

FINAL

BCAG 2020 RTP Travel Demand Model

Model User Guide

Prepared for



August 2020

FEHR & PEERS

RS18-3710

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Prepared for:

Butte County Association of Governments

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OVERVIEW

This document contains information on the use of the BCAG TDF Model for the most common functions of forecasting and regional planning. The details that are specific to model development, reasonableness checks, and validation are contained in the Model Development Report.

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	Variables	Source and Scale of current implementation	Scale of potential implementation	Update Frequency
Highway network	<i>Lanes, facility type, speed, year implemented</i>	MPO RTP model Highway link	Highway link	Often; infrastructure project, RTP, etc
Transit Access	<i>Headway</i>	MPO RTP model TAZ	TAZ	Occasional; transit plan, RTP, etc
Land Use Control Totals	<i>Occupied housing units, occupied thousand square feet, school enrollment, slots</i>	DOF, EDD, MPO RTP model TAZ	TAZ	Often; development project, RTP, etc
Developed Area	<i>Total developed area (or residential and commercial acres)</i>	MPO RTP model TAZ	TAZ	Often review and occasional update; every land use scenario
Household demographics	<i>HHPOP, HHSize_HHIncome, HHAge, etc</i>	Census (ACS) PUMA	TAZ	Often review and occasional update; every land use scenario



Description	Variables	Source and Scale of current implementation	Scale of potential implementation	Update Frequency
Percentages of employment that are high, medium, and low income, by job sector	<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	<i>HBWH_ix, HBWH_xi, HBWM_ix, HBWM_xi, etc</i>	CHTS, Big Data (StreetLight) Census Place	TAZ	Often review and occasional update; every land use scenario
Trip productions and attractions by gateway	<i>HBW_IX, HBW_XI, etc</i>	CSTDM Gateway	Gateway	Often review and occasional update; every land use scenario
Home-work gateway attractions by income group	<i>HBWH_ix, HBWH_xi, HBWM_ix, HBWM_xi, etc</i>	CHTS Gateway	Gateway	Often review and occasional update; every land use scenario
Through Trips	<i>HW_XX, HS_XX, etc</i>	CSTDM, Big Data (StreetLight) Gateway	Gateway	Often review and occasional update; every land use scenario
Trip Generation	<i>Person trips by land use category</i>	CHTS TAZ	TAZ	Often review and occasional update; every land use scenario
Other factors	<i>Auto operating cost, mode choice, etc</i>	Model wide	Model wide	Rarely; model calibration based on new data



Description	Variables	Source and Scale of current implementation	Scale of potential implementation	Update Frequency
"D" Variables	<i>Sidewalk coverage, route directness, intersection density</i>	Base GIS network TAZ	TAZ	Often review and occasional update; every land use scenario



INSTALL, SETUP, AND RUN THE MODEL

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 6.4.3** and **ArcGIS 10.5.1**. 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 6.4.3** and **ArcGIS 10.5.1**. It is recommended to test compatibility of functionality and licensing method in the future.

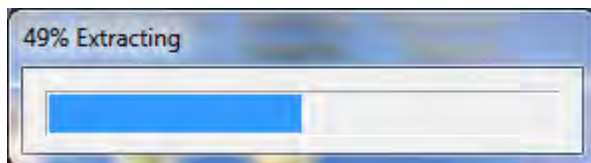
SOFTWARE LICENSING

- Enterprise or individual licensing
- Cube Base, Cube Voyager, and Cube Cluster

SOFTWARE SETUP

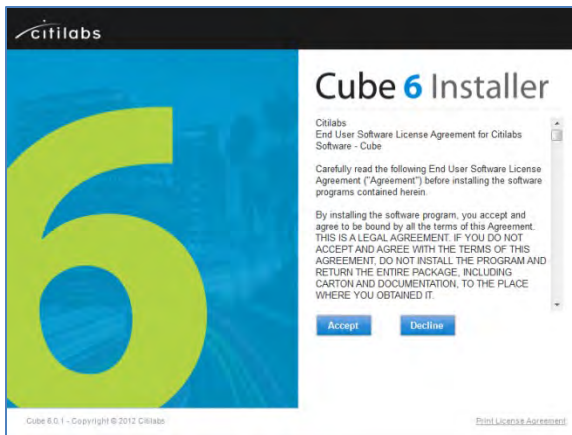
Installation Procedure

- 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.

