

# **Final VMIP 2 Model User Guide**

**Prepared for:  
Tulare CAG**

July 2017

WC12-2954

**FEHR  PEERS**

## Table of Contents

<b>OVERVIEW.....</b>	<b>1</b>
Summary of information to update .....	1
<b>INSTALL, SETUP, AND RUN THE VMIP MODELS .....</b>	<b>4</b>
Installing the Software.....	4
Software Licensing .....	4
Software Setup .....	4
Model File Setup.....	7
Running the Model .....	9
Update Model Directory Structure.....	9
Navigating Application Manager.....	11
Input Processing .....	19
Full Model Run .....	22
Review Scenario Run.....	25
Review Model Outputs.....	27
Running Multiple Scenarios .....	33
Running Individual Sub-Groups .....	37
Application Directory Maintenance .....	39
Post Processors.....	41
Mode Split Summary .....	41
Distribution Summary.....	45
Trip Length Frequency Summary .....	49
Network Compare.....	52
Socioeconomic Detail Compare .....	56
Select Link Analysis / FRATAR to ITE control totals .....	60
Environmental Justice .....	70
Interregional Transit.....	75
Quick-Response Tool .....	77
Mixed Use Development (MXD) Trip Generation and Travel Demand Management (TDM) Module .....	78

Transportation System Management (TSM) Module.....	82
Creating a New Scenario .....	86
Recommended Project Workflow .....	86
Prepare Scenario Input Data.....	87
<b>REARRANGE NETWORK ATTRIBUTES.....</b>	<b>93</b>
Create a Scenario in Cube.....	121
Cube Land .....	126
<b>CREATING MAPS USING VMIP MODELS .....</b>	<b>129</b>
Overview of VMIP Model GIS Maps and Data .....	129
GIS Model Directory Structure .....	129
Importing\Exporting data from geodatabases .....	132
Master Model Map File .....	133
Master Map Highway Data.....	133
Master Map Background Data .....	136
Common Variables and Values for Creating GIS Maps .....	137
Land Use .....	137
Roadway Networks .....	139
TAZ Model Summary .....	141
<b>CREATING SUBAREA MODELS.....</b>	<b>143</b>
Preparing the Subarea Model Input Files .....	144
Creating Subarea Highway and Transit .....	144
Updating Gateways for Subarea.....	151
Updating Interregional Travel for Subarea .....	152
Updating Other Details for Subarea .....	153

## OVERVIEW

This document is a general user guide for all San Joaquin Valley Model Improvement Program Phase 2 (VMIP 2) models due to their similar structure. The content of the guide covers installation, use, and output review. Model development and validation reports were developed separately for each individual model and are available from the relevant MPO.

When XX is used throughout this document, it refers to the 2 or 3-digit character abbreviation for each model and YY refers to the calibration/validation year of the model. Model name, counties covered, and prefix are as follow:

- FresnoCOG, Fresno (FC)
- KernCOG, Kern (KE)
- KCAG, Kings (KN)
- MCTC, Madera (MD)
- Three-County Model for SJCOG, StanCOG, MCAG, (TCM)
- TCAG, Tulare (TU)

## SUMMARY OF INFORMATION TO UPDATE

The table below summarizes the types of data used by the model, suggested update or review, the source of the data, and a reference to the appropriate section of the user guide.

Description	Reference	Variables	Source and Scale of current implementation	Scale of potential implementation	Update Frequency
Highway network	<a href="#"><u>Highway Network</u></a>	<i>Lanes, facility type, speed, year implemented</i>	HERE, MPO RTP model Highway link	Highway link	Often; infrastructure project, RTP, etc
Transit system	<a href="#"><u>Transit Network</u></a>	<i>Route, stop, fare, headway</i>	MPO RTP model Transit route	Transit route	Occasional; transit plan, RTP, etc
Transit Access		<i>Headway</i>	MPO RTP model TAZ	TAZ	Occasional; transit plan, RTP, etc



Description	Reference	Variables	Source and Scale of current implementation	Scale of potential implementation	Update Frequency
Land Use Control Totals	<a href="#"><u>Land Use Preparation</u></a>	<i>Occupied housing units, employees, school enrollment</i>	MPO RTP model TAZ	TAZ	Often; development project, RTP, etc
Developed Area	<a href="#"><u>Local Factors</u></a>	<i>Total developed area (or residential and employment acres)</i>	MPO RTP model TAZ	TAZ	Often review and occasional update; every land use scenario
Household demographics	<a href="#"><u>Socio-Economic Data Preparation</u></a>	<i>HHPOP, HHSize_HHIncome, HHAge, etc</i>	Census (ACS) PUMA	TAZ	Often review and occasional update; every land use scenario
Percentages of employment that are high, medium, and low income, by job sector	<a href="#"><u>Economic Factors</u></a>	<i>EMP_EDUH, EMP_EDUM, EMP_EDUL, etc</i>	LODES County	TAZ	Often review and occasional update; every land use scenario
Percentages of trips produced & attracted to TAZ, by trip purpose	<a href="#"><u>Gateways</u></a>	<i>HBWH_ix, HBWH_xi, HBWM_ix, HBWM_xi, etc</i>	CHTS Census Place	TAZ	Often review and occasional update; every land use scenario
Trip productions and attractions by gateway	<a href="#"><u>Gateways</u></a>	<i>HBW_IX, HBW_XI, etc</i>	CSTD Gateway	Gateway	Often review and occasional update; every land use scenario
Home-work gateway attractions by income group	<a href="#"><u>Gateways</u></a>	<i>HBWH_ix, HBWH_xi, HBWM_ix, HBWM_xi, etc</i>	CHTS Gateway	Gateway	Often review and occasional update; every land use scenario



Description	Reference	Variables	Source and Scale of current implementation	Scale of potential implementation	Update Frequency
Through Trips	<a href="#"><u>Through Trips</u></a>	<i>HW_XX, HS_XX, etc</i>	CSTD Gateway	Gateway	Often review and occasional update; every land use scenario
Trip Generation	<a href="#"><u>Trip Generation</u></a>	<i>Person trips by land use category</i>	CHTS TAZ	TAZ	Often review and occasional update; every land use scenario
Other factors	<a href="#"><u>Other Factors</u></a>	<i>Auto operating cost, mode choice, etc</i>	Model wide	Model wide	Rarely; model calibration based on new data
"D" Variables	<a href="#"><u>Sub-TAZ Factors</u></a>	<i>Sidewalk coverage, route directness, intersection density</i>	Base GIS network TAZ	TAZ	Often review and occasional update; every land use scenario
Stand Alone Sub-Area Model	<a href="#"><u>Creating Subarea Models</u></a>	<i>Varies</i>	Model wide	Model wide	Occasional; General Plans, corridor studies, etc



## INSTALL, SETUP, AND RUN THE VMIP MODELS

This section describes preparing a computer that does not currently have Cube or the model installed, and includes an overview of the software installation, setting up the model as received, running the scenarios that correspond to the validation year and RTP scenario as entire model or specific sub-group applications, and running the post-processors. The following chapters include instructions on [creating new scenarios](#) and [preparing new scenario input data](#) and [viewing the model data in GIS maps](#).

### INSTALLING THE SOFTWARE

The model was developed and tested using **Cube 6.1.1** and **ArcGIS 10.2**. Newer versions of both software have been made available since the beginning of the model development, and at this time it is not recommended to upgrade to versions other than **Cube 6.1.1** and **ArcGIS 10.2**. It is recommended to test compatibility of functionality and licensing method in the future.

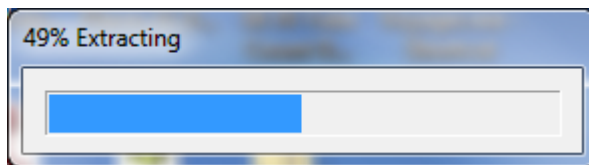
### SOFTWARE LICENSING

- Enterprise licensing for SJV MPOs
- Cube Base, Cube Voyager, Cube Cluster, Cube Land

### SOFTWARE SETUP

#### Installation Procedure

- Locate the Cube setup file included with the deliverables. This will be Version 6.0.1, with ArcGIS Support. Double click the **.exe** file to initiate the install.
- The Windows installer will extract the necessary files. This may take a few minutes.



- The Cube 6 Installer welcome screen will open. Review the End User Software License Agreement and click **Accept**.





- Review the software eligible to be installed with your licensing. Cube Base, Cube Voyager, Cube Cluster (Recommended) or Cube Land (Optional) may be listed depending on the installed license. Click **Install**.



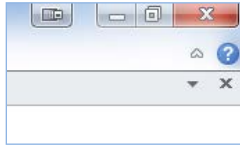
- Once the installation is complete, click **Exit** to close the application. To automatically open Cube or the *What's New* documentation, leave each box checked. Otherwise uncheck both boxes.



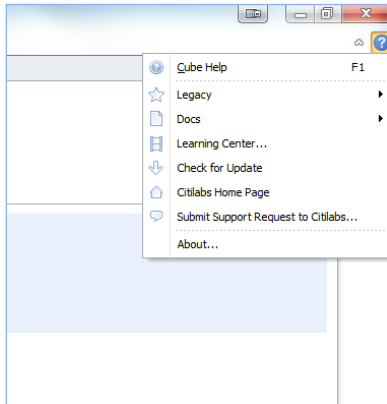


## Review Software Version

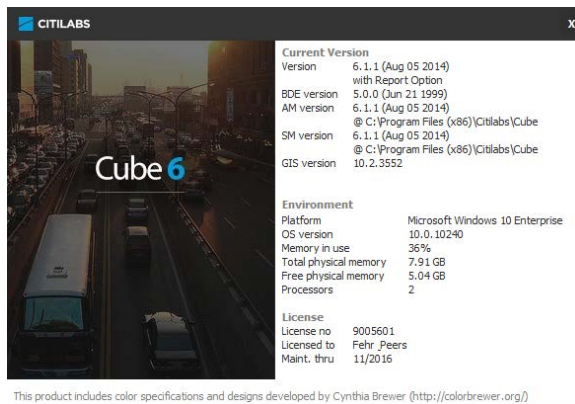
- Open Cube6 via the Start menu or by double-clicking the icon on your desktop
- Verify the version of your software
  - Click on the **question mark** at the top right corner of the program window.



- Click **About...** in the drop down menu.



- Review and note the Version, License No., and Processors of Cube 6



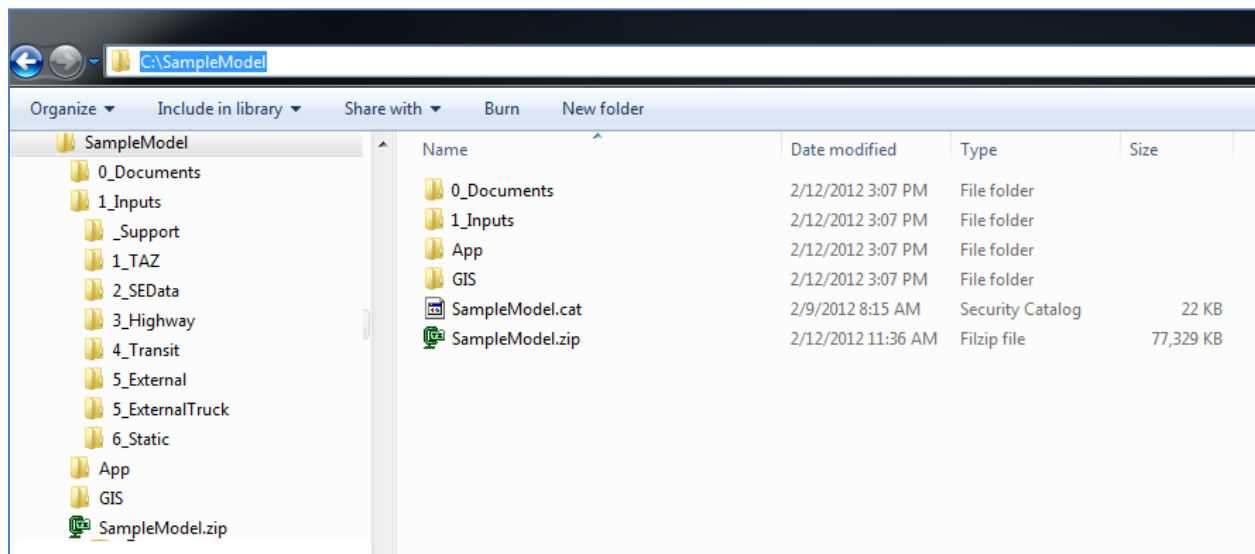
## MODEL FILE SETUP

### Install Model

- Unzip the contents to a directory where you would like to store the model run data.
  - This can be on a different drive or partition than the Citilabs software
  - It is recommended that the directory be local rather than on the network and have at least 10GB of storage for each scenario than you plan to run

### File Descriptions

- The directory structure for the model will look similar to the image below, along with a general description of each directory and its contents.



- 0\_Documents – Documentation and support documents not directly related to the model run itself. Contents and description of this directory:
  - Validation – Directory containing validation spreadsheets for the base year. Summaries for non-validation year scenarios are included in the 01\_Inputs\Support directory. See [Review Model Outputs](#) for more information on the scenario summary spreadsheets used for validation.
  - VMIP 2 Model User Guide 2016September.docx – This document. User guide on running the model, preparing and evaluating scenarios, and reporting results.
  - XX Model Development Report 2016September.docx – General development report for VMIP 2 models customized for with values specific to each model. Detailed model validation for each model is also included.



- 1\_Inputs – The inputs listed by type for SB 375 scenario years and the validation year
  - \_Support – This directory has scenario summary spreadsheets and scenario preparation files used to generate the inputs in the other input directories. Within the “1\_Inputs\Support” directory there are Excel spreadsheets for preparing a majority of the scenario data. The model as delivered contains the data for the SB 375 scenario years and the validation year.
    - ◆ Tools – Recommended directory for post-processor related files
      - ◇ FratarTrips.dbf – Exemplar file used to match trip generation using the Fratar process during the select link assignment post-processor.
      - ◇ RailStationTrips.dbf – Exemplar file used to designate boarding values and external travel for the interregional transit post-processor
      - ◇ SJV MIP Quick Response Tool Template Final.xlsx – The quick-response tool allows the user to quickly determine impacts of smart growth, travel demand management (TDM), and transportation system management (TSM) in an off-model tool.
    - ◆ !!XX Scenario Summary.xlsx – Summary of scenario inputs and change from default parameters. This file is used to document and summarize each scenario, the data files to export from the scenario prep workbook, and the key values to modify in the Cube Application. The file begins with !! to have it always at the top of the directory listing.
    - ◆ VMIP2\_XX LandUsePrep.xlsx – Prepare and summarize land use by zone and planning area.
    - ◆ VMIP2\_XX ScenarioPrep.xlsx – Review local and interregional assumptions relating to land use, socio-economic, and TAZ then export information for scenario model run and evaluation. Auto operating cost calculation for all SJV MPO models based on the fuel and non-fuel costs method developed by the Big 4 MPOs with Big 4 MPOs included.
    - ◆ VMIP2\_XX Parameters.xlsx – Parameters used in model development such as vehicle availability, mode choice, friction factors, and trip generation rates. This file is primary for documentation or future model calibration and the values are not directly used by the model.
  - 1\_TAZ though 10\_Reporting – Recommended directory structure and default output location from the Scenario Prep workbooks to organize input data. Nearly all input files are exported from the input workbook in CSV format. The exceptions to this are:
    - ◆ 3\_Highway – Master network in geodatabase (and associated turn penalty .pen file) or Voyager binary .NET format. The SelectLink assignment and summary text files are also recommended to be stored in this directory.

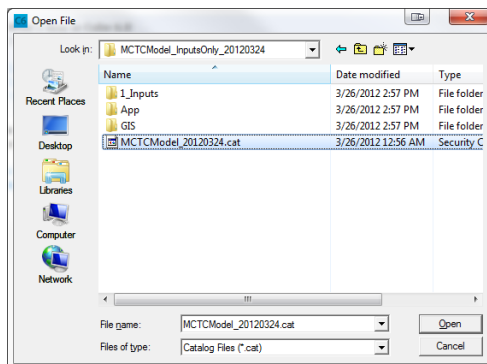


- ◆ 4\_Transit – Drive access block file, walk access block file, and transit line file in plain text format. For models using a geodatabase, the transit lines are in the geodatabase referred to in the highway directory
- ◆ 5\_Trucks – Files from the interregional goods movement model: Auto and Truck interregional matrix files in Voyager binary .MAT format, Regional and sub-area network in Voyager .Net format
- ◆ 6\_Static – transit fare (FAR), public transport system (PTS), and transit factors (FAC) files in plain text format
- App – The scripts and applications for the model. This directory should not be modified except to review or delete PRN files for model runs, and all changes to the scripts should be made from the Cube Catalog.
- GIS – master geodatabase with base GIS layers, blank personal geodatabase and default map documents used to create scenario specific geodatabases, Model map document containing links to all SB 375 scenario input summary data.

## RUNNING THE MODEL

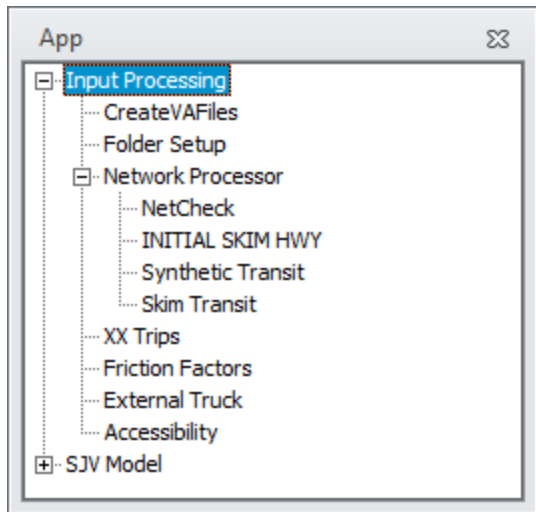
### UPDATE MODEL DIRECTORY STRUCTURE

- Open Cube and click **Open Catalog**
- Navigate to the catalog file and click **Open**

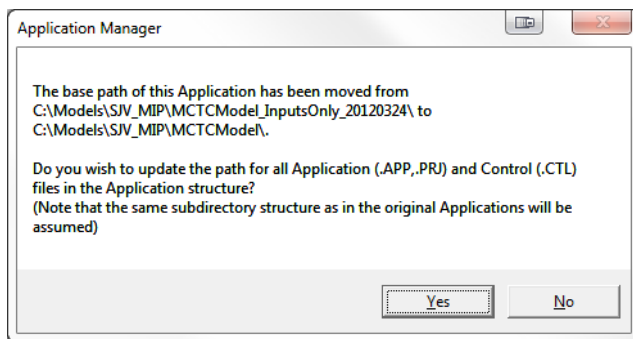


- When the model catalog open's, double-click on **Input Processing** in the Application Manager (App) window pane.





- The first time you open the application, you will be asked to update the application directory. Click **Yes**. This will ensure that the model runs properly.



- Double-click and update the paths for **SJV Model** in the App window pane.

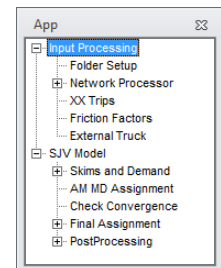
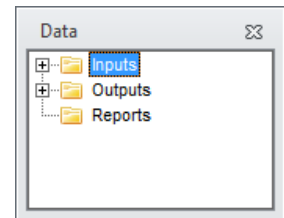
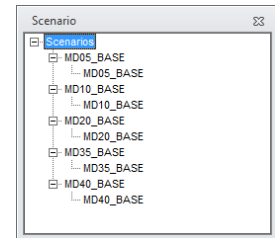


## NAVIGATING APPLICATION MANAGER

### Window Panes

Once you open your model catalog, you will see four windows, or panes, to the left of the program window. They are as follows:

- Scenario Pane
  - Scenarios are hierarchical in nature.
  - Child or sibling scenarios can be added to create variations on the "base" scenario.
  - Child scenarios inherit key values from its parent.
- Data Pane
  - Provides a means of viewing/editing the input files for an application.
  - Lists output files and reports from an application run.
- Application (App) Pane
  - Organizes model applications.
  - Helps the user navigate through the model and quickly access sub-routines.
- Keys Pane
  - Lists catalog keys and associated values referenced in the model script.
  - Key list and values may change depending on the scenario.

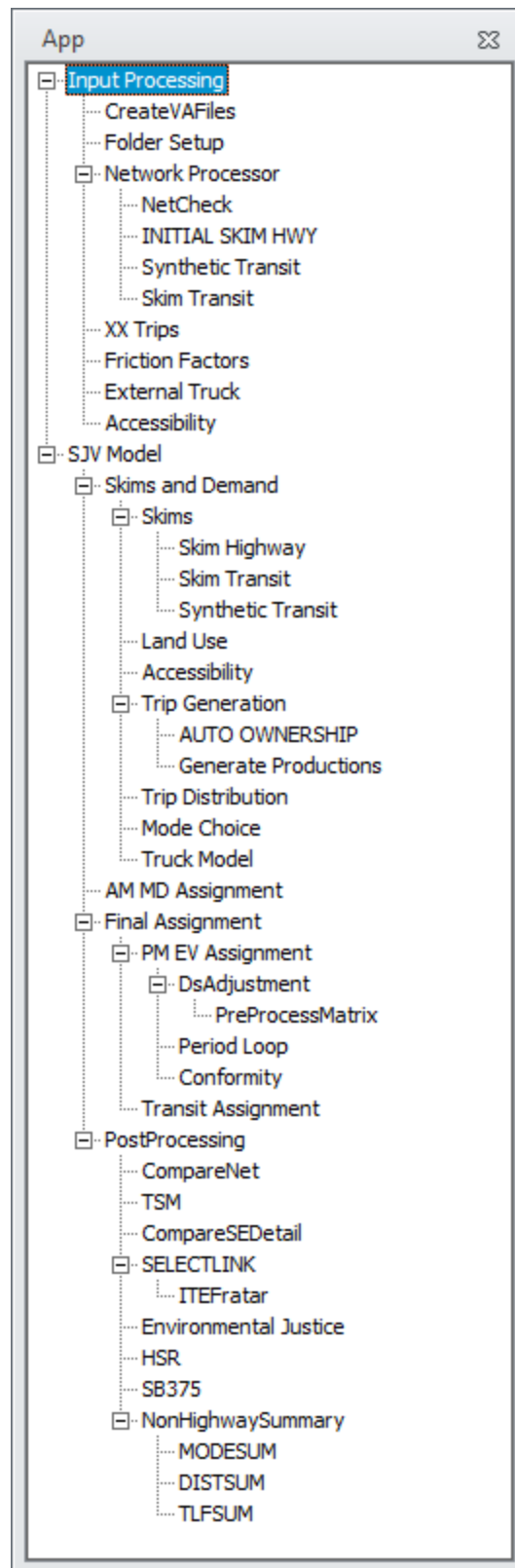


Key	Value
Scen. Name	Scenario_Name
Socio-economic and Highway Inputs	(Note)
ClusterToggle	1
ClusterHandle	Madera05
ClusterNodes	8
NumZones	805
Year	2005

You can modify the panes by resizing, moving, overlapping, or auto-hiding them to suit your needs. For more information, please refer to the Scenario Manager section in Cube 6 Help.

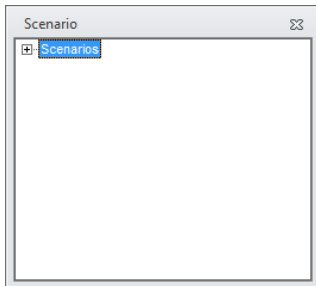
The entire model structure with sub-groups expanded is below.



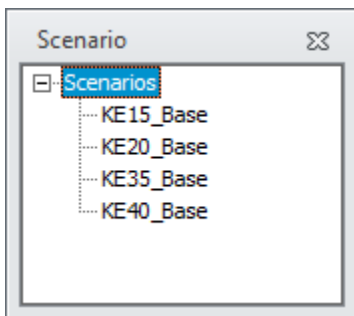


## Selecting a Scenario

- Locate the Scenario pane and click the **[+]** beside Scenarios



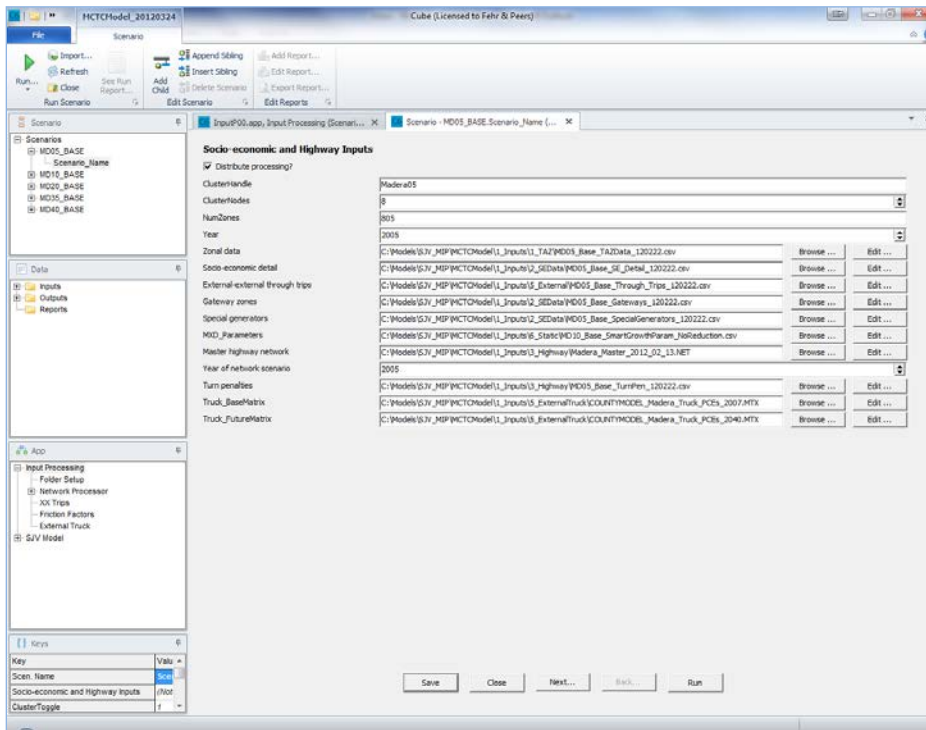
- Click the **scenario name** within the model year you would like to select



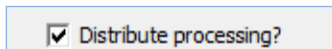


## Checking input keys

- Double-click on the scenario you would like to review
- Review the Socio-economic and Highway Inputs.



- If your model utilizes Cube Cluster, verify that ***Distribute processing?*** is checked. Otherwise, uncheck it.



- **Note:** If ***Distribute processing?*** is checked, set the number of ***ClusterNodes*** to be 1 less than the number of core processors your computer has. This will prevent the model from utilizing 100% of the computer's CPU. If your computer has less than 2 core processors, do not use Cube Cluster.
- Click ***Next...***



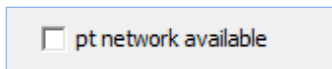
- Review the Post-Processing inputs and assumptions.

The screenshot shows the HCTModel\_20120324 software interface. The main workspace is titled 'Post-Processing' and contains several sections for configuring model inputs and assumptions. The 'Conformity and SB 375' section includes fields for 'Conformity Speed Bin Size (mph range)', 'Conformity number of speed bins', and 'Airbuses'. The 'Compare files to current scenario' section has fields for 'Define network to compare' and 'Define SE Detail to compare'. The 'ITE Match and Select Link/Zone' section includes a checkbox for 'Adjust trips to match value' and a field for 'Zones to adjust to match (ex. 101-105,107)'. The 'Environmental Justice' section includes a table for 'Collisions per VMT' with values for Total Collisions, Collision PDO, Collision Injuries, Collision Fatalities, Deaths, and Injuries. The 'Trip Length Frequency' section includes fields for 'Maximum travel time (minutes)', 'Time Interval for Summary (minutes)', 'Range of Origin Zones for Summary', and 'Range of Destination Zones for Summary'. The interface also includes a 'Save' button and a 'Next...' button.

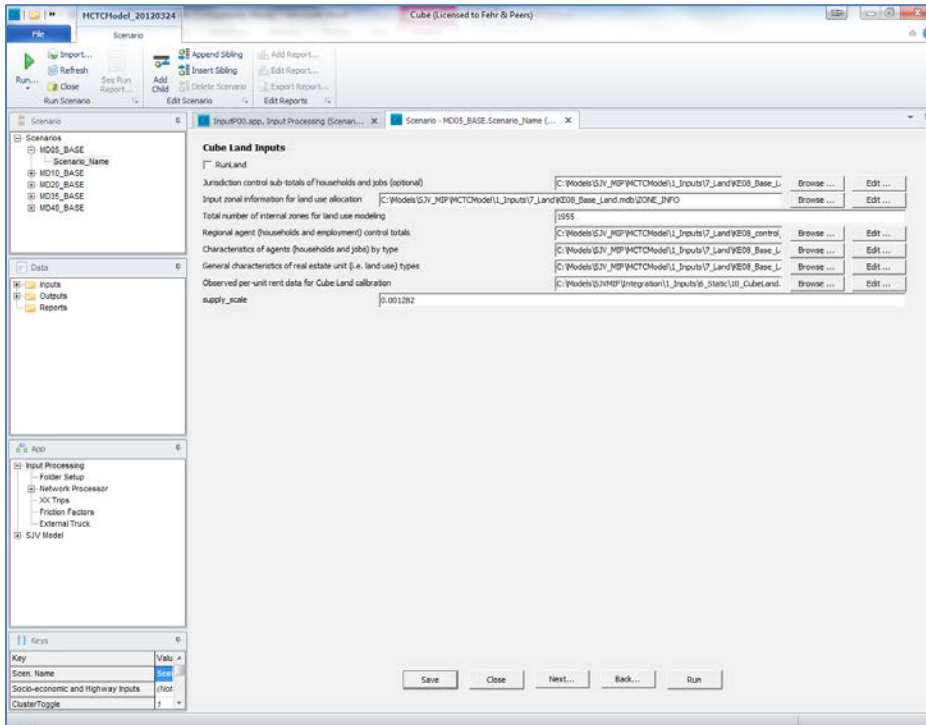
- Click **Next...**
- Review the Transit Inputs.

The screenshot shows the HCTModel\_20120324 software interface. The main workspace is titled 'Transit Inputs' and contains several sections for configuring transit inputs. The 'Transit network available' section includes a checkbox for 'pt network available'. The 'Non-highway transit links' section includes a field for 'XY coordinates for transit only nodes'. The 'Peak transit lines file' section includes a field for 'Peak transit lines file'. The 'Peak drive access block file' section includes a field for 'Peak drive access block file'. The 'Peak walk access block file' section includes a field for 'Peak walk access block file'. The 'Off-peak transit lines file' section includes a field for 'Off-peak transit lines file'. The 'Off-peak transit drive access block' section includes a field for 'Off-peak transit drive access block'. The 'Off-peak transit walk access block' section includes a field for 'Off-peak transit walk access block'. The 'Transit fares' section includes a field for 'Transit fares'. The 'Transit factors' section includes a field for 'Transit factors'. The 'Transit system' section includes a field for 'Transit system'. The interface also includes a 'Save' button and a 'Next...' button.

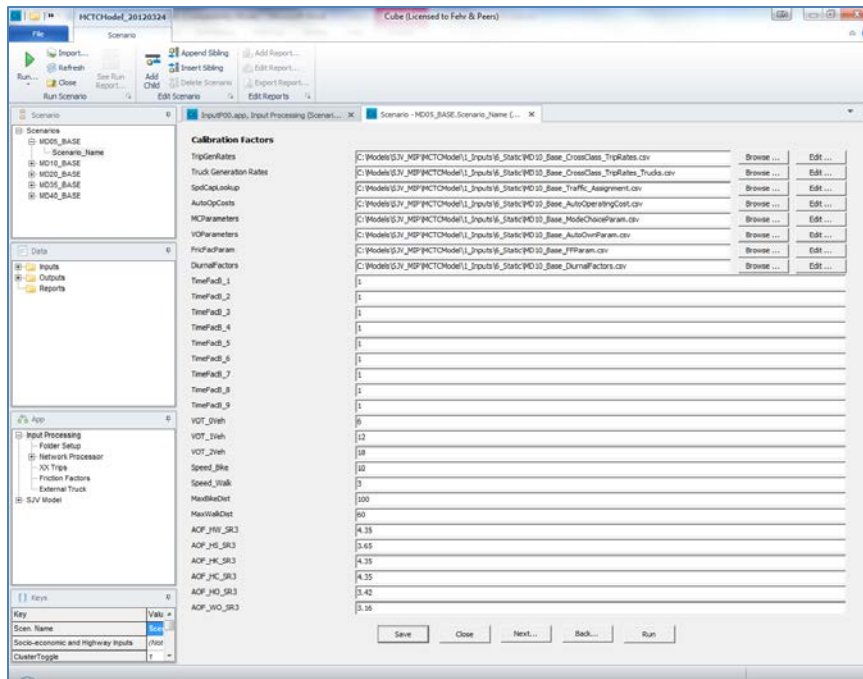
- If your model has transit, verify that **pt network available** is checked. Otherwise, uncheck it.



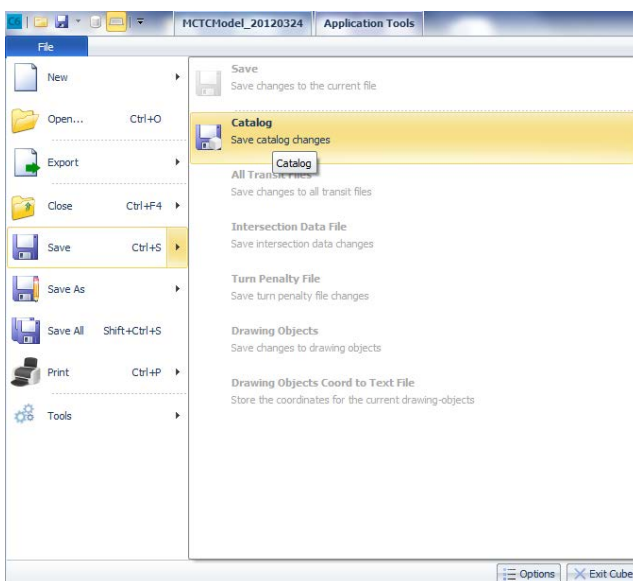
- Click **Next...**
- Review the Cube Land Inputs.



- If you would like to run Cube Land, verify that **RunLand** is checked. Otherwise, uncheck it.
- Click **Next...**
- Review the model Calibration Factors.



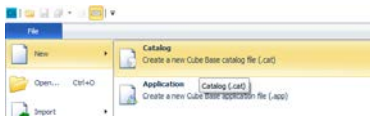
- Click **Next...**
- Review the remaining model Calibration Factors.
- If you make any changes, click **Save** then **Close**. Otherwise, click **Close**.
- To navigate back to any windows you have passed, click **Back...**
- Do not click **Run** to run the model. It is difficult to know which application will be selected.
- Once you exit the inputs tab, be sure to save the catalog file if any changes were made. Click **File**, then **Save**, then select **Catalog**.




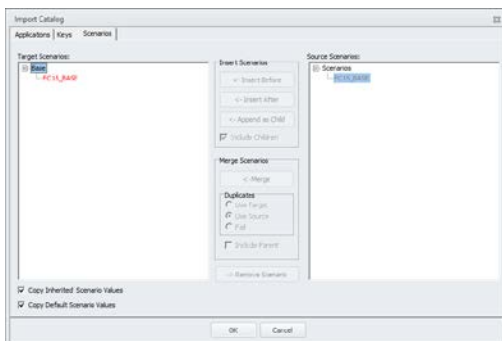
## Importing Scenarios

When the catalog is used for many scenarios or multiple catalogs are used, merging or cleaning the catalog might be needed. To copy or merge scenarios it is very important to remember the parent/child structure of the scenarios and is often best to either delete scenarios (using caution with parent) or create a clean catalog and merge the scenarios as needed.

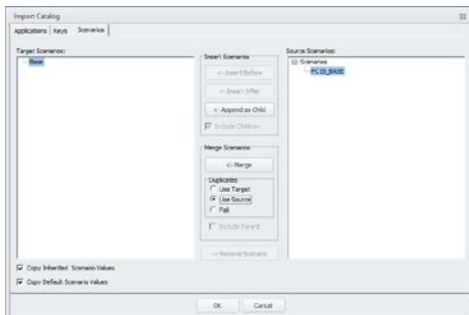
- Create a new Catalog under the File menu and save as a new name, or start with the original as delivered clean catalog to copy the information to.



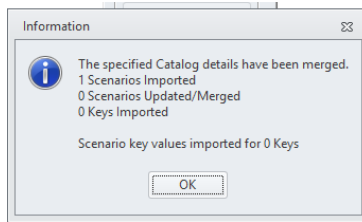
- Click on  and select the catalog that contains the scenarios to import.
- Select the Scenarios menu, and the scenario on the target and source. For new scenario most often the option will be Append as Child. The new scenario shows in red.



- When replacing the values in a scenario with the same name, select Merge and Use Source.



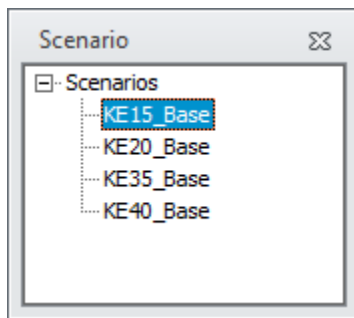
- Click OK and then save the catalog.



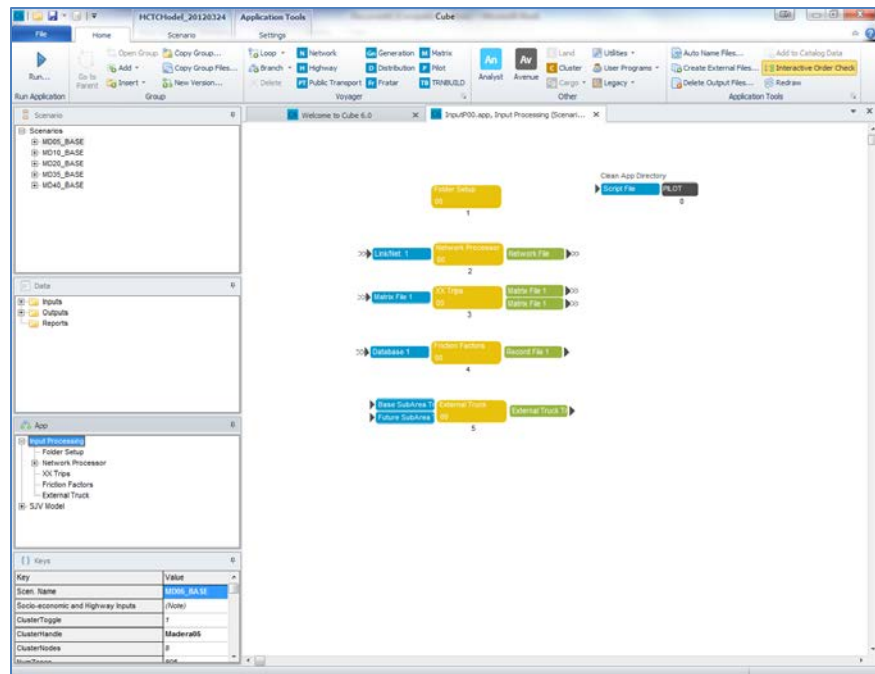
## INPUT PROCESSING

Before running the SJV Model application, run the Input Processing application to prepare the input files and folder structure needed for the full model run.

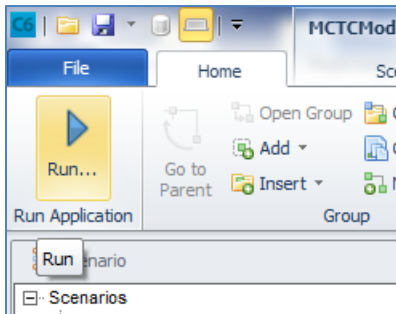
- Select the scenario you will run in the Scenario Pane.



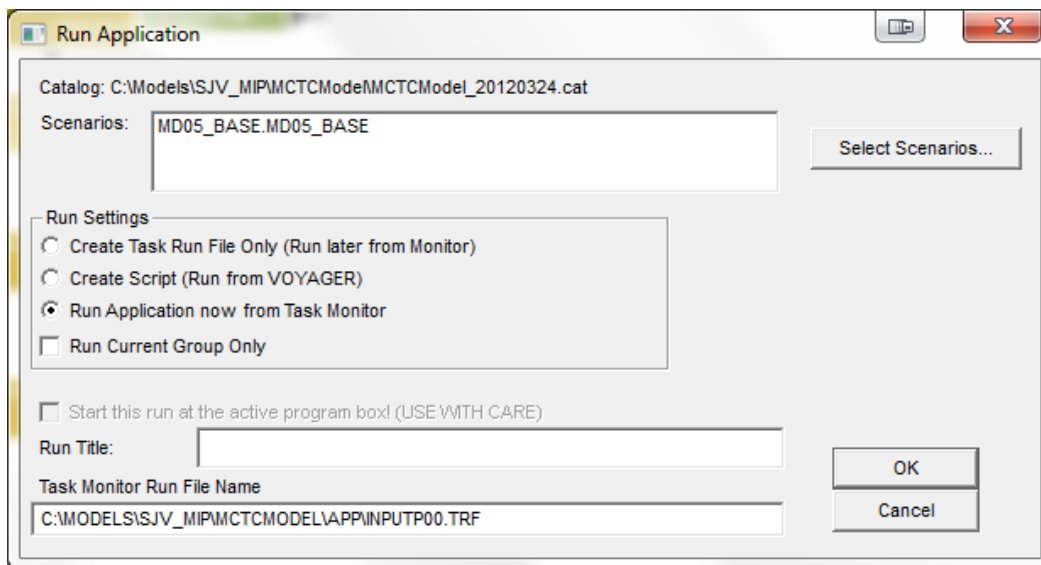
- Double-click on **Input Processing** in the App Pane. This will bring up the Input Processing application flow diagram in the Catalog window.



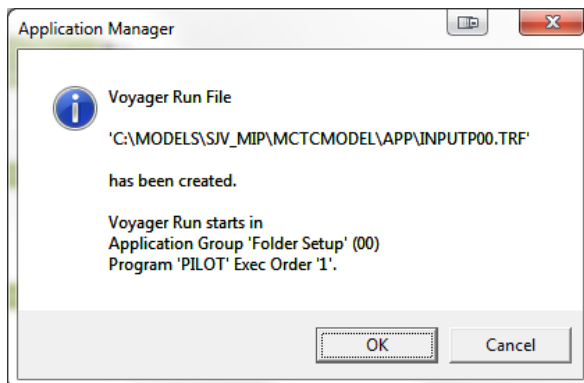
- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Select Run Application now from Task Monitor from the Run Settings list.



- Click **OK**. This should activate the Application Manager window.

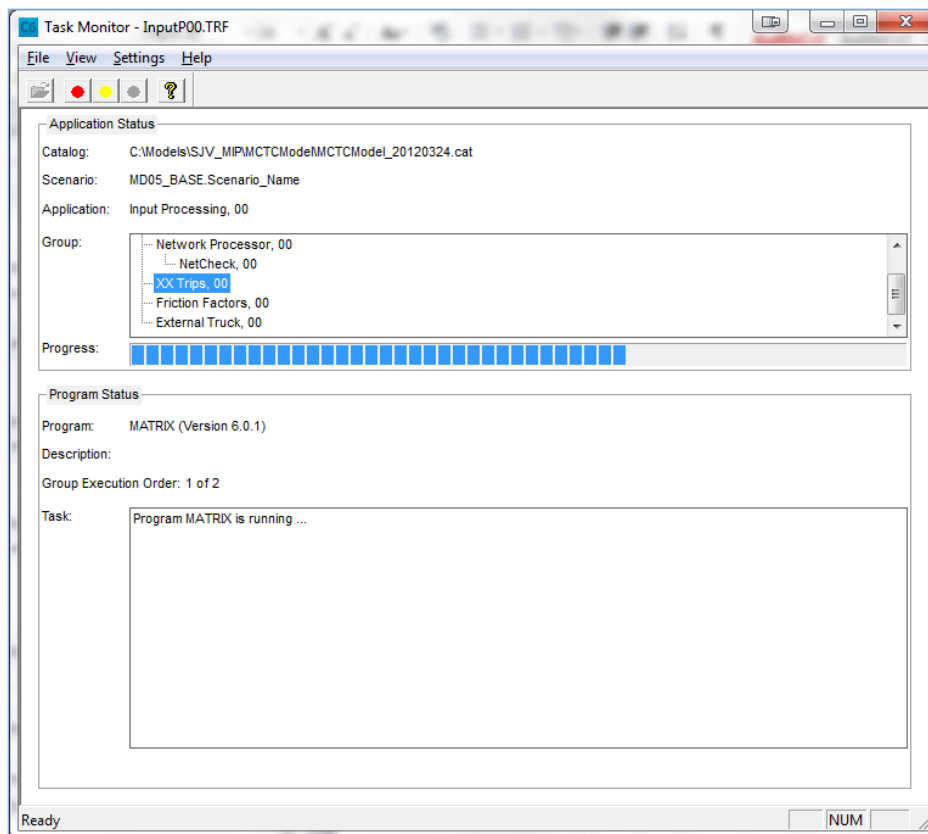


- Click **OK**. This should activate the Task Monitor window.

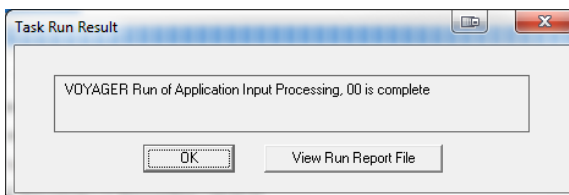


## Checking Results of Input Processing

The Input Processing application creates directories, copies files, and processes input data. Reviewing key outputs of the Input Processing before running the full model is recommended to ensure that the model scenario being evaluated has the inputs as desired. In addition to checking that the files represent the scenario, the Input Processing also produces valuable information for scenario comparison.



- Once the run has completed successfully, the Task Run Result window will pop-up. Click **OK**. If you would like to view the report file, click **View Run Report File**.

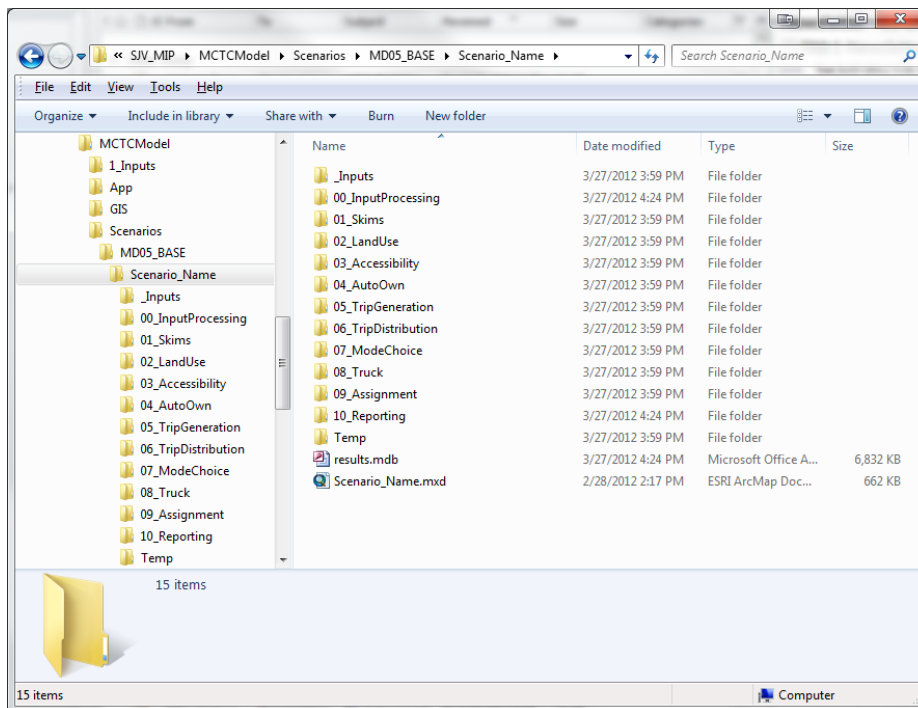


- Close the Inputs window.





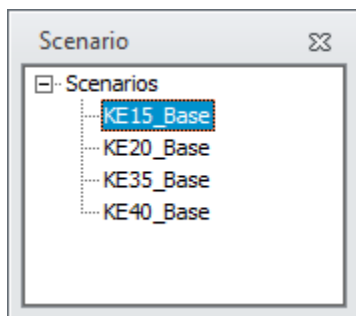
- Check to see that the input files and folders were created in the appropriate model folder.



