey and the model, and based upon the difference, adjusts the gamma parameters. This adjustment influences the shape of the model frequency curve to better match the survey. This adjustment is based upon the following formula:

$$DiffTrips_{15\min} = \frac{ModelTrips_{15\min} - SurveyTrips_{15\min}}{SurveyTrips_{15\min}}$$

$$Gamma\_B_{new} = Gamma\_B_{old} * (1 - DiffTrips / 2)$$

$$Gamma\_C1_{new} = Gamma\_C1_{old} * (1 - DiffTrips / 2)$$

$$Gamma\_C2_{new} = Gamma\_C2_{old} * (1 + DiffTrips / 2)$$

where:

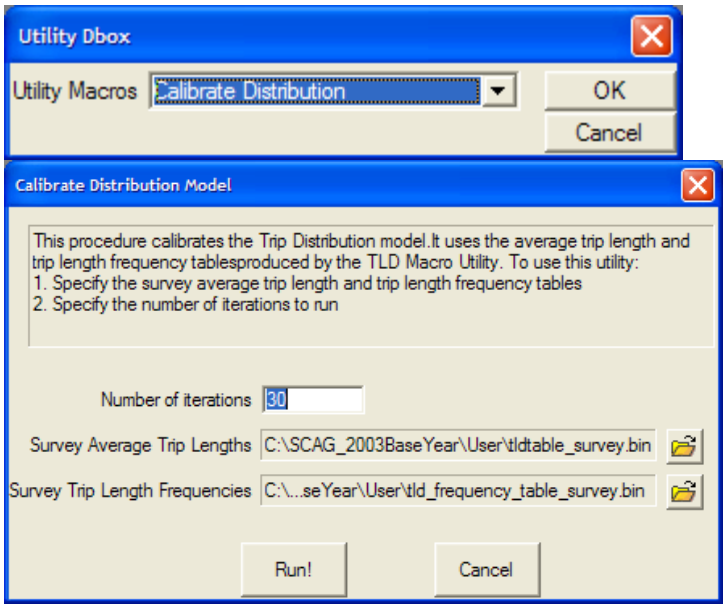
$DiffTrips_{15\min}$ = Relative difference between survey and model trips in first 15 minutes of TLD curve
$ModelTrips_{15\min}$ = Total model trips in first 15 minutes
$SurveyTrips_{15\min}$ = Total survey trips in first 15 minutes

Both adjustments are cumulative with each other.

To Run the "Calibrate Distribution" Utility

1. Open the Regional Model dialog box by choosing Tools-Add-ins and choosing "SCAG Planning Model version 5".

2. Make sure that all trip distribution outputs from the model exist, click on the Utilities button, choose "Calibrate Distribution" and click OK.



3. Enter the number of iterations for the utility to run, then click on the buttons to choose the survey average trip lengths and survey trip length frequencies tables respectively. Click the Run! Button.

The utility adjusts the gamma parameters in the friction factor parameters table and produces the distribution calibration table, which records the progress and results of the calibration.