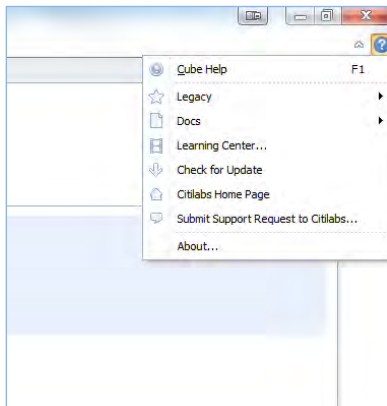


Review Software Version

- 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



CITILABS	
Current Version	
Version	6.4.3 (Oct 06 2017) with Report Option
BDE version	5.0.0 (Nov 04 1999)
AM version	6.4.3 (Oct 06 2017) @ C:\Program Files (x86)\Citilabs\Cube
SM version	6.4.3 (Oct 06 2017) @ C:\Program Files (x86)\Citilabs\Cube
GIS version	ArcGIS Engine 10.5.1702312 (6491)
Environment	
Platform	Microsoft Windows 10 Enterprise
OS version	10.0.17134
Memory in use	50%
Total physical memory	4.00 GB
Free physical memory	1.99 GB
Processors	4
License	
Activation key	Show
Licensed to	Fehr Peers
Maintenance thru	11/2020

This product includes color specifications and designs developed by Cynthia Brewer (<http://colorbrewer.org/>)



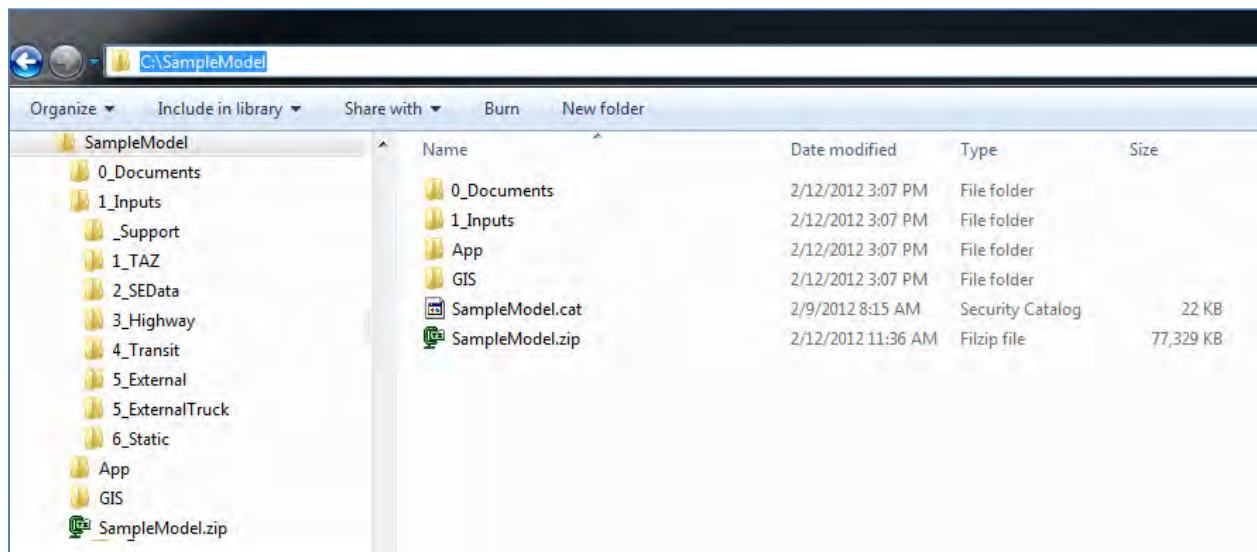
MODEL FILE SETUP

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 that 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 – Model Development Report and Model User Guide with supporting documents not directly related to the model run itself.
- 1_Inputs – The inputs listed by type for SB 375 scenario years and the validation year
 - 1_TAZ through 8_Land – 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.

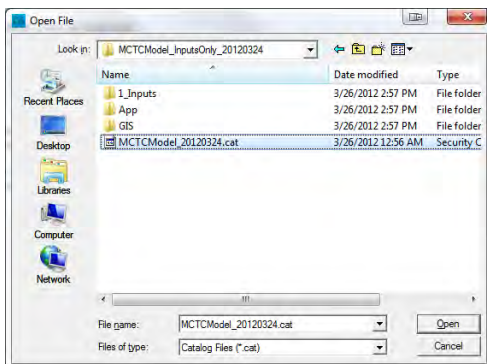


- ◆ 4_Transit – Drive access block file, walk access block file, and transit line file in plain text format. For models using a geodatabase, the transit lines are in the geodatabase referred to in the highway directory
- ◆ 5_ExternalTruck – Files from the interregional goods movement model: Auto and 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.