## FULL MODEL RUN

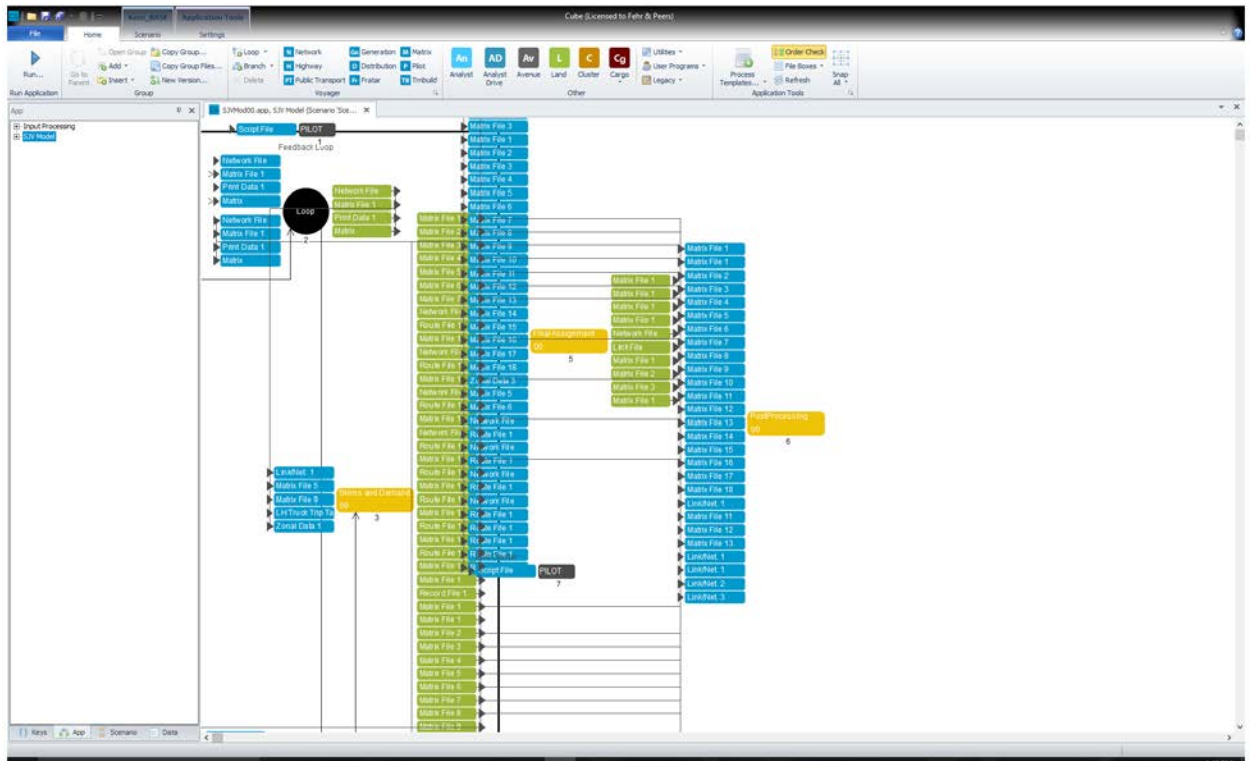
Before running a full model run, verify that you have the appropriate input files created from the Input Processing application.

- Select the scenario you will run in the Scenario Pane.

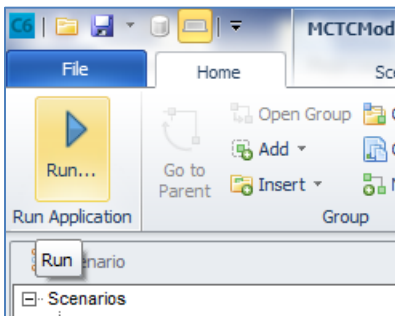


- Double-click on **SJV Model** in the App Pane. This will bring up the SJV Model application flow diagram in the Catalog window.

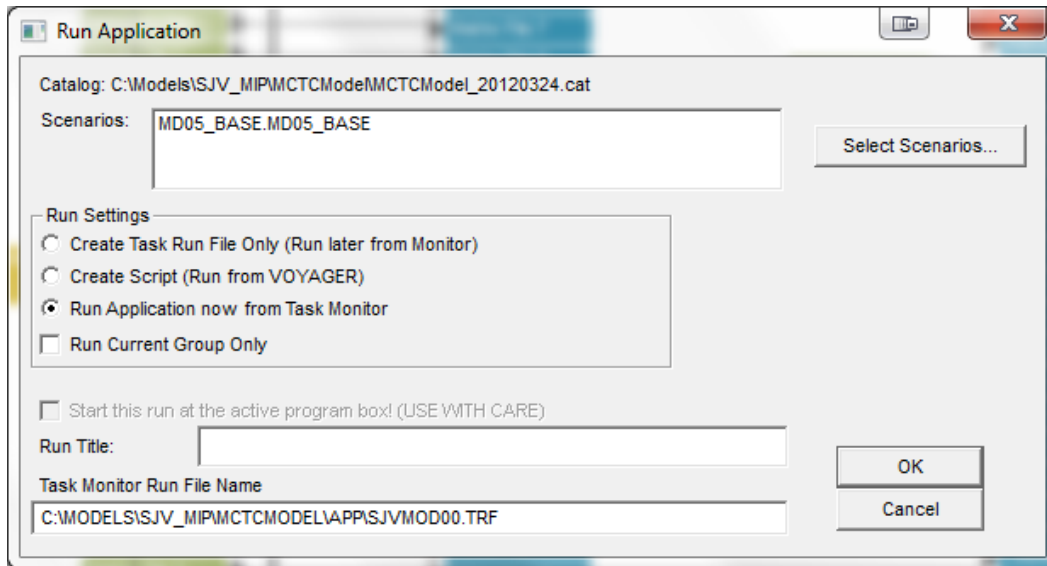




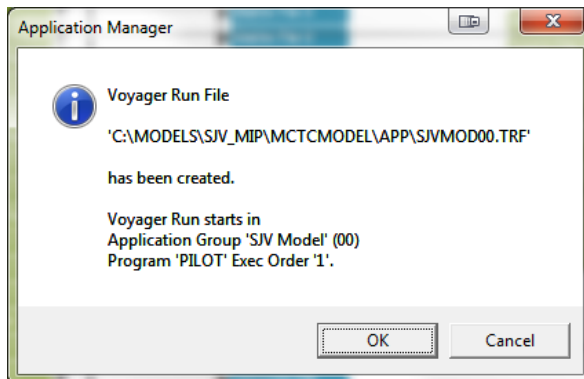
- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



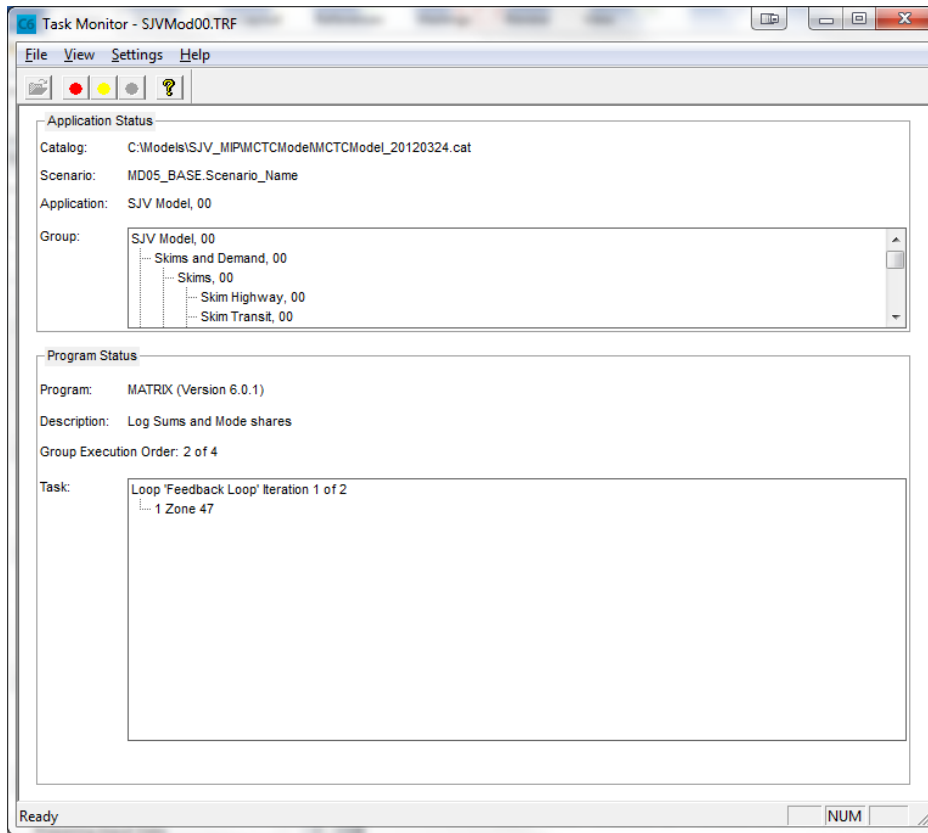
- Select **Run Application now from Task Monitor** from the Run Settings list.



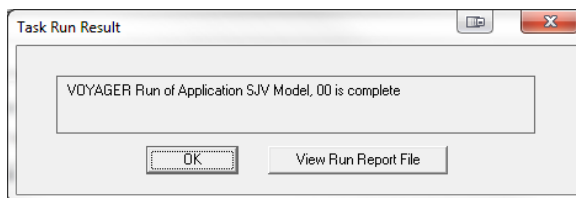
- Click **OK**. This should activate the Application Manager window.



- Click **OK**. This should activate the Task Monitor window.



- Once the run has completed successfully, the Task Run Result window will pop-up. Click **OK**. If you would like to view the report file, click **View Run Report File**.



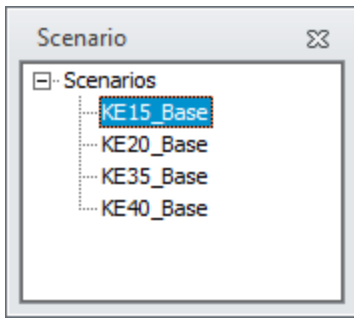
- Close the Inputs window.

## REVIEW SCENARIO RUN

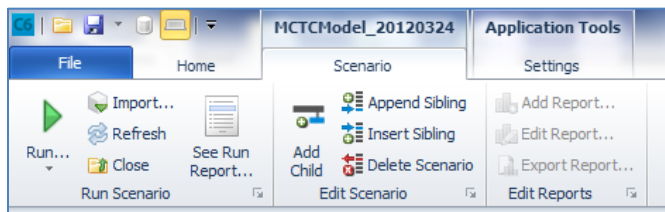
A run report file for a previous model run can be viewed at any time by navigating to the file location in the file directory or accessing it directly in the catalog window.

- Select the scenario to review

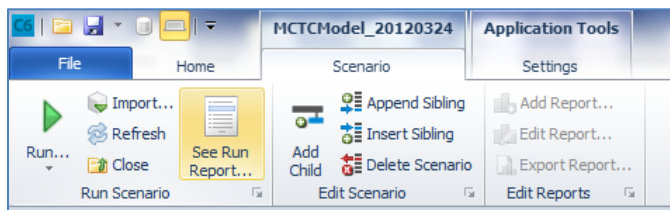




- Click on the **Scenario** ribbon tab



- Click **See Run Report**.



- The report .PRN file will open in the Catalog window for review.



## REVIEW MODEL OUTPUTS

This process is very similar to that done during model development and uses the same Scenario Summary Metrics and Highway validations spreadsheets. The metrics require a full model run, and some of them are only produced with post-processors. See [Post Processors](#) for related.

### Scenario Summary Metrics

The VMIP2 SCENARIOSummaryMetrics.XLSM spreadsheet contains multiple worksheets that summarize detailed model data into tabular form for comparison with CHTS or between scenarios. The validation year spreadsheet is included for each model developed and the spreadsheet is named MPO\_YYValidationSummaryMetrics.XLSM (ex. TCAG\_15ValidationSummary.xlsm). This spreadsheet contains four main types of worksheets: **Setup**, **Outputs**, **Inputs**, and **Calculations**.

The metrics included and instructions for updating are described below.

#### VMIP2 SCENARIOSummaryMetrics.xlsm

##### Notes

- This worksheet describes the various metrics and where the output files are located

The screenshot shows a portion of the 'Notes' worksheet in the VMIP2 SCENARIOSummaryMetrics.xlsm spreadsheet. The worksheet is organized into sections with headings in bold. The visible sections include:

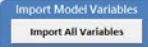
- Scenario Summary Reference**: This section provides instructions for populating the validation spreadsheet. It mentions that red text in cells indicates dynamic references. It lists files to be imported, such as 'scenario\_30\_Detail.DBF' and 'scenario\_30\_Inputs\_2\_SData'. It also includes notes about 'total' values and employment types.
- 12-1.3 Trip Gen Balance**: This section lists files for trip generation, including 'scenario\_PA\_UNBALANCED\_PERSON\_ID.BDF', 'scenario\_PA\_UNBALANCED\_PERSON\_X.DBF', 'scenario\_PA\_UNBALANCED\_PERSON\_XI.DBF', 'scenario\_BASE\_PA\_PERSON.DBF', 'scenario\_PA\_BALANCED\_PERSON\_ID.BDF', and 'scenario\_PA\_BALANCED\_PERSON\_XI.DBF'. It also mentions a data source for 'scenario/P5\_TripGeneration/'.
- 12-1.3 Person Trips per HH**: This section lists files for person trips per household, including 'MODE\_CHOICE\_SUMMARY\_ID.BDF', 'MODE\_CHOICE\_SUMMARY\_XI.DBF', and 'MODE\_CHOICE\_SUMMARY\_XI.DBF'. It also mentions a data source for 'MODE\_CHOICE\_SUMMARY\_IDONLY.d'.
- 12-2.1 Vehicle Availability**: This section lists files for vehicle availability, including 'scenario\_Vehicle.DBF'. It also mentions a data source for 'scenario/P4\_AutoOwn'.
- 12-2.2 Mode Split by Purpose**: This section is partially visible at the bottom of the screenshot.

##### Model Inputs

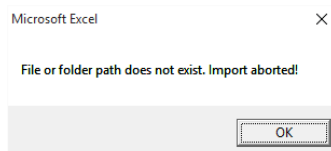
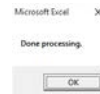
- This worksheet defines the scenario, path to model run files, and model outputs to be summarized for each scenario. For most mode runs, only the scenario description, path, and



scenario prefix for input files needs to be changed. It is recommended practice that all input worksheets start without data prior to importing new scenario data and the template delivered with the model is clear of scenario data.

- Open the VMIP2\_SCENARIOSummaryMetrics.xlsm workbook and Saved As for the new scenario prior to importing scenario data.
- After updating the scenario name, path, and prefix or input file names, click  to import the files.

- After the data are imported a message will appear.
- If the filenames or path contain an error will appear. If the path is correct, files without an error will be processed.



Tab Name	Copy to Cell	Sub Folder Path/Filename
MD	A1	MD_DETAIL_FINAL.CSV
OVERVIEW	A1	04_AutoOwn/MD18_BASE_OVERVIEW.DBF
MODE CHOICE SUMMARY II	A1	10_Reporting(MODE_CHOICE_SUMMARY II.DBF
MODE CHOICE SUMMARY XI	A1	10_Reporting(MODE_CHOICE_SUMMARY XI.DBF
MODE CHOICE SUMMARY IX	A1	10_Reporting(MODE_CHOICE_SUMMARY IX.DBF
VMT Conformity	A1	10_Reporting(MD10_BASE_VMT_Split.CSV
VMT Conformity	U8	10_Reporting(MD10_BASE_VMT_Conformity.CSV
Trips/PersonSummary	A1	10_Reporting(Trips/PersonSummary.DBF
BASE_PA_PERSON	A1	05_TripGeneration(MD10_BASE_PA_PERSON.DBF
PA_BALANCED_PERSON_XI	A1	05_TripGeneration(MD10_BASE_PA_BALANCED_PERSON_XI.DBF
PA_BALANCED_PERSON_IX	A1	05_TripGeneration(MD10_BASE_PA_BALANCED_PERSON_IX.DBF
BASE_UNBALANCED_PERSON	A1	05_TripGeneration(MD10_BASE_PA_UNBALANCED_PERSON.DBF
PA_UNBALANCED_PERSON_XI	A1	05_TripGeneration(MD10_BASE_PA_UNBALANCED_PERSON_XI.DBF
PA_UNBALANCED_PERSON_IX	A1	05_TripGeneration(MD10_BASE_PA_UNBALANCED_PERSON_IX.DBF
TASUMMARY	A1	10_Reporting(TASUMMARY.DBF

### For Compare

- Summary of model scenario and CHTS for the model, San Joaquin Valley, and State.
  - Land use, trip generation, vehicle availability, mode split, travel time and distance, and VMT
  - Some metrics reported for all trip types (internal, exported, imported) and also internal only.



	A	B	C	D	E	AG	AH	AI	AJ	AK	AL	AM	AN
1	<b>Model Summary</b>					<b>II TRIPS ONLY</b>							
2		<b>Geography</b>	<b>Auto Ownership</b>	<b>Purpose</b>		<b>Mode Share by Trip Purpose (Daily)</b>							
3						<b>DA</b>	<b>SR2</b>	<b>SR3+</b>	<b>Transit</b>	<b>Bike</b>	<b>Walk</b>	<b>Other</b>	<b>All Modes</b>
11				WBO	72%	14%	11%	2%	0%	1%	0%	100%	
12				OBO	29%	35%	27%	1%	1%	7%	0%	100%	
13				<b>Total</b>	<b>39%</b>	<b>21%</b>	<b>24%</b>	<b>2%</b>	<b>1%</b>	<b>11%</b>	<b>2%</b>	<b>100%</b>	
14													
15													
16	<b>CHTS Summary</b>												
17	CHTS 2012/2013	Madera County	0-Veh	5%	<b>HBW</b>	<b>83%</b>	<b>6%</b>	<b>2%</b>	<b>0%</b>	<b>5%</b>	<b>4%</b>	<b>0%</b>	<b>100%</b>
18			1-Veh	28%	<b>HBO</b>	<b>25%</b>	<b>20%</b>	<b>25%</b>	<b>1%</b>	<b>1%</b>	<b>20%</b>	<b>9%</b>	<b>100%</b>
19			2-Veh	41%	<b>HBC</b>	<b>54%</b>	<b>0%</b>	<b>46%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>100%</b>	
20			3-Veh	18%	<b>HBK</b>	<b>1%</b>	<b>10%</b>	<b>17%</b>	<b>0%</b>	<b>1%</b>	<b>24%</b>	<b>47%</b>	<b>100%</b>
21			4+-Veh	8%	<b>HBS</b>	<b>29%</b>	<b>30%</b>	<b>36%</b>	<b>0%</b>	<b>3%</b>	<b>2%</b>	<b>0%</b>	<b>100%</b>
22					<b>HBO</b>	<b>31%</b>	<b>20%</b>	<b>24%</b>	<b>1%</b>	<b>1%</b>	<b>23%</b>	<b>0%</b>	<b>100%</b>
23					<b>NHB</b>	<b>52%</b>	<b>19%</b>	<b>23%</b>	<b>0%</b>	<b>0%</b>	<b>6%</b>	<b>1%</b>	<b>100%</b>
24					<b>WBO</b>	<b>95%</b>	<b>3%</b>	<b>2%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>100%</b>
25					<b>OBO</b>	<b>36%</b>	<b>24%</b>	<b>30%</b>	<b>0%</b>	<b>0%</b>	<b>8%</b>	<b>1%</b>	<b>100%</b>
26			<b>HPMS VMT</b>	<b>4,084,820</b>	<b>Total</b>	<b>38%</b>	<b>18%</b>	<b>21%</b>	<b>0%</b>	<b>2%</b>	<b>15%</b>	<b>6%</b>	<b>100%</b>
27		SJV region			<b>HBW</b>	<b>81%</b>	<b>9%</b>	<b>4%</b>	<b>1%</b>	<b>2%</b>	<b>3%</b>	<b>0%</b>	<b>100%</b>
28					<b>HBO</b>	<b>28%</b>	<b>26%</b>	<b>29%</b>	<b>1%</b>	<b>2%</b>	<b>13%</b>	<b>2%</b>	<b>100%</b>
29					<b>NHB</b>	<b>40%</b>	<b>27%</b>	<b>26%</b>	<b>1%</b>	<b>1%</b>	<b>5%</b>	<b>1%</b>	<b>100%</b>
30					<b>Total</b>	<b>39%</b>	<b>24%</b>	<b>24%</b>	<b>1%</b>	<b>1%</b>	<b>10%</b>	<b>2%</b>	<b>100%</b>
31		Statewide			<b>HBW</b>	<b>76%</b>	<b>8%</b>	<b>2%</b>	<b>8%</b>	<b>2%</b>	<b>3%</b>	<b>0%</b>	<b>100%</b>
32					<b>HBO</b>	<b>30%</b>	<b>25%</b>	<b>25%</b>	<b>3%</b>	<b>2%</b>	<b>13%</b>	<b>1%</b>	<b>100%</b>
33					<b>NHB</b>	<b>42%</b>	<b>25%</b>	<b>20%</b>	<b>2%</b>	<b>1%</b>	<b>10%</b>	<b>1%</b>	<b>100%</b>
34					<b>Total</b>	<b>40%</b>	<b>23%</b>	<b>20%</b>	<b>4%</b>	<b>2%</b>	<b>11%</b>	<b>1%</b>	<b>100%</b>

Worksheets **12-1.1** through **12-5.1** correspond to the numbering of the validation report and contain the same values as on the For Compare worksheet in more manageable pieces for the validation report.

- 12-1.1 Land Use
- 12-1.2 Trip Gen - P-A balance
- 12-1.3 Person Trips per HH
- 12-2.1 Vehicle Availability
- 12-2.2 Mode Split by Purpose
- 12-2.3 Purposes by Mode
- 12-3.8 Travel Time
- 12-3.6 VMT
- 12-4.1 Transit Assignment: note that the pivot table needs to be refreshed
- 12-5.1 Trip Distribution

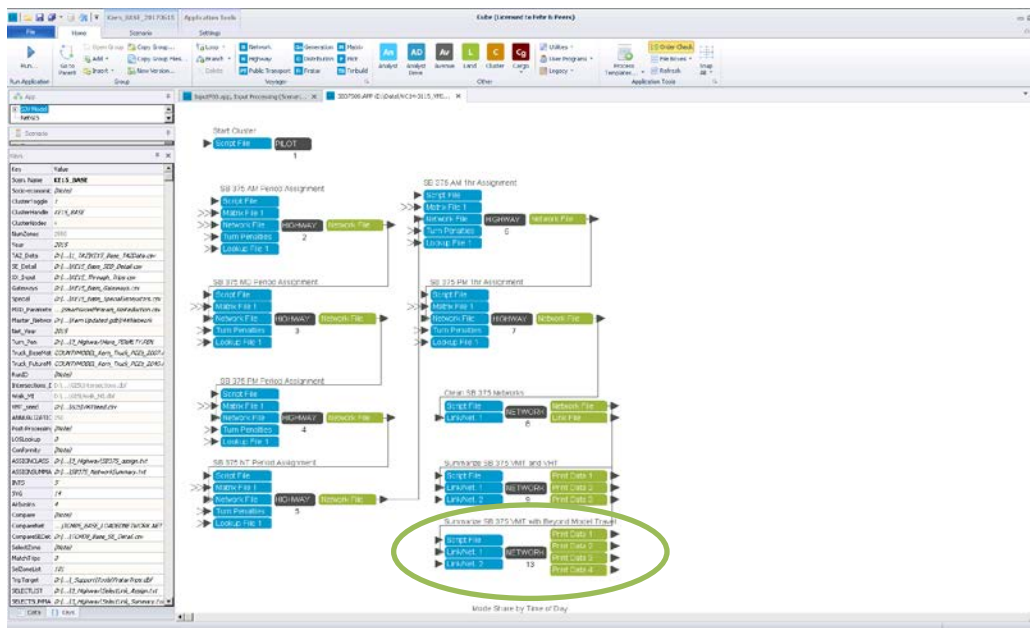




- Worksheets **in blue** are used during the import of model data and should not be changed in name or color.
- Worksheets **in purple** are calculations of model inputs to match the CHTS comparisons and should not be changed in name or color.

### Beyond Model Travel

The Beyond Model Travel calculation was added to the SB 375 Post-Processor and outputs the VMT by time of day by speed bin by air basin for use in the same format as the current TDT with the filename 10\_Reporting\SCENARIO\_VMT\_BeyondModelTravel\_SB375.CSV A screen capture of the added step is circled below.



In addition to the VMT by speed bin separated by II, IX, XI, and XX in the same format as the SB 375 TDT input, the Beyond Model Travel output also includes a summary of daily gateway volumes and VMT to the 10\_Reporting\SCENARIO\_GatewaySummary.CSV A screen capture of the contents of the file is shown below.

	A	B	C	D	E	F	G	H
1	Gateway	IX_Volume	XI_Volume	IXXI_Volume	IXXI_VMT	XX_Volume	Total_Volume	Total VMT
2	29	314.88	313.72	628.6	104977	1485.31	2113.92	353023.97
3	30	761.1	763.48	1524.58	1717.82	8.6	1533.18	1727.51
4	31	599.4	603.32	1202.72	3200.8	846.42	2049.14	5453.39
5	32	3823.62	3842.88	7666.49	7284.48	3511.88	11178.37	10621.37
6	33	1302.09	1305.25	2607.34	59968.89	0	2607.34	59968.89
7	34	5526.43	5502.1	11028.53	777523.65	656.39	11684.92	823798.77
8	35	233.07	233.06	466.13	19111.36	16.05	482.18	19769.3
9	36	218	217.69	435.69	17863.29	16.05	451.74	18521.23
10	37	5655.12	5684.82	11339.95	1326773.68	33371.32	44711.27	5231218.39
11	38	179.24	179.14	358.38	15410.37	147.92	506.3	21770.86
12	39	469.74	472.94	942.68	99924.4	673.24	1615.93	171288.22
13	40	22.72	23.01	45.73	4756.06	69.84	115.57	12019.27
14	41	554.19	554.15	1108.34	130783.98	2047.99	3156.32	372446.32
15	61	1116.02	1114.69	2230.71	131611.69	61.77	2292.48	135256.05
16	62	66.81	67.98	134.8	271.67	0.91	135.7	273.5
17	63	105.72	105.52	211.24	12463.09	11.73	222.96	13154.89
18	64	4897.56	4909.12	9806.68	578593.94	17875.21	27681.89	1633231.59





### CombVMT\_Summary

combines the roadway based VMT and the intrazonal VMT. This worksheet is a calculation and should not be modified.

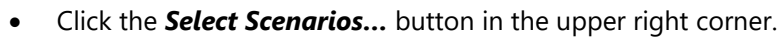
### CombVMTData

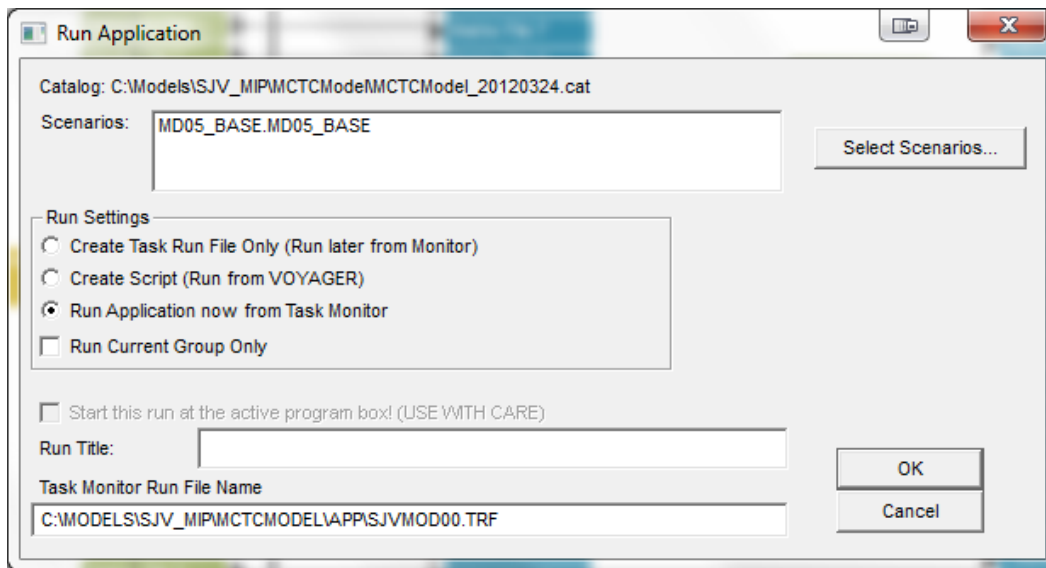
worksheet is the location to copy and paste the SB 375, Conformity, and intrazonal VMT outputs from the travel model. Included in the TDT are the appropriate years for SB 375, so data should be copied into the appropriate section. TDTs are designed for each model output based on the number of air basins or counties. This worksheet should be updated with new scenario data as appropriate.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL		
2009																																							
1	Speed	Year	Study	AM_VMT	AM_VL	AM_VH	AM_VL	AM_VH	MD_VMT	MD_VL	MD_VH	MD_VL	MD_VH	PM_VMT	PM_VL	PM_VH	PM_VL	PM_VH	NT_VMT	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH	NT_VL	NT_VH
2	0.00-0.7	2009	1	887.42	1.1	38.73	0	0	0	0	0	0	0	1271.38	1.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0.75-1.5	2009	1	485.5	1.83	49.66	0	0	856.69	30.07	6.13	0	0	3848.16	204.45	12.64	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1.5-3.0	2009	1	3812.37	29.46	551.97	0.18	0	8642.3	512.43	151.47	0	0	32406.99	379.83	32	0	0	781.38	38.13	32.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	3.0-5.0	2009	1	1882.06	2970.29	6834.39	3.82	0	439944	9947.02	1451.49	14.26	24223.5	8805.76	4387.85	0	0	0	329263	880.14	10434.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	5.0-7.5	2009	1	2568.5	714.77	2738.05	93.34	70484.4	3512.89	3170.31	281.6	49931.6	4027.65	1398.79	137.08	14602	3023.83	3952.44	52.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7	7.5-10.0	2009	1	17007.1	1206.85	5189.16	501.37	140881	4249.32	4052.65	5525.81	12754.4	5596.12	2383.01	529.79	5783.87	3054.4	4054.87	385.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8	10.0-12.5	2009	1	194788	3726.13	9409.26	1950.44	529947	13831.5	13002.8	5887	33027.1	14591.6	8240.78	4092.67	553483	8402.28	9547.27	856.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	12.5-15.0	2009	1	471861	8275.68	11776	124.89	1084625	29803.1	18306.1	5019.96	53057	16403.1	7444.78	8754.22	546348	14506.6	18038.8	122.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	15.0-17.5	2009	1	128994	6467.55	15564.2	4827.59	770549	22208.8	20900	15026	411956	21624.8	10229.1	17504.2	564623	20129.7	24812.2	178.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	17.5-20.0	2009	1	629058	25968.3	73771.4	26447.9	1451569	77720	78647.5	72778.3	713746	60241.7	35045.9	54681.1	663803	71327	83474.8	4754.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
12	20.0-22.5	2009	1	350259	35021.4	54543	17912.5	1200786	78825.7	78825.7	253221	57964	69912.4	35014	109103	468100	70726	84753.9	9948.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
13	22.5-25.0	2009	1	243406	8569.04	12339.3	80895.7	498185	58884.3	20524.9	146770	244870	30004.6	10239	266939	3704.4	21119.9	31335.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
14	25.0-27.5	2009	1	232771	15402.9	29021	142584	478512	50213.6	40181.9	36343.1	201800	27498.9	81113.1	156969	295784	49602.3	163174.7	142950.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15	27.5-30.0	2009	1	801438	1397.39	3751.04	26112	13976	6284.87	7686.13	68950	20021	17437.5	3425.86	22978.8	7221.45	8874.72	25541.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16	30.0-32.5	2009	1	2013713	95052.8	199537	634537	634537	872085.1	307784	286075	378748	346461	286076	137753	769275	2921339	273322	325113	423641.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	Facility	Year	Study	AM_VMT	MD_VMT	PM_VMT	NT_VMT	NT_VMT																															
18	Freeway	2009	1	1287061	301906	149056	238849	238849																															
19	Highway	2009	1	402821	879757	466332	431241	431241																															
20	Express	2009	1	444589	102299	525753	503807	503807																															
21	Arterial	2009	1	505126	2605740	538109	514402	514402																															
22	Collector	2009	1	398540	97085	531648	383861	383861																															
23	Local	2009	1	385096	436331	254869	204506	204506																															
24	Freeway	2009	1	27421.3	63872.4	31490.7	20912.7	20912.7																															
25	Slip	2009	1	36807	85640.8	42938.9	41048.2	41048.2																															
26	Loop	2009	1	3156.38	7056.52	3737.9	3002.62	3002.62																															
27	Local	2009	1	3842678	8868287	4618823	3949346	3949346																															
28	Total	2009	1	1287061	301906	149056	238849	238849																															
29	Speed	Year	Study	AM_VMT	MD_VMT	PM_VMT	NT_VMT	NT_VMT																															

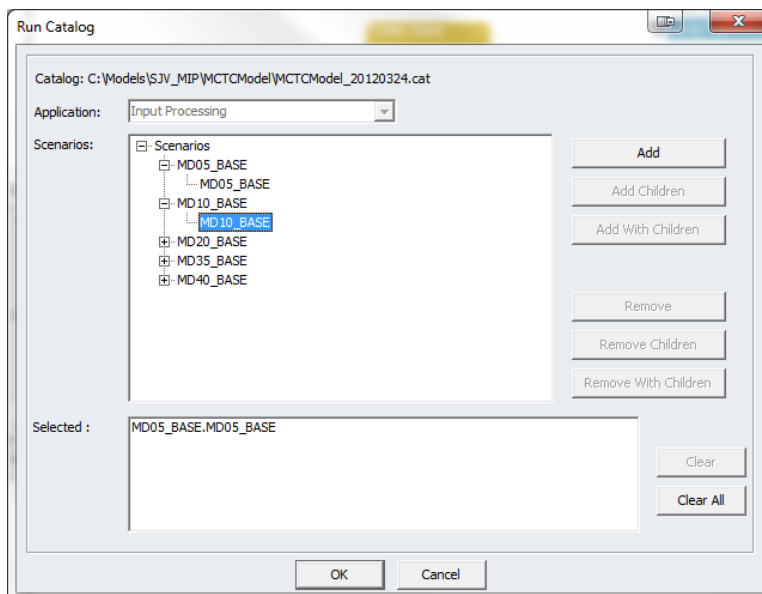
## RUNNING MULTIPLE SCENARIOS

- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



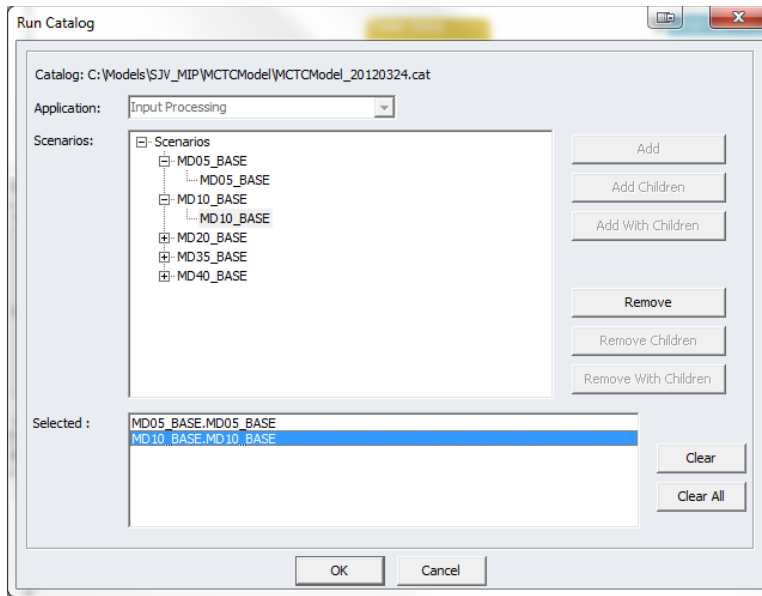


- Select additional scenarios you would like to run in the **Scenarios:** window. Click **Add**.

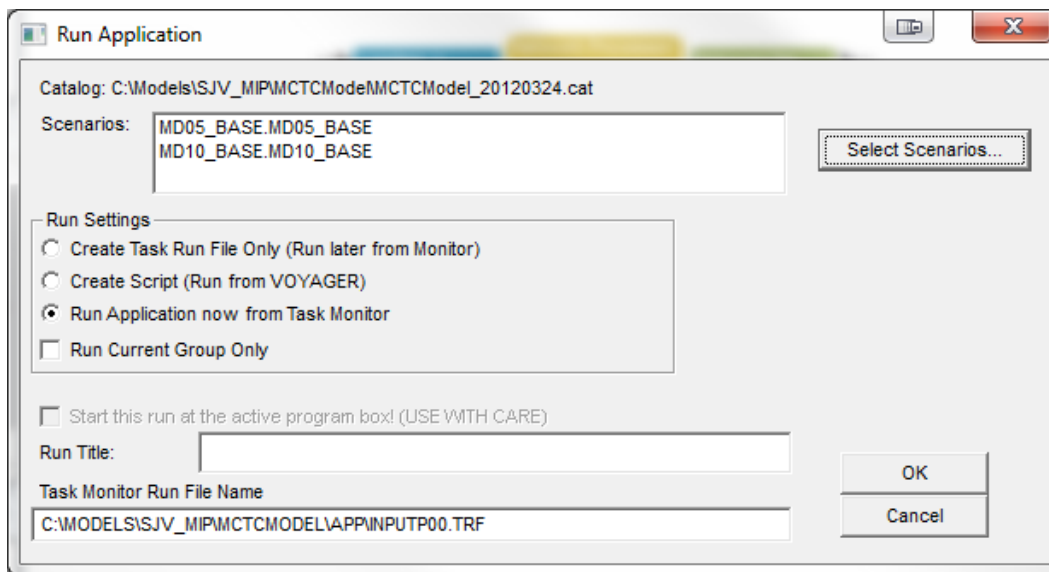


- The additional scenario will be listed in the **Selected:** window.





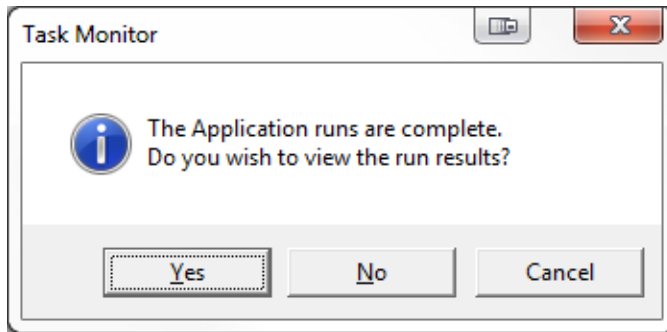
- To remove a scenario listed in the **Selected:** window, click on the scenario and click **Remove**.
- Once you have the final list of scenarios to run, click **OK**. This will re-open the Run Application window. **Note:** the scenarios to be run will be listed in the Scenarios: window.



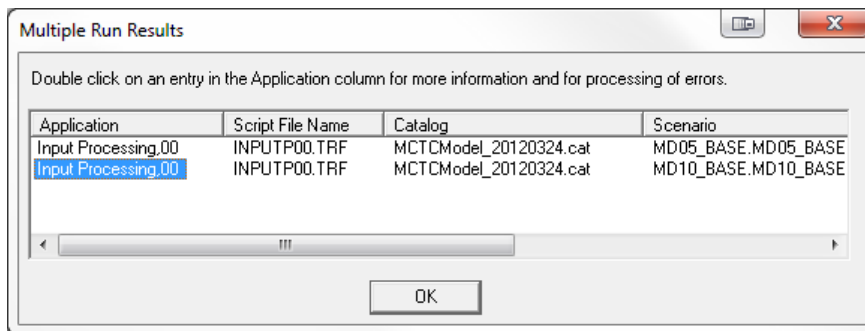
- Select **Run Application now from Task Monitor** from the Run Settings list.
- Click **OK** to proceed with the run. The scenarios will run in series (i.e. one after another).
- Once the run has completed successfully, a Task Monitor window will pop-up. If you would like to view the run results for each scenario, click **Yes**. Otherwise, click **No**.



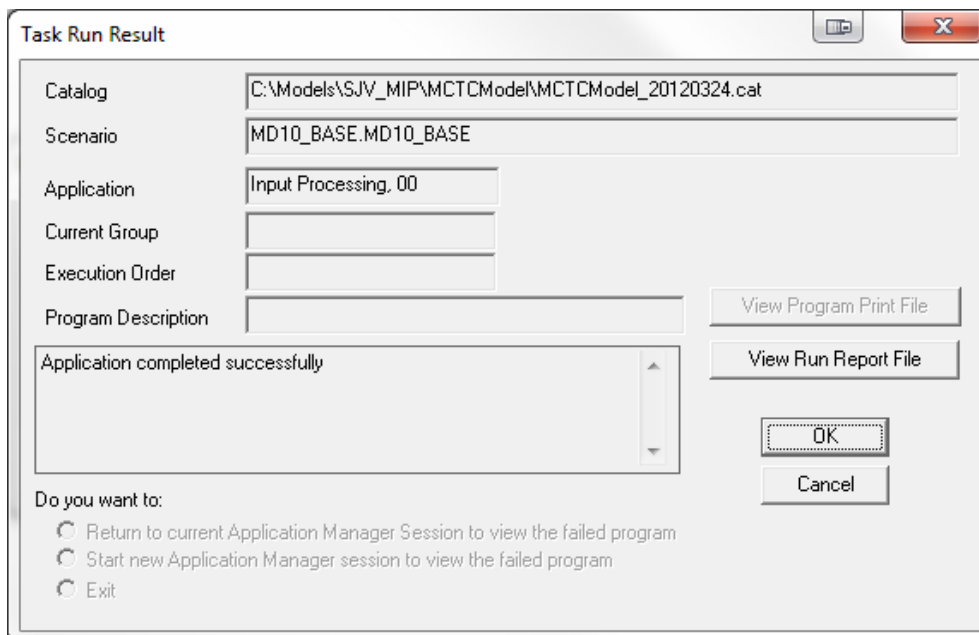




- If you click **Yes** to view the run results, the Multiple Run Results window will open. Double-click the **Application** name for the scenario you would like to view. This will open the Task Run Result window for your scenario.



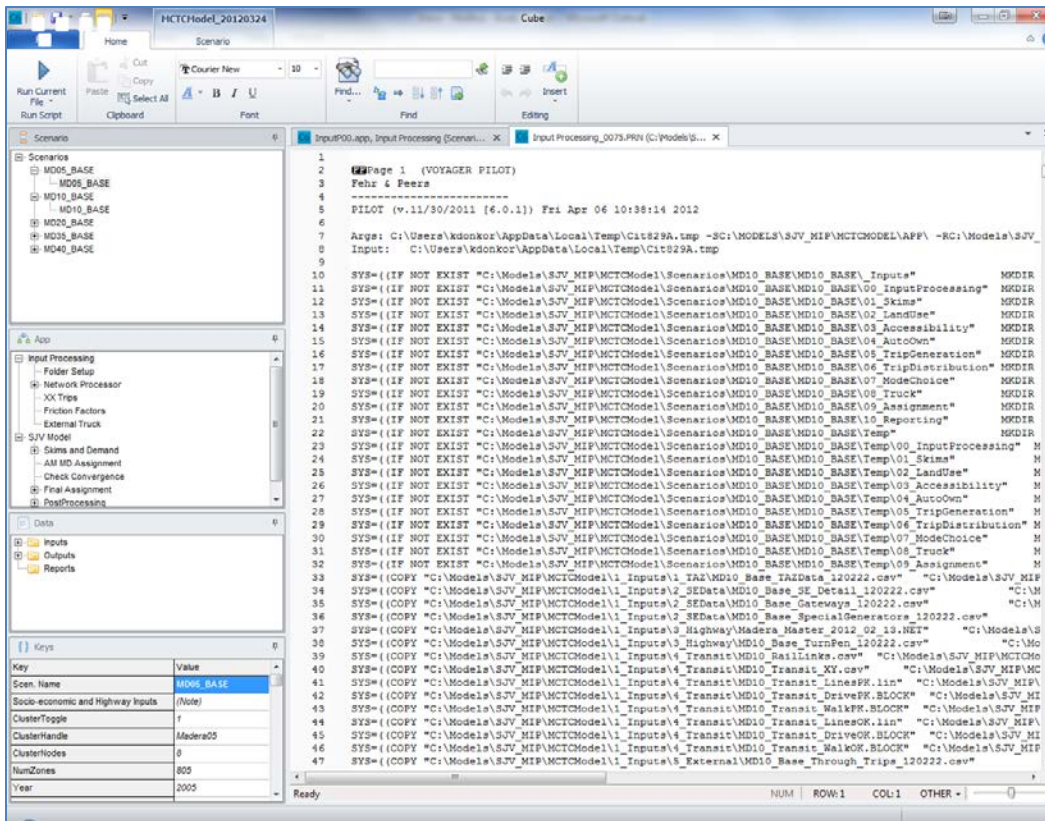
- Click on the **View Run Report File** button. Click **OK**.



- Click **OK** to close the Multiple Run Results window and close the Task Monitor Window.



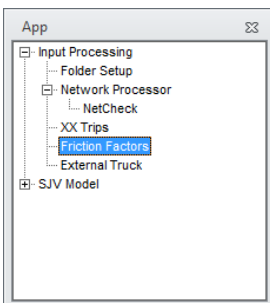
- The run report .PRN file will open in the Catalog window for review.



## RUNNING INDIVIDUAL SUB-GROUPS

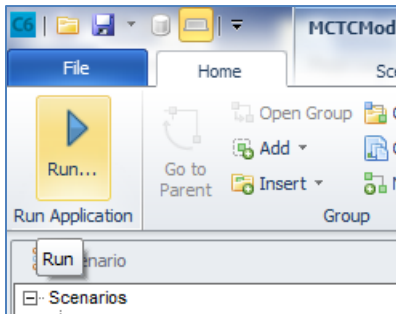
If you would like to run only a portion of the model, you can specify and run application sub-group scripts within the model catalog.

- Click on the application sub-group you would like to run.

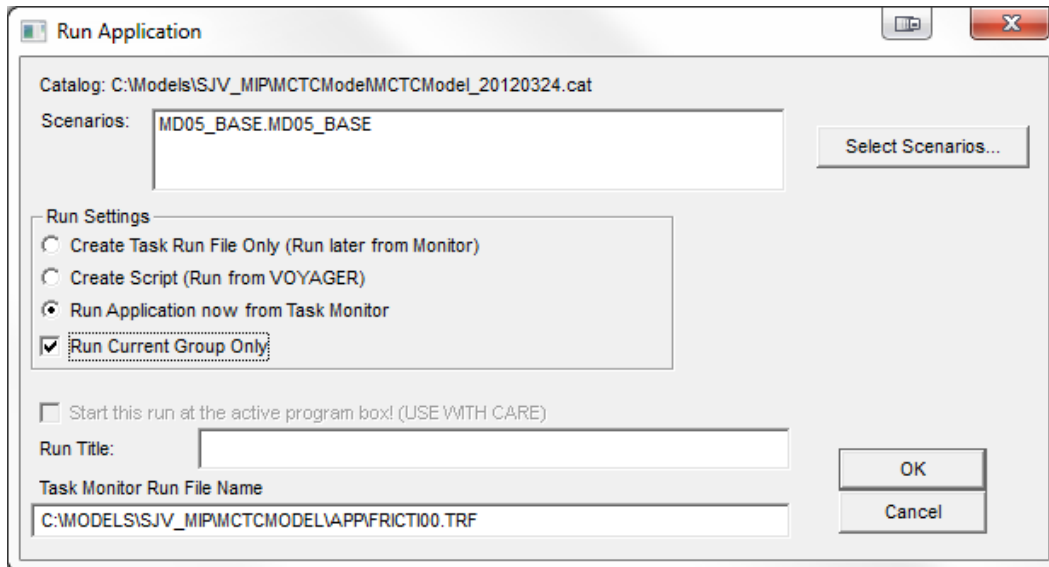




- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Check the **Run Current Group Only** button. The Task Monitor Run File Name will switch from the parent application file to the sub-group application file.



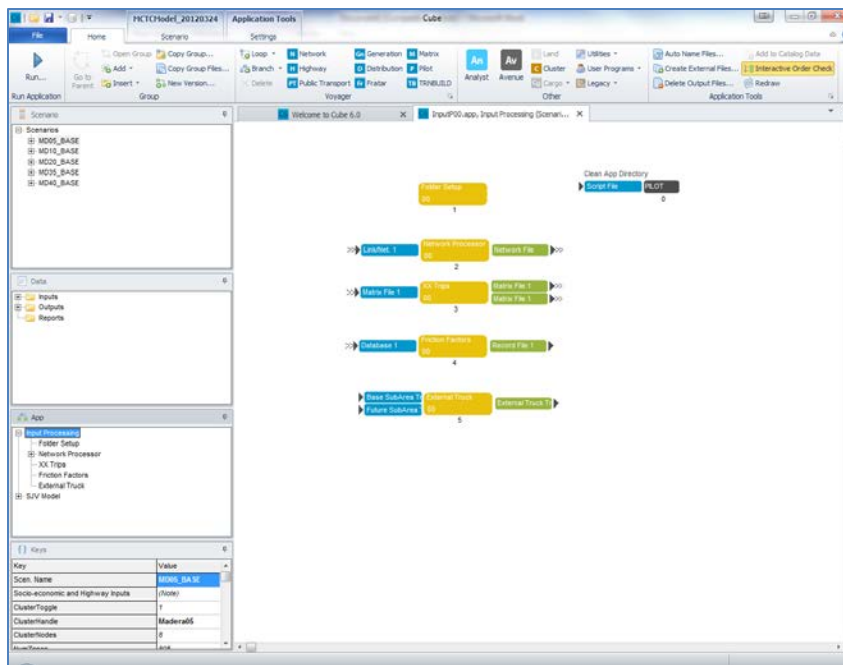
- Click **OK** and proceed with model run.

## APPLICATION DIRECTORY MAINTENANCE

After multiple model runs, the application directory will contain temporary .PRN and miscellaneous files that may take up a sizeable portion of file space. Periodically, it is recommended that these files be removed by the model user.

The model contains a script in the Input Processing application to do the clean-up. However, the sub-group application does not run automatically as part of the Input Processing application. The user must run the sub-group application manually.

- Double-click on **Input Processing** in the App Pane. This will bring up the Input Processing application flow diagram in the Catalog window.

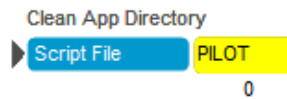


- Locate the **Clean App Directory** sub-group application in the top right corner of the Catalog window.

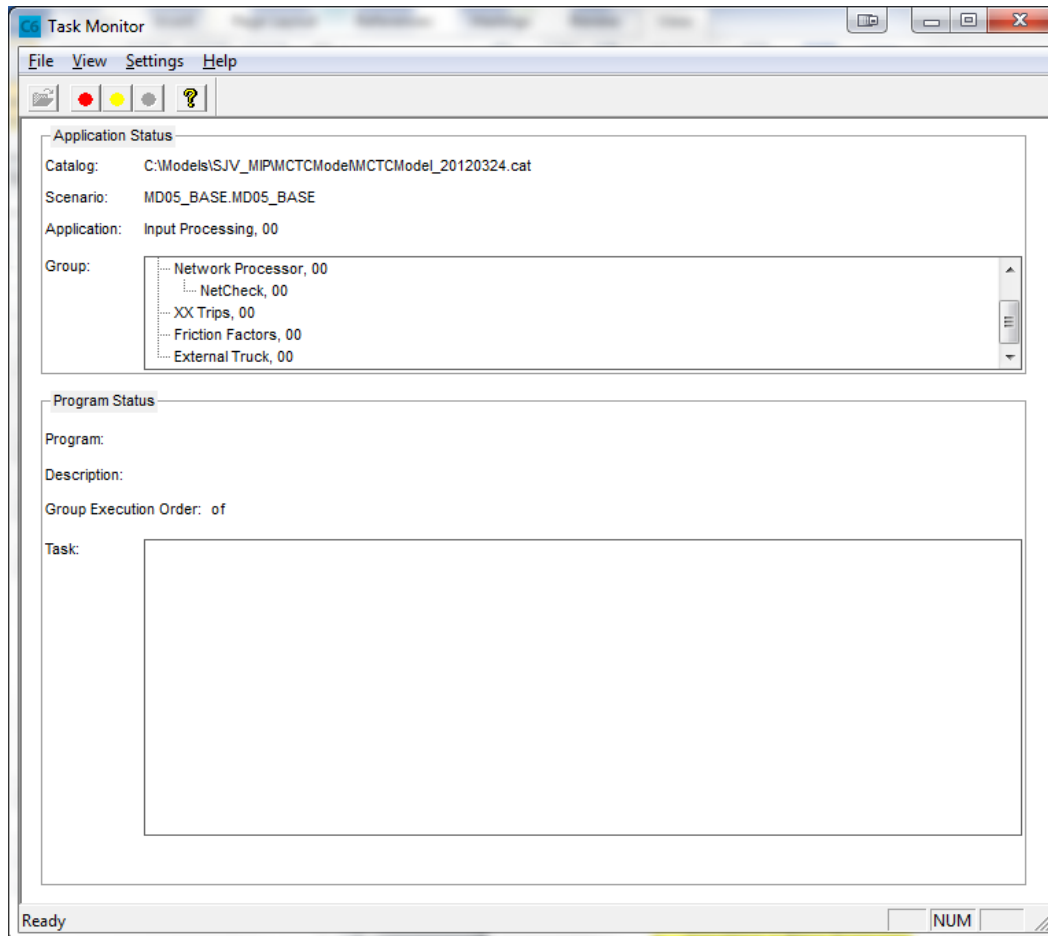


- Double-click on the PILOT icon.

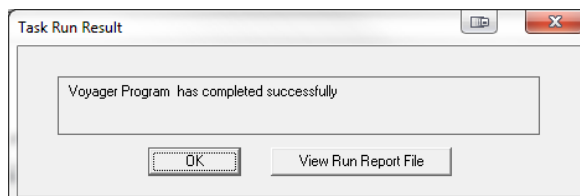




- The Task Monitor window will automatically open.

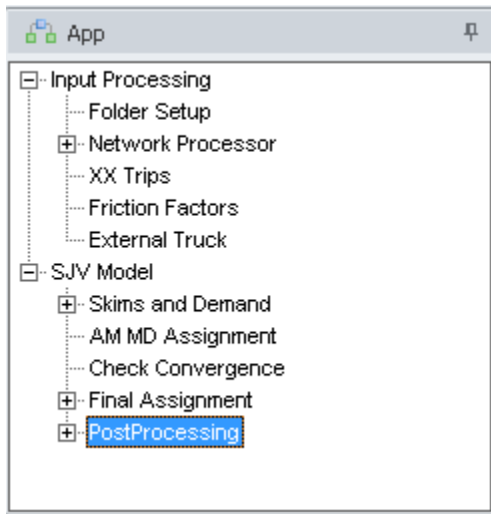


- Click **OK** after the run has completed successfully.



## POST PROCESSORS

After the model is run there are a number of post-processors that can be run to prepare model data. The post-processors can be found in the App Pane in the SJV Model application group.

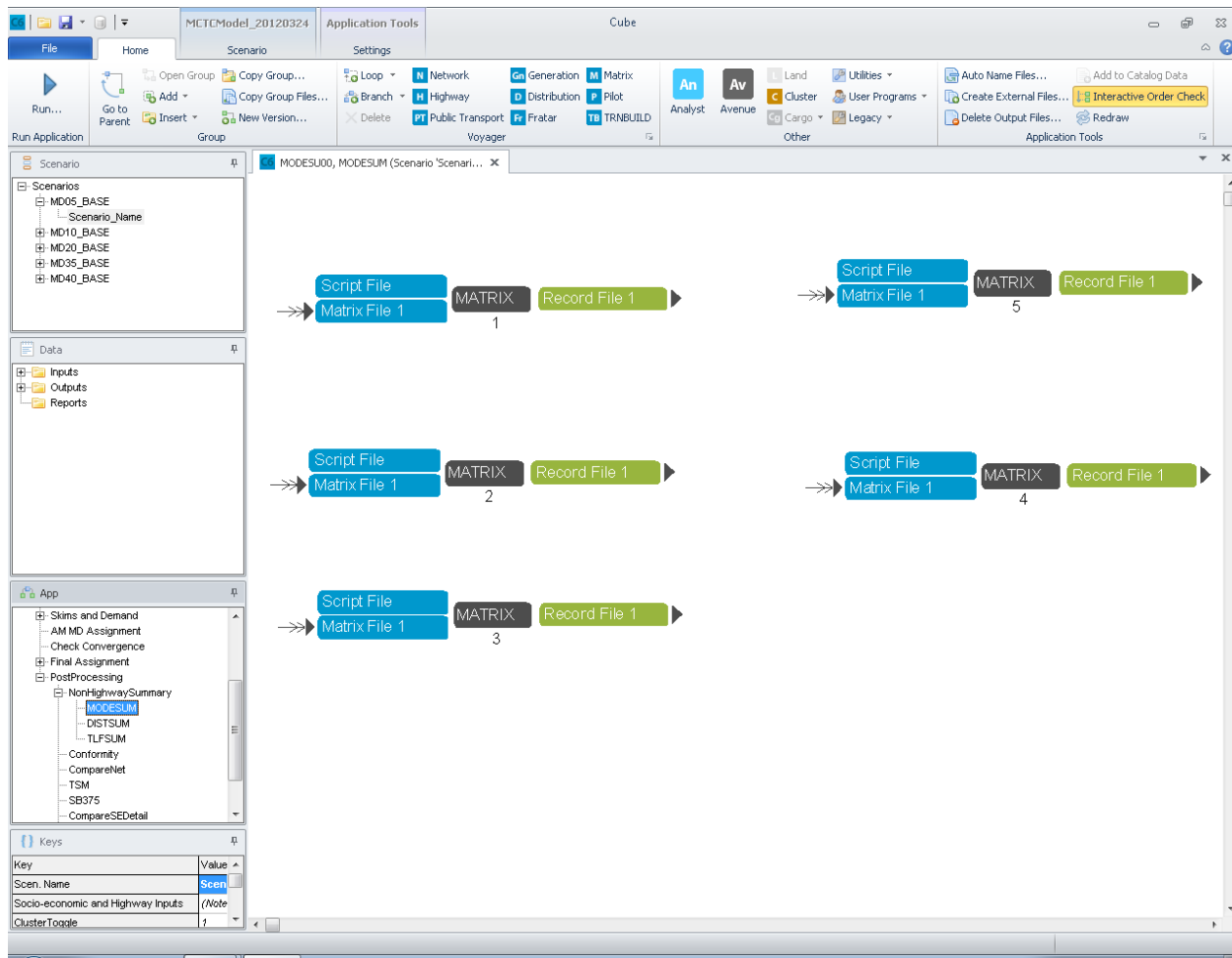


## MODE SPLIT SUMMARY

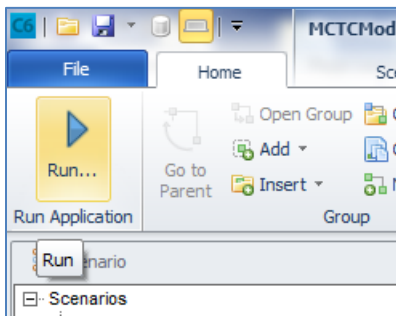
Outputs detailed mode split summary information.

- Double click on **MODESUM** in the App Pane. This will bring up the **MODESUM** application group.





- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Check the **Run Current Group Only** button.

**Run Application**

Catalog:

Scenarios: MD05\_BASE.Scenario\_Name Select Scenarios...

Run Settings

- ☐ Create Task Run File Only (Run later from Monitor)
- ☐ Create Script (Run from VOYAGER)
- ☒ Run Application now from Task Monitor
- ☒ Run Current Group Only

☐ Start this run at the active program box! (USE WITH CARE)

Run Title:

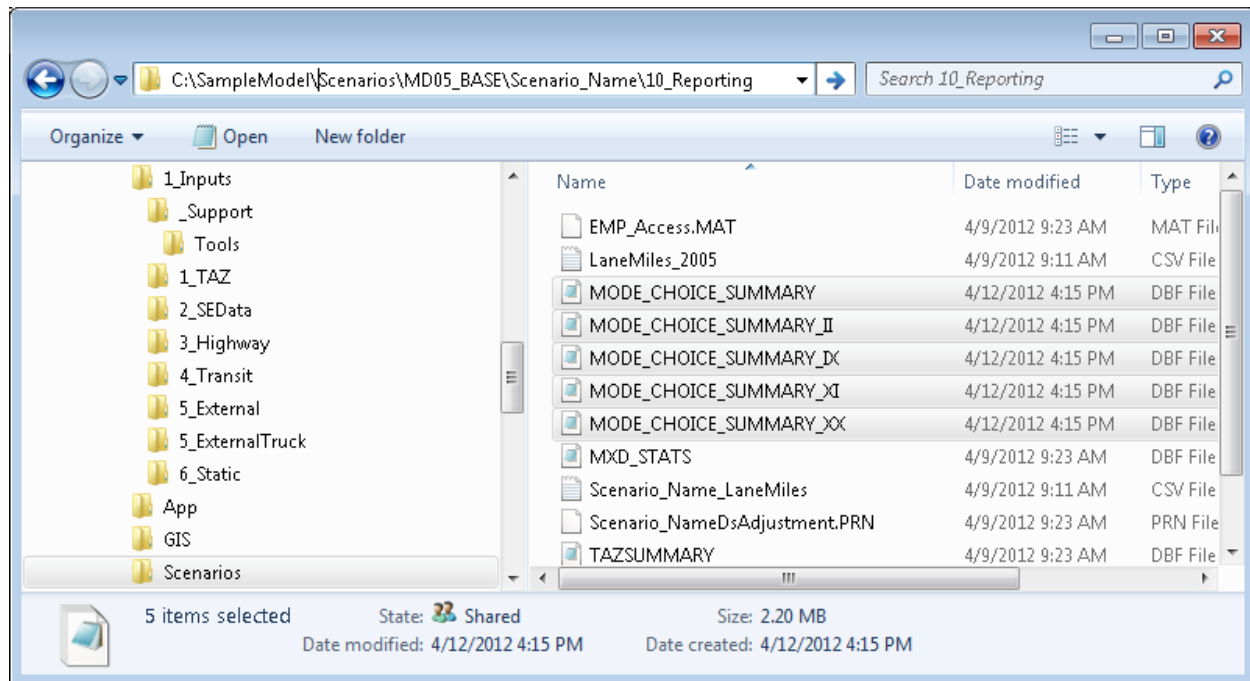
Task Monitor Run File Name

D:\SJ\VMIP\MCTCMODEL-20120324\MCTCMODEL\_INPUTONLY\_20120324\APP\MODESU00

OK Cancel

- Click **OK** and proceed with model run.
- The following five summaries are generated in Scenario\_Name\Reporting
  - MODE\_CHOICE\_SUMMARY
  - MODE\_CHOICE\_SUMMARY\_II
  - MODE\_CHOICE\_SUMMARY\_IX
  - MODE\_CHOICE\_SUMMARY\_XI
  - MODE\_CHOICE\_SUMMARY\_XX





Z	D1_HW	D1_HS	D1_HK	D1_HC	D1_HO	D1_WO	D1_OO	D1_HY	S2_HW	S2_HS	S2_HK	S2_HC	S2_HO	S2_WO	S2_HY
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	16.56	0.72	0	0	4.68	7.28	18.25	1.01	3.49	0.38	0	0	5.72	7.07	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	119.52	0.37	0	0	7.87	61.88	49.1	2.96	23.93	0.19	0	0	9.05	56.52	0
27	166.94	13.75	0	0	14.24	13.05	39.67	2.71	33.66	6.96	0	0	16.64	12.08	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## DISTRIBUTION SUMMARY

Outputs detailed distribution by purpose summary information.

- Double click on **DISTSUM** in the App Pane. This will bring up the **DISTSUM** application group.







- Check the **Run Current Group Only** button.

**Run Application**

Catalog:

Scenarios: MD05\_BASE.Scenario\_Name Select Scenarios...

Run Settings

- ☐ Create Task Run File Only (Run later from Monitor)
- ☐ Create Script (Run from VOYAGER)
- ☒ Run Application now from Task Monitor
- ☒ Run Current Group Only

☐ Start this run at the active program box! (USE WITH CARE)

Run Title:

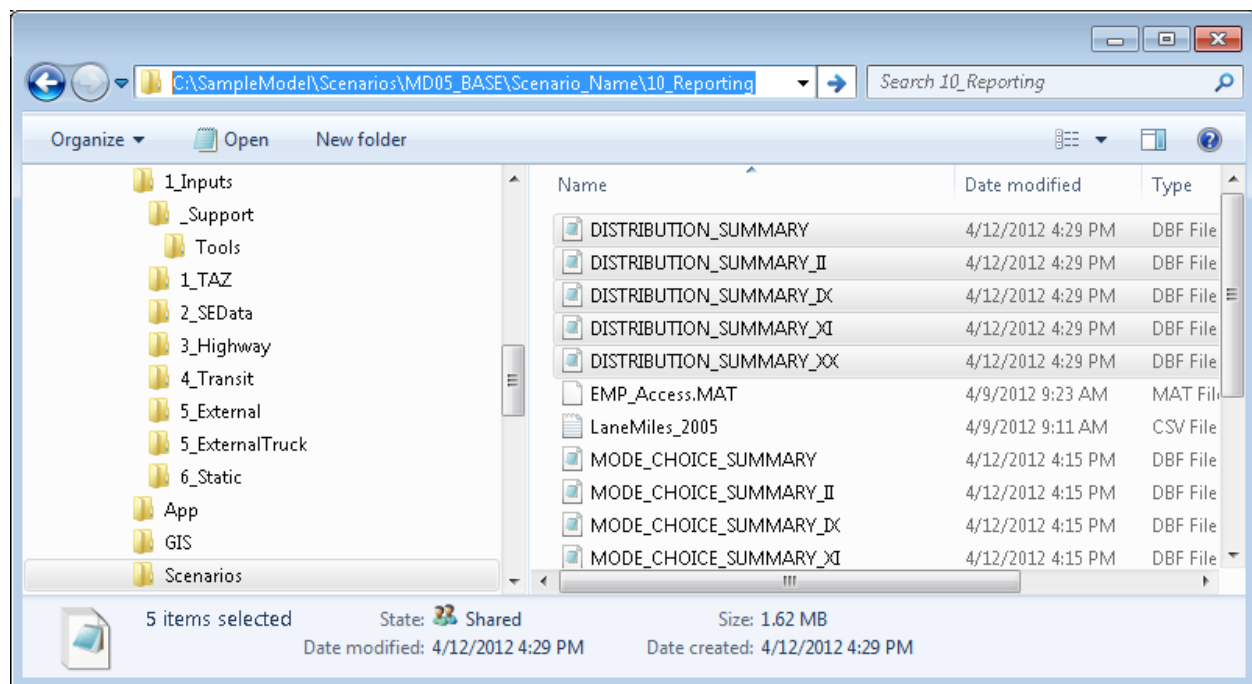
Task Monitor Run File Name

D:\SJ\VMIP\MCTCMODEL-20120324\MCTCMODEL\_INPUTONLY\_20120324\APP\DISTSU00.T

OK Cancel

- Click **OK** and proceed with model run.
- The following five summaries are generated in Scenario\_Name\Reporting
  - DISTRIBUTION\_SUMMARY
  - DISTRIBUTION\_SUMMARY\_II
  - DISTRIBUTION\_SUMMARY\_IX
  - DISTRIBUTION\_SUMMARY\_XI
  - DISTRIBUTION\_SUMMARY\_XX





The screenshot shows the MCTCModel\_20120324 software interface. The main window displays a data table with 15 columns and 39 rows. The columns are labeled: HW\_OVEH, HS\_OVEH, HK\_OVEH, HC\_OVEH, HO\_OVEH, WO\_OVEH, OO\_OVEH, HY\_OVEH, HW\_1VEH, HS\_1VEH, HK\_1VEH, HC\_1VEH, HO\_1VEH, WO\_1VEH, and OO\_1VEH. The rows are numbered 1 through 39. The data table is titled 'DISTRIBUTION\_SUMMARY.DBF (D:\SVM...'.

The sidebar on the left contains a tree view of the application structure. The 'App' pane is expanded, showing the following structure:

- Skims and Demand
  - AM MD Assignment
  - Check Convergence
  - Final Assignment
  - PostProcessing
    - NonHighwaySummary
      - MODESUM
      - DISTSUM
      - TLFSUM
    - Conformity
    - CompareNet
    - TSM
    - SB375
    - CompareSEDetail

The 'Keys' pane at the bottom left shows the following keys:

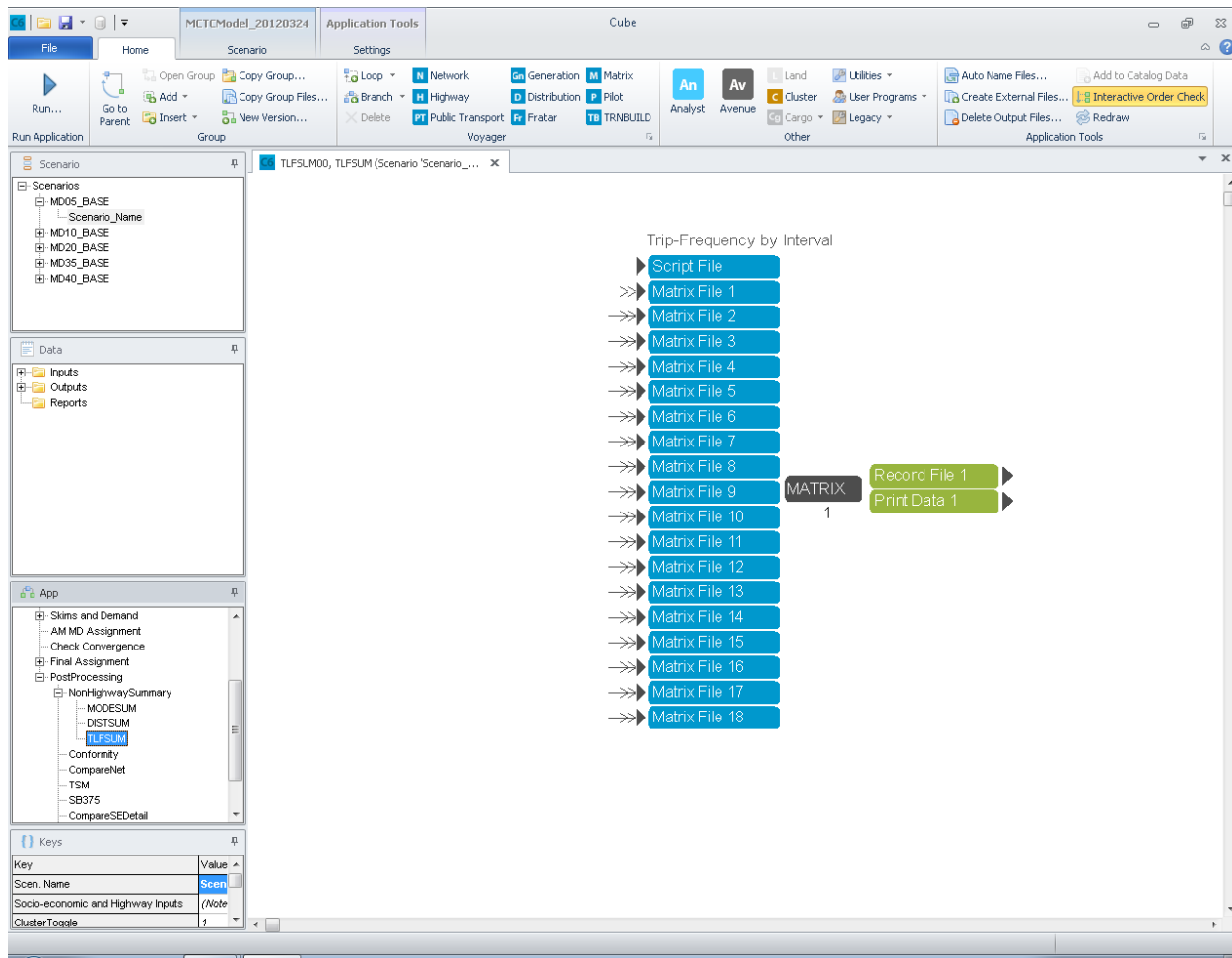
- Key: Scen. Name, Value: Scen. (Note)
- Key: Socio-economic and Highway Inputs, Value: (Note)
- Key: ClusterToggle, Value: 1

## TRIP LENGTH FREQUENCY SUMMARY

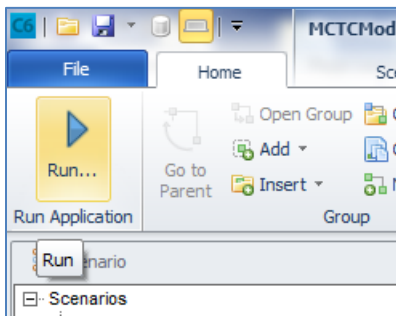
Outputs trip length frequency summary information.

- Double click on **TLFSUM** in the App Pane. This will bring up the **TLFSUM** application group.



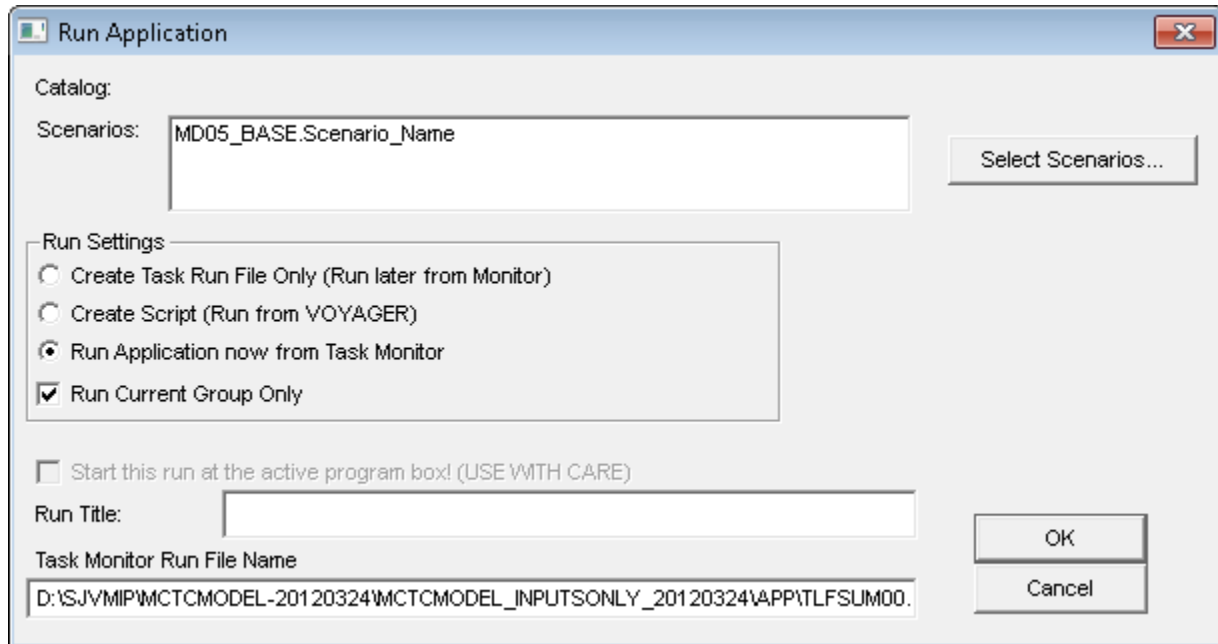


- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.

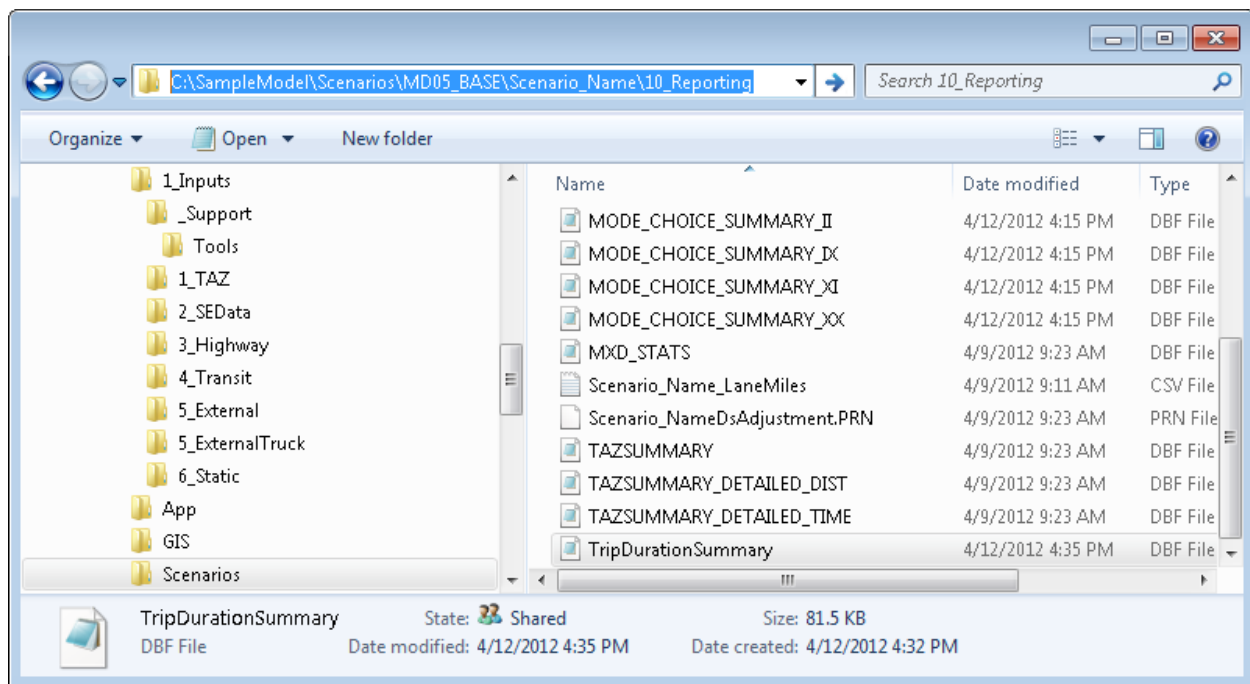


- Check the **Run Current Group Only** button.





- Click **OK** and proceed with model run.
- The following summary is generated in Scenario\_Name\10\_Reporting
  - TripDurationSummary.DBF



The screenshot displays the MCTCModel\_20120324 application. The main window shows a data table with columns for various trip metrics. The sidebar on the left contains navigation options for Scenarios, Data, App, and Keys.

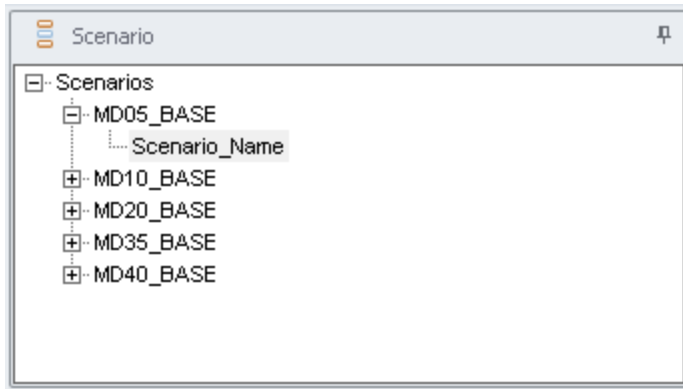
TIME	D1_HW_TRIPS	D1_HS_TRIPS	D1_HK_TRIPS	D1_HC_TRIPS	D1_HO_TRIPS	D1_WO_TRIPS	D1_OO_TRIPS	D1_HV_TRIPS	S2_HW_TRIPS	S2_HS_TRIPS	S2_HK_TRIPS	S2_HC_TRIPS	S2_HO_TRIPS
1	1173.159944	953.984921	667.895469	4.721296	3923.51709	1365.755091	18654.715744	0	204.430941	428.336267	1290.753367	9.215838	4277.584
2	6425.946077	4580.116046	3083.574015	62.508751	13543.179055	3250.7224	46014.116209	0	1134.872696	2069.495509	5988.596008	125.110771	14948.008
3	4395.543388	2262.063971	1185.177093	409.236785	6347.312932	1146.374687	14036.630299	0	792.088142	1045.655124	2336.581292	822.718266	7217.869
4	3585.981352	2621.629005	946.028506	134.641714	5059.812123	1492.030704	13175.592787	0	663.551477	1245.173431	1947.251987	275.181532	5908.029
5	3817.539324	2371.847885	1333.97446	80.062201	3516.836175	1201.81983	7715.077531	0	721.703957	1146.215124	2805.314273	165.576364	4127.264
6	2063.041197	1060.687766	426.642434	87.417837	1446.565969	398.56173	2568.11043	0	397.594417	523.467105	918.695034	197.563387	1733.4
7	938.404589	612.493316	194.817079	11.908257	658.219995	174.145003	1028.657985	0	183.776644	306.973764	430.898247	27.536364	810.541
8	741.330397	433.09505	192.997674	8.983298	347.163191	180.735145	657.662647	0	148.08278	222.049074	435.475162	21.208488	433.530
9	1106.482803	576.856624	204.804894	25.64023	316.348445	324.420149	837.981436	0	225.694141	302.957481	477.138419	61.259312	401.999
10	792.500555	316.041632	178.739132	44.857496	123.892361	151.119249	229.986869	0	165.524445	171.629271	431.076932	109.21501	160.093
11	490.302441	192.729884	83.473265	23.1984	48.715592	91.589855	73.787378	0	106.830997	108.734021	218.49698	57.026248	63.990
12	548.45596	203.458189	117.113716	37.905846	42.888995	113.165228	75.949685	0	121.330408	120.025028	306.664235	101.95191	58.850
13	462.555842	112.525726	78.414943	29.614541	12.697981	49.10634	22.200345	0	104.732228	67.781806	215.5462	78.96908	18.139
14	214.34514	51.420592	25.861766	10.099524	3.390773	35.400935	8.904173	0	50.033733	32.868823	73.922878	27.767296	5.169
15	129.513773	33.663933	16.518122	1.989939	1.813607	15.787074	3.324441	0	30.450367	21.651623	52.50561	5.3228	2.871
16	52.192955	14.175115	4.911984	0.346497	0.517318	4.05935	0.81243	0	12.300423	9.116862	14.326214	1.006722	0.836
17	42.140988	10.255483	3.936859	0.337077	0.310426	5.691399	0.712751	0	10.074485	6.416391	11.677548	1.001803	0.505
18	14.821569	3.172837	0.469773	0.046209	0.132206	1.093931	0.103569	0	3.582106	2.065713	1.398605	0.148869	0.213
19	3.602108	0.63231	0.191519	0	0.0075	1.719064	0.073853	0	0.906985	0.445806	0.576095	0	0.016
20	9.794343	1.624542	0.066697	0	0.019744	0.372647	0.017225	0	2.456033	1.080136	0.235956	0	0.034
21	6.141001	0.838092	0.004912	0	0.004348	0.279561	0.005687	0	1.539375	0.549488	0.019211	0	0.007
22	2.587772	0.322677	0.001348	0	0.000977	0.147971	0.001408	0	0.663662	0.2229	0.004315	0	0.00
23	0.162757	0.028892	0	0	0.000138	5.2E-5	1.7E-5	0	0.041143	0.018932	0	0	0.000
24	0.081625	0.009969	0	0	1.4E-5	0.004167	9.2E-5	0	0.02157	0.007242	0	0	4.6
25	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0	0

## NETWORK COMPARE

Compare user-defined network against model scenario network in personal geodatabase

- Define network to compare against model scenario network in Cube Application keys
- Select scenario in Scenario pane





- Click **Next** for second page of scenario keys
- Define network to compare

Scenario - MD05\_BASE.Scenario\_Name (...)

**Post-Processing**

☒ Use LOS capacity ranges rather than model VC

**Conformity and SB 375**

Conformity Speed Bin Size (mph range)

Conformity number of speed bins

Airbasins

**Compare files to current scenario**

Define network to compare

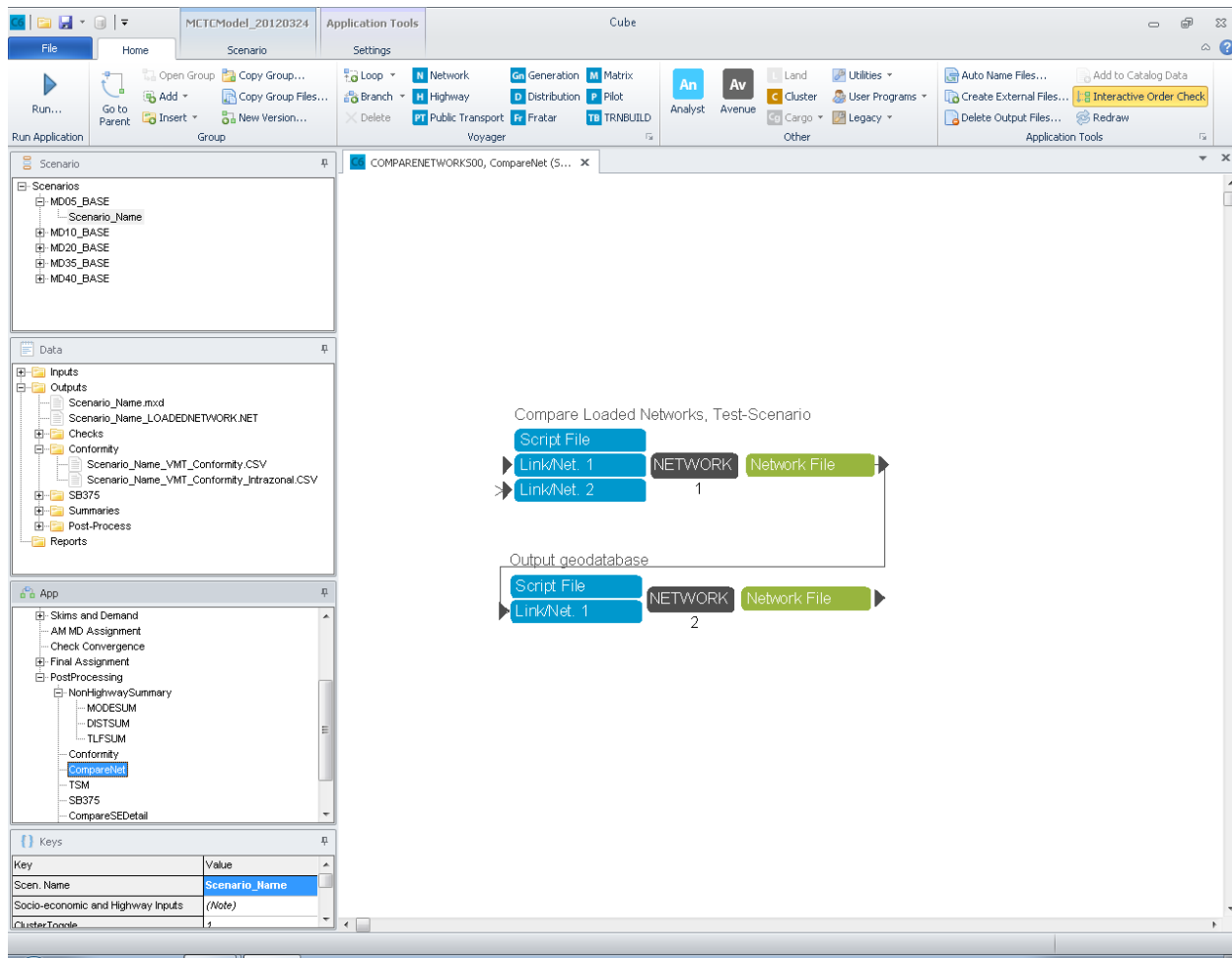
Define SE Detail to compare

ITE Match and Select Link/Zone

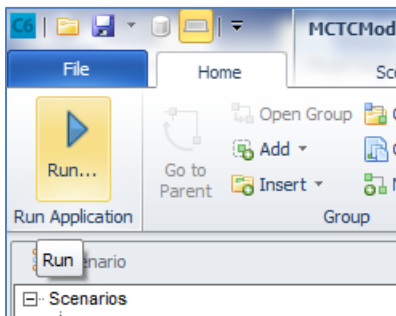
- Double click on **CompareNet** in the App Pane. This will bring up the **CompareNet** application group.



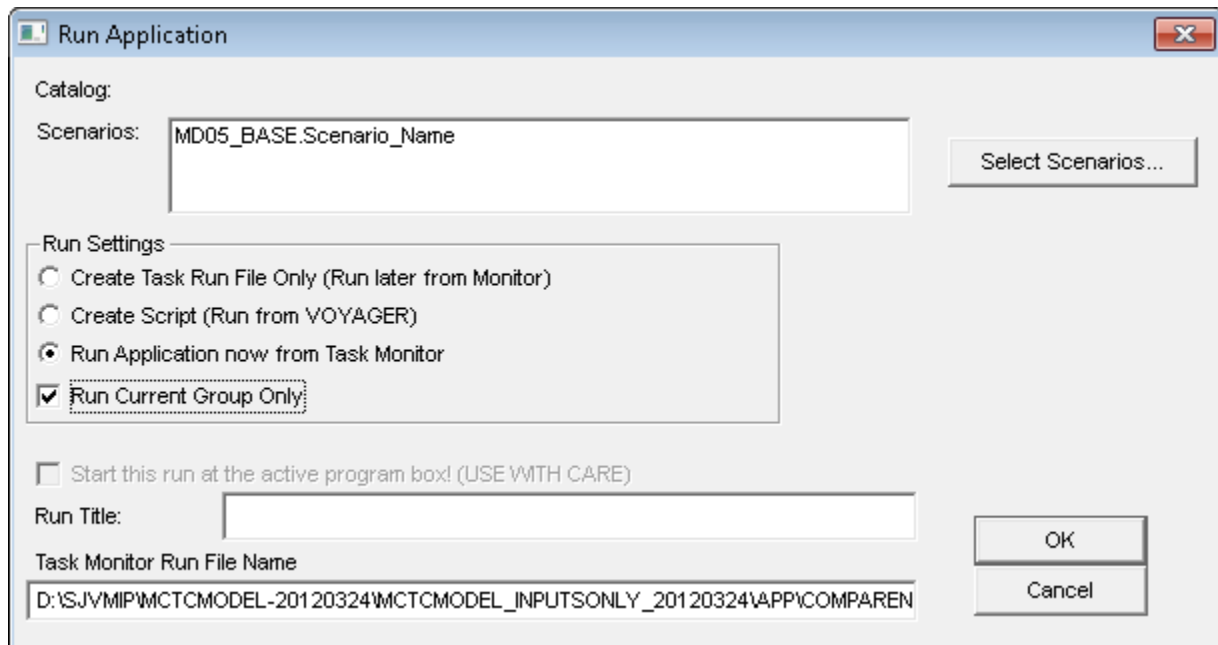




- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



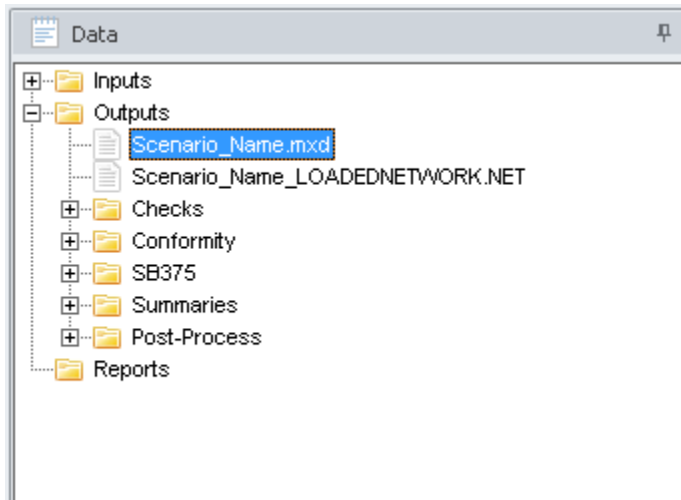
- Check the **Run Current Group Only** button.

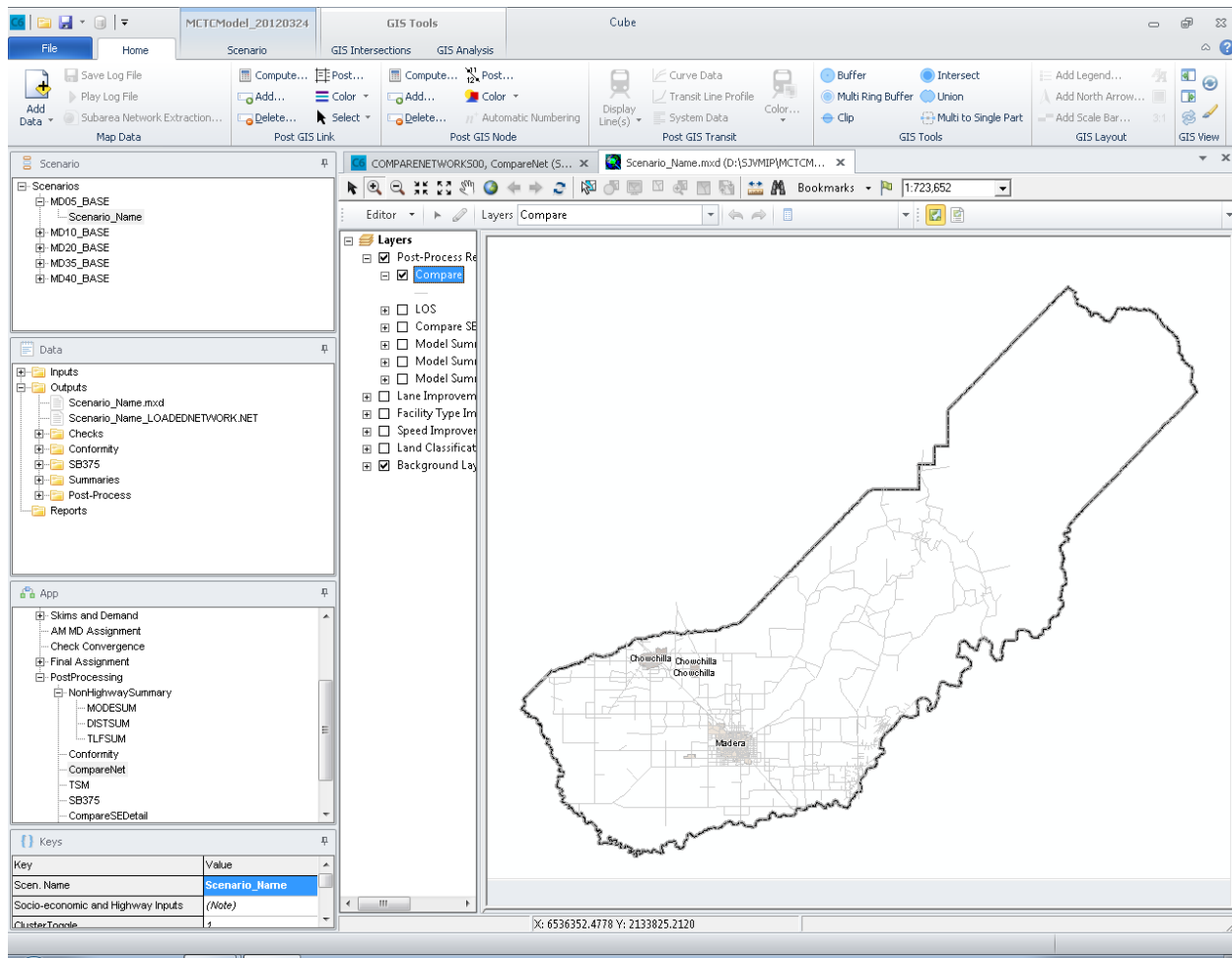


The 'Run Application' dialog box is shown with the following fields and options:

- Catalog:** Scenarios: MD05\_BASE.Scenario\_Name
- Run Settings:**
  - ☐ Create Task Run File Only (Run later from Monitor)
  - ☐ Create Script (Run from VOYAGER)
  - ☒ Run Application now from Task Monitor
  - ☒ Run Current Group Only
- ☐ Start this run at the active program box! (USE WITH CARE)
- Run Title:** [Empty text box]
- Task Monitor Run File Name:** D:\SJVMIP\MCTCMODEL-20120324\MCTCMODEL\_INPUTONLY\_20120324\APP\COMPAREN
- Buttons:** Select Scenarios..., OK, Cancel

- Click **OK** and proceed with model run.
- To view results double click on the personal geodatabase in the Data pane

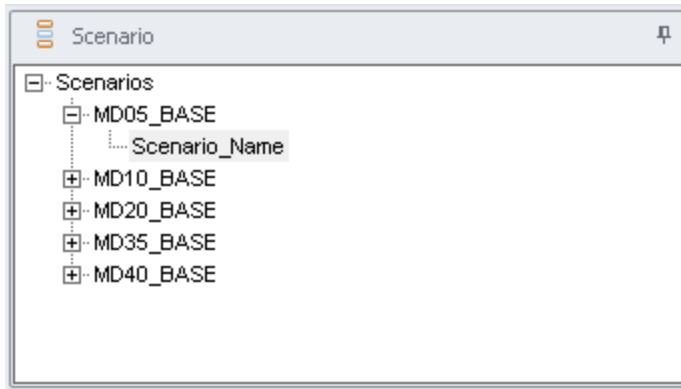




## SOCIOECONOMIC DETAIL COMPARE

Compare user-defined socioeconomic detail against model scenario socioeconomic detail

- Define socioeconomic detail to compare against model scenario socioeconomic detail in Cube Application keys
- Select scenario in Scenario pane



- Click **Next** for second page of scenario keys
- Define socioeconomic detail to compare

Scenario - MD05\_BASE.Scenario\_Name (...)