RUNNING THE MODEL

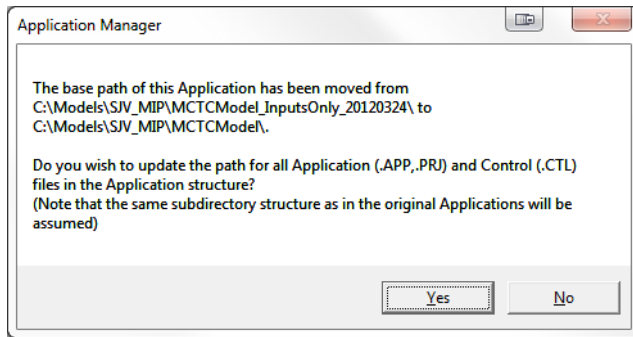
UPDATE MODEL DIRECTORY STRUCTURE

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



- When the model catalog opens, 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 **BCAG Model** in the App window pane.



NAVIGATING APPLICATION MANAGER

Window Panes

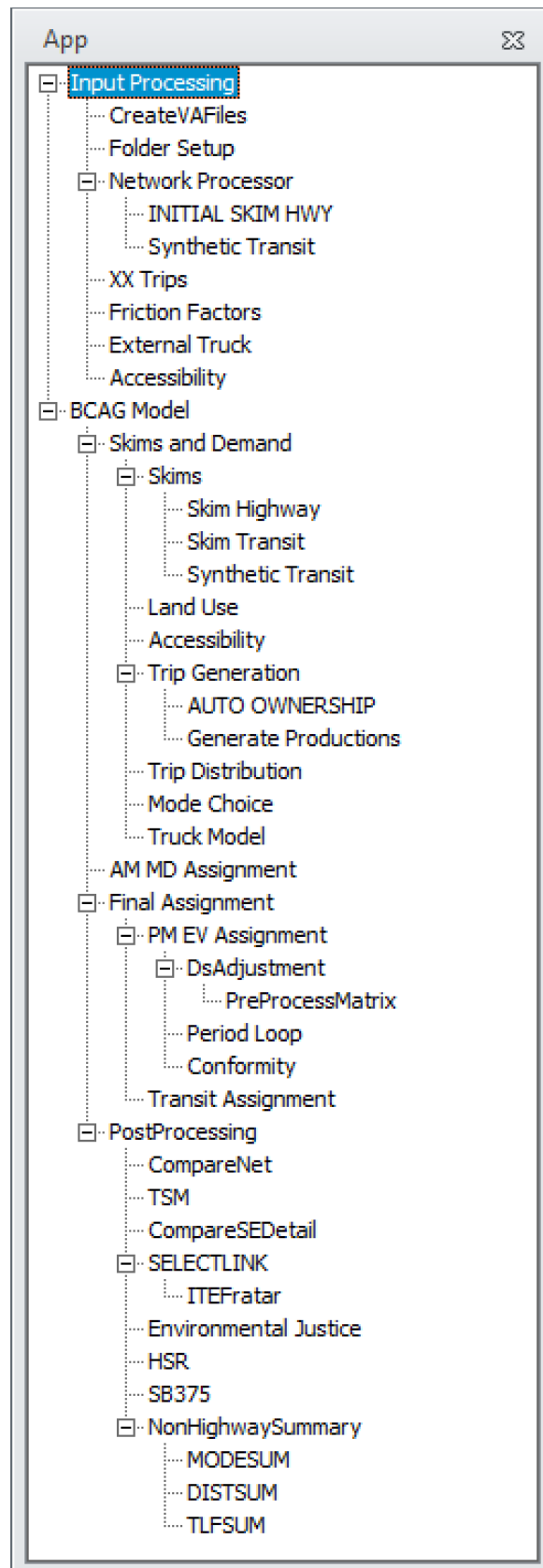
Once you open your model catalog, you will see four windows, or panes, to the left of the program window. They are as follows:

- 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.

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 key inputs

The screen capture on the following page shows the base 2018 scenario manager in the Cube Application Manager. The primary inputes are all located on this screen and should be evaluated prior to running a new scenario.

The inputs for the screen capture are shown below, with bold indicating the values that are most often updated with every scenario.