**Post-Processing**

☒ Use LOS capacity ranges rather than model VC

**Conformity and SB 375**

Conformity Speed Bin Size (mph range)

Conformity number of speed bins

Airbasins

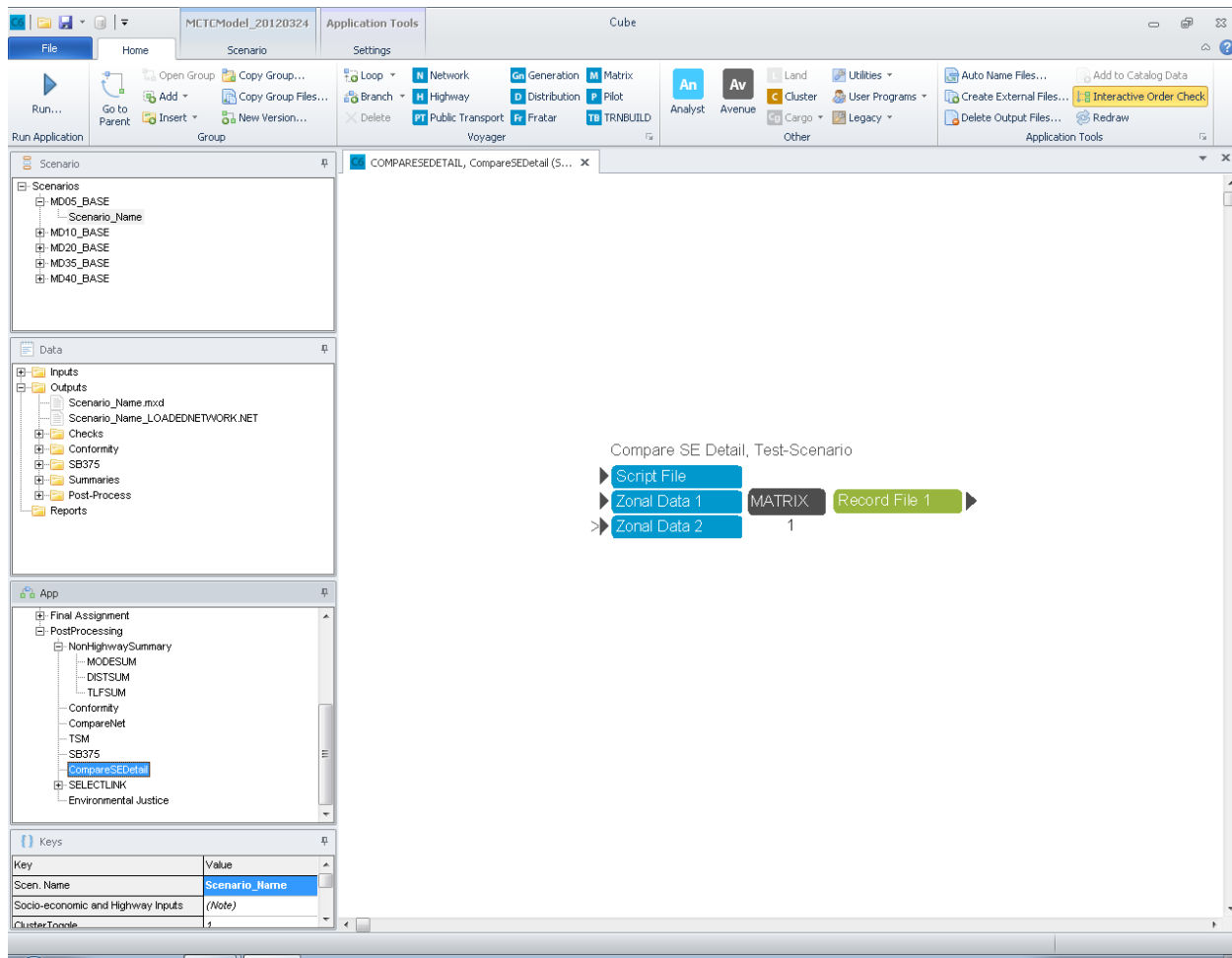
**Compare files to current scenario**

Define network to compare

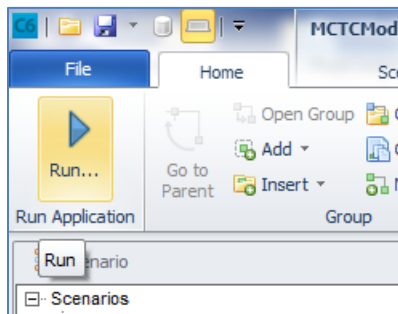
Define SE Detail to compare

ITE Match and Select Link/Zone

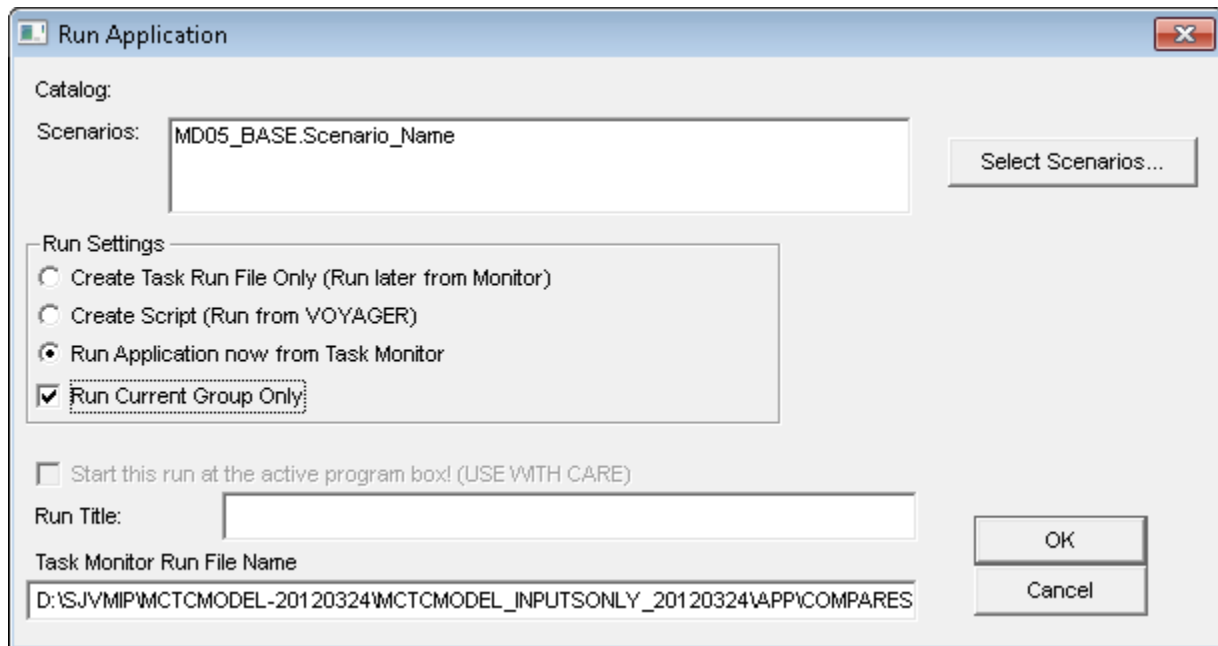
- Double click on **CompareSEDetail** in the App Pane. This will bring up the **CompareSEDetail** application group.



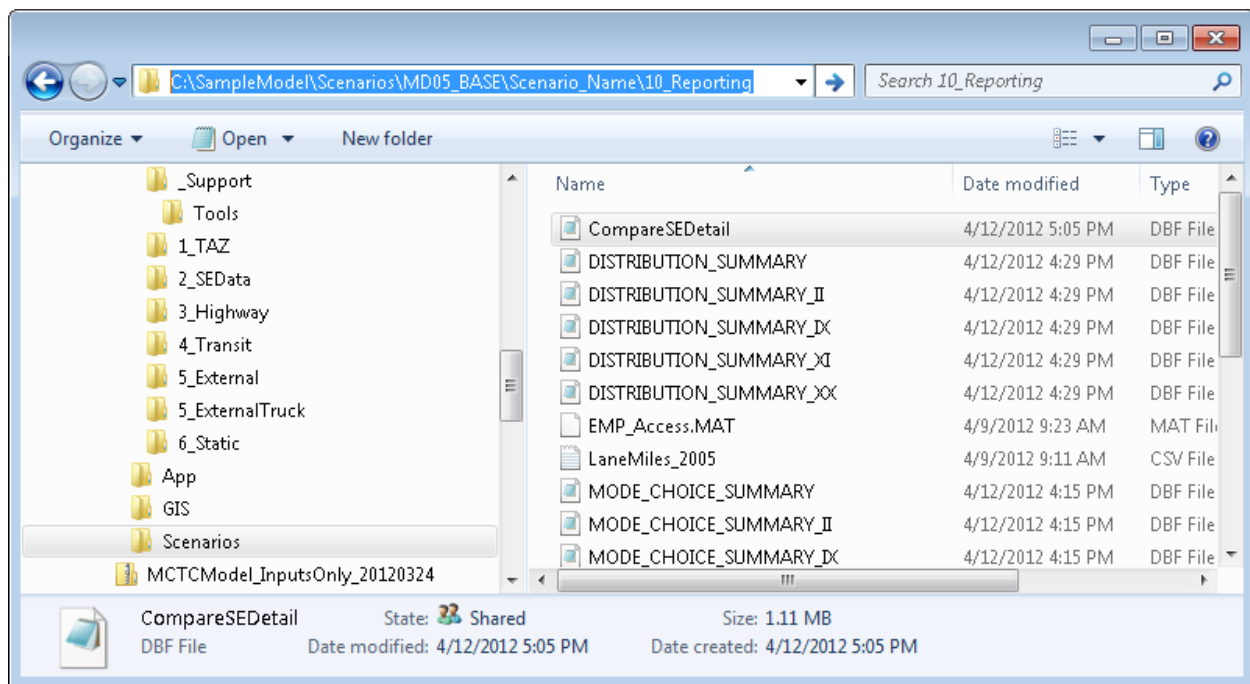
- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Check the **Run Current Group Only** button.



- Click **OK** and proceed with model run.
- The following files are generated in Scenario\_Name\10\_Reporting
  - CompareSEDetail.DBF



The screenshot displays the MCTCModel\_20120324 application window. The main area shows a data table with columns: Z, D\_TOTHH, D\_POP, D\_R1, D\_R2, D\_R3, D\_R4, D\_R5, D\_R6, D\_R7, D\_R8, D\_R9, D\_R10, and D\_R1\_POP. The table contains 39 rows of data, all with values of 0. The left sidebar contains a 'Scenarios' tree with 'MD05\_BASE' selected, and a 'Data' tree with 'Inputs' and 'Outputs' expanded. The 'Outputs' tree shows 'Scenario\_Name\_LOADEDNETWORK.NET' selected. The 'App' tree shows 'Final Assignment' and 'PostProcessing' expanded, with 'NonHighwaySummary' and 'MODESUM' selected. The 'Keys' section at the bottom shows a table with 'Key' and 'Value' columns, where 'Scen\_Name' is set to 'Scenario\_Name' and 'Socio-economic and Highway Inputs' is set to '(Note)'. The status bar at the bottom indicates '1 of 805'.

## SELECT LINK ANALYSIS / FRATAR TO ITE CONTROL TOTALS

Creates select link or zone analysis for review in personal geodatabase file. If desired, select zone can be adjusted to match ITE control totals for easier review of select zone. The high level steps for this process are:

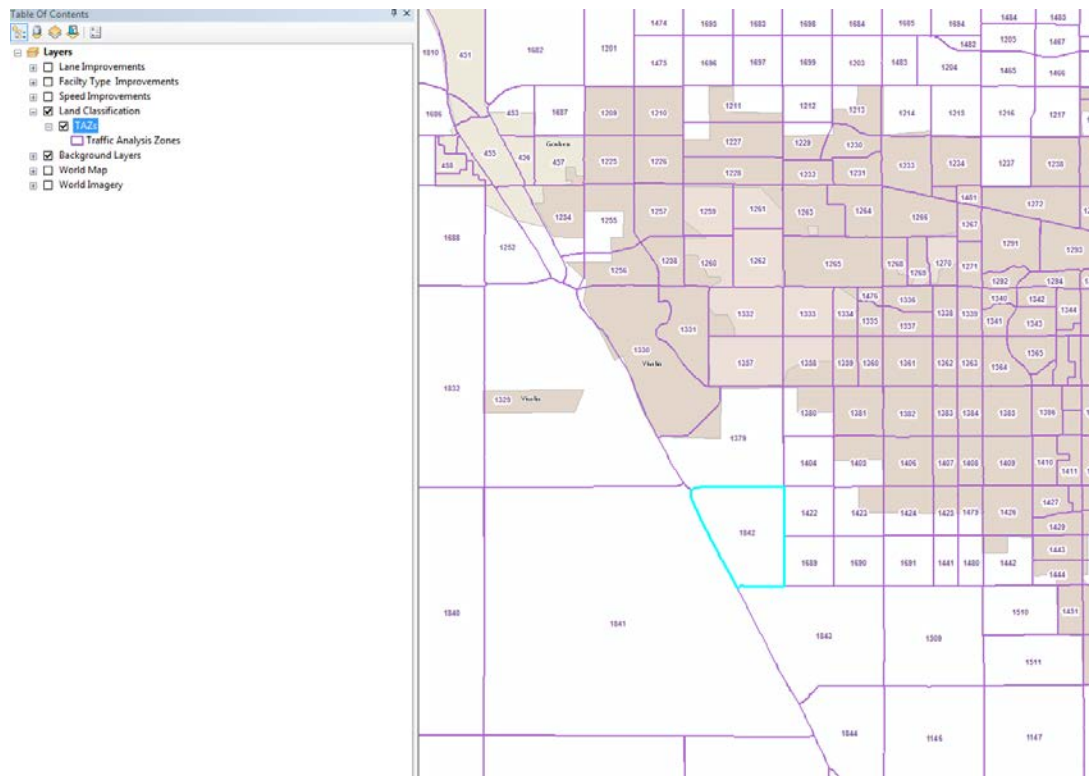
- Full model run with land use representing the project
- Prepare trip generation target and input file
- Define Scenario detail in Cube Application keys and running the post-process
- Review results



## Full Model Run Preparing for Select Link/Fratar

The Select Link and Fratar post-process is based on a full model run for a given scenario and tracks the route/distribution of auto trips for a single zone or a group of zones. Before running the model, it is recommended to review the TAZ boundary to determine which zone(s) reflect the project, the land use in the zone(s), and if additional zones should be created.

- The MODELNAME.MXD in the GIS directory contains a layer for the TAZ boundary. (TAZ 1842 in the example below)



- Use the Parameters Workbook to review the land use in the zone and compare with the project land use. Typical projects fall into one of the following cases.
  - Case A: The land use is similar in type and magnitude and if the project represents the entire zone. No additional changes are needed.
  - Case B: The land use is not similar in type and magnitude, but represents the entire TAZ. Update the land use to reflect the project.
  - Case C: The land use is similar in type and magnitude, but does not represent the entire TAZ. Identify a vacant TAZ within the same zone range, modify the land use in the original zone and project zone to match the type and magnitude of land use, add a centroid and connector to the master network using the same attributes as the original zone.

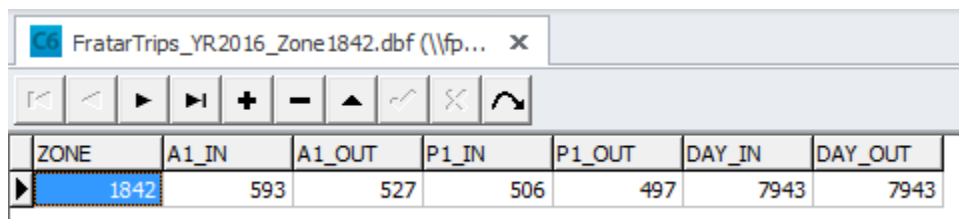




- Case D: The land use is not similar in type and magnitude and the project does not represent the entire original zone, or the entire project is in addition to the existing land use in the zone. Identify a vacant TAZ within the same zone range, leave the land use in the original zone and add the project land use to the vacant zone, add a centroid and connector to the master network using the same attributes as the original zone.

### Prepare trip generation target and input file

- Determine the net new project vehicle trips for AM Peak 1hr, PM Peak 1hr, and Daily using empirical data, regionally validated trip generation rates, ITE, MXD+, or other methods.
- Copy and rename the 1\_Inputs\Support\Tools\FratarTrips.DBF to a project specific name, and open in Cube.
- Edit the Zone number(s) and inbound/outbound trips by time of day to reflect the project. Save the file and close.

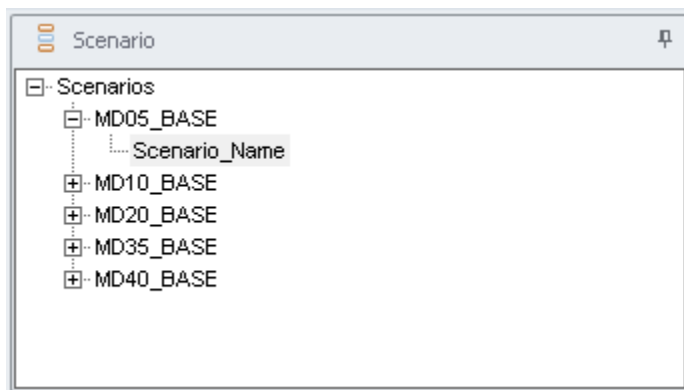


The screenshot shows a data table with the following columns: ZONE, A1\_IN, A1\_OUT, P1\_IN, P1\_OUT, DAY\_IN, and DAY\_OUT. The row for Zone 1842 is highlighted.

ZONE	A1_IN	A1_OUT	P1_IN	P1_OUT	DAY_IN	DAY_OUT
1842	593	527	506	497	7943	7943

### Define Scenario detail in Cube Application keys and running the post-process

- Select the scenario for evaluation



- Click **Next** for second page of scenario keys
- Define ITE Match and Select Link/Zone options to compare

#### ITE Match and Select Link/Zone

Adjust trips to match value:	
Zones to adjust to match (ex. 101-105,107)	101
Trip targets by zone (DBF with Zone,A1_IN, A1_OUT, P1_IN, P1_OUT, DAY_IN, DAY_OUT)	C:\VMIP\Training\TCM\1_Inputs\Support\Tools\FratarTrips.dbf
Select Link/zone Listing	C:\VMIP\Training\TCM\1_Inputs\3_Highway>SelectLink_Assign.txt
Select Zone/Link Summary	C:\VMIP\Training\TCM\1_Inputs\3_Highway>SelectLink_Summary.txt

- Update the Select Link text file for assignment (1\_Inputs\3\_Highway>SelectLink\_Assign.txt)
  - Copy or Save As the current example file
  - Copy and paste the block of text for the number of select links/nodes desired
  - Update the matrix numbers incrementing by 1 and keeping the matrix and assignment values consistent
  - Update the select link/node value
  - Save the file

SelectLink\_Assign.txt - Notepad

File Edit Format View Help

```

/* Examples
L=10005-10006 - This option selects the volume on link the link in direction from node 10005-10006
L=10005-10006* - This option selects the volume on link the both directions (from node 10005-10006 and from node 10006-10005)
A=101-105 | B=101-105 - This option selects the inbound and outbound links (centroids in this case) with nodes 101-105
N=101-105 - This option selects trips to/from nodes 101-105
*/

PHASE=ILOOP
; Total trips - do not modify this section
PATH=LW.GT_PK_DA_2Veh, EXCLUDEGRP=23, VOL[1]=MI.1.D1_TOT, PENI=1 ; D1 Trips
PATH=LW.GT_PK_S2_2Veh, EXCLUDEGRP=3, VOL[2]=MI.1.S2_TOT, PENI=1 ; SR2 trips
PATH=LW.GT_PK_S3_2Veh, EXCLUDEGRP=5, VOL[3]=MI.1.S3_TOT, PENI=1 ; SR3 trips
PATH=LW.GT_PK_DA_2Veh, EXCLUDEGRP=23, VOL[4]=MI.1.XX, PENI=1 ; external
PATH=LW.GT_Truck, EXCLUDEGRP=23, VOL[5]=MI.1.TOTTRK, PENI=1 ; Truck Trips

; Begin of select links/zone - remove, add, modify as needed

; Select link/zone trips - Node 101 Description of location
PATH=LW.GT_PK_DA_2Veh, EXCLUDEGRP=23, MW[6]=MI.1.D1_TOT+MI.1.XX, SELECTLINK=(N=101),VOL[6]=MW[6],PENI=1 ; DA and XX
PATH=LW.GT_PK_S2_2Veh, EXCLUDEGRP=3, MW[7]=MI.1.S2_TOT,SELECTLINK=(N=101),VOL[7]=MW[7],PENI=1 ; SR2 trips
PATH=LW.GT_PK_S3_2Veh, EXCLUDEGRP=5, MW[8]=MI.1.S3_TOT,SELECTLINK=(N=101),VOL[8]=MW[8],PENI=1 ; SR3 trips
PATH=LW.GT_Truck, EXCLUDEGRP=23, MW[9]=MI.1.TOTTRK,SELECTLINK=(N=101),VOL[9]=MW[9],PENI=1 ; Truck Trips

; Select link/zone trips - One way on link 14522->14531 Description of location
PATH=LW.GT_PK_DA_2Veh, EXCLUDEGRP=23, MW[10]=MI.1.D1_TOT+MI.1.XX,SELECTLINK=(L=14522-14531),VOL[10]=MW[10],PENI=1 ; DA and XX
PATH=LW.GT_PK_S2_2Veh, EXCLUDEGRP=3, MW[11]=MI.1.S2_TOT,SELECTLINK=(L=14522-14531),VOL[11]=MW[11],PENI=1 ; SR2 trips
PATH=LW.GT_PK_S3_2Veh, EXCLUDEGRP=5, MW[12]=MI.1.S3_TOT,SELECTLINK=(L=14522-14531),VOL[12]=MW[12],PENI=1 ; SR3 trips
PATH=LW.GT_Truck, EXCLUDEGRP=23, MW[13]=MI.1.TOTTRK,SELECTLINK=(L=14522-14531),VOL[13]=MW[13],PENI=1 ; Truck Trips

; Select link/zone trips - Both ways on link 14522<->1
PATH=LW.GT_PK_DA_2Veh, EXCLUDEGRP=23, MW[14]=MI.1.D1_TOT+MI.1.XX,SELECTLINK=(L=14522-14531*),VOL[14]=MW[14],PENI=1 ; DA and XX
PATH=LW.GT_PK_S2_2Veh, EXCLUDEGRP=3, MW[15]=MI.1.S2_TOT,SELECTLINK=(L=14522-14531*),VOL[15]=MW[15],PENI=1 ; SR2 trips
PATH=LW.GT_PK_S3_2Veh, EXCLUDEGRP=5, MW[16]=MI.1.S3_TOT,SELECTLINK=(L=14522-14531*),VOL[16]=MW[16],PENI=1 ; SR3 trips
PATH=LW.GT_Truck, EXCLUDEGRP=23, MW[17]=MI.1.TOTTRK,SELECTLINK=(L=14522-14531*),VOL[17]=MW[17],PENI=1 ; Truck Trips
ENDPHASE

```

Select node group. Note MW[6] in the definition on the left corresponds to VOL[6] in the assignment set. Increasing by 1 for each assignment set.

Define the select node or link

- Update the Select Link summary file (1\_Inputs\3\_Highway>SelectLink\_Summary.txt)
  - Copy or Save As the current example file
  - Copy and paste the block of text for the number of select links/nodes desired



- Update the volume set numbers with the clean name to refer to the appropriate Select Link volume group
- Save the file

SelectLink\_Summary.txt - Notepad

File Edit Format View Help

```
; Select Link 1 Trips
; AM Peak Period
; Directional
A03_DA_SL1=LI.1.V6_1
A03_SR2_SL1=LI.1.V7_1
A03_SR3_SL1=LI.1.V8_1
A03_TRK_SL1=LI.1.V9_1
A03_PAS_SL1=A03_DA_SL1+A03_SR2_SL1+A03_SR3_SL1
A03_VOL_SL1=A03_PAS_SL1+A03_TRK_SL1
```

Define the text description and the volume set to be summarized based on the assignment. For AM peak period (1 in the assignment), V6 is Drive Alone for Select Link 1

```
; Non-Directional
TOT_A03_DA_SL1=LI.1.V6T_1
TOT_A03_SR2_SL1=LI.1.V7T_1
TOT_A03_SR3_SL1=LI.1.V8T_1
TOT_A03_TRK_SL1=LI.1.V9T_1
TOT_A03_PAS_SL1=TOT_A03_DA_SL1+TOT_A03_SR2_SL1+TOT_A03_SR3_SL1
TOT_A03_VOL_SL1=TOT_A03_PAS_SL1+TOT_A03_TRK_SL1
```

The total volume is the same as the directional, with the addition of T in the volume set name. V6 is directional, V6T is non-directional.

```
; Mid-Day Period
; Directional
M07_DA_SL1=LI.1.V6_2
M07_SR2_SL1=LI.1.V7_2
M07_SR3_SL1=LI.1.V8_2
M07_TRK_SL1=LI.1.V9_2
M07_PAS_SL1=M07_DA_SL1+M07_SR2_SL1+M07_SR3_SL1
M07_VOL_SL1=M07_PAS_SL1+M07_TRK_SL1
```

Define the text description and the volume set to be summarized based on the assignment. For Mid-Day period (2 in the assignment), V6 is Drive Alone for Select Link 1

```
; Non-Directional
TOT_M07_DA_SL1=LI.1.V6T_2
TOT_M07_SR2_SL1=LI.1.V7T_2
TOT_M07_SR3_SL1=LI.1.V8T_2
TOT_M07_TRK_SL1=LI.1.V9T_2
TOT_M07_PAS_SL1=TOT_M07_DA_SL1+TOT_M07_SR2_SL1+TOT_M07_SR3_SL1
TOT_M07_VOL_SL1=TOT_M07_PAS_SL1+TOT_M07_TRK_SL1
```

- Update the scenario key Cube Catalog for the scenario being evaluated
  - Check "Adjust Trips to match value" for Fratar to be active



- Enter zone number(s) for Fratar trips, or leave box unchecked and zone as 101 for no change from model generated trips
- Browse to reference file created and modified to reflect the project trips for the scenario. Note that the full path should show in the box, unlike the example below which uses only the file name as an example.
- Refer to the Select Link text file for traffic assignment. The file includes samples of select node/zone, a link in one direction, and a link in both directions. By using a text file, multiple select links can be conducted with the same run of the post-processor.

**ITE Match and Select Link/Zone**

☐ Adjust trips to match value.

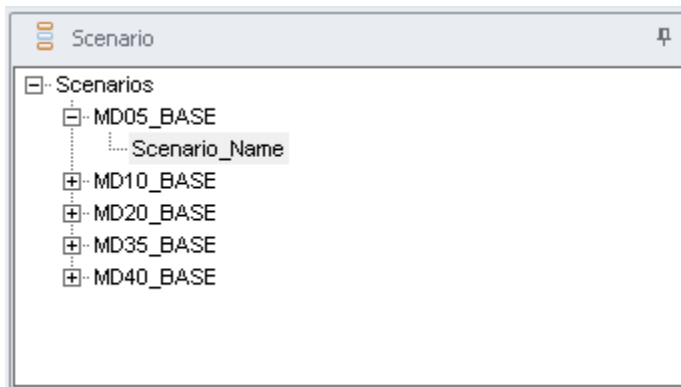
Zones to adjust to match (ex. 101-105,107)

Trip targets by zone (dbf with zone,A1\_IN, A1\_OUT, P1\_IN, P1\_OUT, DAT\_IN, DAT\_OUT)

Select Link/Zone Listing

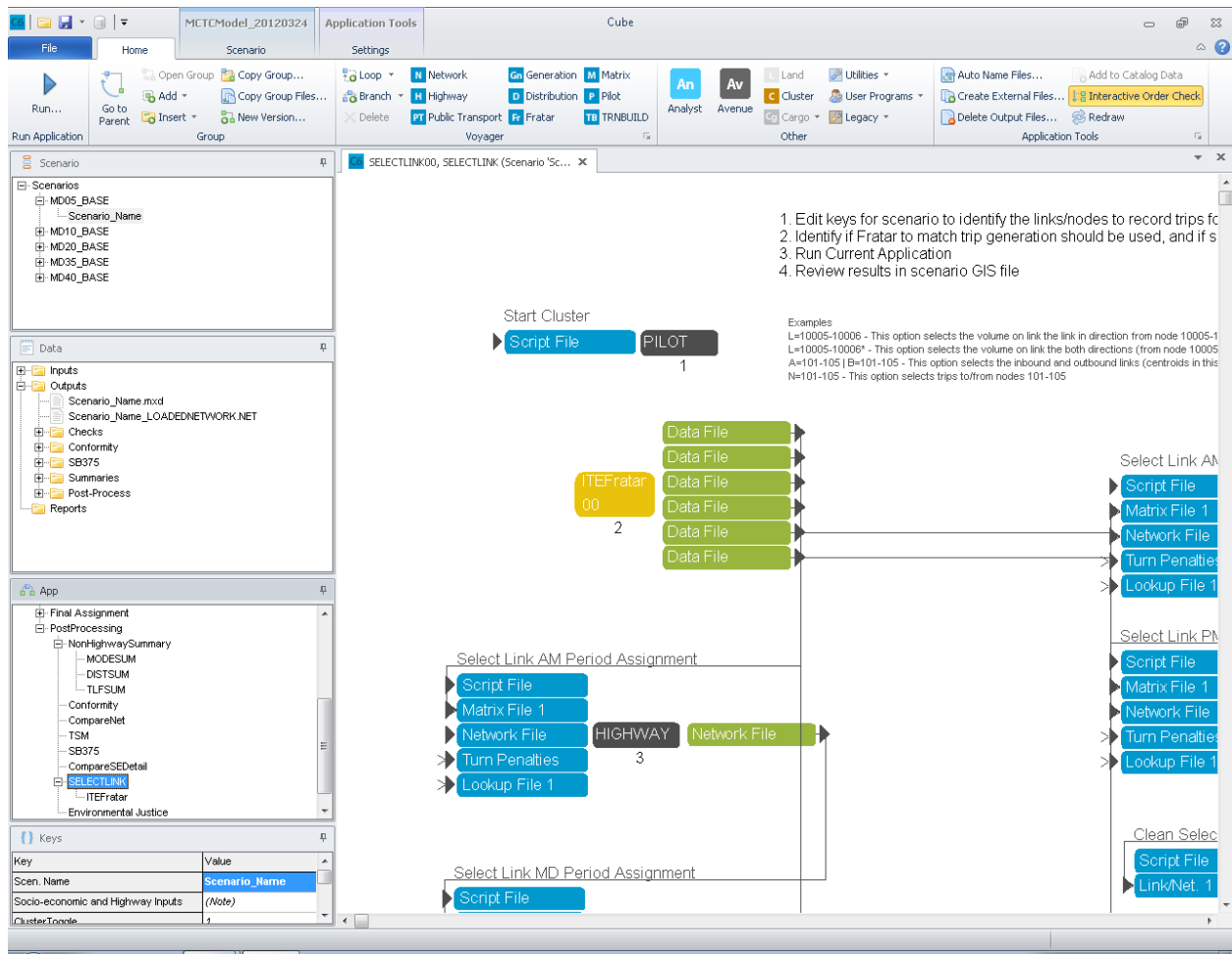
Select Zone/Link Summary

- Save and exit the scenario
- Select the scenario for evaluation

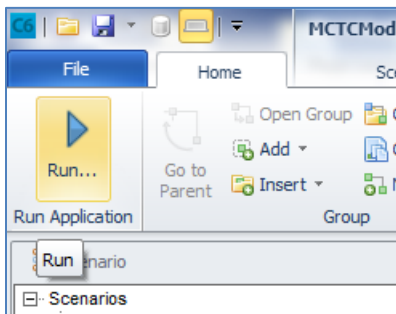


- Browse in the Applications to SelectLink



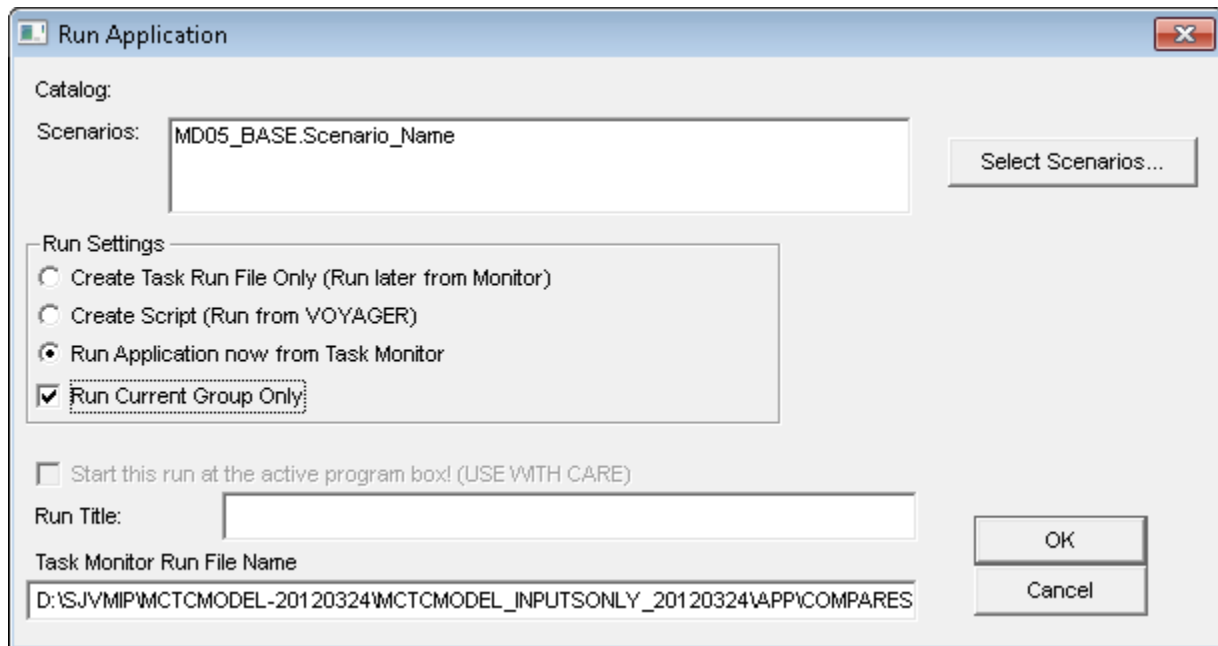


- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.

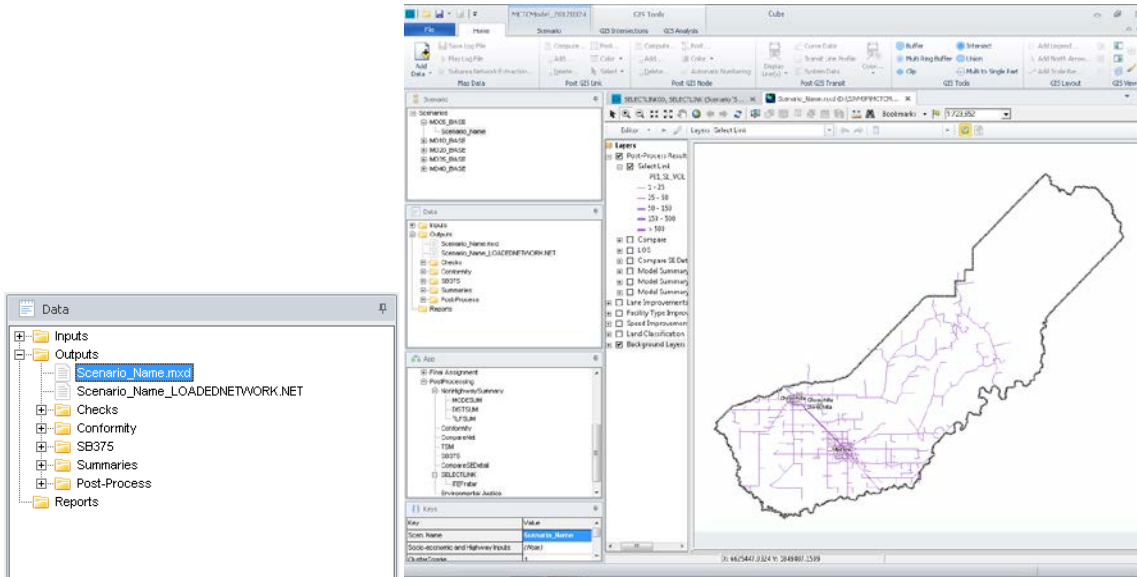


- Check the **Run Current Group Only** button.





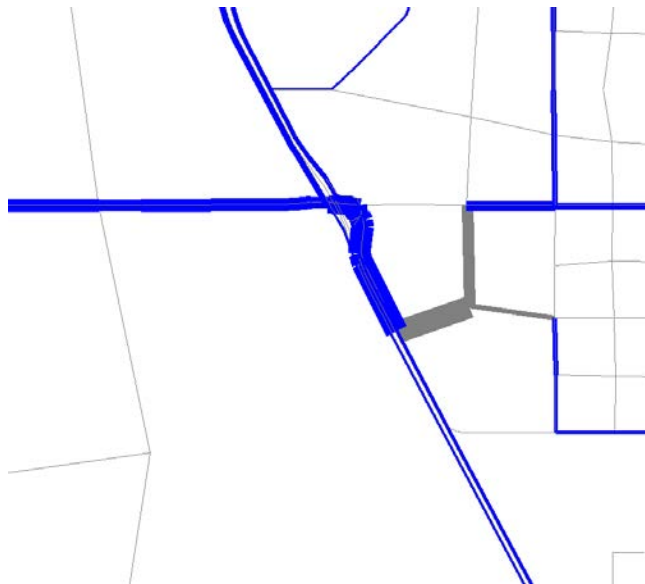
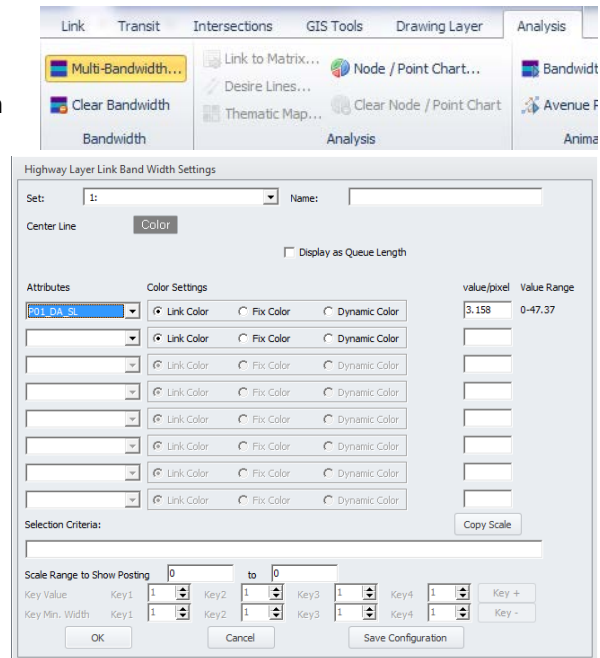
- Click **OK** and proceed with model run.
- To view results double click on the personal geodatabase in the Data pane



- To view results on the Cube Network, open 09\_Assignment\SCENARIO\_SL\_LinkVolumes.NET

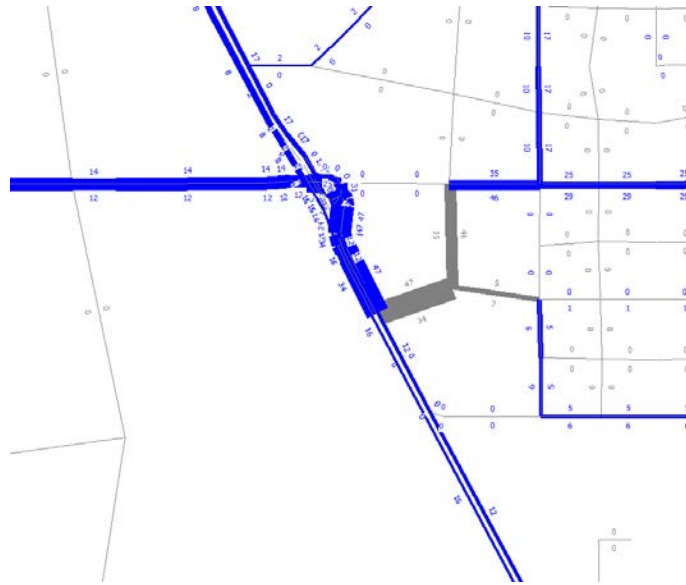


- The variables can be posted using multi-bandwidth and/or labels and use the same naming convention as the full assignment, with the exception that project trip variables include \_SL at the end. For example, P01\_DA\_SL is the PM peak 1hr (P01) Drive Alone (DA) select link (SL).
- For multi-bandwidth, select Analysis and then Multi-Bandwidth, and one or more variables to be posted. Click ok and zoom to the study zone(s) to view the results.

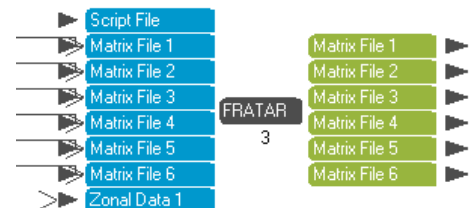
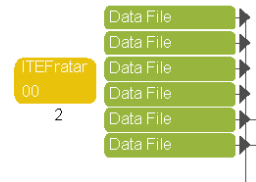


- Next, to post the values, select Home and then Post All in the Link section, and one or more variables to be posted. Click ok and zoom to the study zone(s) to view the results.





- Percentage of project trip distributions can be calculated using the Link Calculation functions, as needed.
- If the result are not matching the target, verify that the Catalog Keys and the input file are correct. The ITEFratar step applies the targets to the AM 1hr, PM 1hr, and proportional to the times of day that add to create daily.
  - Review the inputs (FRATARIN is the original and SL is the output) and outputs of this step to confirm the results match what is expected for the row and column totals.
  - The auto trips (drive alone, shared ride 2, and shared ride 3+) and truck trips are all adjusted based on the land use trip generation. Only XX trips are not adjusted.
  - The example below, the AM 1hr row total (outbound) and column total (inbound) for the original matrix file (left) was adjusted to match the target values, as shown on the output matrix file (right).
  - Although comparing each mode is possible, the total on the first tab for each time period is the most effective in QA since mode share by zone may vary and quickly determining if the trips match by mode is more difficult than total vehicles.



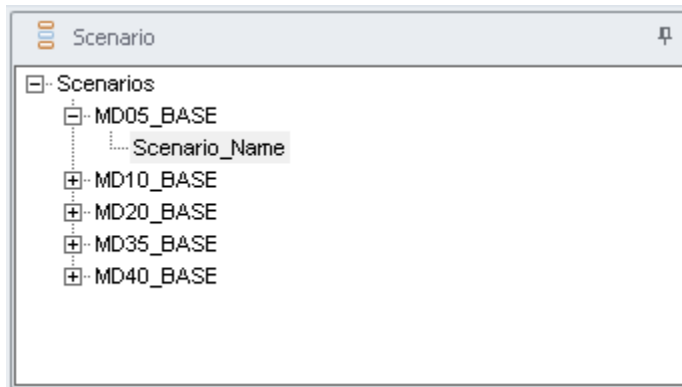


*1 AM1	2 D1_Tot	3 S2_Tot	4 S3_Tot	5 XX	*1 AM1	2 D1_Tot	3 S2_Tot	4 S3_Tot	5 XX
Sum	1842	1843	1844		Sum	1842	1843	1844	
55361.24	4.97	19.12	1.53		56471.73	592.64	19.12	1.53	
1842	4.56	0.00	0.00	0.00	1842	527.38	0.00	0.00	0.00
1843	13.44	0.00	0.01	0.00	1843	13.44	0.00	0.01	0.00
1844	1.16	0.00	0.00	0.00	1844	1.16	0.00	0.00	0.00
1845	3.33	0.00	0.00	0.00	1845	3.33	0.00	0.00	0.00

## ENVIRONMENTAL JUSTICE

The Environmental Justice application post-processes the model data to calculate the various performance metrics for Environmental Justice areas compared to the overall model area.

- Define environmental justice data in Cube Application keys
- Select scenario in Scenario pane



- Click **Next** for second page of scenario keys
- Define environmental justice data

Environmental Justice	
Collisions per VMT	1355
Total Collisions	10513
Collision PDO	6049
Collision Injuries	4322
Collision Fatalities	143
Deaths	163
Injuries	7261

- Define the Environmental Justice zones in column 'EJ' of the "TAZData\_Inputs" tab in the parameters workbook. Make sure this 'TAZData' parameter file is the one used in your scenario



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	TAZ	ELEM_BNDY	MD_BNDY	HIGH_BNDY	GENPARKCOST	EMPPARKCOST	INTDEN	WALKPERC	MHHNC	RESACRE	EMPACRE	HWYCOM	PTERM	ATERM	PKFREQ	OPFREQ	AIRBASIN	EJ	
1	101								53327	88.98182			1.00	1.00	0	0	1		
2	102								46462	66.901276			1.00	1.00	180	180	1		
3	103								46462	75.549395			1.00	1.00	180	180	1		
4	104								46462	40.619987			1.00	1.00	180	180	1		
5	105								45522	101.50532			1.00	1.00	0	0	1		
6	106								39213	70.972663			1.00	1.00	0	0	1		
7	107								46462	51.974712			1.00	1.00	0	0	1		
8	108								46462	107.0468			1.00	1.00	0	0	1		
9	109								24808	70.456908			1.00	1.00	0	0	1		
10	110								45522	5.1936719			1.00	1.00	0	0	1		
11	111								53327	54.251334			1.00	1.00	0	0	1		
12	112								45522	43.010531			1.00	1.00	0	0	1		
13	113								24808	106.69449			1.00	1.00	0	0	1		
14	114								39238	91.876138			1.00	1.00	180	180	1		
15	115								35073	67.421026			1.00	1.00	0	0	1		
16	116								35073	114.14087			1.00	1.00	180	180	1		
17	117								35073	190.79592			1.00	1.00	0	0	1		
18	118								35073	114.11938			1.00	1.00	0	0	1		
19	119								35073	85.164036			1.00	1.00	0	0	1		
20	120								35073	41.821743			1.00	1.00	0	0	1		
21	121								35073	0			1.00	1.00	0	0	1		
22	122								42365	18.114102			1.00	1.00	0	0	1		
23	123								42365	20.466173			1.00	1.00	0	0	1		
24	124								42365	673.99196			1.00	1.00	0	0	1		
25	125								42365	7.7583879			1.00	1.00	0	0	1		
26	126								53327	20.552784			1.00	1.00	0	0	1		
27	127								53327	2.4740264			1.00	1.00	0	0	1		
28	128								53327	0			1.00	1.00	0	0	1		
29	129								53327	6.8582813			1.00	1.00	0	0	1		
30	130								53327	68.155998			1.00	1.00	0	0	1		
31	131								45522	27.647288			1.00	1.00	180	180	1		
32	132								45522	14.144463			1.00	1.00	0	0	1		
33	133								53327	82.312854			1.00	1.00	0	0	1		
34	134								53327	160.60125			1.00	1.00	0	0	1		
35	135								53327	0.0248921			1.00	1.00	0	0	1		
36	136								53327	32.645893			1.00	1.00	0	0	1		
37	137								53327	89.780747			1.00	1.00	0	0	1		
38	138								53327	90.968788			1.00	1.00	0	0	1		
39	139								53327	29.156338			1.00	1.00	0	0	1		
40	140								53327	28.922895			1.00	1.00	0	0	1		
41	141								53327	0			1.00	1.00	0	0	1		
42	142								53327	9.962997			1.00	1.00	0	0	1		
43	143								53327	0.7945364			1.00	1.00	0	0	1		
44	144								0	0			1.00	1.00	0	0	1		
45	145								0	0			1.00	1.00	0	0	1		
46	146								0	0			1.00	1.00	0	0	1		
47	147								0	0			1.00	1.00	0	0	1		
48	148								0	0			1.00	1.00	0	0	1		
49	149								0	0			1.00	1.00	0	0	1		
50	150								0	0			1.00	1.00	0	0	1		
51	151								0	0			1.00	1.00	0	0	1		
52	152								0	0			1.00	1.00	0	0	1		
53	153								0	0			1.00	1.00	0	0	1		
54	153								0	0			1.00	1.00	0	0	1		

EJ00, Environmental Justice (Scenario 'S...
Scenario - MD05\_BASE.Scenario\_Name (...

**Socio-economic and Highway Inputs**

☒ Distribute processing?

ClusterHandle: Madera05

ClusterNodes: 8

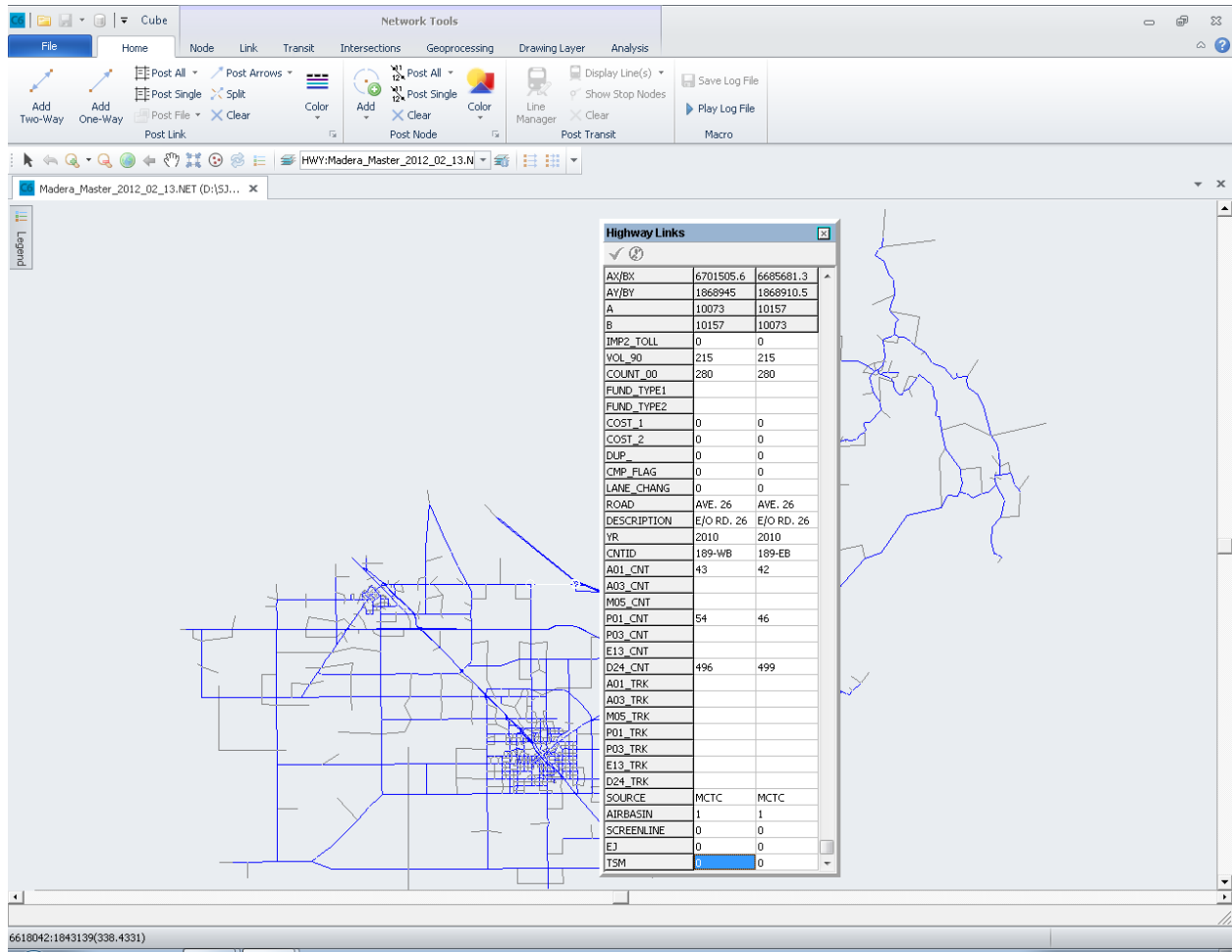
NumZones: 805

Year: 2005

Zonal data: D:\SJMIP\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\1\_TAZ\MD05\_Base\_

Socio-economic detail: D:\SJMIP\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\2\_SEData\MD05\_Ba

- Define the Environmental Justice links in variable 'EJ' of the master highway network. Make sure this master highway network file is the one used in your scenario



Scenario - MD05\_Base.Scenario\_Name (...)

**Socio-economic and Highway Inputs**

☒ Distribute processing?

ClusterHandle: Madera05

ClusterNodes: 8

NumZones: 805

Year: 2005

Zonal data: D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\1\_TAZ\MD05\_Base\_TAZData\_120; Browse ... Edit ...

Socio-economic detail: D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\2\_SEData\MD05\_Base\_SE\_Detail; Browse ... Edit ...

External-external through trips: D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\5\_External\MD05\_Base\_Through; Browse ... Edit ...

Gateway zones: D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\2\_SEData\MD05\_Base\_Gateways; Browse ... Edit ...

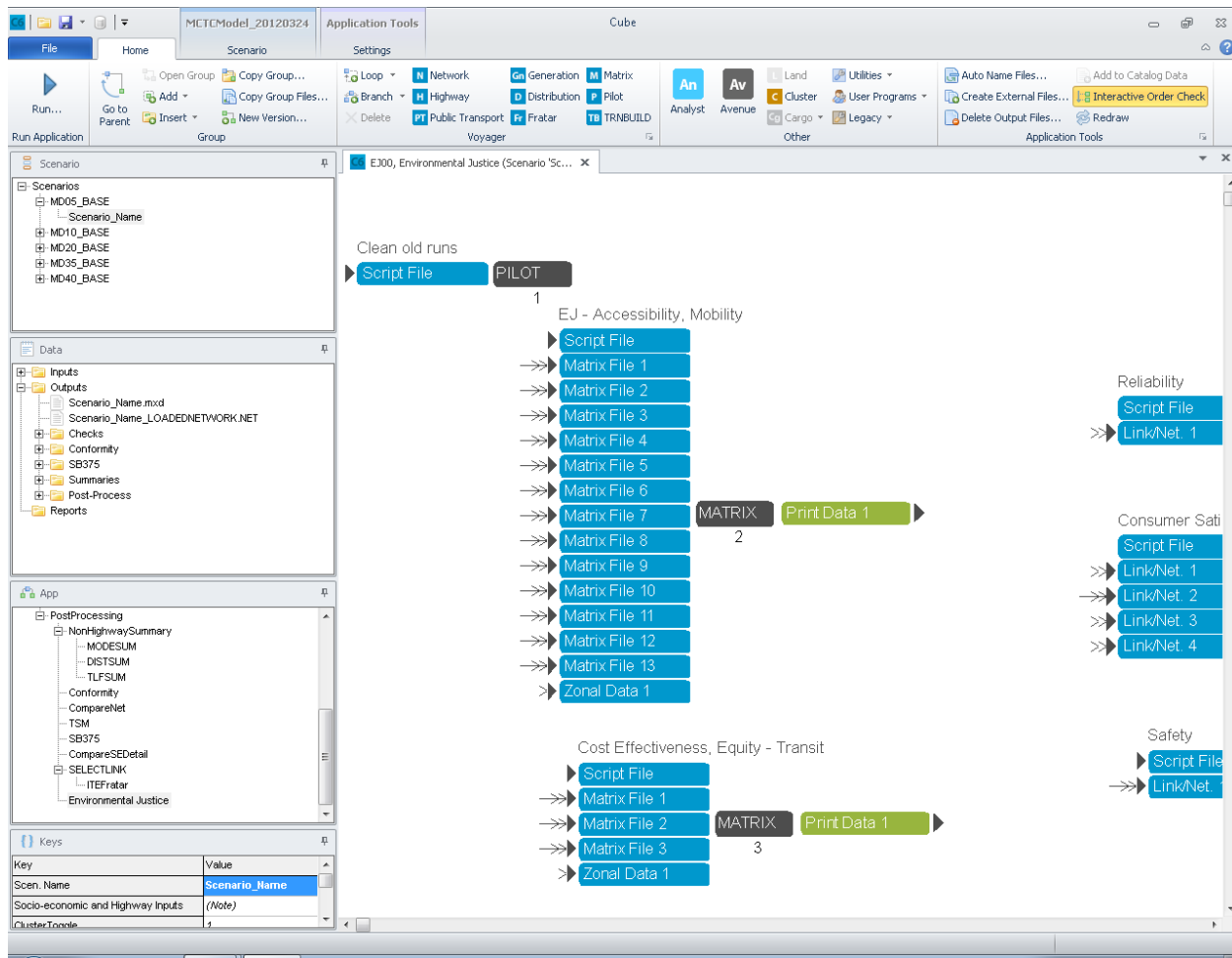
Special generators: D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\2\_SEData\MD05\_Base\_SpecialGen; Browse ... Edit ...

MXD\_Parameters: D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\6\_Static\MD10\_Base\_SmartGrowt; Browse ... Edit ...

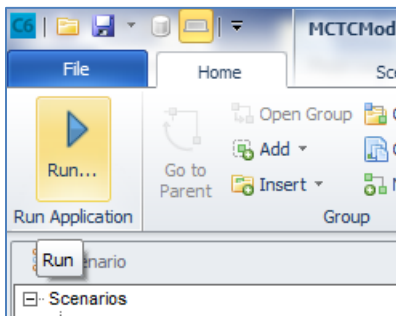
**Master highway network:** D:\SJVMIPI\MCTCModel-20120324\MCTCModel\_InputsOnly\_20120324\1\_Inputs\3\_Highway\Madera\_Master\_2012; Browse ... Edit ...

- Double click on **Environmental Justice** in the App Pane. This will bring up the **Environmental Justice** application group.





- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Check the **Run Current Group Only** button.

**Run Application**

Catalog:

Scenarios: MD05\_BASE.Scenario\_Name Select Scenarios...

Run Settings

☐ Create Task Run File Only (Run later from Monitor)

☐ Create Script (Run from VOYAGER)

☒ Run Application now from Task Monitor

☒ Run Current Group Only

☐ Start this run at the active program box! (USE WITH CARE)

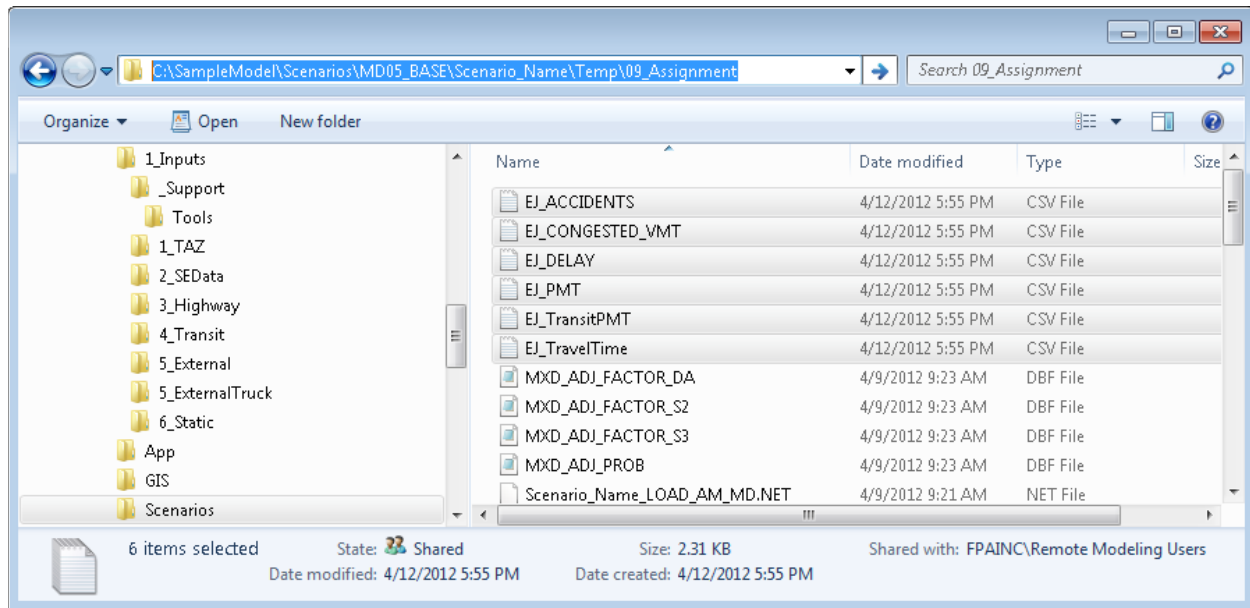
Run Title:

Task Monitor Run File Name

D:\SJVMIP\MCTCMODEL-20120324\MCTCMODEL\_INPUTONLY\_20120324\APP\EJ00.TRF

OK Cancel

- Click **OK** and proceed with model run.
- The following files are created in Scenario\_Name\Temp\09\_Assignment\
  - EJ\_Accidents.csv
  - EJ\_TravelTime.csv
  - EJ\_TransitPMT.csv
  - EJ\_Congested\_VMT.csv
  - EJ\_Delay.csv
  - EJ\_Accidents.csv



## INTERREGIONAL TRANSIT

### Purpose

The post-processor is intended to shift auto trips traveling using the gateways parallel to interregional transit (transit exiting the model area) from the gateway to the park-and-ride lot of the rail station. The implementation is most useful for interregional rail (i.e. Amtrak or ACE), but can be used for similar interregional transit when the mode is not represented in the model already.

### Process

Within the Post-Processing application of the MIP model is an application called Interregional Transit. This application adjusts the auto trip table based on user inputs of person trips to the gateway(s) that would be shifted from driving out of the model area to auto access at the interregional transit station. The adjusted auto trip matrices are then assigned to the highway network and SB 375 VMT summary by speed bin is produced.

### Input Preparation

1. Run a full model for the scenario to be evaluated
2. Select the file in the catalog for the Interregional Rail input on the Post-Processor tab using the Browse button



3. Click Edit to change the input values



4. If developing data for a new scenario, Select Yes when prompted to save the file as a new name. Otherwise edit the original file with new values.
5. Verify that zone numbers match the external gateways and the internal zones where parking for the station is located. The “No Project” input file is shown below.

ZONE	DESCRIPTION	TRIPS_P	TRIPS_A	XX_P	XX_A
69	SR 99 North	0	0	0	0
64	I-5 North	0	0	0	0
37	I-5 South	0	0	0	0
692	Downtown HSR Station	0	0		
1944	Dummy Station	0	0		

6. For Highspeed rail (HSR), PB provided data for trips that shifted from auto to HSR and origin-destinations of trips for each future year. This information can be used to estimate the ridership and direction of travel/gateway used by trips. ACE, Amtrak, and other planning studies often have estimates of ridership.
7. The Trips\_P (Produced, exiting the model area) and Trips\_A (Attracted, entering the model area) represent ridership values at each of the stations. The values for internal zones are daily boardings (P) and alightings (A), and the gateways are the distribution of those trips based on the gateway the trip would have driven out of. The sum of the gateway trips and station trips should be equal.
8. The XX\_P and XX\_A trips represent auto trips that travel through the model area on HSR. The Productions from one direction should equal the attractions at the other direction.
9. An example scenario and input file representing the coding for the scenario are:
  - a. HSR will run parallel to SR 99 in the north and I-5 in the south of the model area with zone numbers 69 and 37, respectively. Trips traveling out of I-5 to the north (zone 64) may also take HSR.
  - b. 3,000 trips travel through the model network that would be on HSR when implemented in 2035. 2,500 of them previously used SR 99 on the north, the remaining 500 previously used I-5.
  - c. The downtown transit station for HSR is zone 692. There are forecasted to be 1,100 productions and 500 attractions per day. Of these, the auto trips were without the project were distributed to the gateways as:
    - i. SR 99 north: 300 productions, 300 attractions



- ii. I-5 North: 100 productions, 150 attractions
- iii. I-5-South: 700 productions, 50 attractions
- d. The result of this scenario would be an input as shown below

ZONE	DESCRIPTION	TRIPS_P	TRIPS_A	XX_P	XX_A
69	SR 99 North	300	300	2500	2500
64	I-5 North	100	150	500	500
37	I-5 South	700	50	3000	3000
692	Downtown HSR Station	1100	500		
1944	Dummy Station	0	0		

10. As an example for demonstration purposes only, the following approach was used to estimate trips for the post-processor:
- a. 2030 daily weekday ridership estimates by route were used from the SJRRC Service Expansion Analysis
  - b. The route ridership was assumed to equal both the productions and attractions of the adjacent freeway gateway and the total productions and attractions of all stations along the route (with ridership distributed evenly across all stations)
  - c. Total gateway productions and attractions were set equal to the corresponding route daily ridership plus the ridership at stations along the route that are outside of the model area, summed up for all routes
  - d. Station productions and attractions within the model area were similarly summed up for all routes
  - e. Approximate station zone locations were identified in the model
  - f. If available, station-level boarding and alighting data is preferable to this approach

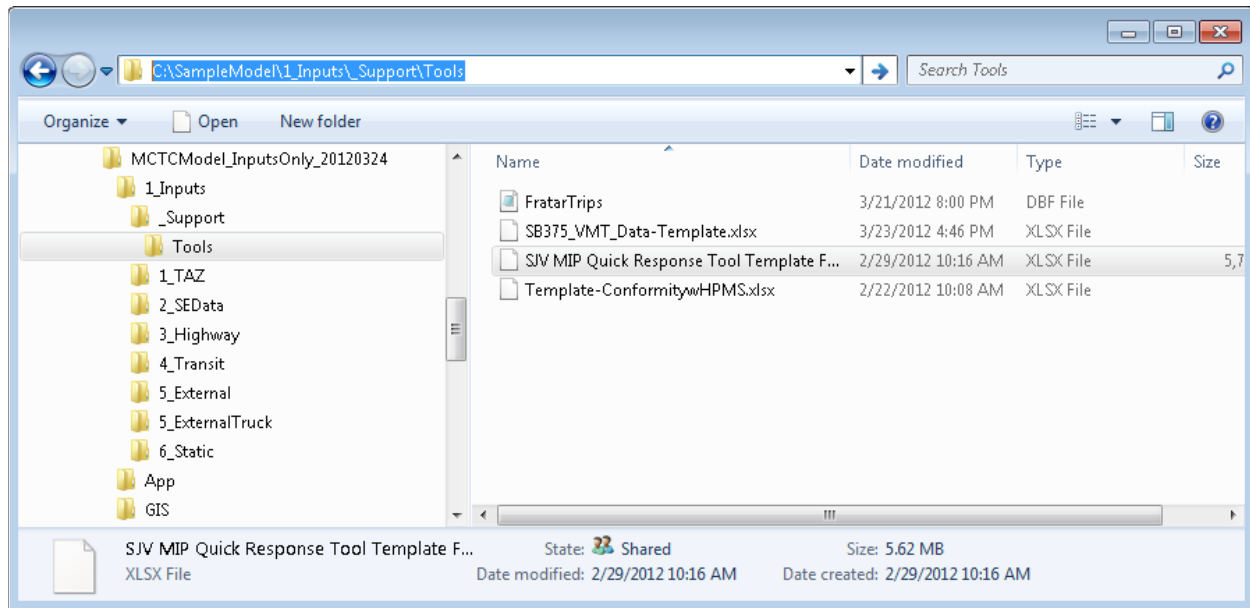
## QUICK-RESPONSE TOOL

The quick-response tool allows the user to quickly determine impacts of smart growth, travel demand management (TDM), and transportation system management (TSM) in an off-model tool. The quick response tool contains two modules: the Mixed Use Development (MXD) Trip Generation and TDM Module and the TSM Module. Users should note that the MXD and TDM calculations are based on research related to smart growth and TDM effects at the project scale and may not be fully transferrable across an entire TAZ. As such, the tool is intended for quick-response or sketch exercises.

The quick-response tool template can be found in 1\_Inputs\Support\Tools







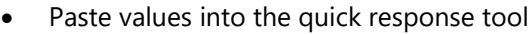
## MIXED USE DEVELOPMENT (MXD) TRIP GENERATION AND TRAVEL DEMAND MANAGEMENT (TDM) MODULE

The effects of smart growth and TDM are quantified in this module. The user inputs a land use and TDM profile in a user-defined TAZ with smart growth characteristics.

Instructions
1. Find "TAZSUMMARY.dbf" in the ScenarioName\10_Reporting\ model directory
2. Copy paste the values of "TAZSUMMARY.dbf" into the "MXD+TDM Input" tab
3. Select the Traffic Analysis Zone (TAZ) where you are planning your project
4. Enter the land use associated with your project
5. Select transportation demand management (TDM) measures for your project
6. Enter the amount of participation in TDM measures for your project

- Open "TAZSUMMARY.dbf" from the Data Pane





- Input TAZ and land use for development intended for analysis

Traffic Analysis Zone	101	
-----------------------	-----	--

### Land Use Input

Number of Dwelling Units	Quantity	Units
Single Family	770	DU
Multi-Family	2,748	DU
High Rise Condo	3,482	DU

### Retail

General Retail other than those listed below	140	kSF
Supermarket	0	kSF
Bank	0	kSF
Health Club	0	kSF
Restaurant (non-fast food)	0	kSF
Fast-Food Restaurant	0	kSF
Gas Station	0	kSF
Auto Repair	0	kSF

### Office

Non-Medical	3,000	jobs
Medical	0	jobs

### Industrial

Light Industrial	0	jobs
Manufacturing	0	kSF
Warehousing / Self-Storage	0	kSF

### Lodging

Hotel (including restaurant, facilities, etc...)	0	Rooms
Motel	0	Rooms

### Movie Theater

	0	Screens
--	---	---------

### School

University	0	Students
High School	0	Students
Middle School	0	Students
Elementary	0	Students

Trips from Land uses not covered above ==>	0
Jobs in those Land Uses	0

- Input TDM measures for development intended for analysis



## Transportation Demand Management (TDM) Input

### San Joaquin Valley Air District Rule 9410

Requires employers with >100 employees to attain a Average Vehicle Ratio (AVR) (employees on site / vehicles on site) of 1.3

Implement?	Participation %
No	0%

	New target
Modify target AVR?	No 1.3

### Other TDM Measures

To be calculated by trip purpose separately

Home-based Work TDM Measure Trip Reduction

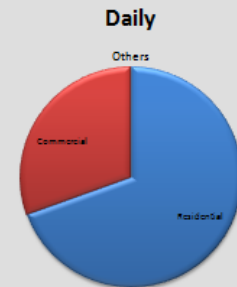
Home-based Other TDM Measure Trip Reduction

Non home-based TDM Measure Trip Reduction

Implement?	Participation %
No	
0%	0%
0%	0%
0%	0%

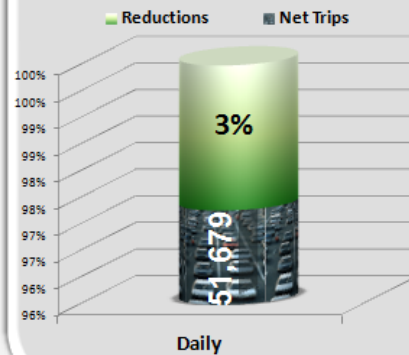
- Review outputs

### GROSS TRIP GENERATION



Gross 53,128  
Net 51,679

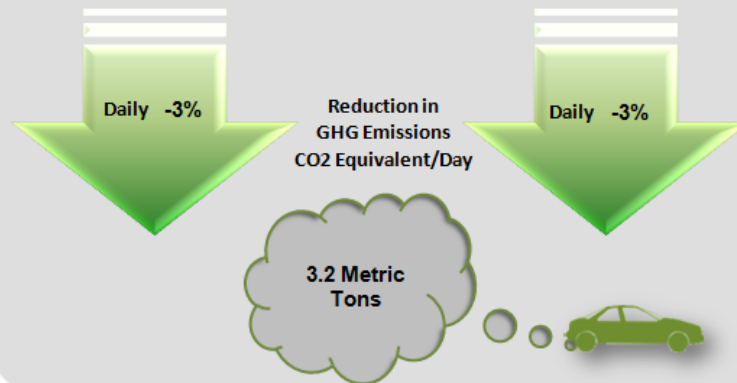
### TRIP GENERATION REDUCTIONS



### SUMMARY OF VMT REDUCTIONS

	Gross	Net
Daily	264,770	257,043

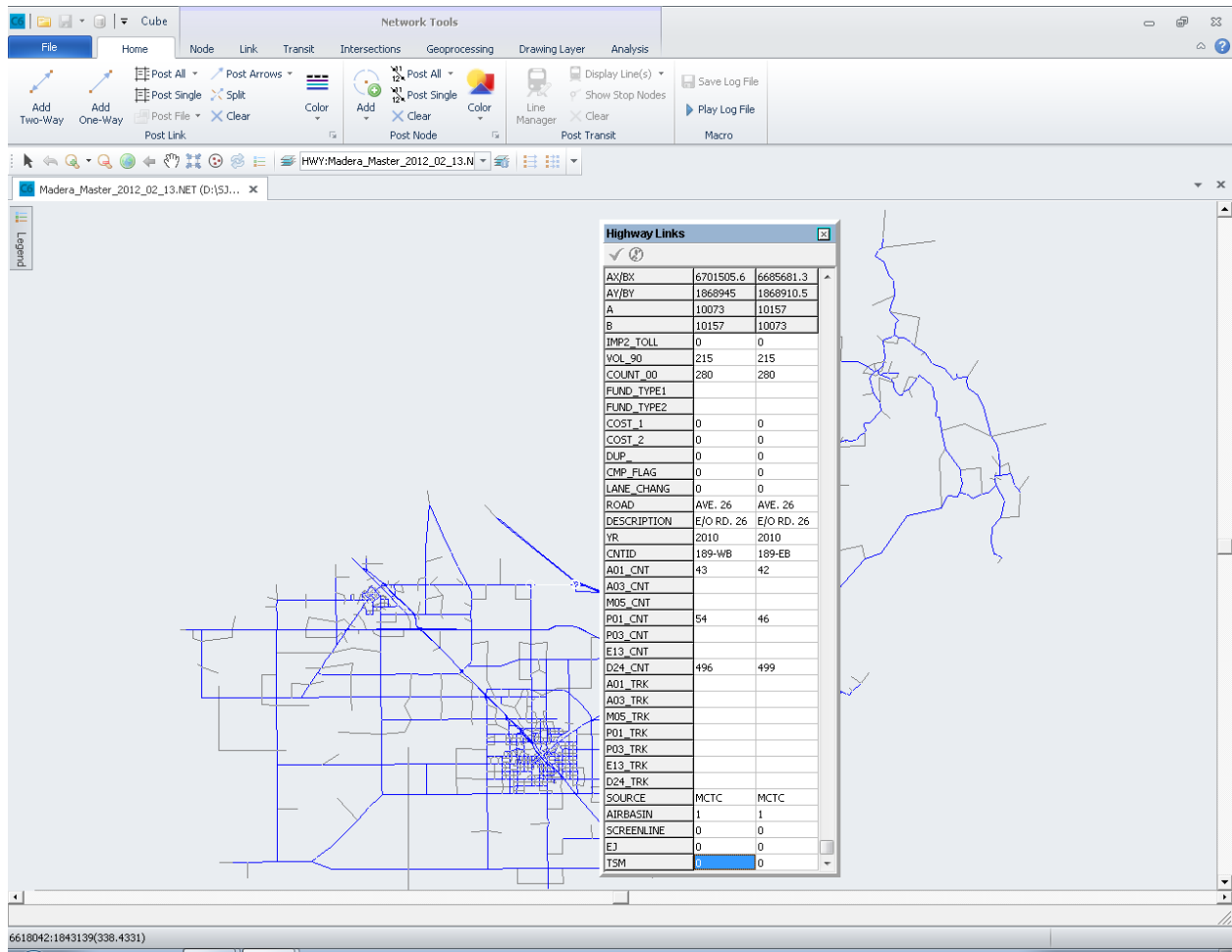
	Gross	Net
Daily	53,128	51,679



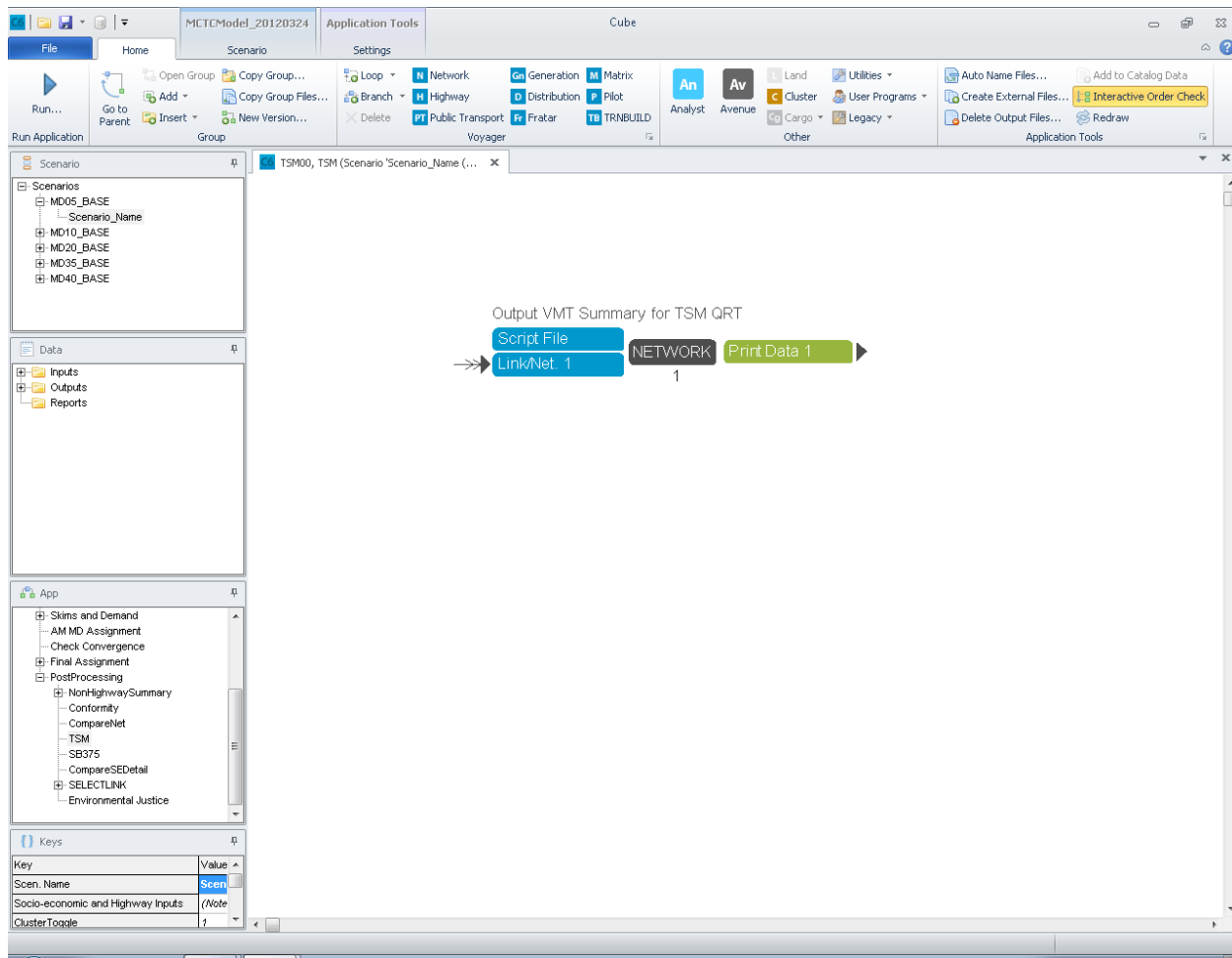
## TRANSPORTATION SYSTEM MANAGEMENT (TSM) MODULE

The effects of Transportation System Management (TSM) are quantified in this module.

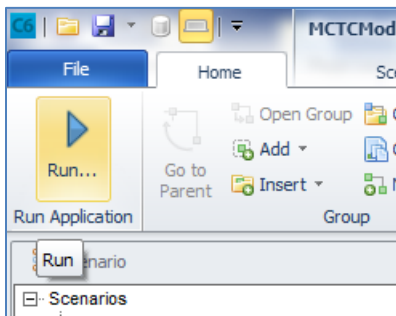
- Edit the variable "TSM" on the master highway network to assign management measures to links
  - Value of 1 means Congestion Mitigation
  - Value of 2 means Traffic Smoothing
  - Value of 3 means Speed Management
  - Value of 4 means Congestion Mitigation and Traffic Smoothing



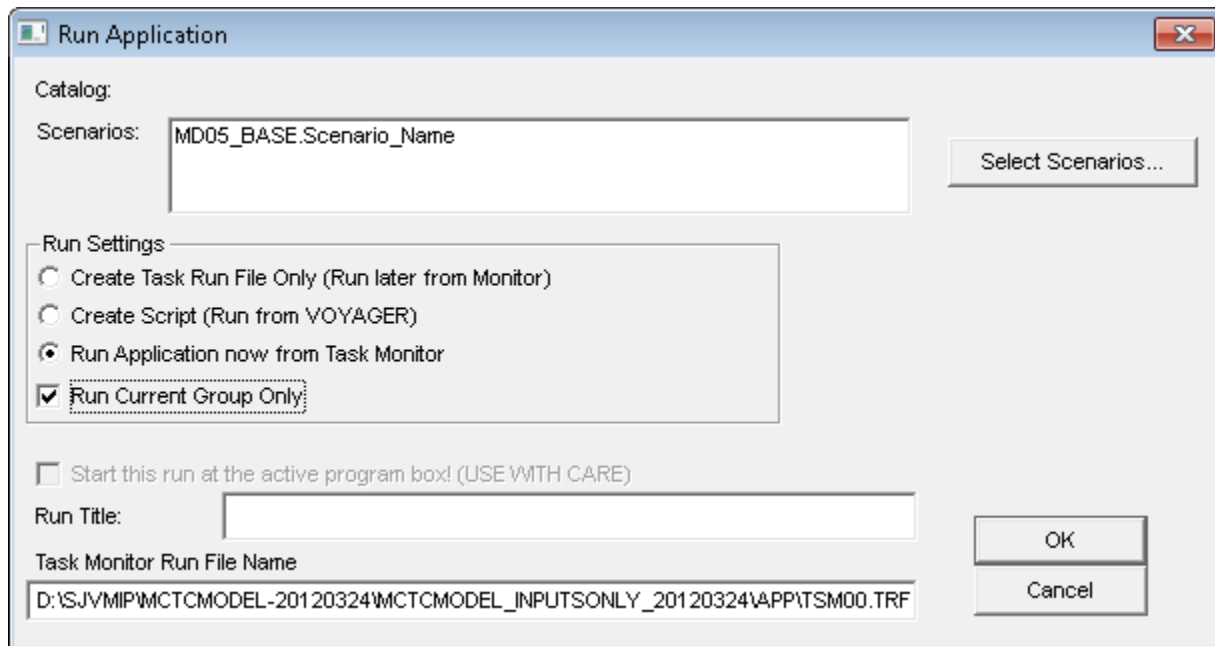
- Double click on **TSM** in the App Pane. This will bring up the **TSM** application group.



- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Check the **Run Current Group Only** button.



The 'Run Application' dialog box contains the following elements:

- Catalog:** A label above the 'Scenarios' field.
- Scenarios:** A text box containing 'MD05\_BASE.Scenario\_Name'.
- Select Scenarios...** A button to the right of the 'Scenarios' text box.
- Run Settings:** A group box containing four radio buttons and one checked checkbox:
  - ☐ Create Task Run File Only (Run later from Monitor)
  - ☐ Create Script (Run from VOYAGER)
  - ☒ Run Application now from Task Monitor
  - ☒ Run Current Group Only
- ☐ Start this run at the active program box! (USE WITH CARE)
- Run Title:** A text box.
- Task Monitor Run File Name:** A text box containing 'D:\SJVMIP\MCTCMODEL-20120324\MCTCMODEL\_INPUTONLY\_20120324\APP\TSM00.TRF'.
- OK** and **Cancel** buttons.

- Click **OK** and proceed with model run.

#### Instructions

1. Find "VMT\_TSM\_ScenarioName.CSV" in the ScenarioName\10\_Reporting\model directory
2. Copy paste values of "VMT\_TSM\_ScenarioName.CSV" into "TSM Input" tab
3. Return to "TSM Tool" tab to view reductions attributable to TSM measures

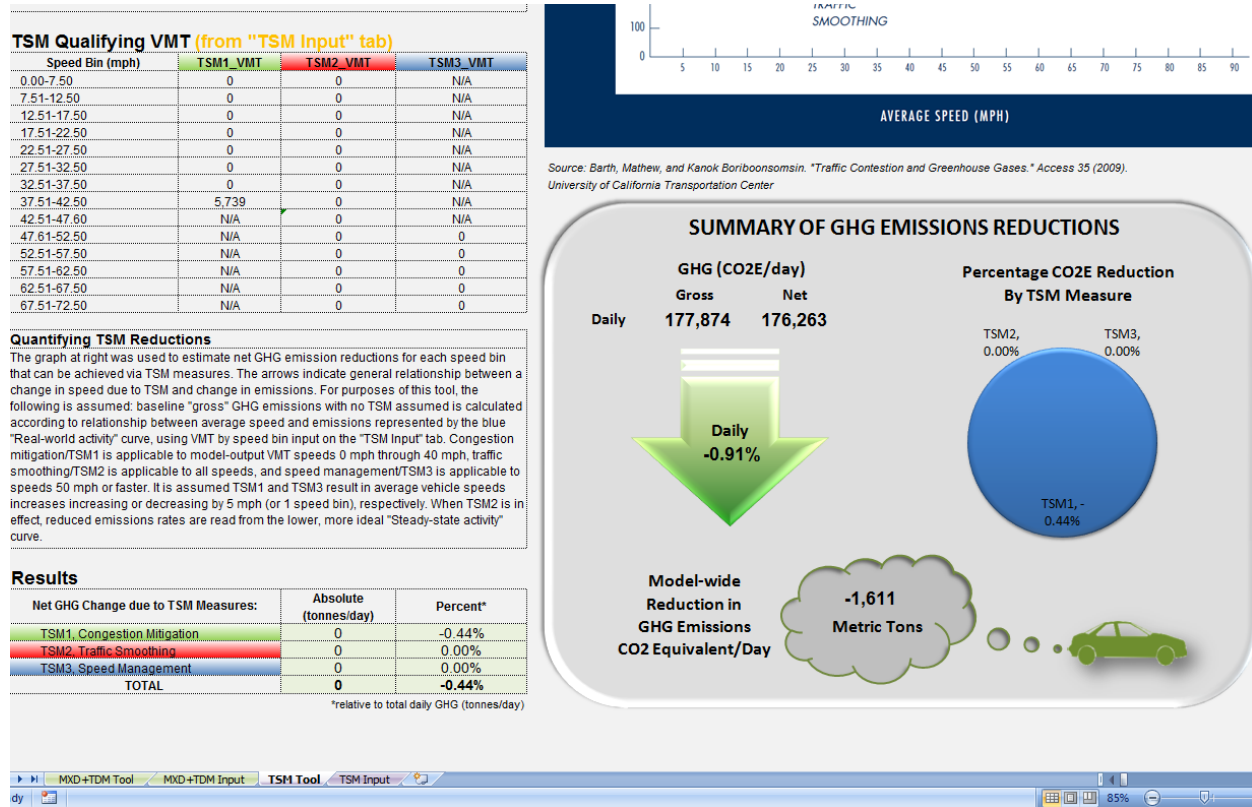
- Paste values from VMT\_TSM\_ScenarioName.csv to 'TSM Input' tab



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	SpeedBin	TSM1_VMT	TSM2_VMT	TSM3_VMT												
2	0.00-7.50	0	0	0												
3	7.51-12.50	0	0	0												
4	12.51-17.50	0	0	0												
5	17.51-22.50	0	0	0												
6	22.51-27.50	0	0	0												
7	27.51-32.50	0	0	0												
8	32.51-37.50	0	0	0												
9	37.51-42.50	5739.23	0	2865.26												
10	42.51-47.50	0	0	0												
11	47.51-52.50	0	0	0												
12	52.51-57.50	0	0	0												
13	57.51-62.50	0	0	0												
14	62.51-67.50	0	0	0												
15	67.51-72.50	0	0	0												
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
40																
41																
42																
43																
44																
45																
46																
47																

- Review outputs





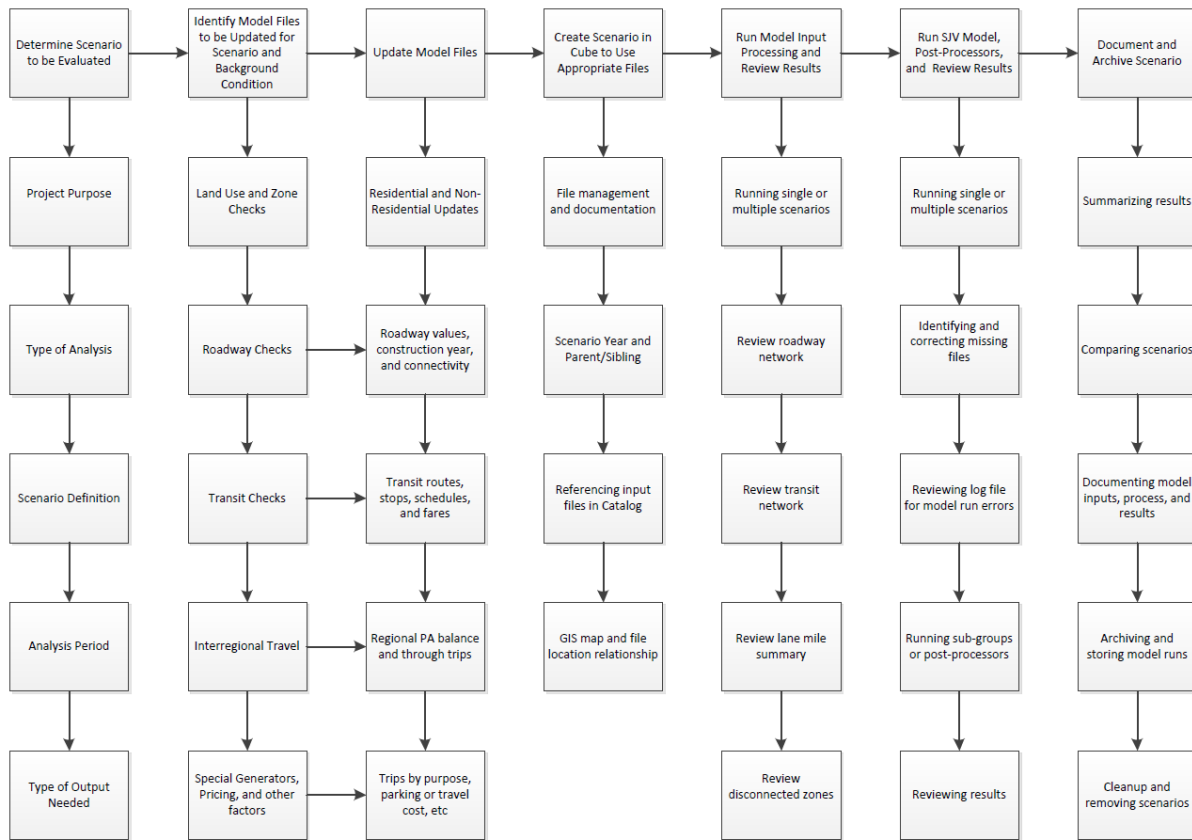
## CREATING A NEW SCENARIO

### RECOMMENDED PROJECT WORKFLOW

Although each project, application, and modeler may have a different approach to modeling, a recommended practice is to clearly define the scenario, type of analysis needed, sample work product, review inputs and outputs, and then document and archive the data. Evaluating scenario input data should be conducted prior to running the model. An example memo using the RTP/SCS scenarios is attached which looks at household and employment growth, and provides insight to the potential need and method for adjusting interregional factors.

An example workflow is below.





## PREPARE SCENARIO INPUT DATA

### Network Links

A recommended practice is to check the highway network for accurate information and link connectivity before running model scenarios. The master network should be checked prior to running the Input Processing application and compared to the RTP project list. After running the Input Processing application, the scenario network outputs in tabular form (lane miles by facility type, changes from 2005) and network form (.NET and geodatabase) should be reviewed.

Each model has a master network file called *MPO\_MASTERNETWORK.NET* or *HWYNET* if contained in the geodatabase. The master network file contains links and nodes, which can be checked for accuracy within Cube.

The first step is to open the master network file in Cube and visually inspect the density of the network file in rural, suburban, and urban areas. Cube automatically visualizes the network links as blue and the centroid connectors as grey. The information below describes how to color code the link by variable values (i.e. Functional Type).

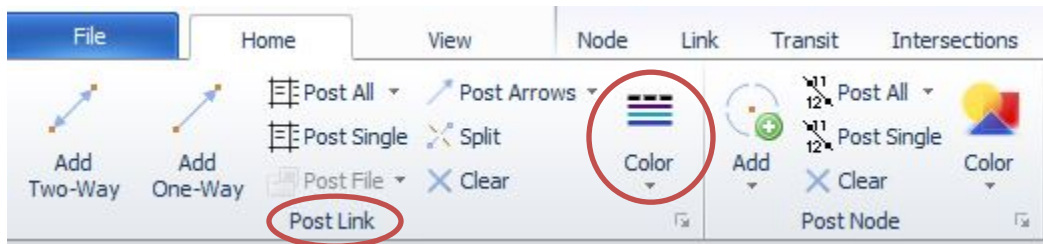


### Highway Network

Changes to any network link attribute are described below using Facility Types and a .NET file as the primary example. The geodatabase example follows the .NET instructions.

Facility types categorize the network according to the type of service provided by the roadway. Examples of facility types include freeways, highways, expressways, and arterials. During assignment, the facility type is used to determine link capacity and volume delay functions, and ultimately impacts total volumes assigned to the links.

Facility types can be checked by color-coding the links with the facility type categories. This can be done in Cube under the **Home** tab, and clicking on **Post Link Color**. See [CREATING MAPS USING VMIP MODELS](#) for instructions on using Arc GIS for the scenario output network(s).



Any errors in facility types can be fixed in two ways.

1. Fixing facility type errors manually – best for editing a few links

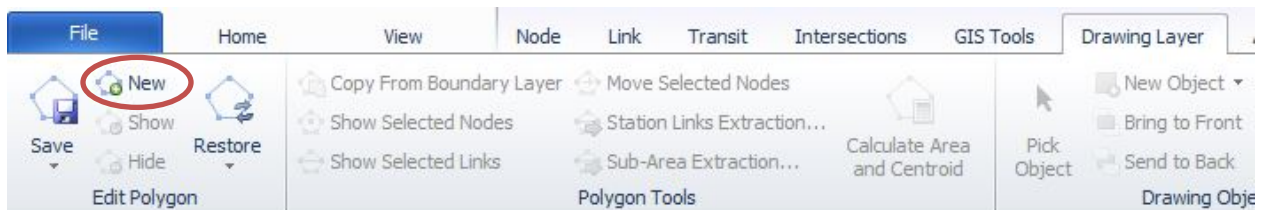
By clicking on the link, Cube opens a window with the link attributes. Located the facility type field and input the correct facility type for the base year and any improvement year facility types if applicable. Note this is only for errors in facility types, not upgrades.



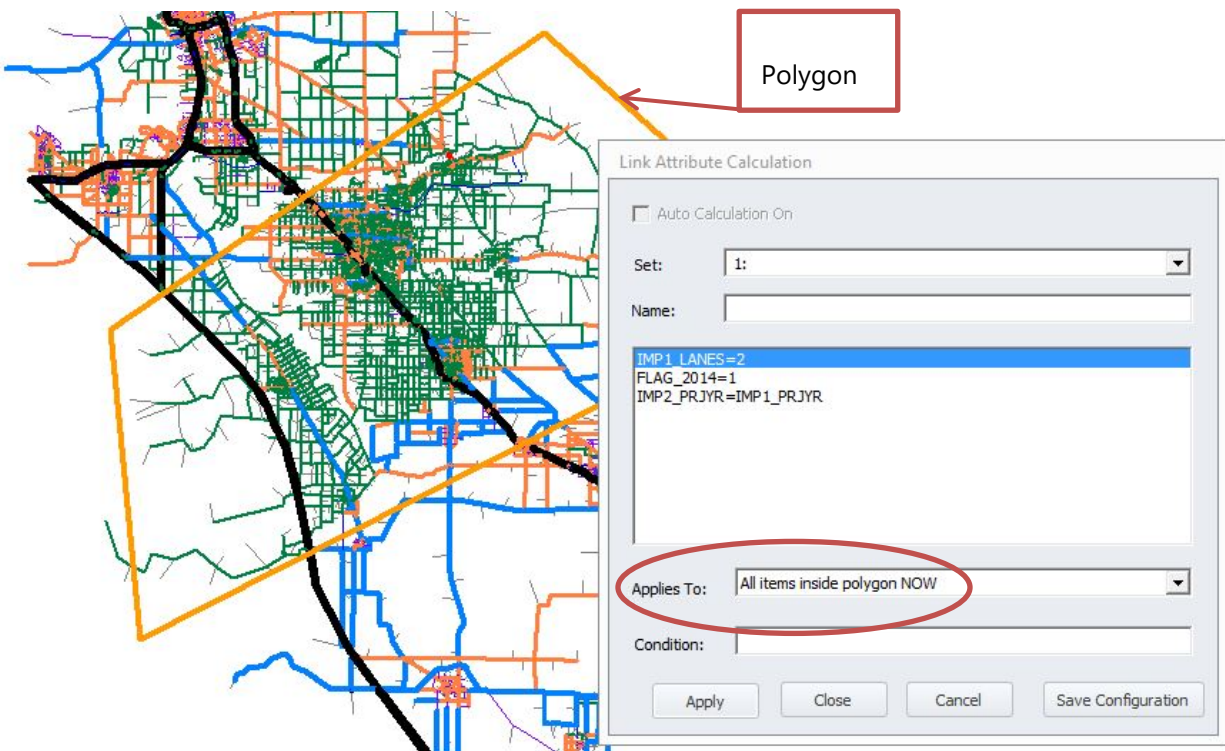
Highway Links		
AX/BX	6343562	6343968.6
AY/BY	2071447.1	2072983.1
A	12264	15188
B	15188	12264
ROUTE	0	0
IMP1_PRJID	0	0
IMP2_PRJID	0	0
IMP1_PRJYR	0	0
IMP2_PRJYR	0	0
BASE_FACTYP	5	5
IMP1_FACTYP	0	0
IMP2_FACTYP	0	0
BASE_LANES	1	1
IMP1_LANES	0	0
IMP2_LANES	0	0

2. Fixing facility type errors by calculation – best for editing many links

Under the **Link** tab is **Compute**, in which the change to facility type is entered as an equation. This method is best used with a polygon boundary. A polygon boundary can be drawn around the incorrect links by clicking on New under the Drawing Layer Tab.

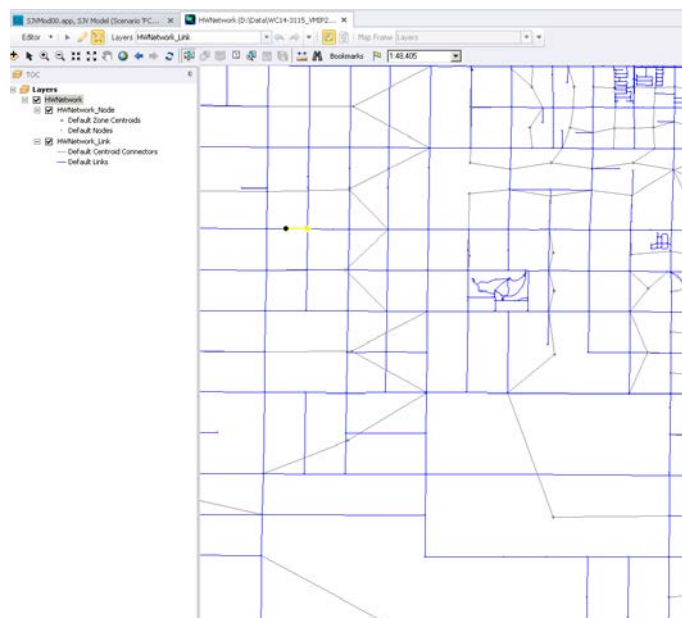


Once the polygon is drawn, the facility types can be changed using **Link, Compute** and applying changes inside/outside the polygon boundaries. Additional conditions can be added if needed.



The same process can be repeated for **speeds**, **number of lanes**, and **area type**.

1. To edit the network in GIS, edit the highway network and the file will automatically open in an ArcGIS editor window.



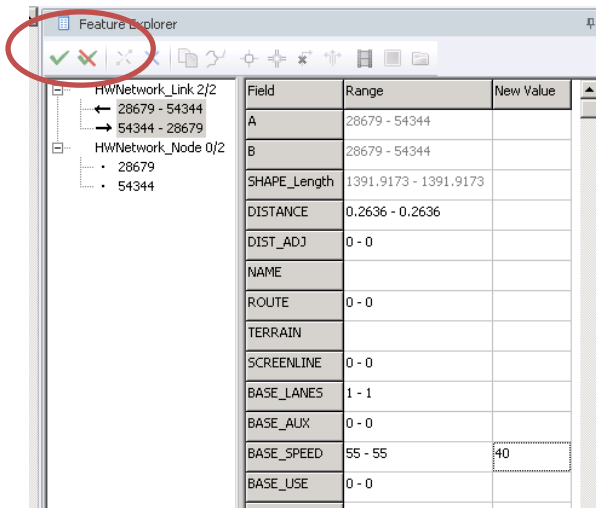
- ▶ Start Editing


	Field	Range	Item Value
2	A	28679 - 54384	
3	B	28679 - 54384	
4	State_Length	1291, 9173 - 1391, 9173	
5	DISTANCE	0.2636 - 0.2636	
6	DEST_AOI	0 - 0	
7	NAME		
8	ROUTE	0 - 0	
9	TERRAIN		
10	SCHNEELINE	0 - 0	
11	BASE_LANES	1 - 1	
12	BASE_AIX	0 - 0	
13	BASE_SPEED	55 - 55	
14	BASE_LGE	0 - 0	
15	BASE_TOLL	0 - 0	
16	IMP1_PRJID	52 - 52	
17	IMP1_PRRR	9999 - 9999	
18	IMP1_DESC	0 - 0	
19	IMP1_LANES	2 - 2	
20	IMP1_AIX	0 - 0	
21	IMP1_SPEED	55 - 55	
22	IMP1_LGE	0 - 0	
23	IMP1_TOLL	0 - 0	
24	IMP2_PRJID	0 - 0	
25	IMP2_PRRR	0 - 0	
26	IMP2_DESC	0 - 0	
27	IMP2_LANES	0 - 0	
28	IMP2_AIX	0 - 0	
29	IMP2_SPEED	0 - 0	
30	IMP2_LGE	0 - 0	
31	IMP2_TOLL	0 - 0	
32	SPEED_LIMIT	0 - 0	
33	HOV3RDY	0 - 0	


- 

- 
- Feature Explorer
- HWNetwork\_Link 2/2
    - ← 28679 - 54344
    - 54344 - 28679
  - HWNetwork\_Node 0/2
    - 28679
    - 54344
- | Field        | Range                 | New Value |
|--------------|-----------------------|-----------|
| A            | 28679 - 54344         |           |
| B            | 28679 - 54344         |           |
| SHAPE_Length | 1391.9173 - 1391.9173 |           |
| DISTANCE     | 0.2636 - 0.2636       |           |
| DIST_ADJ     | 0 - 0                 |           |
| NAME         |                       |           |
| ROUTE        | 0 - 0                 |           |
| TERRAIN      |                       |           |
| SCREENLINE   | 0 - 0                 |           |
| BASE_LANES   | 1 - 1                 |           |
| BASE_AUX     | 0 - 0                 |           |
| BASE_SPEED   | 55 - 55               | 40        |
| BASE_CSC     | 0 - 0                 |           |

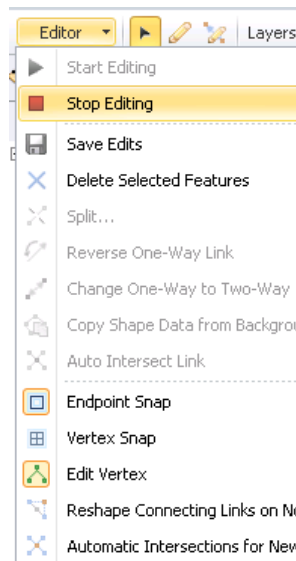
6. To save the changes on the link, click . To reject the changes, click .



7. To add new links, use the Create Feature tool. 

8. After making edits, keep or reject them in the Feature Explorer and then  Save Edits under the ArcGIS editor.

9. To exit Edit mode, select Stop Editing









the IMP1\_PRJYR and if the year is equal or greater, implements the values in IMP1, then checks IMP2\_PRJYR and implements IMP2 values if the year is equal or greater. The PRJYR is the value when the project is complete (i.e. open to traffic or closed to traffic). The IMP1 and IMP2 value should be coded as the value at the end of the project, not the change in value. For example, a roadway changing from 1 lane in each direction to 2 lanes in each direction in 2018 should have BASE\_LANES=1, IMP1\_PRJYR=2018, IMP2\_LANES=2, and the other IMP1 attributes such as facility type, use code, etc the same as BASE.

1. IMP\_PRJYR exists but no change in lanes #
  - IMP1\_PRJYR<>0 & (BASE\_LANES=IMP1\_LANES) or
  - IMP2\_PRJYR<>0 & (IMP1\_LANES=IMP2\_LANES)
2. Lanes # change but no IMP\_PRJYR
  - (IMP1\_LANES<>0 & (BASE\_LANES<>IMP1\_LANES)) & IMP1\_PRJYR=0 or
  - (IMP2\_LANES<>0 & (IMP1\_LANES<>IMP2\_LANES)) & IMP2\_PRJYR=0
3. 3+ improvement links – the Standard Network Variables have been set up to track only 2 improvements.
  - BLDYEAR<>0 & IMPYEAR<>0 & DELYEAR<>0 or
  - BLDYEAR<>0 & IMPYEAR<>0 & IMPYEAR1<>0 or
  - BLDYEAR<>0 & DELYEAR<>0 & IMPYEAR1<>0 or
  - IMPYEAR<>0 & DELYEAR<>0 & IMPYEAR1<>0
4. Out-of-order years
  - (IMP1\_PRJYR<>0 & IMP2\_PRJYR<>0) & IMP1\_PRJYR>IMP2\_PRJYR
5. IMP1\_PRJID and IMP2\_PRJID missing on all improvement projects

### *Network Nodes*

Cleaning network nodes is recommended for the model development team but not recommended for by MPO staff. If incorrect nodes are removed, the model will not complete a full estimation.

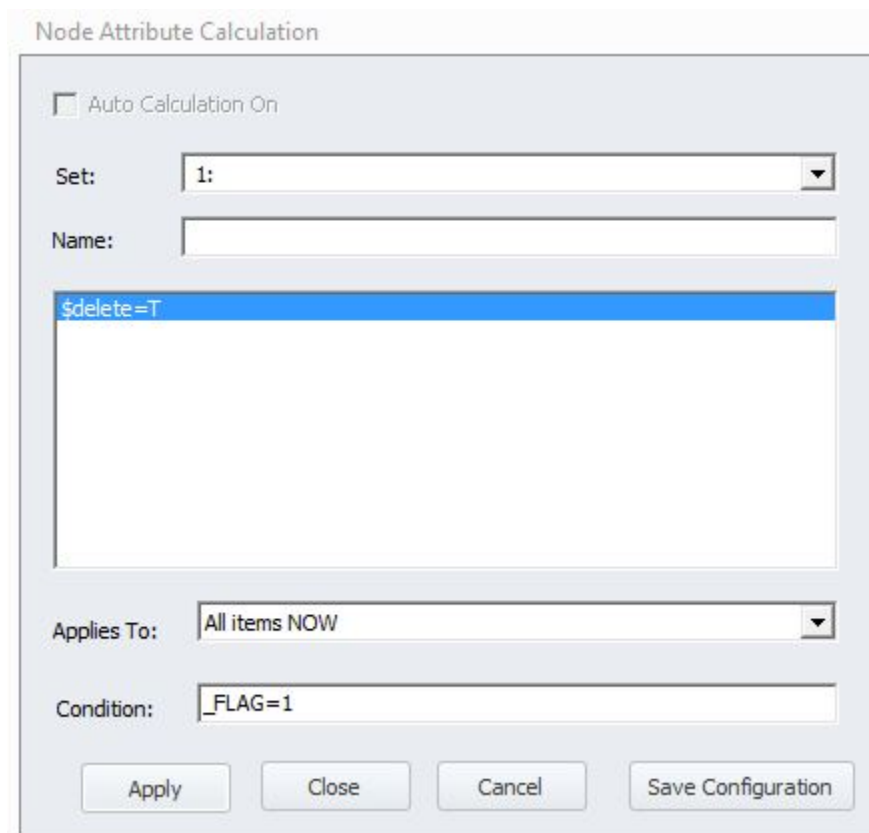
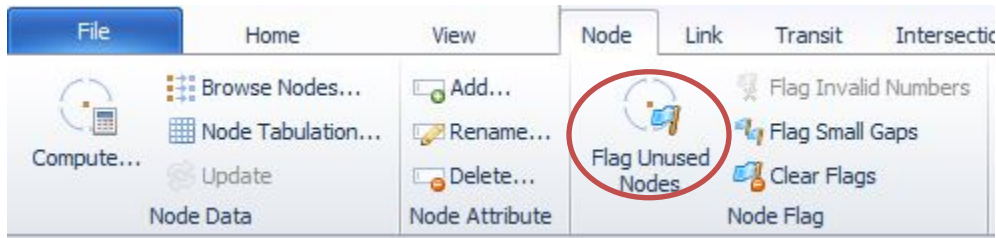
A common error is the presence of 'overlapping' nodes where one node is not connected and therefore an 'unused' node. If scenario land use is associated to the unused node, the model will run, but it will estimate no impact from the scenario inputs. Since the land use inputs are located in a separate parameter workbook, it is important to have the correct node attached to the roadway.



1. The first step is to check if the unused nodes have the same ID as the underlying TAZ.

Save the network file as a test network.

Flag unused nodes in the Node tab and delete all flagged nodes under the Node, Compute tab. The formula is  $\$delete=T$ , the condition is  $\_FLAG=1$ . This removes all unused nodes from the dataset.

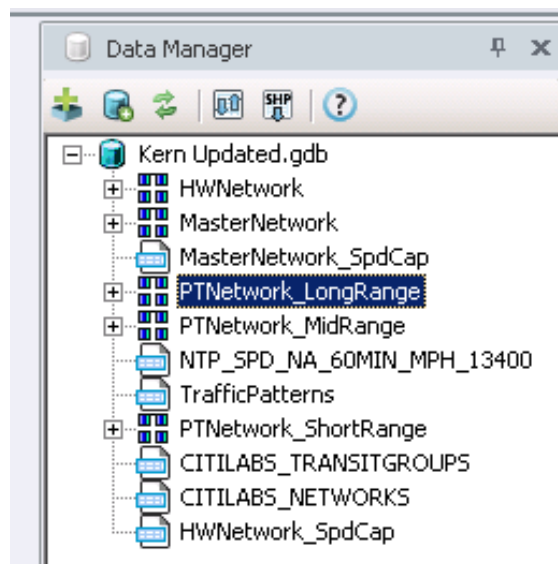
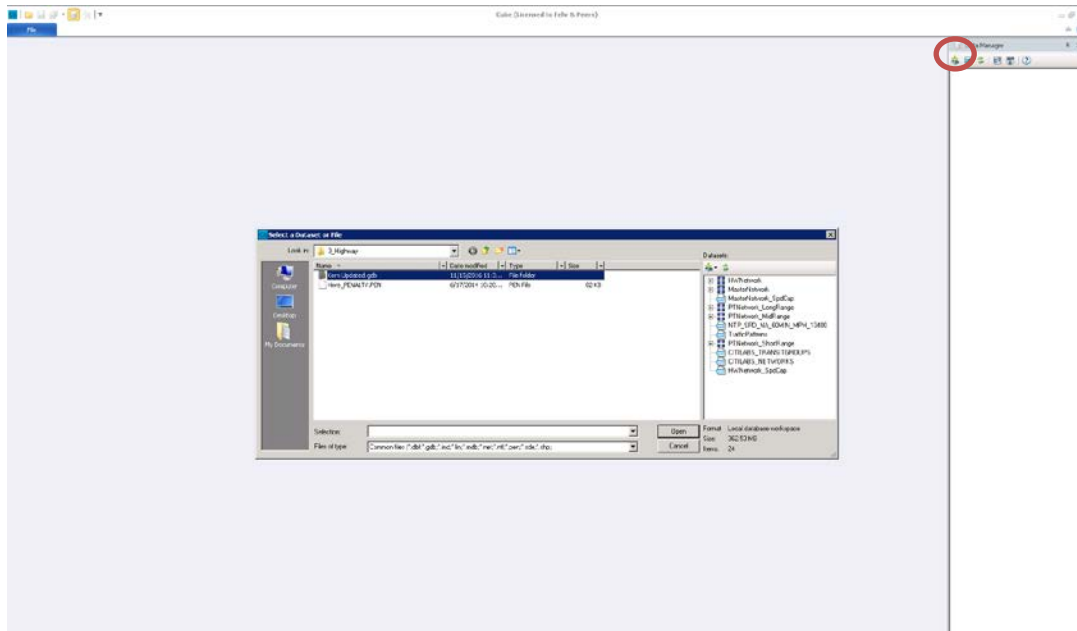


### Transit Network

The transit lines require the highway network to display and function, so opening the transit line file will automatically open the associated highway network in an ArcGIS editor window.



1. Load the Highway geodatabase in the Data Manager by Clicking Add Data and browsing to the 3\_Highway directory.



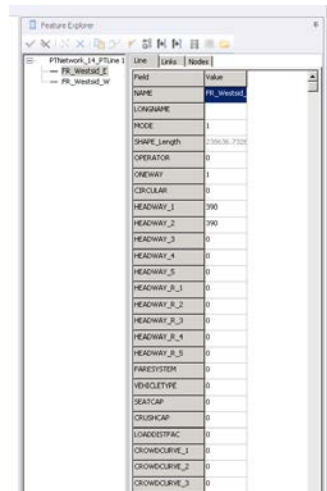
2. To load the transit lines, double click on the PT network you wish to open. The transit line and highway network will open



- Editor Layers PTNetwork\_14\_PTLine Map Frame Layers
- Start Editing
- Bookmarks 1:889,823

- 
- Color \*
- Automatic Numbering
- Copy Attributes...
- Display Line(s)
- Curve Data
- Transit Line Profile
- Display Data
- Transit
- Color...
- Buffer
- Multiring Buffer
- OK
- Cancel
- NetNetwork (D:\Data\NHCA\3115\_NHPP0...) X
- File Edit View Windows Help
- Map Frame Layers
- 1,637,540
- Transit Display Selection
- Pick one or more  
transit lines to display
- PP\_Cos\_Ave\_X  
PP\_Cos\_Ave\_Y  
PP\_Cos\_Fre\_X  
PP\_Cos\_Fre\_Y  
PP\_Is\_Eg\_X  
PP\_Is\_Eg\_Y  
PP\_Sprague\_X  
PP\_Sprague\_W  
PP\_Sprague  
PP\_Silas  
PP\_Silvman\_X  
PP\_Silvman\_Y  
PP\_Westlnd\_X  
PP\_Westlnd\_Y
- Extended Selection
- Select All Clear All
- OK Cancel

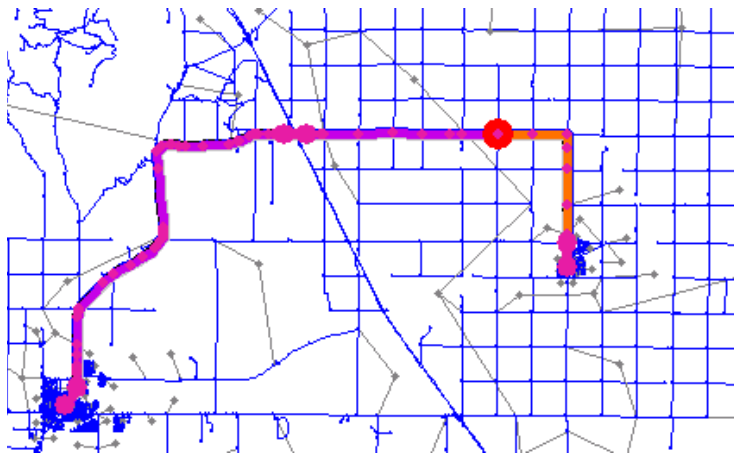
- Feature explorer is used to view and edit the attributes of the line, and is often hidden to the right of the screen. Click it and then click the pin to have it easily accessible.



- Using the Edit Feature tool, select the line and then double click a node\stop to begin editing from that location in the direction of travel.



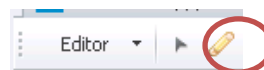
- The node selected is large and magenta, with the previous nodes/links to the edit point shows in magenta and the remainder shows in orange.



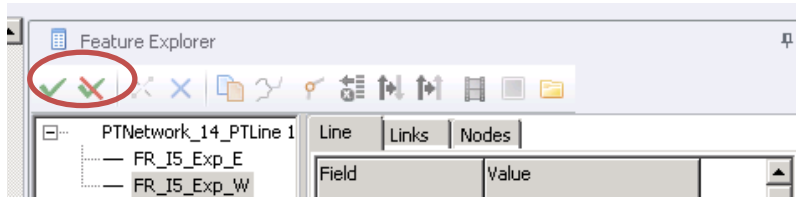
- The bottom of the screen gives helpful hints on modifying the transit lines

Click=auto route w/stop node, Alt-Click=auto route w/non-stop node, Shift-Click=direct link

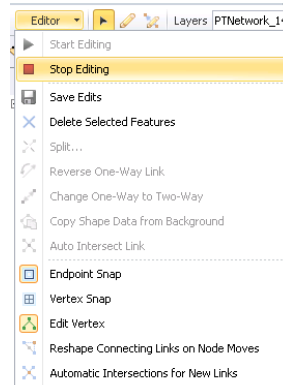
- To add new lines, use the Create Feature tool.



10. After making edits, keep or reject them in the Feature Explorer and then Save Edits under the ArcGIS editor.



11. To exit Edit mode, select Stop Editing



### *Transit System, Factors, and Fares*

After adding or modifying the transit lines, the transit system, fares, and factors files might also need to be updated if new modes or operators are added. If only lines are changed within an existing operator, mode, and fare system these files do not need to be updated.

1. Using a text editor, edit the Public Transport System (PTS), Fare System (FAR), and Factors (FAC) files to remove the lines no longer needed. Keeping the same mode number as in the original is preferred so the sub-area and full model can transfer data easily back and forth. Save files with the sub-area model name. Remember to change the file type from TXT to all.



## PTS

After	Before
<pre>TCM08_BASE_TRAN.PTS - Notepad File Edit Format View Help ;;&lt;&lt;PT&gt;&gt;&lt;&lt;SYSTEM&gt;&gt;;  MODE NUMBER=1 LONGNAME="StaRT" Local " NAME="StaRT_Loc" MODE NUMBER=2 LONGNAME="StaRT" InterCity " NAME="StaRT_Int" MODE NUMBER=3 LONGNAME="MAX" Local " NAME="MAX_Loc" MODE NUMBER=4 LONGNAME="MAX" InterCity " NAME="MAX_Int" MODE NUMBER=5 LONGNAME="CAT" Local " NAME="CAT_Loc" MODE NUMBER=6 LONGNAME="CAT" InterCity " NAME="CAT_Int" MODE NUMBER=7 LONGNAME="BLAST" Local " NAME="BLAST_Loc" MODE NUMBER=8 LONGNAME="BLAST" InterCity " NAME="BLAST_Int" MODE NUMBER=9 LONGNAME="ROTA" Local " NAME="ROTA_Loc" MODE NUMBER=10 LONGNAME="ROTA" InterCity " NAME="ROTA_Int" MODE NUMBER=11 LONGNAME="RTD" Local " NAME="RTD_Loc" MODE NUMBER=12 LONGNAME="RTD" InterCity " NAME="RTD_Int" MODE NUMBER=13 LONGNAME="THEBUS" Local " NAME="THEBUS_Loc" MODE NUMBER=14 LONGNAME="THEBUS" InterCity " NAME="THEBUS_Int" MODE NUMBER=15 LONGNAME="Escalon Transit" " NAME="ETTRANS" MODE NUMBER=16 LONGNAME="Lodi Fixed Route" " NAME="lodi_trn" MODE NUMBER=17 LONGNAME="Lodi Express" " NAME="lodi_EXP" MODE NUMBER=18 LONGNAME="Mentica Transit" " NAME="Manti_trn" MODE NUMBER=19 LONGNAME="Tracy Transit" " NAME="Tracy_trn" MODE NUMBER=21 LONGNAME="Greyhound" NAME="Greyhound" MODE NUMBER=22 LONGNAME="Altamont Commuter Express" NAME="ACE" MODE NUMBER=23 LONGNAME="Amtrak" NAME="Amtrak"  MODE NUMBER=101 LONGNAME="Walk Access/Egress" NAME="Walk" MODE NUMBER=102 LONGNAME="Drive Access/Egress" NAME="Drive" MODE NUMBER=103 LONGNAME="Transfers" NAME="Xfers"  ; ; WAITCURVES FROM CITILABS EXAMPLE ; WAITCRVDEF NUMBER=1 LONGNAME="InitialWait" NAME="InitWait" , CURVE=1-0.5,16-8,27-12,48-15,160-20 WAITCRVDEF NUMBER=2 LONGNAME="TransferWait" NAME="XferWait" , CURVE=1-0.0, 160-5.0  WAITCRVDEF NUMBER=3 LONGNAME="ScheduledTransferWait" NAME="SchdXferWait" , CURVE=1-0.0, 160-5.0</pre>	<pre>Stockton08_BASE_TRAN.PTS - Notepad File Edit Format View Help ;;&lt;&lt;PT&gt;&gt;&lt;&lt;SYSTEM&gt;&gt;;  MODE NUMBER=11 LONGNAME="RTD" Local " NAME="RTD_Loc" MODE NUMBER=12 LONGNAME="RTD" InterCity " NAME="RTD_Int" MODE NUMBER=21 LONGNAME="Greyhound" NAME="Greyhound"  MODE NUMBER=101 LONGNAME="Walk Access/Egress" NAME="Walk" MODE NUMBER=102 LONGNAME="Drive Access/Egress" NAME="Drive" MODE NUMBER=103 LONGNAME="Transfers" NAME="Xfers"  ; ; WAITCURVES FROM CITILABS EXAMPLE ; WAITCRVDEF NUMBER=1 LONGNAME="InitialWait" NAME="InitWait" , CURVE=1-0.5,16-8,27-12,48-15,160-20 WAITCRVDEF NUMBER=2 LONGNAME="TransferWait" NAME="XferWait" , CURVE=1-0.0, 160-5.0  WAITCRVDEF NUMBER=3 LONGNAME="ScheduledTransferWait" NAME="SchdXferWait" , CURVE=1-0.0, 160-5.0</pre>



## FAR

After	Before
<pre>TCM08_BASE_TRAN.FAR - Notepad File Edit Format View Help  FARESYSTEM, NUMBER=1, NAME="StarT_Loc", Local ", LONGNAME="StarT", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=1  FARESYSTEM, NUMBER=2, NAME="StarT_Int", LONGNAME="StarT", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=3  FARESYSTEM, NUMBER=3, NAME="MAX_Loc", Local ", LONGNAME="MAX", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=3  FARESYSTEM, NUMBER=4, NAME="MAX_Int", LONGNAME="MAX", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=1  FARESYSTEM, NUMBER=5, NAME="CAT_Loc", Local ", LONGNAME="CAT", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=3  FARESYSTEM, NUMBER=6, NAME="CAT_Int", LONGNAME="CAT", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=3  FARESYSTEM, NUMBER=7, NAME="BLAST_Loc", Local ", LONGNAME="BLAST", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=1</pre>	<pre>Stockton08_BASE_TRAN.FAR - Notepad File Edit Format View Help  FARESYSTEM, NUMBER=11, NAME="RTD_Loc", Local ", LONGNAME="RTD", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=3  FARESYSTEM, NUMBER=12, NAME="RTD_Int", LONGNAME="RTD", InterCity ", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=3  FARESYSTEM, NUMBER=21, NAME="Greyhound", LONGNAME="Greyhound", STRUCTURE=FLAT, SAME=SEPARATE, IBOARDFARE=20</pre>





## FAC

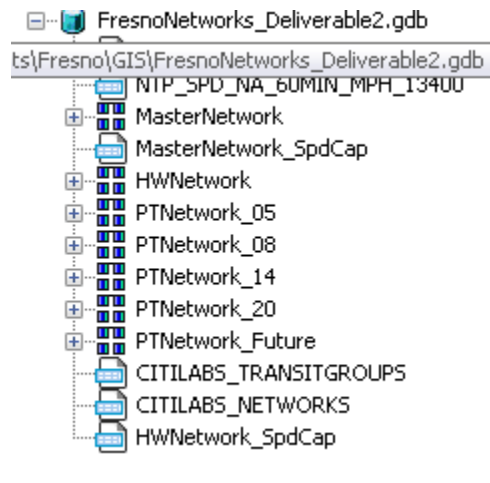
After	Before
<pre>TCM08_BASE_TRAN.FAC - Notepad File Edit Format View Help  /*For Route Enumeration*/  VALUEOFTIME=23*15      ; based on assumption in  FARESYSTEM=1 , MODE=1 FARESYSTEM=2 , MODE=2 FARESYSTEM=3 , MODE=3 FARESYSTEM=4 , MODE=4 FARESYSTEM=5 , MODE=5 FARESYSTEM=6 , MODE=6 FARESYSTEM=7 , MODE=7 FARESYSTEM=8 , MODE=8 FARESYSTEM=9 , MODE=9 FARESYSTEM=10, MODE=10 FARESYSTEM=11, MODE=11 FARESYSTEM=12, MODE=12 FARESYSTEM=13, MODE=13 FARESYSTEM=14, MODE=14 FARESYSTEM=15, MODE=15 FARESYSTEM=16, MODE=16 FARESYSTEM=17, MODE=17 FARESYSTEM=18, MODE=18 FARESYSTEM=19, MODE=19 FARESYSTEM=21, MODE=21 FARESYSTEM=22, MODE=22 FARESYSTEM=23, MODE=23  MAXFERS=2              ; not a maximum, routes EXTRAXFERS1 = 2        ; CITILABS EXAMPLE EXTRAXFERS2 = 1        ; CITILABS EXAMPLE SPREADFACT = 1.1       ; min time then x fact C SPREADFUNC = 2         ; CITILABS EXAMPLE combi SPREADCONST = 5        ; min transit time x 1.1  /*For Route Enumeration and Evaluation*/ ; no XFERPEN for now ;XFERPEN = 1, FROM=1 TO=1 ;XFERPEN = 1, FROM=1 TO=2 ;XFERPEN = 1, FROM=1 TO=3 ;XFERPEN = 1, FROM=2 TO=1 ;XFERPEN = 1, FROM=2 TO=2 ;XFERPEN = 1, FROM=2 TO=3 ;XFERPEN = 1, FROM=3 TO=1 ;XFERPEN = 1, FROM=3 TO=2 ;XFERPEN = 1, FROM=3 TO=3</pre>	<pre>Stockton08_BASE_TRAN.FAC - Not File Edit Format View Help  /*For Route Enumeration*/  VALUEOFTIME=23*15      ; based on assumption in standard script  FARESYSTEM=11, MODE=11 FARESYSTEM=12, MODE=12  FARESYSTEM=21, MODE=21  MAXFERS=2              ; not a maximum, routes with more than 2 transfers : EXTRAXFERS1 = 2        ; CITILABS EXAMPLE EXTRAXFERS2 = 1        ; CITILABS EXAMPLE SPREADFACT = 1.1       ; min time then x fact CITILABS EXAMPLE model was cr SPREADFUNC = 2         ; CITILABS EXAMPLE combination of generalized cost c SPREADCONST = 5        ; min transit time x 1.1 then add 5 min  /*For Route Enumeration and Evaluation*/ ; no XFERPEN for now ;XFERPEN = 1, FROM=1 TO=1 ;XFERPEN = 1, FROM=1 TO=2 ;XFERPEN = 1, FROM=1 TO=3 ;XFERPEN = 1, FROM=2 TO=1 ;XFERPEN = 1, FROM=2 TO=2 ;XFERPEN = 1, FROM=2 TO=3 ;XFERPEN = 1, FROM=3 TO=1 ;XFERPEN = 1, FROM=3 TO=2 ;XFERPEN = 1, FROM=3 TO=3  /*For Route Evaluation*/ ALPHA = 1.0            ; CITILABS EXAMPLE LAMBDAW = 0.2          ; CITILABS EXAMPLE LAMBDAA = 0.2          ; CITILABS EXAMPLE CHOICECUT=0.05         ; CITILABS EXAMPLE IWAITCURVE=1, N=10001-29999 XWAITCURVE=2, N=10001-29999 XWAITCURVE=3, N=10001-29999 WAITFACTOR=1.4, N=10001-29999</pre>



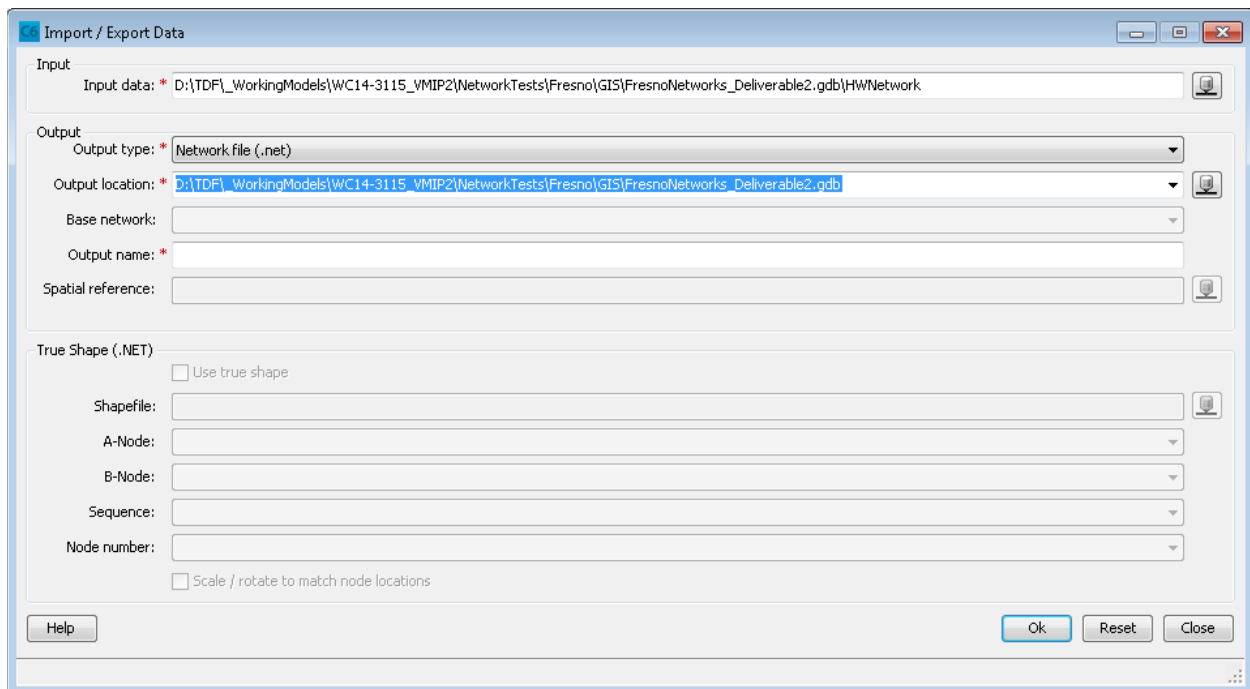
### Option to use/export .NET or .LIN files in VMIP 2 Models

Although GIS files are needed to do special analysis, sometimes you may want to share or edit the Cube format files rather than GIS based files.

Master files in geodatabase

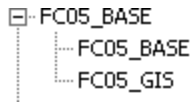


Right click and export the master to .net or .lin as appropriate



Edit file in Cube as usual, remembering to have the transit lines on as you edit the master network (and remembering that roadways will turn on/off based on the year and lanes)

Save with a unique name and create a new scenario referring to the file.



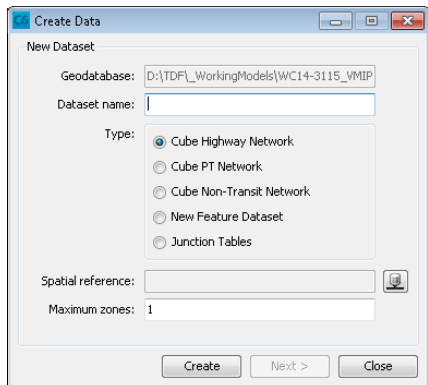
Original GIS master network key

Master highway network	D:\TDF\WorkingModels\WC14-3115_VMIP2\NetworkTests\Fresno\GIS\FresnoNetworks_Deliverable2.gdb\HWNNetwork
Peak transit lines file	D:\TDF\WorkingModels\WC14-3115_VMIP2\NetworkTests\Fresno\GIS\FresnoNetworks_Deliverable2.gdb\PTNetwork_05

.Net and .LIN network keys

Master highway network	D:\TDF\WorkingModels\WC14-3115_VMIP2\NetworkTests\Fresno\1_Inputs\3_Highway\FC_MASTER_NETWORK_HWY_20130302_MB_Proj_wEJ.net
Peak transit lines file	D:\TDF\WorkingModels\WC14-3115_VMIP2\NetworkTests\Fresno\1_Inputs\4_Transit\FC05_PT_New.LIN

To import the .NET or .LIN back into GIS, the original master geodatabase will be used and Add data to an existing geodatabase for the edited highway or transit network.



### *Import and Export Highway and Transit networks*

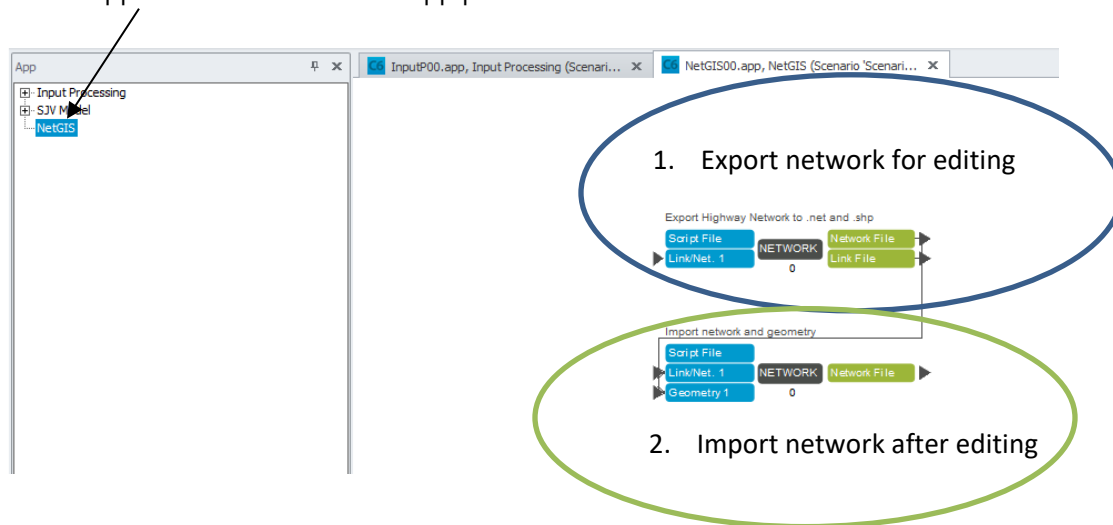
For highway networks, rather than the manual process described above a two step application (NetGIS) was developed. Since this application is used less frequently than the full model run, it was separated into its own application group rather than having it in-line with the model data preparation. The purpose of these processes is to export the highway network and transit line from a geodatabase so they can be edited



as .NET and .LIN, then import them back into the geodatabase using the original shape file to retain the geometry of the original GIS network in the geodatabase.

1. **ExportNetwork**: this script exports a .net and .shp from a geodatabase for editing. This is the first step in the application and can be run by double clicking on the first black box labeled Network.
2. **ImportNetwork**: this script imports the modified .net file using the .shp file created from the first step as a reference for the geometry and updates the geodatabase. This is the second step in the application and can be run by double clicking on the second black box labeled network. This step should be completed after the .net file has been edited.
3. For transit files, the video on exporting and importing .LIN files is most effective rather than scripts. After Step 2 above is complete, the .LIN can be imported and associated with the new highway network in the geodatabase using the instructions in the previous section.

A screen capture of the new application with the export and import functions is shown below, with the new NetGIS application selected in the App panel.



Along with the additional application are associated catalog keys to designate the network that will be exported for editing (i.e. the HWNetwork feature class in the geodatabase), the output network that will be edited with the associated shape file, and the new network or geodatabase feature class for the edited network to be imported. The new catalog keys are on the same screen as the Transit Inputs. A screen capture of the new catalog keys with colors corresponding to the steps above is shown below.

Transit Inputs		
<input checked="" type="checkbox"/> pt network available		
Non-highway transit links	C:\KernCOG_Model\1_Inputs\14_TransitWE14_NonHighwayPTLinks.csv	Browse ... Edit ...
XY coordinates for transit only nodes	C:\KernCOG_Model\1_Inputs\14_TransitWE14_NonHighwayPTNodes.csv	Browse ... Edit ...
Peak transit lines file	C:\KernCOG_Model\1_Inputs\13_HighwayKern Updated.gdb\PTNetwork_ShortRange	Browse ... Edit ...
Peak drive access block file	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_DRIVEACC.BLOCK	Browse ... Edit ...
Peak walk access block file	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_WALKACC.BLOCK	Browse ... Edit ...
Off-peak transit lines file	C:\KernCOG_Model\1_Inputs\13_HighwayKern Updated.gdb\PTNetwork_ShortRange	Browse ... Edit ...
Off-peak transit drive access block	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_DRIVEACC.BLOCK	Browse ... Edit ...
Off-peak transit walk access block	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_WALKACC.BLOCK	Browse ... Edit ...
TransitFares	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_TRAN_FAR.FAR	Browse ... Edit ...
TransitFactors	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_TRAN_FAC.FAC	Browse ... Edit ...
TransitSystem	C:\KernCOG_Model\1_Inputs\14_TransitWE14_Base_TRAN_PTS.PTS	Browse ... Edit ...
GIS Processing		
Network to Export to GIS	C:\KernCOG_Model\1_Inputs\13_HighwayKern Updated.gdb\H\Network	Browse ... Edit ...
Exported Network Name	C:\KernCOG_Model\1_Inputs\13_HighwayKern Updated.NET	Browse ... Edit ...
Exported Shape Name	C:\KernCOG_Model\1_Inputs\13_HighwayKern Updated.SHP	Browse ... Edit ...
Imported New Network Name	C:\KernCOG_Model\1_Inputs\13_HighwayKern Updated.gdb\H\Network_v2	Browse ... Edit ...

## Land Use Preparation

The `1_Inputs\Support` directory contains the spreadsheet VMIP2 LandUsePrep MODEL.XLSX. This file is the TAZ level disaggregate control total for each land use category (10 residential, 21 employment, 4 group quarters population, and 3 school enrollment) for the validation year and SB 375 years. Although the travel model aggregates the land use categories for travel forecasting, the land use preparation spreadsheet allows for more disaggregate land use planning at the TAZ level. The **NOTES** worksheet contains the data dictionary.

	A	B	C	D
1	MODEL	(All)		
2	PLACETYPE	(All)		
3				
4	Row Labels	Sum of RU1	Sum of RU2	Sum of RU3
5	Fresno	7079	5387	7053
6	Clovis	1130	361	637
7	Coalinga	597	491	62
8	Firebaugh	454	347	764
9	Fowler	502	154	599
10	Huron	952	471	487
11	Kerman	346	378	9
12	Kingsburg	263	307	734
13	Mendota	305	215	634
14	Orange Cove	452	86	319
15	Parlier	272	914	489
16	Reedley	516	963	777
17	San Joaquin	668	171	772
18	Sanger	622	529	770

To update the land use for any of the years that are included and/or for years other than the SB 375 years, the data from adjacent years can be interpolated/extrapolated or other forecasting methods (UPlan, Envision Tomorrow, etc) can be used to obtain the control totals.

## Socio-Economic Data Preparation

The `1_Inputs\Support` directory contains the spreadsheet VMIP2 SCENARIOPrep.XLSX. This spreadsheet is used to develop the socio-economic data (SED), gateway productions and attractions (Gateways), special generators (SpecialGenerators) and TAZ data (TAZ\_Date) for a specific scenario. This spreadsheet contains four main types of data: **Inputs**, **Outputs**, **Local Factors**, and **Interregional Factors**.

The input to the file is the scenario Land Use developed in the VMIP2 LandUsePrep MODEL.XLSX which is copied and pasted as values into the **LU\_Detailed** worksheet. The detailed land uses are automatically aggregated and summarized into the travel model categories on the **LU\_Input\_Template** using the residential classification and NAICS equivalencies shown in the **Land Use** table. Once aggregated, the travel model residential land use categories are multiplied by the factors obtained from the Census on the **SED\_Cross\_ClassRates\_Template**, with the resulting cross-classified households, population, employment, group quarters population, and school enrolment being calculated on the **SED\_Final** worksheet.



### Local Factors

Local factors include the cross-classification of the households, employment sector income (high, medium, and low), and aggregation of land use variables for the travel model. Although the spreadsheet contains demographics at the TAZ level based on Census as a starting point, scenarios wishing to change the demographics (household size, income, average population per household, or age distribution) can make changes at the zone level by adjusting the values on the **SED\_Cross\_ClassRates\_Template** worksheet. Conditional formatting is implemented to flag where the total does not add to 100% within a classification. The data for parking pricing, developed area, transit headways (for models without transit networks), EJ, AirBasin, and the employment by income is a TAZ level variable on the **TAZ\_Interim** worksheet. The variables are updated as needed at a TAZ level and the employment by income values are currently at a county level, and all of these values should be evaluated for each scenario. Changing the aggregation of land use is only recommended during model development since the trip generation rates must be consistent with the land use aggregation. The TAZ local and interregional information are combined on the **TAZ\_Data** worksheet and used in the model process.

### Special Generators

The **SpecialGenerators** is the final worksheet that is scenario dependent. The values are used to adjust the trips being generated by the model land use to match a target for a special generator and can be the total trips when no land use is used in the model or an adjustment value when the land use is included in the model.

The following pages contain examples of each of the worksheets and the [Trip Generation](#) section contains a flowchart showing how the files integrate to produce trips by purpose by zone.

VMIP2\_SCENARIOPrep.XLSX

### LU\_Detailed

- Geographic information is in white and includes TAZ and Jurisdiction

	A	B
1	TAZ	Jurisdiction
2	101	Arvin
3	102	Arvin
4	103	Arvin
5	104	Arvin
6	105	Arvin
7	106	Arvin
8	107	Arvin
9	108	Arvin
10	109	Arvin
11	110	Arvin
12	111	Arvin_Spare



- Residential information is in light orange and includes total households by unit types 1-10 based on Census. The units are occupied households.

	A	C	D	E	F	G	H	I	J	K	L	M
1	TAZ	TOTHH	RU1	RU2	RU3	RU4	RU5	RU6	RU7	RU8	RU9	RU10
2	101	1480	943	59	105	0	165	0	0	0	208	0
3	102	324	246	10	36	0	3	0	0	0	29	0
4	103	515	290	50	18	0	33	0	0	0	124	0
5	104	936	656	62	169	0	39	0	0	0	10	0
6	105	20	14	1	4	0	1	0	0	0	0	0
7	106	11	6	1	0	0	1	0	0	0	3	0
8	107	27	21	1	3	0	0	0	0	0	2	0
9	108	6	4	0	1	0	1	0	0	0	0	0
10	109	15	7	1	2	0	2	0	0	0	3	0
11	110	1119	658	32	32	0	37	0	0	0	349	11
12	111	0	0	0	0	0	0	0	0	0	0	0
13	112	0	0	0	0	0	0	0	0	0	0	0
14	113	0	0	0	0	0	0	0	0	0	0	0

- Employment information is in light green and includes total employees and detailed employee types. The units are total employees by zone.

	A	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	TAZ	TOTEMP	AGRICULTURE	MINING	UTILITIES	CONSTRUCTION	MANUFACTURE	WHOLESALE	RETAIL	WAREHOUSE	INFORMATION	FINANCIAL	REAL ESTATE	SERVICE PROFIT	SERVICE UNEMPLOYED	SERVICE ADMIN	EDUCATION	HEALTH	ENTERTAINMENT	ACCOMMODATION	FOOD	SERVICE OTHER	PUBLIC
2	101	1059	380	0	0	0	209	0	181	0	0	0	4	7	0	0	179	75	1	0	3	18	0
3	102	432	3	0	0	7	0	0	24	0	0	0	0	0	0	9	225	81	0	0	20	0	63
4	103	196	4	0	0	0	13	0	14	10	0	11	0	4	0	0	0	14	0	0	28	0	90
5	104	617	260	0	0	13	77	7	27	0	0	0	2	0	0	10	179	26	0	0	17	0	0
6	105	86	62	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0
7	106	86	20	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	107	97	32	0	0	0	20	0	0	0	0	0	0	0	0	0	16	29	0	0	0	0	0
9	108	18	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	109	164	110	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
11	110	225	60	0	0	7	0	0	26	0	0	0	0	4	0	0	72	2	0	0	0	52	0
12	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

- Group Quarters Population information is in dark green and includes dorm, assisted living, military, and institutional population (prison, mental health, etc). The units are persons excluding employees and household population.



	A	AJ	AK	AL	AM
1	TAZ	POPDORM	POPASSIS	POPMILITA	POPINST
2	101				
3	102				
4	103				
5	104				
6	105				
7	106				
8	107				
9	108				

- School enrolment information is in dark blue and includes elementary, high school, and college enrolment. The units are students and excludes employees.

	A	AN	AO	AP
1	TAZ	ELEM	HS	COLLEGE
2	101	720	0	0
3	102	571	2473	0
4	103	0	0	0
5	104	1510	0	0
6	105	0	0	0
7	106	0	0	0
8	107	0	0	0
9	108	0	0	0
10	109	0	0	0
11	110	871	0	0

## LU\_Input\_Template

This worksheet aggregates the residential and employment data from the **LU\_Detailed** worksheet.

- Geographic information is in white and includes TAZ and Jurisdiction, and relations to Census 2010

	A	B	C	D	E	F	G	H	I	J
1	TAZ	STATE	COUNTY	PUMA	CITY	TRACT	BLOCKGROUP	BLOCK	MODEL	PLACETYPE
2	101	CA	Kern	2905	Arvin	063032	60290063032	2002	KERNCOG	
3	102	CA	Kern	2905	Arvin	063011	60290063011	1020	KERNCOG	
4	103	CA	Kern	2905	Arvin	063012	60290063012	2024	KERNCOG	
5	104	CA	Kern	2905	Arvin	063041	60290063041	1016	KERNCOG	
6	105	CA	Kern	2905	Arvin	063041	60290063041	1016	KERNCOG	
7	106	CA	Kern	2905	Arvin	063012	60290063012	2024	KERNCOG	
8	107	CA	Kern	2905	Arvin	063011	60290063011	1020	KERNCOG	
9	108	CA	Kern	2905	Arvin	063031	60290063031	1005	KERNCOG	
10	109	CA	Kern	2905	Arvin	060073	60290060073	3544	KERNCOG	
11	110	CA	Kern	2905	Arvin	062021	60290062021	1546	KERNCOG	
12	111	CA	Kern	2905C	Arvin	0	0	0	KERNCOG	





- Residential information is in light orange and includes total households by unit types 1-10 based on Census and residential groups 1-3, with spares in grey. The units are occupied households.

	A	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	TAZ	TOTHH	RU1	RU2	RU3	RU4	RU5	RU6	RU7	RU8	RU9	RU10	RUG1	RUG2	RUG3	RUG1SPARE	RUG2SPARE	RUG3SPARE	RUG4SPARE	RUG5SPARE	RUG6SPARE	RUG7SPARE
2	101	1480	943	59	105	0	165	0	0	0	208	0	1002	270	208							
3	102	324	246	10	36	0	3	0	0	0	29	0	256	39	29							
4	103	515	290	50	18	0	33	0	0	0	124	0	340	51	124							
5	104	936	656	62	169	0	39	0	0	0	10	0	718	208	10							
6	105	20	14	1	4	0	1	0	0	0	0	0	15	5	0							
7	106	11	6	1	0	0	1	0	0	0	3	0	7	1	3							
8	107	27	21	1	3	0	0	0	0	0	2	0	22	3	2							
9	108	6	4	0	1	0	1	0	0	0	0	0	4	2	0							
10	109	15	7	1	2	0	2	0	0	0	3	0	8	4	3							
11	110	1119	658	32	32	0	37	0	0	0	349	11	690	69	360							
12	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
13	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
14	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
15	114	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
16	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
17	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0							

- Employment information is in light green and includes total employees aggregated by type with spares in grey. The units are total employees by zone.

	A	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	TAZ	TOTEMP	EMPEDU	EMPF00	EMPG0V	EMPIND	EMPME0	EMPOFC	EMPOTH	EMPRET	EMPAGR	EMPSPARE1	EMPSPARE2	EMPSPARE3	EMPSPARE4	EMPSPARE5	EMPSPARE6	EMPSPARE7	EMPSPARE8
2	101	1069	179	4	0	26	75	17	209	181	398								
3	102	432	225	20	63	7	81	9	0	24	3								
4	103	196	0	28	90	18	14	15	13	14	4								
5	104	617	179	17	0	20	25	12	77	27	280								
6	105	98	0	0	0	36	0	0	0	0	62								
7	106	65	0	0	0	0	0	0	45	0	20								
8	107	97	16	0	0	0	29	0	20	0	32								
9	108	18	0	0	0	0	6	0	0	0	12								
10	109	164	0	3	0	51	0	0	0	0	110								
11	110	225	72	0	0	87	2	4	0	0	60								
12	111	0	0	0	0	0	0	0	0	0	0								
13	112	0	0	0	0	0	0	0	0	0	0								
14	113	0	0	0	0	0	0	0	0	0	0								
15	114	0	0	0	0	0	0	0	0	0	0								
16	115	0	0	0	0	0	0	0	0	0	0								
17	116	0	0	0	0	0	0	0	0	0	0								

- Group Quarters Population information is in dark green and includes dorm, assisted living, military, and institutional population (prison, mental health, etc). The units are persons excluding employees and household population.



	A	AX	AY	AZ	BA
1	<b>TAZ</b>	POPDORM	POPASSIST	POPMILITARY	POPINST
2	101	0	0	0	0
3	102	0	0	0	0
4	103	0	0	0	0
5	104	0	0	0	0
6	105	0	0	0	0
7	106	0	0	0	0
8	107	0	0	0	0
9	108	0	0	0	0
10	109	0	0	0	0
11	110	0	0	0	0
12	111	0	0	0	0
13	112	0	0	0	0
14	113	0	0	0	0
15	114	0	0	0	0
16	115	0	0	0	0
17	116	0	0	0	0

- School enrolment information is in dark blue and includes elementary, high school, and college enrolment. The units are students and excludes employees.

	A	BB	BC	BD
1	<b>TAZ</b>	ELEM	HS	COLLEGE
2	101	720	0	0
3	102	571	2473	0
4	103	0	0	0

#### SED\_Final

This worksheet is the product of the percentage allocation on [SED\\_Cross\\_ClassRates\\_Template](#) and the control total on [LU\\_Input\\_Template](#) with the result being cross-clarified households and population, employment, group quarters population, and student enrolment by TAZ.

- Geographic information is in white and includes TAZ and Jurisdiction, and relations to Census 2010



	A	B	C	D	E	F	G	H	I	J
1	TAZ	STATE	COUNTY	PUMA	CITY	TRACT	BLOCKGROUP	BLOCK	MODEL	PLACETYPE
2	101	CA	Kern	2905	Arvin	063032	60290063032	2002	KERNCOG	
3	102	CA	Kern	2905	Arvin	063011	60290063011	1020	KERNCOG	
4	103	CA	Kern	2905	Arvin	063012	60290063012	2024	KERNCOG	
5	104	CA	Kern	2905	Arvin	063041	60290063041	1016	KERNCOG	
6	105	CA	Kern	2905	Arvin	063041	60290063041	1016	KERNCOG	
7	106	CA	Kern	2905	Arvin	063012	60290063012	2024	KERNCOG	
8	107	CA	Kern	2905	Arvin	063011	60290063011	1020	KERNCOG	
9	108	CA	Kern	2905	Arvin	063031	60290063031	1005	KERNCOG	
10	109	CA	Kern	2905	Arvin	060073	60290060073	3544	KERNCOG	
11	110	CA	Kern	2905	Arvin	062021	60290062021	1546	KERNCOG	
12	111	CA	Kern	2905C	Arvin	0	0	0	KERNCOG	

- Residential household information is in light orange and includes total households, total household population, and households by aggregated group types, with spares in grey.

	A	K	L	M	N	O	P	Q	R	S	T	U	V
1	TAZ	TOTHH	TOTPOP	RUG1	RUG2	RUG3	RUG1SPARE	RUG2SPARE	RUG3SPARE	RUG4SPARE	RUG5SPARE	RUG6SPARE	RUG7SPARE
29	128	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	131	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	132	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	133	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	134	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	136	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	137	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	138	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	139	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	141	5.00	14.91	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	142	1.00	2.98	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44	143	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	144	364.00	1046.76	272.00	9.00	83.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46	145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	146	40.00	118.53	38.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	147	278.00	800.45	211.00	3.00	64.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	148	775.00	2222.27	772.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	149	1468.00	3800.48	974.00	410.00	84.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Residential population information is in light blue and includes household population by aggregated group types, with spares in grey. Population is not used directly in the model except for the age of population. Total households, population, and households by group are not used to generate trips but are in the calculation of per-capita performance measures and residential development density.



	A	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	TAZ	RUG1_HHPOP	RUG3_HHPOP	RUG6_HHPOP	RUG1SPARE_HHPOP	RUG1SPARE_HHPOP	RUG1SPARE_HHPOP	RUG1SPARE_HHPOP	RUG1SPARE_HHPOP	RUG1SPARE_HHPOP	RUG1SPARE_HHPOP
2	101	2275.06	471.01	365.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	102	581.25	68.03	51.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	103	771.98	88.97	218.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	104	1630.23	362.85	17.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	105	34.06	8.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	106	15.89	1.74	5.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	107	49.95	5.23	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	108	9.08	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	109	18.16	6.98	5.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	110	1586.66	120.37	633.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	116	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	117	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	118	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	119	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	121	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Residential household cross-classified information by household type and then by income, and household size is in light green. Cross-classified residential units are the generator of home-based productions and minor amount of non-home based productions and attractions.

	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	TAZ	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP	RUG1_HHPOP
2	101	62.01	69.29	42.45	18.08	16.63	58.22	55.28	57.17	53.82	89.69	24.76	33.53	42.92	28.08	51.97	21.09
3	102	15.84	17.75	10.89	4.87	4.25	14.58	21.79	14.81	13.75	22.91	6.33	5.37	10.74	7.15	13.26	5.39
4	103	21.04	23.51	14.41	8.47	5.64	18.08	28.84	18.40	18.26	34.43	8.40	11.38	14.26	8.50	17.63	7.98
5	104	44.43	49.65	30.42	13.87	11.92	40.28	81.11	45.97	38.57	64.27	17.74	24.62	30.12	20.07	37.24	14.85
6	105	0.95	1.54	0.84	0.29	0.25	0.84	1.28	0.86	0.81	1.54	0.37	0.58	0.43	0.42	0.78	0.32
7	106	0.43	0.45	0.30	0.13	0.12	0.39	0.65	0.40	0.38	0.63	0.17	0.23	0.29	0.20	0.36	0.15
8	107	1.36	1.52	0.93	0.42	0.37	1.23	1.87	1.26	1.16	1.97	0.54	0.74	0.92	0.61	1.14	0.45
9	108	0.25	0.28	0.17	0.08	0.07	0.22	0.34	0.23	0.21	0.36	0.10	0.13	0.17	0.11	0.21	0.08
10	109	0.50	0.55	0.34	0.15	0.13	0.45	0.65	0.46	0.43	0.72	0.20	0.27	0.34	0.22	0.41	0.17
11	110	42.70	47.71	29.23	13.14	11.45	38.71	58.75	39.37	37.98	61.76	17.66	23.09	28.94	19.28	35.78	14.53
12	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	116	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	117	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	118	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	119	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	121	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Residential households by age of the head of household in purple and is aggregated by residential unit group type. The households by age of head of house is used to modify trip generation by purpose.

	A	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO
1	TAZ	RU1_AGE1524	RU1_AGE2564	RU1_AGE6574	RU1_AGE75	RU3_AGE1524	RU3_AGE2564	RU3_AGE6574	RU3_AGE75	RU9_AGE1524	RU9_AGE2564	RU9_AGE6574	RU9_AGE75
2	101	760.57	142.15	43.59	55.69	238.86	31.14	0.00	0.00	163.99	19.12	6.96	17.93
3	102	194.32	36.32	11.14	14.23	34.50	4.50	0.00	0.00	22.86	2.67	0.97	2.50
4	103	258.08	48.23	14.79	18.90	45.12	5.88	0.00	0.00	97.76	11.40	4.15	10.69
5	104	545.00	101.86	31.24	39.90	184.01	23.99	0.00	0.00	7.88	0.92	0.33	0.86
6	105	11.39	2.13	0.65	0.83	4.42	0.58	0.00	0.00	0.00	0.00	0.00	0.00
7	106	5.31	0.99	0.30	0.39	0.88	0.12	0.00	0.00	2.37	0.28	0.10	0.26
8	107	16.70	3.12	0.96	1.22	2.65	0.35	0.00	0.00	1.58	0.18	0.07	0.17
9	108	3.04	0.57	0.17	0.22	1.77	0.23	0.00	0.00	0.00	0.00	0.00	0.00
10	109	6.07	1.13	0.35	0.44	3.54	0.46	0.00	0.00	2.37	0.28	0.10	0.26
11	110	523.75	97.89	30.02	38.35	61.04	7.96	0.00	0.00	283.83	33.08	12.05	31.03
12	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	116	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	117	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	118	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Residential household population by age range is in green. The resident by age is used to generate school trips.

	A	DP	DQ	DR	DS	DT	DU	DV	DW
1	TAZ	POP0005	POP0514	POP1517	POP1824	POP2554	POP5564	POP6574	POP75
2	101	439.16	689.65	272.97	447.99	1011.60	124.44	126.05	0.00
3	102	52.62	117.76	78.61	70.78	264.33	54.49	21.30	40.40
4	103	137.07	220.96	43.86	161.19	401.34	52.09	38.93	23.58
5	104	220.40	414.76	117.21	309.57	660.21	187.34	84.15	17.03
6	105	4.69	8.82	2.49	6.59	14.05	3.99	1.79	0.36
7	106	2.91	4.69	0.93	3.42	8.52	1.11	0.83	0.50
8	107	4.41	9.87	6.59	5.93	22.16	4.57	1.79	3.39
9	108	1.67	2.37	0.84	1.74	4.35	1.20	0.39	0.00
10	109	0.63	3.56	2.55	4.49	8.07	4.90	4.64	1.58
11	110	230.85	436.34	192.80	370.74	962.56	83.72	36.60	6.52
12	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Employment information is in light green and includes total employees aggregated by type with spares in grey. Employees generate home-based attractions and non-home based productions and attractions. For schools, employees generate the non-school related purposes (i.e. home-work) and the household population and school enrolment generate the school related purpose.



	A	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO
1	TAZ	TOTEMP	EMPEDU	EMPFOO	EMPGOV	EMPIND	EMPMED	EMPOFC	EMPOTH	EMPRET	EMPAGR	EMPSPAR1	EMPSPAR2	EMPSPAR3	EMPSPAR4	EMPSPAR5	EMPSPAR6	EMPSPAR7	EMPSPAR8
2	101	1069.00	179.00	4.00	0.00	26.00	75.00	17.00	209.00	161.00	398.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	102	432.00	225.00	20.00	63.00	7.00	81.00	9.00	0.00	24.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	103	196.00	0.00	28.00	90.00	18.00	14.00	15.00	13.00	14.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	104	617.00	179.00	17.00	0.00	20.00	25.00	12.00	77.00	27.00	260.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	105	98.00	0.00	0.00	0.00	36.00	0.00	0.00	0.00	0.00	62.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	106	65.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	107	97.00	16.00	0.00	0.00	0.00	29.00	0.00	20.00	0.00	32.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	108	18.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	109	164.00	0.00	3.00	0.00	51.00	0.00	0.00	0.00	0.00	110.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	110	225.00	72.00	0.00	0.00	87.00	2.00	4.00	0.00	0.00	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	116	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	117	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	118	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	119	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	121	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	122	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Group Quarters Population information is in dark green and includes dorm, assisted living, military, and institutional population (prison, mental health, etc). The group quarters population does not generate trips.

	A	EP	EQ	ER	ES
1	TAZ	POPDORM	POPASSIS	POPMLITA	POPINST
2	101	0.00	0.00	0.00	0.00
3	102	0.00	0.00	0.00	0.00
4	103	0.00	0.00	0.00	0.00
5	104	0.00	0.00	0.00	0.00
6	105	0.00	0.00	0.00	0.00
7	106	0.00	0.00	0.00	0.00
8	107	0.00	0.00	0.00	0.00
9	108	0.00	0.00	0.00	0.00
10	109	0.00	0.00	0.00	0.00
11	110	0.00	0.00	0.00	0.00
12	111	0.00	0.00	0.00	0.00
13	112	0.00	0.00	0.00	0.00
14	113	0.00	0.00	0.00	0.00
15	114	0.00	0.00	0.00	0.00
16	115	0.00	0.00	0.00	0.00
17	116	0.00	0.00	0.00	0.00

- School enrolment information is in dark blue and includes elementary, high school, and college enrolment. The school enrolment generates the attractions of school based trips.



	A	ET	EU	EV
1	TAZ	ELEM	HS	COLLEGE
2	101	720.00	0.00	0.00
3	102	571.00	2473.00	0.00
4	103	0.00	0.00	0.00
5	104	1510.00	0.00	0.00
6	105	0.00	0.00	0.00
7	106	0.00	0.00	0.00
8	107	0.00	0.00	0.00
9	108	0.00	0.00	0.00
10	109	0.00	0.00	0.00

#### SED\_Cross\_ClassRates\_Template

This worksheet has the same structure as the worksheet with the exception that the values are average (population for household) or percentage. This worksheet is based on data at a Census geography (Block Group, Place, or PUMA) but can be modified at a TAZ level.

### Interregional Factors

The two primary required input updates for subarea model are the gateway station weights and the through trips. The gateway station weights attract/produce beyond the model study area, so when the subarea model is developed the relative proportion of trips at each gateway should be evaluated and updated as needed. The through trips are those that travel from one gateway to another gateway without stopping in the model area.

#### Gateways

The station weights are productions and attractions by purpose at each gateway that interact with the trips generated within the study area. The station weights can remain constant over time and the values will be used as percentages rather than absolute values, but should be evaluated to ensure the land use growth and travel patterns warrant the distribution of trips remaining constant.

The interregional factors include the internal and external percentage of trips by purpose, gateway productions and attractions, and home-work income distribution at the gateways. The interregional values on the [tx\\_xi](#) worksheet (internal external trips by purpose by Census place) and the income distribution for home-work trips on the [Gateway HML](#) worksheet are based on the CHTS, while the gateway values on the [Gateways\\_Raw](#) worksheet are derived from passenger vehicle forecasts from the California Statewide travel demand model. The interregional data only need to be updated for scenarios where the results of trip generation are not balanced for home-work by income or when significantly different scenarios are being developed. The values can be updated based on the Statewide model or modified to test alternative





scenarios. The gateway values and high/medium/low income data are combined into the **Gateways Final** worksheet for use in the model.

#### IX\_XI

The percentage of trips that are imported (IX) or exported (XI) by purpose and Census Place, with home-work purposes being by high, medium, and low income.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Name	countyNa	HBWH_ix	HBWH_xi	HBWM_ix	HBWM_xi	HBWL_ix	HBWL_xi	HBS_ix	HBS_xi	HBK_ix	HBK_xi	HBC_ix	HBC_xi	HBO_ix	HBO_xi	WBO_ix	WBO_xi	OBO_ix	OBO_xi
2	Armona	Kings	0.35	0.378	0.267	0.2	0.076	0.215	0.093	0.026	0.013	0.053	0.086	0.057	0.066	0.046	0.048	0.151	0.059	0.125
3	Arvin	Kern	0.048	0.123	0.055	0.045	0.049	0.03	0	0.01	0	0	0.009	0.01	0	0.003	0.036	0.024	0.035	0.043
4	Atwater	Merced	0.072	0.033	0.058	0.153	0.062	0.008	0	0.007	0	0.021	0.086	0.057	0.041	0	0.045	0.074	0	0
5	Avenal	Kings	0.35	0.378	0.267	0.2	0.076	0.215	0.093	0.026	0.013	0.053	0.086	0.057	0	0.046	0.048	0.151	0.059	0.125
6	Bakersfield	Kern	0.061	0.016	0.014	0.009	0.003	0.011	0.004	0.013	0	0	0	0.012	0.025	0.015	0.011	0.013	0.011	0.007
7	California City	Kern	0.048	0.123	0.055	0.045	0.049	0.03	0.046	0.01	0	0.031	0.009	0.01	0.595	0.04	0.036	0.024	0.035	0.043
8	Ceres	Stanislaus	0.08	0.004	0.059	0.011	0.074	0.015	0	0.005	0	0	0.086	0.057	0.017	0	0.018	0.023	0.033	0.027
9	Chowchilla	Madera	0.453	0.073	0.193	0.095	0.298	0.11	0.1	0	0.011	0.009	0.086	0.057	0.409	0.22	0.176	0.098	0.163	0.121
10	Clovis	Fresno	0.064	0.067	0	0.088	0.015	0.057	0	0	0	0.006	0.027	0.14	0.037	0.029	0.014	0	0.006	0.01
11	Coalinga	Fresno	0.064	0.067	0.078	0.088	0.015	0.057	0.015	0.023	0.007	0.002	0.027	0.14	0.052	0.179	0.052	0.022	0.039	0.031
12	Corcoran	Kings	0.35	0.378	0.267	0.2	0.076	0.215	0.093	0.026	0.013	0.053	0.086	0.057	0.069	0.006	0.048	0.151	0.059	0.125
13	Cutler	Tulare	0.085	0.09	0.06	0.081	0.126	0.039	0.021	0.059	0.005	0.004	0.264	0.011	0.038	0.028	0.052	0.07	0.037	0.044
14	Delano	Kern	0.048	0.123	0.055	0.045	0.049	0.03	0.006	0	0	0.013	0.009	0.01	0.015	0.018	0.036	0.024	0.121	0.043

#### Gateway HML

The percentage of high, medium, and low home-work trips at each gateway for imported (IX) or exported (XI) trips.

	A	B	C	D	E	F	G	H	I	J
1					IX			XI		
2	Node	Region Co	Region Na	Hwy Nam	HBWH %	HBWM %	HBWL %	HBWH %	HBWM %	HBWL %
3	43	2	West	SR 198 W	50%	25%	25%	50%	25%	25%
4	44	2	West	Panoche	50%	25%	25%	50%	25%	25%
5	45	2	West	Mercey H	50%	25%	25%	50%	25%	25%
6	61	1	North	SR 99 N	20%	57%	23%	19%	34%	48%
7	62	1	North	SR 41 N	26%	43%	31%	22%	29%	49%

#### Gateways\_Raw

The relative value of imported (IX) or exported (XI) trips for each purpose by gateway. The initial values are based on observed trips and the gateways are balanced to the internal trip generation. Home-work trips for high, medium, low are set as the same value if gateway percentages are used. If the number of trips are estimated independently, the percentages should be set at 100% in the Gateway HML worksheet.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	AB
1	TAZ	HWM_P	HWM_P	HWM_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	HWM_A	HWM_A	HWM_A	HS_A	HK_A	HC_A	HO_A	WO_A	OO_A	HY_A	SPECIAL	STF		
62	61	1788	1788	1788	737	0	34	4566	1139	8084	729	3509	3509	3509	642	0	25	3406	5821	2144	729				
63	62	14121	14121	14121	2563	0	60	8153	770	4497	476	938	938	938	110	0	22	2988	2630	1460	476				
64	63	10927	10927	10927	1666	0	45	6153	850	7152	491	1301	1301	1301	709	0	25	3408	4044	2158	491				
65	64	2495	2495	2495	618	0	14	1855	113	716	87	99	99	99	7	0	2	323	347	200	87				
66	65	71	71	71	7	0	0	33	10	35	3	18	18	18	7	0	0	19	25	16	3				
67	66	825	825	825	19	0	14	1883	464	1061	200	3199	3199	3199	3089	0	29	3926	796	1130	200				
68	67	1835	1835	1835	41	0	10	1393	532	967	147	2328	2328	2328	857	0	15	2003	772	780	147				
69	68	461	461	461	87	0	4	475	413	296	62	1415	1415	1415	87	0	6	766	240	539	62				
70	69	2660	2660	2660	225	0	13	1809	1132	760	149	2372	2372	2372	33	0	5	672	501	1010	149				
71	70	1288	1288	1288	399	0	9	1223	695	395	75	846	846	846	7	0	1	134	219	516	75				
72	71	8870	8870	8870	917	0	28	3776	2131	3462	482	4704	4704	4704	240	0	9	1224	2134	3662	482				
73	72	9	9	9	1	0	0	3	1	4	0	2	2	2	1	0	0	2	3	2	0				
74	73	3570	3570	3570	699	0	13	1722	1086	125	492	492	492	492	9	0	1	119	458	588	125				
75	74	782	782	782	194	0	5	629	432	330	39	234	234	234	67	0	2	255	177	86	39				





## TAZ\_Interim

The basic internal TAZ information such as Airbasin, total and developed area, terminal times, and transit frequency (for scenarios or models using synthetic transit). Hard coded.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	TAZ	COUNTY	CITY	AIRBASIN	MID_BNDRY	HIGH_BNDRY	GENPARKCOST	EMPPARKCOST	INTDEN	WALKPERC	MHHINC	AREA_AC	RESACRE	EMPACRE	HWYCOM	PTERM	ATERM	PKFREQ	OPFREQ	EJ
2	101	Fresno	Clovis	1			0	0	0.827024581			171.0040000000	152.8387376			1	1			
3	102	Fresno	Clovis	1			0	0		1		153.4626000000	153.4203964			1	1			
4	103	Fresno	Clovis	1			0	0	0.941964949			170.2019000000	170.2019			1	1			
5	104	Fresno	Clovis	1			0	0	0.984934602			160.9518000000	160.9518			1	1			
6	105	Fresno	Clovis	1			0	0	0.722417051			241.2949000000	212.3263787			1	1			
7	106	Fresno	Clovis	1			0	0	0.666263677			240.4379000000	240.3317354			1	1			
8	107	Fresno	Clovis	1			0	0	0.753355726			167.2361000000	125.1172048			1	1			
9	108	Fresno	Clovis	1			0	0	0.684150389			142.8412000000	104.0584484			1	1			
10	109	Fresno	Clovis	1			0	0	0.63088999			235.1224000000	209.4670058			1	1			
11	110	Fresno	Clovis	1			0	0	0.621364005			25.6858000000	25.57812425			1	1			
12	111	Fresno	Clovis	1			0	0	0.946891779			46.6320000000	46.26231453			1	1			
13	112	Fresno	Clovis	1			0	0	0.13941939			44.7463000000	10.88307068			1	1			
14	113	Fresno	Clovis	1			0	0	0.886896232			87.1942000000	87.1942			1	1			
15	114	Fresno	Clovis	1			0	0	0.856853231			61.8905000000	61.87151924			1	1			
16	115	Fresno	Clovis	1			0	0		1		88.3700000000	78.02919291			1	1			
17	116	Fresno	Clovis	1			0	0	0.880375218			71.5186000000	64.56023185			1	1			
18	117	Fresno	Clovis	1			0	0	0.925169885			157.8268000000	156.0530769			1	1			
19	118	Fresno	Clovis	1			0	0	0.408970038			160.5723000000	70.23256353			1	1			
20	119	Fresno	Clovis	1			0	0	0.800773242			160.6581000000	145.8181605			1	1			
21	120	Fresno	Clovis	1			0	0	0.962414124			80.1444000000	74.87180261			1	1			
22	121	Fresno	Clovis	1			0	0	0.578237425			80.3263000000	23.06341787			1	1			
23	122	Fresno	Clovis	1			0	0	0.625075305			88.8981000000	61.22577309			1	1			

## Through Trips

The through trips can be obtained by running select link on the Statewide model and outputting the OD matrix, using big data, or assumed to be similar to the original model depending on the scale difference between the original and subarea model. A common approach is to calibrate the internal trips, and the count at the gateways is the difference between internal generated\attractive trips and the through trips.

The following process should be implemented after determining the values of through trips, to update the through trip file:

1. Use the existing through trip structure and change the values for the daily through trips by purpose.
  - a. Column A is the origin zone (1-100)
  - b. Column B is the purpose (1=HW 2=HS 3=HK 4=HC 5=HO 6=WO 7=OO 8=HY . Although replaced by the truck matrix, the other purposes are 9=TS 10=TM 11=TH)
  - c. Column C is the matrix file (always 1)
  - d. Column D repeats the origin number (1-100 same as A)
  - e. Columns E-DA are the destination with E=1 and DA=100
2. Save the file as a CSV when finished editing

## Economic Factors

The percentage of employees by job type for high, medium, and low income groups. Hard coded.



119

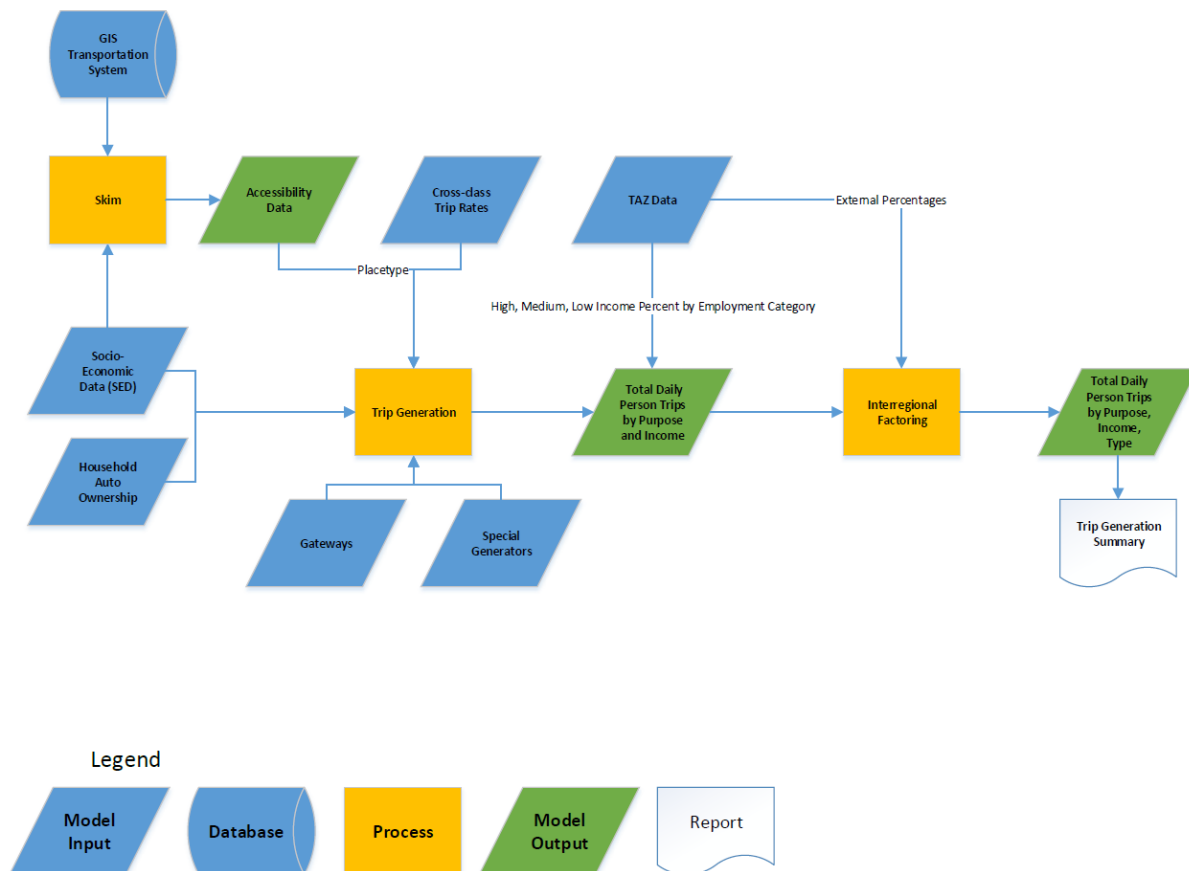
Socio-economic and Highway Inputs	
<input checked="" type="checkbox"/> Distribute processing?	
Cluster handle	WE15_BASE
Cluster nodes	4
NumZones	2550
Year	2015
Zone data	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\1_TAFWE15_Base_TAFData.csv
Socio-economic detail	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\2_SEData\WE15_Base_SED_Detail.csv
External-external through trips	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\3_External\WE15_Through_Trip.csv
Gateway zones	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\2_SEData\WE15_Base_Gateway.csv
Special generators	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\2_SEData\WE15_Base_SpecialGenerators.csv
MID_Parameters	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\6_Start\StartGrowthParam_Reduction.csv
Raster highway network	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\3_HighwayItem_Updated.gdb\HWNetwork
Year of network scenario	2015
Turn penalties	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\3_HighwayItem_Updated\TURNALTY.PEN
Truck_BaseMatrix	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\5_ExternalTruck\COUNTYMODELS_Kern_Truck_PCBS_2007.MTX
Truck_FutureMatrix	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\Inputs\5_ExternalTruck\COUNTYMODELS_Kern_Truck_PCBS_2040.MTX
Calculate Intersection Density	
Output from intersections.py	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\GIS\Intersections.dbf
Output from RoadwayHills.py	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\GIS\InRA_ML.dbf
Starting values for compute VMT per worker	C:\VermCOG_Model\T02\VerCOG_Update_20170517\VerCOG_Model_Updated20170517\GIS\VMTSeed.csv
Annualization Factor	250

## Trip Generation

When changing the land use control totals, socio-economic data assumptions (household income, size, etc), evaluating large development projects or specific/general plans, or significant changes within our outside the model area, checking the trip generation balancing and interregional travel from the Statewide Model is appropriate. The flowchart on the following page describes how the data and processes for trip generation interact and where the interregional factors come are integrated with the model. The flowchart on the subsequent page shows the interaction with the Statewide model (or household survey/Big Data). For instructions on changing the inputs, see the previous sections for [Land Use Preparation](#) or [Socio-Economic Data Preparation](#). The Non-Highway Validation spreadsheet summarizes the production and attraction balancing by purpose, and the following section describes using the trip generation spreadsheet to adjust the local and interregional factors to balance the trip generation.



## Trip Generation



### Other Factors

The model was estimated and calibrated to reflect the base year travel conditions and to roughly approximate data from multiple sources (CHTS, HPMS, traffic counts, etc). The inputs such as demographics, income ranges, split between job classes, etc as described in the previous sections along with associated the interregional travel are the most frequently modified inputs to reflect scenarios or assumptions, but other factors such as auto operating cost, vehicle ownership\availability, sensitivity to mode, value of time, are generally assumed constant. Calibration factors are usually only modified based on new data refer to the Model Development Report to determine when\how to update the values.

### CREATE A SCENARIO IN CUBE

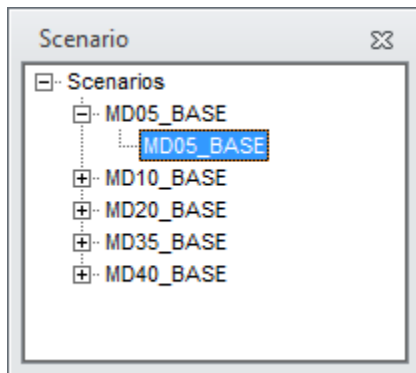
Setting up a new scenario can be very helpful to test the effects of variations in your input data (i.e., land use, network). In the model catalog, scenarios are hierarchical in nature and can be managed in the **Scenario** pane. Cube has helpful tools to easily create or delete scenarios.



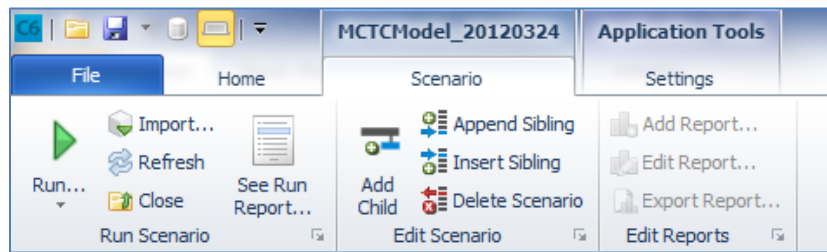
## Child Scenario

A child scenario will inherit the key values from its parent. This means that all files and parameter settings will be copied to this new scenario. Any variation will have to be edited after the scenario is created. A child scenario will be placed a level below the parent scenario.

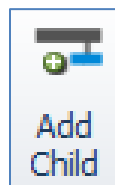
- In the Scenario pane, Click on the scenario from which you would like to create a new child scenario.



- Click on the **Scenario** ribbon tab.

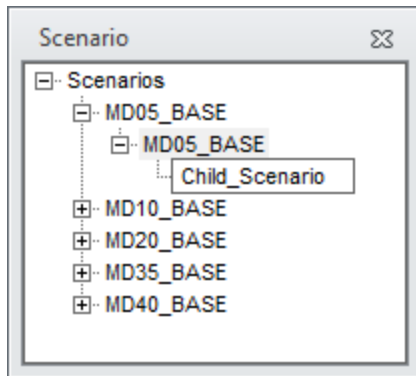


- Click on **Add Child**.

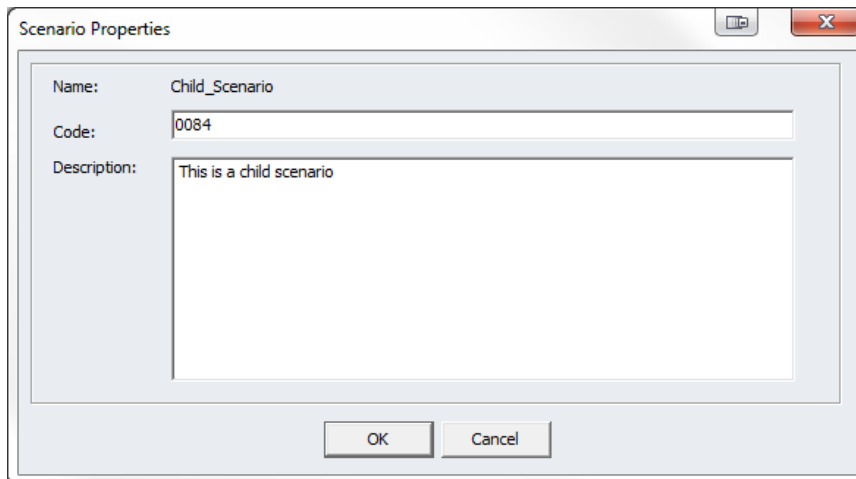


- Type in the name of the new scenario. Press **Enter**. This will open the Scenario Properties window.





- Type in a description of the new scenario. Click **OK**.



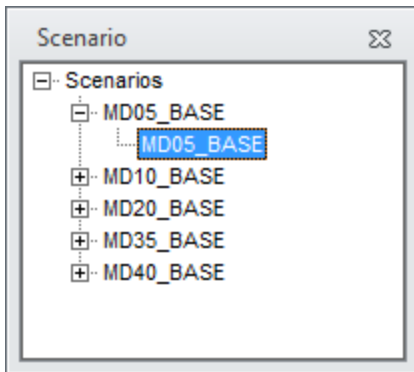
- To edit scenario specific input data, double-click on the child scenario to open the input key window.

### Sibling Scenario

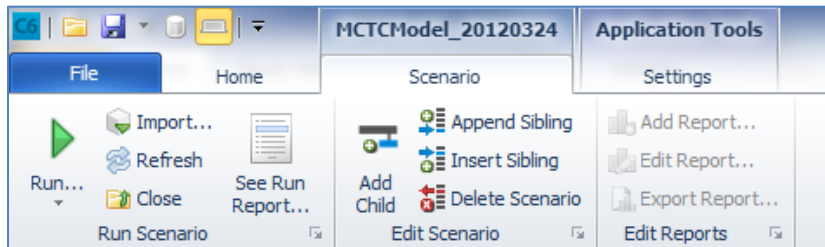
A sibling scenario is placed at the same level of the scenario it was created from. It will inherit the key values from that scenario as well. A sibling scenario cannot be created from the base scenario automatically created in the model catalog (**Scenarios**). You can insert or append a sibling scenario to a list of existing scenarios.

- In the Scenario pane, Click on the scenario from which you would like to create a new sibling scenario.

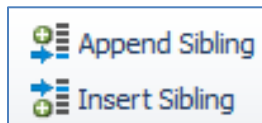




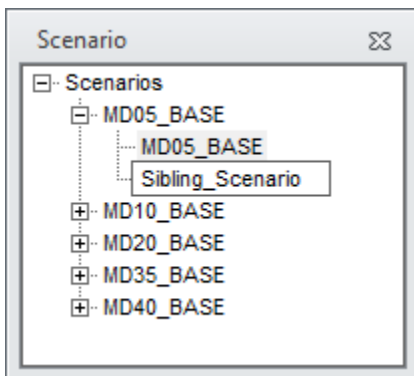
- Click on the **Scenario** ribbon tab.



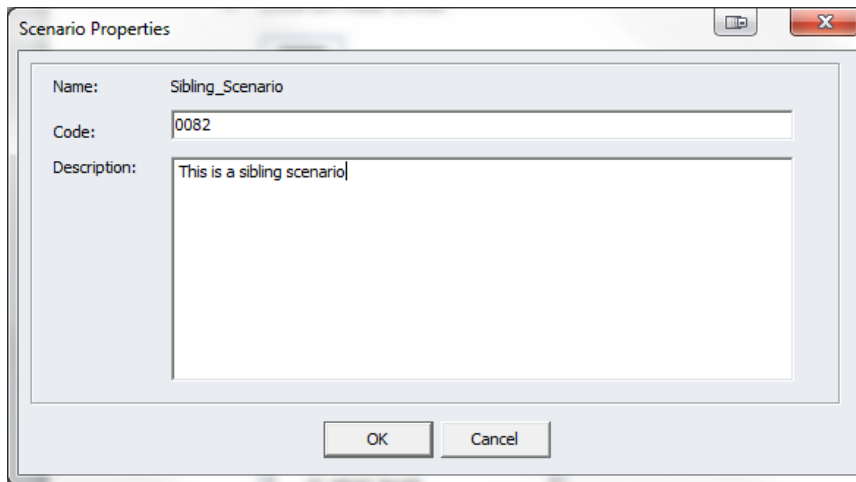
- Click on **Append Sibling** or **Insert Sibling**.



- Type in the name of the new scenario. Press **Enter**. This will open the Scenario Properties window.



- Type in a description of the new scenario. Click **OK**.

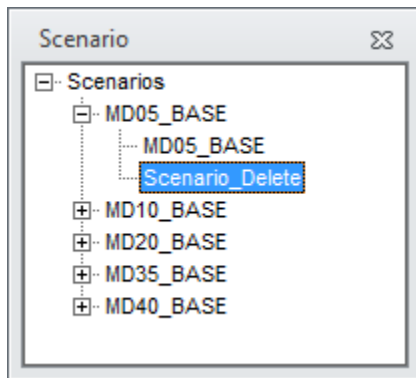


- To edit scenario specific input data, double-click on the sibling scenario to open the input key window.

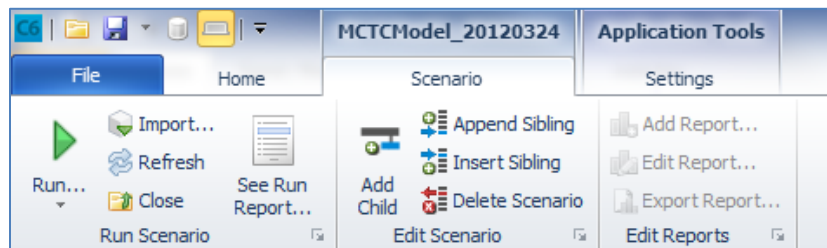
### Delete Scenario

Deleting a scenario will remove the scenario and any of its children.

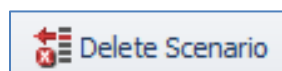
- In the Scenario pane, Click on the scenario you would like to delete.



- Click on the **Scenario** ribbon tab.



- Click on **Delete Scenario**.





## CUBE LAND

Cube Land is the land use allocation model implemented within the VMIP 2 models. It runs in-line with the travel models as an optional component. To turn on Cube Land, check the Run Land in the catalog key.

**SJV MIP2 Land Inputs**

☐ Run Land

Average rent for single-family development in first zone: 977.36

Characteristics of agents (households and jobs) by type: C:\MIP\Final\_Prep\Madera\Madera\_2010BaseModel\1\_Inputs\7\_Land\TCM08\_Base\_Land.mdb\AGENT\_INFO

Real estate attributes: C:\MIP\Final\_Prep\Madera\Madera\_2010BaseModel\Appl\F\_RESTATE.DBF

Initial zonal attributes for Cube Land: C:\MIP\Final\_Prep\Madera\Madera\_2010BaseModel\1\_Inputs\7\_Land\TCM08\_Base\_Land.mdb\Land\_TAZ

### CATALOG KEY INPUTS:

Most of the catalog keys in the model are the same as in the travel demand model.

**SJV MIP2 Land Inputs**

☐ Run Land

Average rent for single-family development in first zone: 977.36

Characteristics of agents (households and jobs) by type: C:\MIP\Final\_Prep\Madera\Madera\_2010BaseModel\1\_Inputs\7\_Land\TCM08\_Base\_Land.mdb\AGENT\_INFO

Real estate attributes: C:\MIP\Final\_Prep\Madera\Madera\_2010BaseModel\Appl\F\_RESTATE.DBF

Initial zonal attributes for Cube Land: C:\MIP\Final\_Prep\Madera\Madera\_2010BaseModel\1\_Inputs\7\_Land\TCM08\_Base\_Land.mdb\Land\_TAZ

The added keys pertaining to Cube Land, are listed below:

— Average rent for single-family development in first zone: all rent estimates output by Cube Land are defined relative to the user-specified rent for a single reference location option. For this model, single-family housing in zone one was chosen as the reference location.

— Characteristics of agents (households and jobs) by type: one of two inputs located in a special Land-specific geodatabase (TCM08\_Base\_Land.mdb) in the sub-folder "{CATALOG\_DIR}\1\_Inputs\7\_Land\", this table provides all the information necessary regarding the agents to be allocated by the model, especially control totals and attributes.

Agents 1-25 are households, cross-classified by size and income. Agents 26-31 are SJV MIP 2 employment categories.

The control totals to be allocated are in the column "NAGENT", which should be updated for forecasting as well as backcasting applications. Other required fields include:

- \* PERSONS: average number of people per household or jobs per establishment
- \* WRKLOWWAGE: average number of low-wage workers per household (under \$1,250/month)
- \* WRKHIWAGE: average number of high-wage workers per household (over \$3,333/month)



- \* TOTWORKERS: average total workers per household

- \* POP\_18\_64: total number of working-age (18-64 y.o.) persons per household

— Real estate attributes: this table lists the attributes for every combination of zone and real estate type in the model. This is currently stored as a DBF but could easily be converted into GIS layers. Fields include:

- \* IDZONE: internal Cube Land zone number (not the same as MIP TAZ number – see ZONE\_NAMES.DBF for crosswalk)

- \* IDREST: real estate type (1=single-family, 2=multi-family, 3=retail, 4=office, 5=industrial, 6=other)

- \* IS\_SF, IS\_MF, DUMID, DUMO, DUMR, OTHERNR: dummy variables for specific real estate types

- \* SF\_EMP: square feet per employee (non-residential market only)

- \* IS\_BIG: probability (0-1) that a residential real estate unit is big (more than 2,000 square feet)

- \* FAR: floor-area ratio (floorspace to lot size)

- \* DU\_ACRE: development density in dwelling units per acre

- \* PCT\_RES: average percent of residential development in a given parcel

- \* PARKSPAC: average number of parking spaces per acre

- \* SF\_DU: average square feet per dwelling unit

— Initial zonal attributes for Cube Land: a polygon feature class containing input zonal data for Cube Land.

Key fields include:

- \* TAZ\_MIP: SJV MIP TAZ number (note: different from numbering system internally used by Cube Land)

- \* INTDENS: intersection density (based upon HERE data and calculated as part of accessibility)

- \* WRKLOWWAGE: initial estimate of low-wage workers living in zone

- \* WRKHIWAGE: initial estimate of high-wage workers living in zone

- \* TOTWORKERS: initial estimate of total workers living in zone



## INSTRUCTIONS FOR DYNAMIC VALIDATION:

1. Copy the TCM08\_Base\_Land.mdb file to a new geodatabase, TCM14\_Base\_Land.mdb, in the same folder.
2. Edit the Agent\_Info table in the new geodatabase to update control totals and attributes as needed.
3. Create a new child scenario under TCM14\_BASE in Cube.
4. Point the agent attributes catalog key reference to the new geodatabase and Agent\_Info table.
5. Run the scenario. Cube Land will be automatically included in the full model feedback process, overwriting the input SE\_Detail file with the results of allocating the control totals by agent type to zones after the first iteration. The SE Detail file generated by Cube Land will be used for all travel model calculations, and the skims produced by the travel model will be used to calculate updated accessibility measures for Cube Land as well.
6. Compare outputs to observed data. The SE Detail file produced by Land is at:  
"{SCENARIO\_DIR}\SE\_DETAIL\_LAND.CSV". If zone-level observed socio-economic data are not available, jurisdiction or community-level summaries may be suitable for dynamic validation purposes.



## CREATING MAPS USING VMIP MODELS

Although the base and model data can be used to make many different maps, the recommended maps to review inputs and most often used output maps are automated and have GIS files and MXD map files included with the model structure. The information below summarizes the maps already included in the model and highlights the process for setting up, reviewing, and modifying the maps.

### Related Topics

[Input Processing](#)

[Full Model Run](#)

[Post Processors](#)

## OVERVIEW OF VMIP MODEL GIS MAPS AND DATA

Before starting to make maps, some key things to keep in mind.

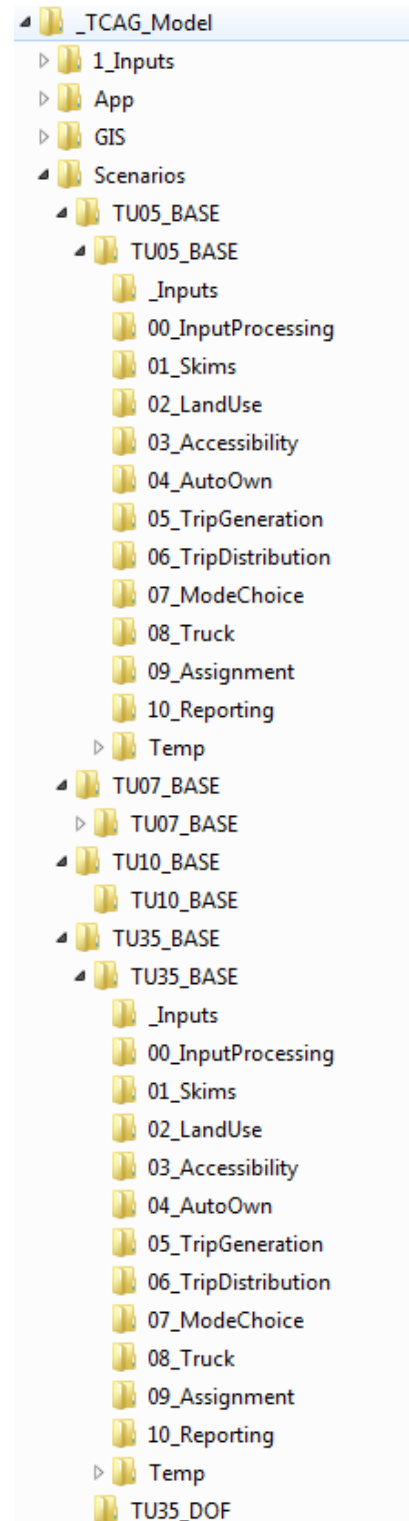
- Cube Catalog and Application Manager rely on the relationships (parent, child, sibling) between scenarios and inherited attributes (i.e. file locations and variable values). This concept was replicated in the included GIS map MXD files by referencing model data in a relative file structure (see details below)
- Base data that do not change by scenario are located in the Master.GDB and all other scenario specific data are contained in the Results.MDB within the scenario directory.
- To make maps using different symbology or variables, refer to the documentation tables for list of variables and values.

## GIS MODEL DIRECTORY STRUCTURE

- Model Directory
  - 1\_Inputs: Input files, Parameters Workbooks, Scenario Summary
  - App: Model scripts and applications
  - GIS
    - Master.gdb: street centerline files, city and county boundary, TAZ boundary
    - Blank.mdb: empty template geodatabase correctly projected for each model. When model is run file is copied as Results.mdb in the scenario directory. During the model run, scenario highway networks (input and loaded) and post-processor results are copied for access by the scenario MXD.

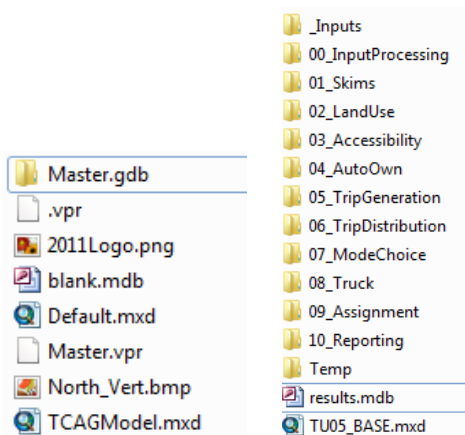


- Default.mxd: template map file used for input review before running full model and output mapping for scenarios. When model is run file is copied as SCENARIO\_NAME.mxd in the scenario directory. Relative reference to Master.gdb and Results.mdb
- MODELNAME.mxd: Master map file used for displaying the basic comparisons of standard scenarios (2005, validation year, 2020, 2035, and 2040). Relative link to Master.gdb and Results.mdb for standard scenarios.
- Images and layer files for background information or layout file for printing: F&P logo, north arrow, and National Geographic topographic and aerial maps.
- Scenarios: Model runs. Example for 2 years and 3 scenarios below
  - SCENARIOYR1\_BASE
    - ◆ SCENARIOYR1\_NAME1
      - ◇ Model directories (13 directories of model data)
      - ◇ Results.mdb
      - ◇ SCENARIOYR1\_NAME1.mxd
    - ◆ SCENARIOYR1\_NAME2
      - ◇ Model directories (13 directories of model data)
      - ◇ Results.mdb
      - ◇ SCENARIOYR1\_NAME2.mxd
    - ◆ SCENARIOYR1\_NAME3
      - ◇ Model directories (13 directories of model data)
      - ◇ Results.mdb
      - ◇ SCENARIOYR1\_NAME3.mxd
  - SCENARIOYR2\_BASE
    - ◆ SCENARIOYR2\_NAME1




- ◇ Model directories (13 directories of model data)
- ◇ Results.mdb
- ◇ SCENARIOYR2\_NAME1.mxd
- ◆ SCENARIOYR2\_NAME2
  - ◇ Model directories (13 directories of model data)
  - ◇ Results.mdb
  - ◇ SCENARIOYR2\_NAME2.mxd
- ◆ SCENARIOYR2\_NAME3
  - ◇ Model directories (13 directories of model data)
  - ◇ Results.mdb
  - ◇ SCENARIOYR2\_NAME3.mxd

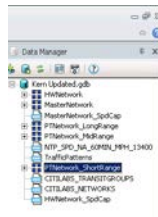
An example from the Tulare model is shown in the image to the right, with the directory tree expanded. Contents of the GIS directory (left) and the TU05\_BASE scenario (right).



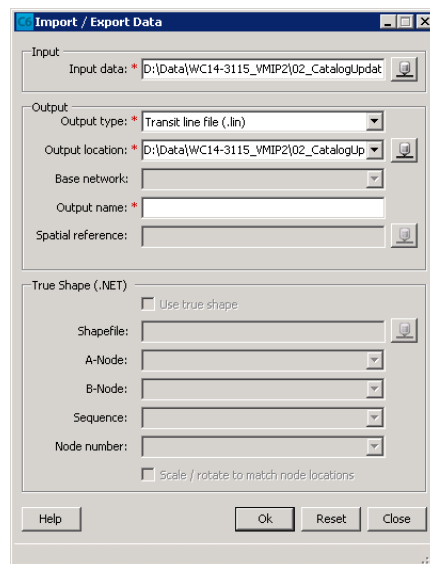
## IMPORTING\EXPORTING DATA FROM GEODATABASES

The GIS maps can only work with GIS based data (geodatabases and shape file), not the Cube standard files (highway .NET or transit .LIN). Cube has an easy to use data manager to import and export data between the different formats.

- If the database is not already loaded, click on  and load the data in the 01\_Inputs\3\_Highway



- To export a highway network or transit line, right click on the layer and select Export. Select the output location (default is the geodatabase so most likely change to a directory instead) and output type (this example is .LIN), enter a file name for the output, and then click OK. After the Operation Complete message shows up, click Close.



- To import a highway network or transit line, the same dialog box is used as export but the Input data should be a .NET or .LIN.
  - For a highway network, a shape file that relates to the .NET can be specified for a true shape display within the geodatabase.



- For a .LIN, an underlying highway network must also be specified.

Other datasets can also be added to the geodatabase, but it is recommended that most other files be added to the master geodatabase rather than the highway database to limit file size, maximize usability, and reduce the risk of corrupting the highway or transit networks.

## MASTER MODEL MAP FILE

The MODELNAME.mxd is used to map the inputs for the standard scenarios (2005, validation year, 2020, 2035 and 2040) and is contained within the MODELDIRECTORY\GIS folder with relative link to the scenario results geodatabase for only two levels of scenario directories following the MODELDIRECTORY\Scenarios\Level1\Level2\Results.mdb

The master model map file contains three basic types of information:

- Highway network lanes, facility type and speed
- TAZ boundary
- Background layers such as county or city boundary, and aerial or topographic maps

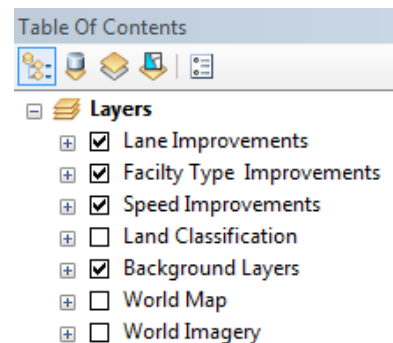


Table Of Contents	
<b>Layers</b>	
<input checked="" type="checkbox"/>	Lane Improvements
<input checked="" type="checkbox"/>	Facility Type Improvements
<input checked="" type="checkbox"/>	Speed Improvements
<input type="checkbox"/>	Land Classification
<input checked="" type="checkbox"/>	Background Layers
<input type="checkbox"/>	World Map
<input type="checkbox"/>	World Imagery

The Table of Contents of this Map file is shown below to the right.


## MASTER MAP HIGHWAY DATA

The highway network lanes, facility type, and speed are bold colors for the scenario year (after improvements are implemented), with the same symbology but muted intensity for the validation year. By overlaying the information and toggling on or off, the changes between years can quickly be seen. The change between the validation year and the scenario year are not yet standard outputs, but will be in upcoming enhancements. A discussion of each of the primary highway network maps is in the following sections.






## Master Map Lane Improvements



















- [-]  **Layers**
  - [-] ☐ Lane Improvements
    - [+] ☐ 2005 Lanes
    - [+] ☐ 2007 Lanes
    - [+] ☐ 2020 Lanes
    - [-] ☒ 2035 Lanes
      - Through Lanes per Direction
      - 1
      - 2
      - 3
      - 4
    - [+] ☐ 2040 Lanes
    - [-] ☒ Base Lanes
      - Through Lanes per Direction
      - 1
      - 2
      - 3
      - 4

## Master Map Facility Type Improvements








- [-]  **Layers**
  - [+] ☐ Lane Improvements
  - [-] ☒ Facility Type Improvements
    - [+] ☐ 2005 Facility Type
    - [+] ☐ 2007 Facility Type
    - [+] ☐ 2020 Facility Type
    - [-] ☒ 2035 Facility Type
      - Invalid Class
      - Facility Type
      - Freeway
      - Highway
      - Expressway
      - Arterial
      - Collector
      - Local
      - Ramp
      - Connector
    - [+] ☐ 2040 Facility Type
    - [-] ☒ Base Facility Type
      - Invalid Class
      - Facility Type
      - Freeway
      - Highway
      - Expressway
      - Arterial
      - Collector
      - Local
      - Ramp
      - Connector



### Master Map Speed Improvements

-  **Layers**
  -  ☐ Lane Improvements
  -  ☐ Facility Type Improvements
  -  ☒ **Speed Improvements**
    -  ☐ 2005 Speed
    -  ☐ 2007 Speed
    -  ☐ 2020 Speed
    -  ☒ 2035 Speed
      - Speed (mph)
        -  30 or lower
        -  31 - 40
        -  41 - 50
        -  51 or greater
  -  ☐ 2040 Speed
  -  ☒ Base Speed
    - Speed (mph)
      -  30 or lower
      -  31 - 40
      -  41 - 50
      -  51 or greater











### Master Map TAZ Data

-  **Layers**
  -  ☐ Lane Improvements
  -  ☐ Facility Type Improvements
  -  ☐ Speed Improvements
  -  ☒ **Land Classification**
    -  ☒ TAZs
      -  Traffic Analysis Zones



## MASTER MAP BACKGROUND DATA

### Master Map Background Base Data

-  **Layers**
  -  ☐ Lane Improvements
  -  ☐ Facility Type Improvements
  -  ☐ Speed Improvements
  -  ☐ Land Classification
  -  ☒ Background Layers
    -  ☒ City
    -  ☒ County
    - 
  -  ☐ RoadCL



## COMMON VARIABLES AND VALUES FOR CREATING GIS MAPS

This section has most commonly used variables and values. For full descriptions see the model documentation.

### LAND USE

Type	Attribute	Description	Units
Geographic	TAZ	Traffic Analysis Zone ID	
	STATE	State	
	COUNTY	County	
	PUMA	Census Public Use Microdata Area	
	CITY	City	
	TRACT	Census tract ID	
	BLOCK	Census block ID	
	MODEL	Model ID	
	PLACETYPE <sup>1</sup>	Placetype category	
Residential	TOTHH	Total Households	Households
	RU1, RU2, ... RU10 <sup>2</sup>	Households by Residential Unit Type	Households
	RUG1, RUG2, RUG3 <sub>2</sub>	Households by Residential Unit Type Groups	Households
	RUG1SPARE, ... RUG7SPARE	Unused in current model but available for expanding grouping of residential unit types.	
Non-residential <sup>3</sup>	TOTEMP	Total employees	Employees
	EMPEDU	Educational Services (61-63)	Employees
	EMPFOO	Accommodations (721), Food Services (722), Arts, Entertainment and Recreation (71)	Employees
	EMPGOV	Public Administration (92)	Employees
	EMPIND	Utilities (22), Construction (23), Other Services Except Public Administration (81), Wholesale Trade (42), Transportation and Warehousing (48-49)	Employees
	EMPMED	Health Care and Social Assistance (62)	Employees



Type	Attribute	Description	Units
Scenario	EMPOFC	Information (51), Finance and Insurance (52), Real Estate, Rental and Leasing (53), Professional, Scientific, and Technical Services (54), Management of Companies and Enterprises (55), Administrative/Support, Waste Management & Remediation (56)	Employees
	EMPOTH	Mining, Quarrying, Oil and Gas Extraction (21), Manufacturing (31-33)	Employees
	EMPRET	Retail Trade (44-45)	Employees
	EMPAGR	Agriculture, Forestry, Fishing and Hunting (11)	Employees
	EMPSPARE1, ... EMPSPARE8	Unused in current model but available for expanding employment categories	
	POPDORM	Group Quarters population: School (Dormitory, Fraternity, Sorority)	People
	POPASSIST	Group Quarters Population: Medical (Assisted living, retirement home)	People
	POPMILITARY	Group Quarters Population: Military (Military base if not special generator)	People
	POPINST	Group Quarters Population: Institutionalized population (prison, mental health, etc)	People
	ELEM	Elementary and middle school enrollment	Student Enrollment
	HS	High school enrollment	Student Enrollment
	COLLEGE	College enrollment	Student Enrollment
	YEAR	Scenario year	
	SCEN	Scenario name	
	MPO	MPO	
	Comments	Scenario comments	

Notes:

1. See Table 3.2-3 in Development Report for place type categories.
2. See Table 3.2-4 in Development Report for residential unit type categories.
3. Non-residential description contains NAICS sector number(s).

Source:

## ROADWAY NETWORKS

Highway network variables and values are listed below.

Highway Facility Type (FACTYP)	
1.	Freeway
2.	Highway
3.	Expressway
4.	Arterial
5.	Collector
6.	Local
7.	Ramp: Freeway-Freeway
8.	Ramp: Slip
9.	Ramp: Loop
10.	Connector: Dist. $\leq 0.25$
11.	Connector: Dist. $> 0.25$

Master network variables

Attribute	Description
<b>Nodes</b>	
X	X-coordinate of node in Nad 83
Y	Y-coordinate of node in Nad 83
N	Node number
TAZ	Traffic Analysis Zone Number
DISTRICT	Super district number used for aggregation
SOI	Sphere of influence used to number TAZs alphabetically
STYINT	Study location number used to record turning movements when non-zero
COUNTY	County where node is located
JURISDICTION	Political jurisdiction where node is located
COMMUNITY	Community/district name
<b>Links</b>	
A	A node



Attribute	Description
B	B node
DISTANCE	Distance in miles
ST_NAME	Local street name
ROUTE	Numerical state route number
TERRAIN	Terrain (F=Flat , R=Rolling, M=Mountain)
JURISDICTION	Political jurisdiction where link is located location
SCREENLINE	Screenline by direction (See Figures 3-1.1 through 3.1.10)
XXXX_PRJID <sup>1</sup>	RTP Project ID number
XXXX_PRJYR <sup>1</sup>	RTP Project Opening Year
XXXX_FACTYP <sup>1</sup>	Facility type by year <sup>2</sup>
XXXX_AREATYP <sup>1</sup>	Area type by year <sup>2</sup>
XXXX_LANES <sup>1</sup>	Number of directional through travel lanes by year <sup>2</sup>
XXXX_AUX <sup>1</sup>	Auxiliary lane (0=no, 1=yes)
XXXX_SPEED <sup>1</sup>	Free-flow speed in miles-per hour by year <sup>3</sup>
XXXX_CAPCLASS <sup>1</sup>	Capacity class by year (derived from Terrain, Facility type, and Area Type) <sup>2</sup>
XXXX_CAPACITY <sup>1</sup>	Vehicle per hour (calculated based on Lanes and CapClass) <sup>4</sup>
XXXX_USE <sup>1</sup>	Identifies vehicle prohibitions by year <sup>5</sup>
XXXX_TOLL <sup>1</sup>	Code used for cost on toll facilities by year <sup>3</sup>
AREATYP	Character to store scenario variable
AIRBASIN	Air basin number for air quality or County number in multi-county models
TSM	Transportation System Management
EJ	Environmental Justice designation (0 or 1)

Notes:

XXXX represents BASE (calibration/validation year), IMP1 (status after first improvement), and IMP2 (status after second improvement). In addition to calibration/validation year which varies by MPO, required years to be covered by improvement are 05, 20, 35, and 40.

0 or 1=facility open to all ("general purpose") ; 2=Carpool 2; 3=Carpool 3+; 4=Combination trucks prohibited; 5=Walk or bike only



## TAZ MODEL SUMMARY

10\_Reporting TAZ Summary files report TAZ level outputs in different aggregation levels by purpose and mode. They can be joined to the TAZ shape file for mapping. Since the variables are summarized by zone and the values are not mutually exclusive, these TAZ files should not be used for aggregating VMT or other metrics.

Attribute	Description
<b>TAZSummary.DBF</b>	
I	TAZ Number
TOTHH_SF	Total Single Family Households
HHPOP_SF	Total Single Family Population
TOTHH_MF	Total Multi-Family Households
HHPOP_MF	Total Multi-Family Population
RETEMP	Retail Employment
NONRETEMP	Non-Retail Employment
ELEM	Elementary Enrollment
HS	High School Enrollment
COLLEGE	College Enrollment
INTDEN	Intersection Density
WALKPERC	Percentage of Zone with Walk Access
RESACRE	Residential Developed Acres
EMPACRE	Employment Developed Acres
TOT_XVEH <sup>1</sup>	Total Households with X Vehicles Available
HH_AVGVEH	Average Household Vehicle Availability
HH_05TRN	Total Households within half mile of Transit
EMP_05TRN	Total Employees within half mile of Transit
EMP_30TRN	Total Employees within 30 minutes of Transit
EMP_1WALK	Employment within 1 mile walk
EMP_AVO	Employee Average Vehicle Occupancy
EXPORT_RES	Exported Residential Work Trips
IMPORT_EMP	Imported Employee Work Trips





Attribute	Description
VMODE_PURP_VT <sup>2, 3</sup>	Total Vehicle Trips by Mode by Purpose
VMODE_PURP_VMT <sup>2, 3</sup>	Total Vehicle Miles Traveled by Mode by Purpose
VMODE_PURP_VDIST <sup>2, 3</sup>	Average Vehicle Distance Traveled (miles) by Mode by Purpose
VMODE_PURP_VTIME <sup>2, 3</sup>	Average Vehicle Time Traveled (minutes) by Mode by Purpose
<b>TAZSUMMARY_DETAILED_TIME.DBF</b>	
I	TAZ Number
MODE_PURPOSE_PT <sup>4, 5</sup>	Total Person Trips by Mode by Purpose
MODE_PURPOSE_PHT <sup>4, 5</sup>	Total Person Hours of Travel by Mode by Purpose
MODE_PURPOSE_PTIME <sup>4, 5</sup>	Average Person Travel Time (minutes) by Mode by Purpose
<b>TAZSUMMARY_DETAILED_DIST.DBF</b>	
I	TAZ Number
MODE_PURPOSE_PT <sup>4, 5</sup>	Total Person Trips by Mode by Purpose
MODE_PURPOSE_PMT <sup>4, 5</sup>	Total Person Miles of Travel by Mode by Purpose
MODE_PURPOSE_PDIST <sup>4, 5</sup>	Average Person Travel Distance (miles) by Mode by Purpose

Notes:

1. X represents number of vehicles per household: 1, 2, 3, or 4.
2. VMODE represents vehicle travel mode: D1=Drive alone; S2=Shared Ride 2 people; S3= Shared Ride 3+ people
3. PURP represents aggregated travel purpose: HW=Home-Based Work; HO=Home-Based Other; NH= Non-Home Based
4. MODE represents persons by travel mode: D1=Drive alone; S2=Shared Ride 2 people; S3= Shared Ride 3+ people; TW=Walk to Transit; TD=Drive to Transit; BK=Bike; WK=Walk
5. PURPOSE represents travel purpose: HW=Home-Work; HS=Home-Shop; HK=Home-School; HS=Home-College; HO=Home-Other; WO=Work-Other; OO=Other-Other



## CREATING SUBAREA MODELS

The VMIP 2 model structure is intended to be transferable to other areas and used in easily developing subarea models for individual projects or jurisdictions. The process below describes the tasks specific to the subarea model development, with references to the previous sections of the user guide when the steps are similar.

Due to the geographic scale of the model and the focus on regional VMT forecasts for air quality conformity and greenhouse gas analysis in the RTP/SCS, local-scale project applications should verify the model's performance within the local study area. Normally, this will be done by performing a subarea validation in recognition that use of regional MPO models for purposes other than regional planning should ensure that the model provides the appropriate scale and sensitivity for applications at a sub-regional level such as corridor, sub-area, or local planning studies. Below the regional level, model refinements are likely necessary to ensure the model meets the validation targets and is appropriately sensitive to smaller scale changes associated with sub-regional studies."

Common checks for subarea models include all the same type of checks described in the [Creating a New Scenario](#) and the [Review Model Outputs](#) sections of this user guide. In addition, the model sensitivity to the type of project being evaluated should be conducted. This often includes splitting TAZs, adding roadway network detail, refining land use inputs and converting square-footages to employees, modifying demographics of the project, and validating overall trip magnitude (trip generation rates) and trips for specific times of day (diurnal factors).

As the base scenario was validated and future scenarios were evaluated, the following notes were made in the model development report that includes the accuracy of project level forecasts.

1. Model households, population, and total employment not matching identically to the growth forecast: Some scenarios deviate from the control totals of the regional forecast purposefully. Small differences due to rounding may occur and result in less than 0.5% overall error. For differences large than 0.5%, verification of input data and implications on regional travel, PA balancing, etc should be conducted as described in the attached memo. Although population is used for school trips only, ensuring the household size by income group reflects the plan is important as it influences travel for all purposes.
2. Lower than expected person and auto trips per household: Multiple factors when combining the disaggregate data into a single value like total trips per household rather than percentages. The most likely factors are:



- CHTS households and total trips not being the same as the model due to different years and also the weighting of CHTS
  - small percentage deviation allowed in calibration of mode share over a large number of trips causes larger numerical difference (ex. transit mode choice with only 2% difference resulting in 120% overestimate of transit ridership compared to agency reported observed boardings). Shift between drive alone, shared ride 2, and shared ride 3+ have a direct impact on the vehicles per household calculation
  - using single average value by purpose for persons per vehicle for auto 3+ mode share
3. Updated regional plans, statewide model, or other factors influencing through trips and through trip VMT within the study area: The passenger vehicle through trips are extracted from the CSTDM and adjusted based on internal generated trips for the base year. The adjustment was applied to the interpolated years between the base and future years on the CSTDM. At the time the model was developed, the CSTDM did not include the SJV MPO regional plans. Since the development of the model, the CSTDM may have been updated and future forecasts also updated to reflect the plans and also the recovery from the recession.
  4. Time of day turn movements do not match counts: The model was calibrated at a link level based on the time of day information recommended by the RTP Guidelines at a regional scale. Local factors such as land use activity, local congestion, intersection control, roadway network and TAZ detail, that influence turn movements and subregional travel were not calibrated. For metrics other than VMT by time of day and speed, local validation and potentially calibration is recommended. For turn movements, it is recommended that a method such as NCHRP 255 or 716 are applied rather than using the model volumes directly.

## PREPARING THE SUBAREA MODEL INPUT FILES

The input file structure and content for the subarea model should be identical to the overall model, but more specific to the details and values of the model. The required changes are the high network, transit system, external gateways, and interregional trips. Other changes to land use and socioeconomics, zone system, and calibration factors are optional but recommended to at least confirm the reasonableness.

### CREATING SUBAREA HIGHWAY AND TRANSIT

The example below uses the .NET and .LIN format. Editing in GIS is similar and the files can be edited in GIS or Cube native format, and transferred between each as described in the [Importing\Exporting data from geodatabases](#).

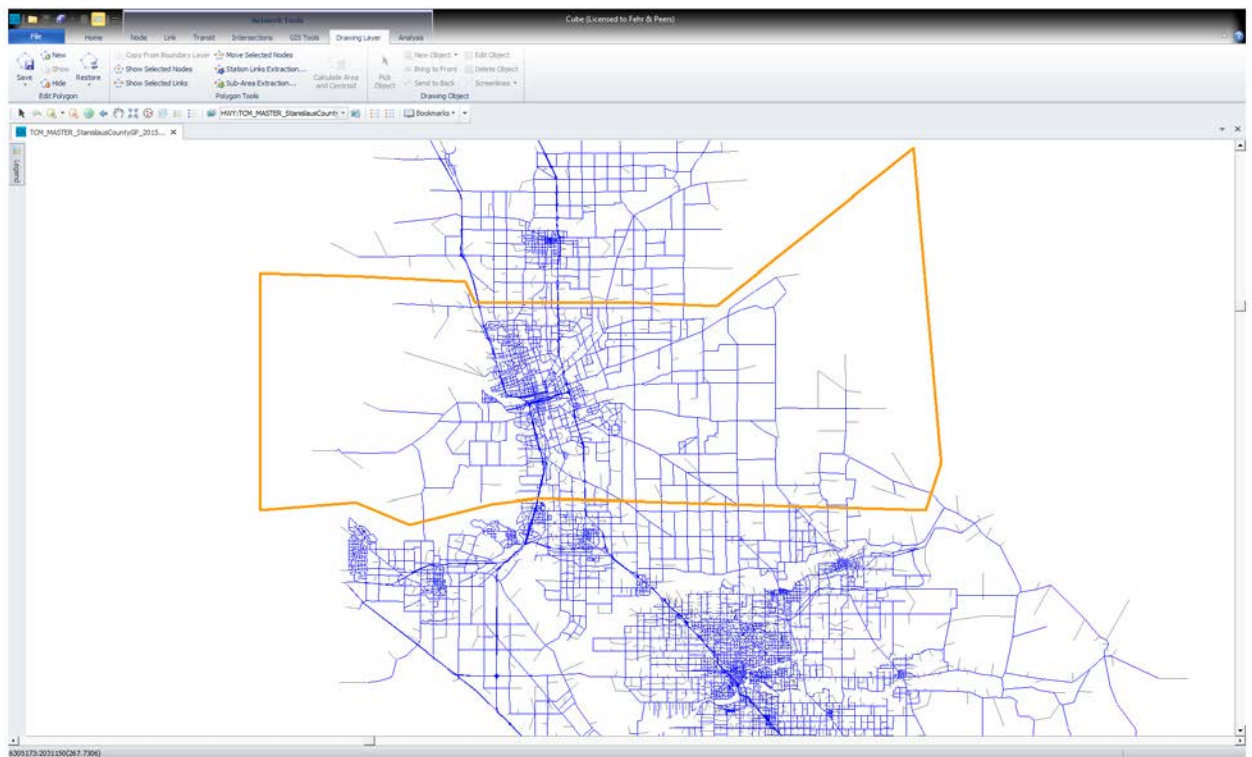
1. Copy all original model files to a new directory

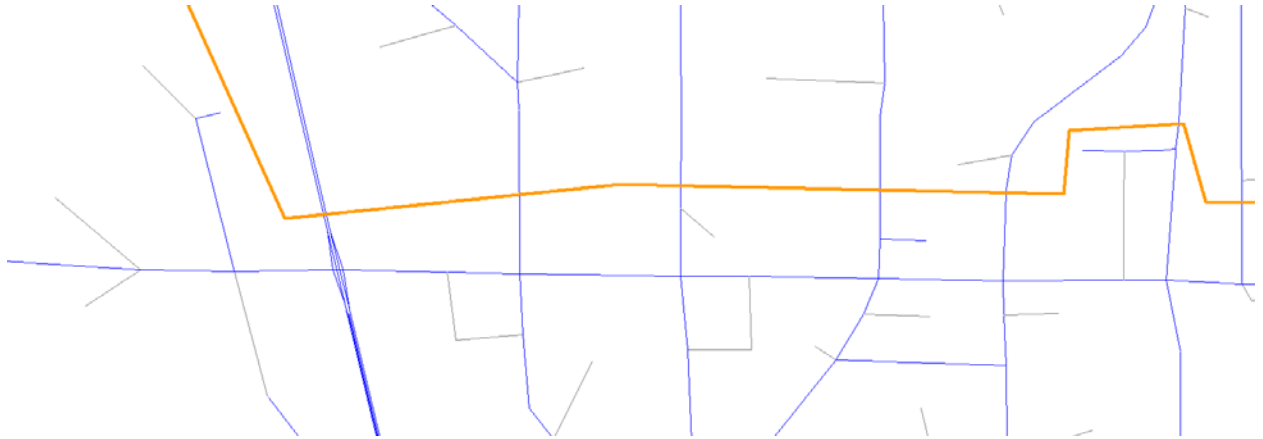


2. Open the master highway network
3. Identify the geographic coverage of the sub-area model and create a polygon from the Drawing Layer menu and then select New. A boundary file from a planning area, city limits, etc could also be used and loaded to select from instead and loading the model TAZ boundary file may also be useful.

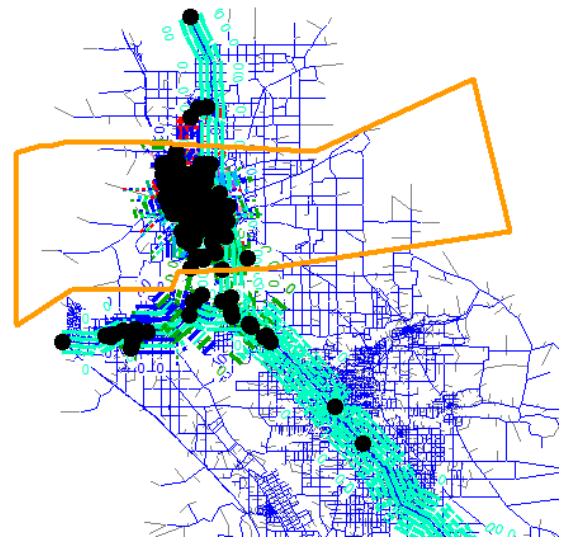
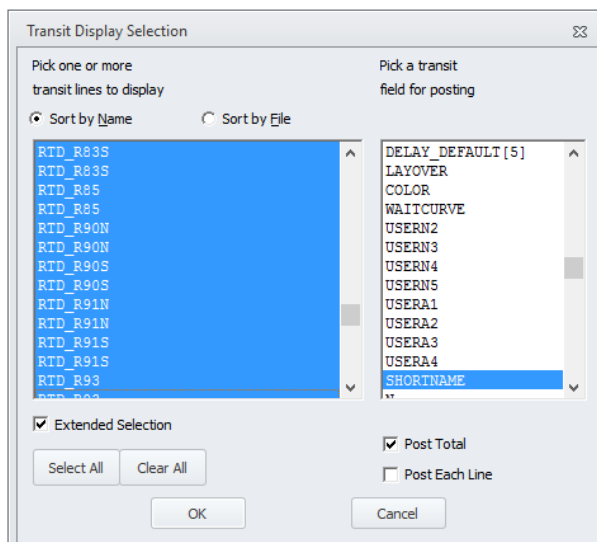


4. Draw a polygon around the sub area, making sure all centroids that you wish to remain in the model are connected to roadways and minimizing gateways. Click to make the vertices of the polygon and double click to close. Zoom in to refine the lines as needed, then save with a name for later use.

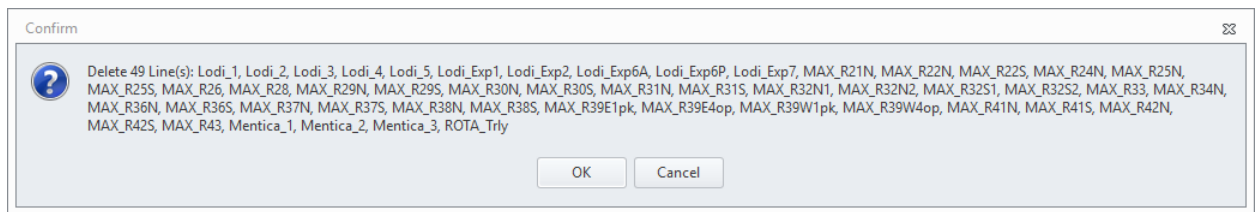
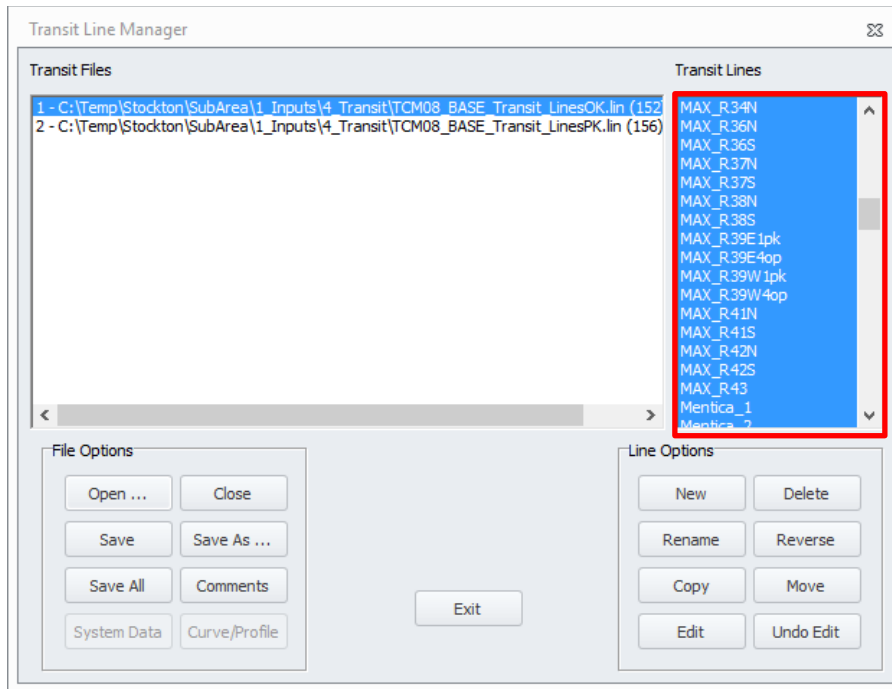




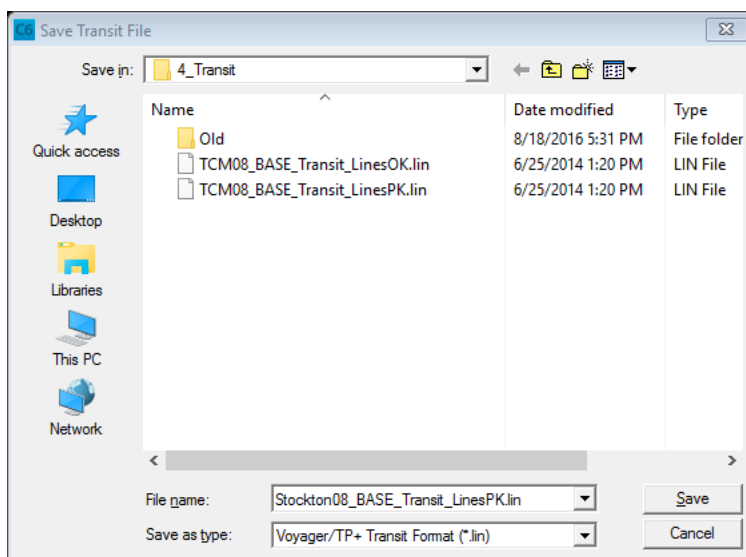
5. Load all of the existing and future transit lines (if applicable).
6. Based on the extent of the sub-area model being developed, identify transit lines that are completely within the boundary and those cross the boundary but that might be included in the sub-area model (turning on stop nodes may be useful).



7. Using the Line Manager, remove all the lines that are not within the sub-area from each of the transit line files.



8. Save each the transit lines with the sub-area model name.



- Using a text editor, edit the Public Transport System (PTS), Fare System (FAR), and Factors (FAC) files to remove the lines no longer needed. Keeping the same mode number as in the original model is preferred so the sub-area and full model can transfer data easily back and forth. Save files with the sub-area model name. Remember to change the file type from TXT to all.

## PTS

TCMS08\_BASE\_TRANPTS - Notepad
File Edit Format View Help

```

;;<<PT>><<SYSTEM>>;
MODE NUMBER=1 LONGNAME="StarT" Local " NAME="StarT_Loc"
MODE NUMBER=2 LONGNAME="StarT" InterCity " NAME="StarT_Int"
MODE NUMBER=3 LONGNAME="MAX" Local " NAME="MAX_Loc"
MODE NUMBER=4 LONGNAME="MAX" InterCity " NAME="MAX_Int"
MODE NUMBER=5 LONGNAME="CAT" Local " NAME="CAT_Loc"
MODE NUMBER=6 LONGNAME="CAT" InterCity " NAME="CAT_Int"
MODE NUMBER=7 LONGNAME="BLAST" Local " NAME="BLAST_Loc"
MODE NUMBER=8 LONGNAME="BLAST" InterCity " NAME="BLAST_Int"
MODE NUMBER=9 LONGNAME="ROTA" Local " NAME="ROTA_Loc"
MODE NUMBER=10 LONGNAME="ROTA" InterCity " NAME="ROTA_Int"
MODE NUMBER=11 LONGNAME="RTD" Local " NAME="RTD_Loc"
MODE NUMBER=12 LONGNAME="RTD" InterCity " NAME="RTD_Int"
MODE NUMBER=13 LONGNAME="THEBUS" Local " NAME="THEBUS_Loc"
MODE NUMBER=14 LONGNAME="THEBUS" InterCity " NAME="THEBUS_Int"
MODE NUMBER=15 LONGNAME="Escalon Transit" " NAME="ETTRANS"
MODE NUMBER=16 LONGNAME="Lodi Fixed Route" " NAME="lodi_trn"
MODE NUMBER=17 LONGNAME="Lodi Express" " NAME="lodi_EXP"
MODE NUMBER=18 LONGNAME="Mentica Transit" " NAME="Manti_trn"
MODE NUMBER=19 LONGNAME="Tracy Transit" " NAME="Tracy_trn"
MODE NUMBER=21 LONGNAME="Greyhound" " NAME="Greyhound"
MODE NUMBER=22 LONGNAME="Altamont Commuter Express" " NAME="ACE"
MODE NUMBER=23 LONGNAME="Amtrak" " NAME="Amtrak"

MODE NUMBER=101 LONGNAME="Walk Access/Egress" " NAME="Walk"
MODE NUMBER=102 LONGNAME="Drive Access/Egress" " NAME="Drive"
MODE NUMBER=103 LONGNAME="Transfers" " NAME="Xfers"

;
; WAITCURVES FROM CITILABS EXAMPLE
;
WAITCRVDEF NUMBER=1 LONGNAME="InitialWait" NAME="InitWait" ,
CURVE=1-0.5,16-8,27-12,48-15,160-20
WAITCRVDEF NUMBER=2 LONGNAME="TransferWait" NAME="XferWait" ,
CURVE=1-0.0, 160-5.0

WAITCRVDEF NUMBER=3 LONGNAME="ScheduledTransferWait" NAME="SchdXferWait" ,
CURVE=1-0.0, 160-5.0

```

Stockton08\_BASE\_TRANPTS - Notepad
File Edit Format View Help

```

;;<<PT>><<SYSTEM>>;
MODE NUMBER=11 LONGNAME="RTD" Local " NAME="RTD_Loc"
MODE NUMBER=12 LONGNAME="RTD" InterCity " NAME="RTD_Int"
MODE NUMBER=21 LONGNAME="Greyhound" " NAME="Greyhound"

MODE NUMBER=101 LONGNAME="Walk Access/Egress" " NAME="Walk"
MODE NUMBER=102 LONGNAME="Drive Access/Egress" " NAME="Drive"
MODE NUMBER=103 LONGNAME="Transfers" " NAME="Xfers"

;
; WAITCURVES FROM CITILABS EXAMPLE
;
WAITCRVDEF NUMBER=1 LONGNAME="InitialWait" NAME="InitWait" ,
CURVE=1-0.5,16-8,27-12,48-15,160-20
WAITCRVDEF NUMBER=2 LONGNAME="TransferWait" NAME="XferWait" ,
CURVE=1-0.0, 160-5.0

WAITCRVDEF NUMBER=3 LONGNAME="ScheduledTransferWait" NAME="SchdXferWait" ,
CURVE=1-0.0, 160-5.0

```

## FAR

```
TCM00L_BASE_TRAN\FAR - Notepad
File Edit Format View Help
FARESYSTEM,
NUMBER=1,
NAME="StarT_Loc",
LONGNAME="StarT Local ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=1

FARESYSTEM,
NUMBER=2,
NAME="StarT_Int",
LONGNAME="StarT InterCity ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=3

FARESYSTEM,
NUMBER=3,
NAME="MAX_Loc",
LONGNAME="MAX Local ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=3

FARESYSTEM,
NUMBER=4,
NAME="MAX_Int",
LONGNAME="MAX InterCity ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=1

FARESYSTEM,
NUMBER=5,
NAME="CAT_Loc",
LONGNAME="CAT Local ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=3

FARESYSTEM,
NUMBER=6,
NAME="CAT_Int",
LONGNAME="CAT InterCity ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=3

FARESYSTEM,
NUMBER=7,
NAME="BLAST_Loc",
LONGNAME="BLAST Local ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=1

Stockton00L_BASE_TRAN\FAR - Notepad
File Edit Format View Help
FARESYSTEM,
NUMBER=11,
NAME="RTD_Loc",
LONGNAME="RTD Local ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=3

FARESYSTEM,
NUMBER=12,
NAME="RTD_Int",
LONGNAME="RTD InterCity ",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=3

FARESYSTEM,
NUMBER=21,
NAME="Greyhound",
LONGNAME="Greyhound",
STRUCTURE=FLAT, SAME=SEPARATE,
IBOARDFARE=20
```





## FAC

TCM08\_BASE\_TRAN.FAC - Notepad

File Edit Format View Help

```

/*For Route Enumeration*/
VALUEOFTIME=23*15      ; based on assumption in
FARESYSTEM=1 , MODE=1
FARESYSTEM=2 , MODE=2
FARESYSTEM=3 , MODE=3
FARESYSTEM=4 , MODE=4
FARESYSTEM=5 , MODE=5
FARESYSTEM=6 , MODE=6
FARESYSTEM=7 , MODE=7
FARESYSTEM=8 , MODE=8
FARESYSTEM=9 , MODE=9
FARESYSTEM=10, MODE=10
FARESYSTEM=11, MODE=11
FARESYSTEM=12, MODE=12
FARESYSTEM=13, MODE=13
FARESYSTEM=14, MODE=14
FARESYSTEM=15, MODE=15
FARESYSTEM=16, MODE=16
FARESYSTEM=17, MODE=17
FARESYSTEM=18, MODE=18
FARESYSTEM=19, MODE=19
FARESYSTEM=21, MODE=21
FARESYSTEM=22, MODE=22
FARESYSTEM=23, MODE=23
MAXFERS=2              ; not a maximum, routes
EXTRAXFERS1 = 2        ; CITILABS EXAMPLE
EXTRAXFERS2 = 1        ; CITILABS EXAMPLE
SPREADFACT = 1.1       ; min time then x fact C
SPREADFUNC = 2         ; CITILABS EXAMPLE combi
SPREADCONST = 5        ; min transit time x 1.1
/*For Route Enumeration and Evaluation*/
; no XFERPEN for now
;XFERPEN = 1, FROM=1 TO=1
;XFERPEN = 1, FROM=1 TO=2
;XFERPEN = 1, FROM=1 TO=3
;XFERPEN = 1, FROM=2 TO=1
;XFERPEN = 1, FROM=2 TO=2
;XFERPEN = 1, FROM=2 TO=3
;XFERPEN = 1, FROM=3 TO=1
;XFERPEN = 1, FROM=3 TO=2
;XFERPEN = 1, FROM=3 TO=3

```

Stockton08\_BASE\_TRAN.FAC - Notepad

File Edit Format View Help

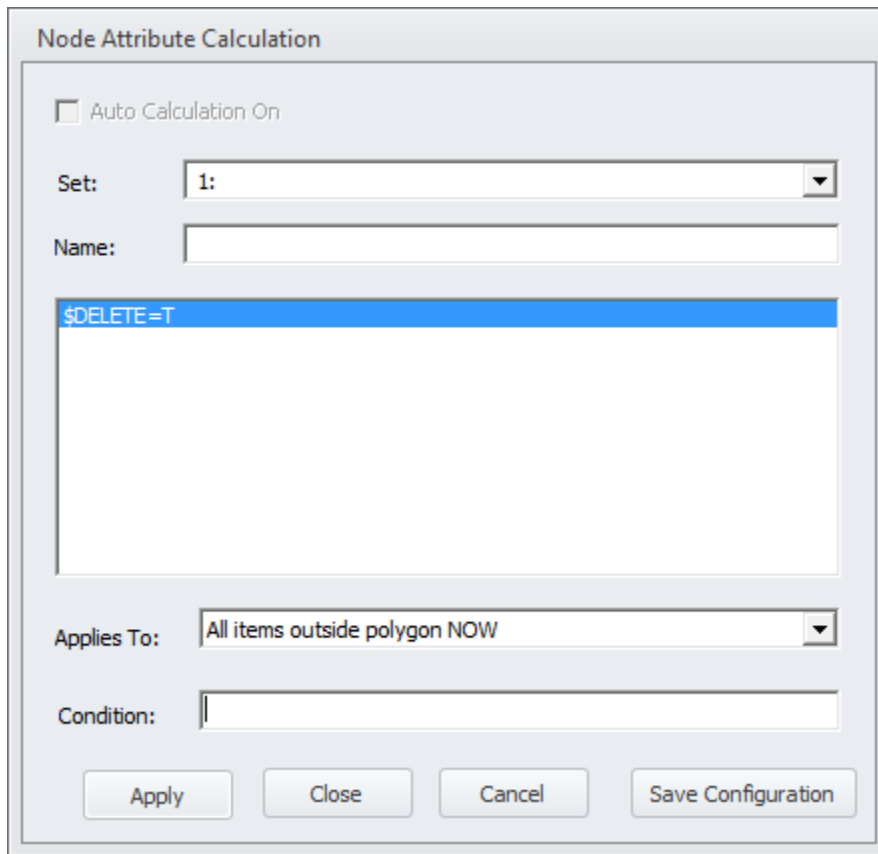
```

/*For Route Enumeration*/
VALUEOFTIME=23*15      ; based on assumption in standard script
FARESYSTEM=11, MODE=11
FARESYSTEM=12, MODE=12
FARESYSTEM=21, MODE=21
MAXFERS=2              ; not a maximum, routes with more than 2 transfers :
EXTRAXFERS1 = 2        ; CITILABS EXAMPLE
EXTRAXFERS2 = 1        ; CITILABS EXAMPLE
SPREADFACT = 1.1       ; min time then x fact CITILABS EXAMPLE model was cr
SPREADFUNC = 2         ; CITILABS EXAMPLE combination of generalized cost c
SPREADCONST = 5        ; min transit time x 1.1 then add 5 min
/*For Route Enumeration and Evaluation*/
; no XFERPEN for now
;XFERPEN = 1, FROM=1 TO=1
;XFERPEN = 1, FROM=1 TO=2
;XFERPEN = 1, FROM=1 TO=3
;XFERPEN = 1, FROM=2 TO=1
;XFERPEN = 1, FROM=2 TO=2
;XFERPEN = 1, FROM=2 TO=3
;XFERPEN = 1, FROM=3 TO=1
;XFERPEN = 1, FROM=3 TO=2
;XFERPEN = 1, FROM=3 TO=3
/*For Route Evaluation*/
ALPHA = 1.0            ; CITILABS EXAMPLE
LAMBDAA = 0.2          ; CITILABS EXAMPLE
LAMBDAA = 0.2          ; CITILABS EXAMPLE
CHOICECUT=0.05         ; CITILABS EXAMPLE
IWAITCURVE=1, N=10001-29999
XWAITCURVE=2, N=10001-29999
XWAITCURVE=3, N=10001-29999
WAITFACTOR=1.4, N=10001-29999

```

10. Repeat steps 6-9 to remove all transit lines that cross the boundary of the study area and save files as a new name.
11. Delete all nodes outside of the model sub-area





The dialog box is titled "Node Attribute Calculation". It contains the following elements:

- A checkbox labeled "Auto Calculation On" which is currently unchecked.
- A "Set:" label followed by a dropdown menu showing "1:".
- A "Name:" label followed by an empty text input field.
- A large text area containing the text "\$DELETE=T", which is highlighted in blue.
- An "Applies To:" label followed by a dropdown menu showing "All items outside polygon NOW".
- A "Condition:" label followed by an empty text input field.
- Four buttons at the bottom: "Apply", "Close", "Cancel", and "Save Configuration".

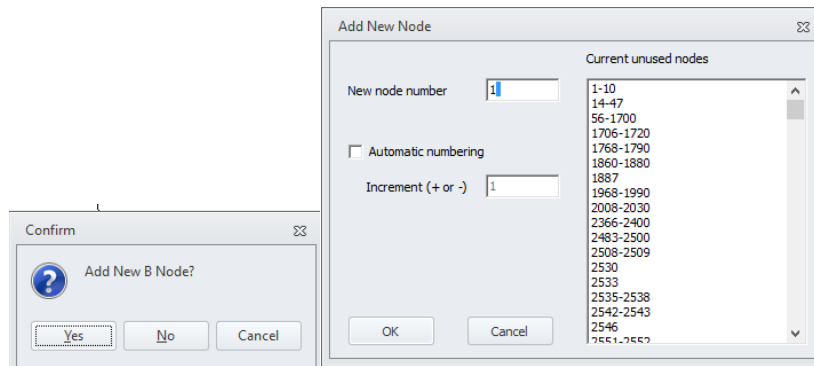
12. The links and nodes outside of the polygon will be deleted, keeping those within (but not crossing) the polygon only.

## UPDATING GATEWAYS FOR SUBAREA

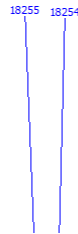
The highway network that was previously internal to the model and is not external to the model is represented by gateways at the point the model network was extracted in the step above. To create new gateways:

1. Determine the gateway numbers to be used (1-100 are used for externals).
2. Copy an existing centroid connector and paste the link, connecting to the network link and having the new node be the gateway number selected, drawing the centroid connector in the direction of travel.
3. The endpoint of the new centroid connector will prompt for a node number from the unused zone numbers. Use the node number determined in Step 1 for each location.





**Before**



**After**



4. Save the network

## UPDATING INTERREGIONAL TRAVEL FOR SUBAREA

Although the model will run without updating these files, the model should not be used without updating the values or the results will be meaningless. For more details see [Updating Interregional Travel](#)

### Subarea Gateway Station Weights

The station weights are productions and attractions by purpose at each gateway that interact with the trips generated within the study area. This process is the same as described in [Gateway Station Weights](#), with the exception that the gateways are different at locations and should have different values.

### Subarea Through Trips

The other piece of information needed for the new subarea network is the through trips. Since the model is a subarea from a larger model, the through trips can be obtained by running select link on the original model (or a larger model containing the subarea like the statewide model) and outputting the OD matrix, using big data, or assumed to be similar to the original model depending on the scale difference between



the original and subarea model. Once the values of through trips are determined, the process described to update the [Through Trips](#) can be implemented.

## UPDATING OTHER DETAILS FOR SUBAREA

Although the model will run without updating these files, the current values were determined for regional planning and should not be used within confirming they are appropriate for subarea model.

### TAZs

Keeping the zone number of externals 1-100 and the internals from 101 to the max number needed is required. It is recommended internal zones be renumbered and TAZs split/joined as needed. Keeping a relationship between the subarea zone number and the new zone number is also recommended. If zone numbers are going to be changed, the relationship to the previous land use/TAZ number are critical to maintain so the land use is allocated back in the same place. If the number of zones exceeds the previous model, renumbering the nodes will also be required. Renumbering non-centroids is only recommended if needed and is recommended as the final step in the process since turn penalty and A-B link designations with counts may also need to be updated.

After determining the zone numbers, renumbering the

1. Update the TAZ boundary and the **TAZ\_Data** tab in VMIP2\_SCENARIOPrep.XLSX (particularly the developed and total acres)
2. Create an equivalency between the previous node numbers and the new node numbers (possibly only for TAZs) where the first column is the current node number and the second is the new node number. Use the VMIPZoneRenumber.csv as a template.
3. Modify the VMIP2\_NodeRenumber.s script to read in the correct network and correlation file
4. Run the script
5. Verify the process worked correctly

### Land Use and Special Generators

At a minimum, updating the control totals for each zone and verifying special generators are accurate for each zone. If zone changes are made from the original model, verify the control totals are the same before updating with refined data to ensure that the split\aggregation of zones is working properly.



### **Socioeconomic Details**

Verify that the control total, TAZ allocation, and socio-demographic data for each zone is accurate. This is both the [SED\\_Cross\\_ClassRates\\_Template](#) for the residential and the [TAZ\\_Data](#) for the interregional travel of households and the income by job type.

### **Calibration Factors**

The average vehicle occupancy, value of time, maximum walk\bike distance and similar values in the calibration parameters should be evaluated for the subarea model in relation to the overall model. Updated values can be implemented in the scenario keys as needed. If the values are changed, update the top level Scenario and the values will carry forward to each child scenario. A new catalog should be created with a distinct name so factors that are not often used are clearly different. Also document the changes in [VMIP2\\_XX\\_Parameters.xlsx](#) and Subarea Model Development Report.