- Distributed processing, ClusterHandle, and ClusterNodes are used for running the model with Cube Voyager on multiple cores. It is recommended that this not be modified unless the machine running the model has fewer than four cores.
- Number of zones in general should not be modified unless the model is expanded in the future.
- **Year** refers to the time that the land use, interregional travel, and overall activity occur.
- **Land Use** data is the control total by zone in terms of occupied residential and occupied non-residential units.
- **Zonal data** contain the cross-classified residential factors, interregional travel percentages by purpose, simplified transit headways, parking fees, and other TAZ level information.
- **Socio-economic data** is an intermediate file that is output by combining the cross-classified demographics and the land use control totals.
- **External through trips** are personal vehicles traveling through the model area.
- Gateway zones are the productions and attractions by purpose used to balance with internal trips.
- **Special generators** are trips by purpose that cannot be accurately reflected by multiplying the trip generation and the land use. Note that special generators are additive to the land use generated trips.
- MXD parameters contain the built environment parameters to reflect the "Ds." In general, this should not be modified except for special land use types the model may not be able to capture, and for which a special generator is not possible.
- Master network refers to the geodatabase transportation network that contains base and future projects.



- **Year of network scenario** reflects the year that transportation projects are open to traffic. This can be different than the land use and interregional travel.
- Turn penalties are usually prohibitions for turning by time of day.
- Truck Base and Future are derived from the CSFFM and are interpolated based on Year.

Socio-economic and Highway Inputs

Distribute processing?

ClusterHandle	BCAG_Base	
ClusterNodes	4	
NumZones	1570	
Year	2018	
Zonal data	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\1_TAZ\BCAG18_Base_TAZData.csv	Browse ... Edit ...
LandUse	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\2_SEData\2018_LandUse_TAZ_occupancy_adjusted_v2.dbf	Browse ... Edit ...
Socio-economic detail	C:\Data\BCAG_Model\BCAG4_v7\Scenarios\BCAG18_Base\02_LandUse\BCAG18_Base_SEDetail.CSV	Browse ... Edit ...
External-external through trips	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\5_External\BCAG18_Base_Through_Trips.csv	Browse ... Edit ...
Gateway zones	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\2_SEData\BCAG18_Base_Gateways.csv	Browse ... Edit ...
Special generators	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\2_SEData\BCAG18_Base_SpecialGenerators.csv	Browse ... Edit ...
MXD_Parameters	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\6_Static\Base_SmartGrowthParam_NoReduction.csv	Browse ... Edit ...
Master highway network	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\3_Highway\BCAG_2020RTP_Model.gdb\BCAG_2020RTP_Master_Network	Browse ... Edit ...
Year of network scenario	2018	
Turn penalties	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\3_Highway\BCAG_TURNPEN_2018.csv	Browse ... Edit ...
Truck_BaseMatrix	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\5_ExternalTruck\BCAG07_ExternalTruckTripTable_F.MAT	Browse ... Edit ...
Truck_FutureMatrix	C:\Data\BCAG_Model\BCAG4_v7\1_Inputs\5_ExternalTruck\BCAG40_ExternalTruckTripTable_F.MAT	Browse ... Edit ...

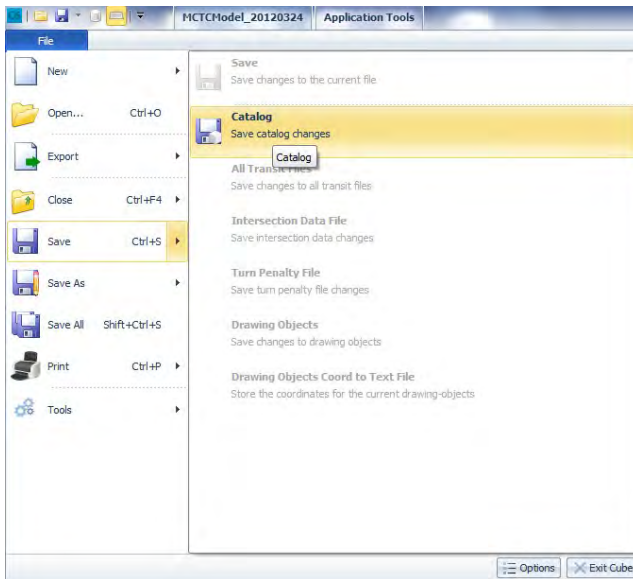
The Browse boxes are used to search for the input file and the Edit boxes are used to edit the file within Cube.

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

Distribute processing?

- **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.
- 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**.

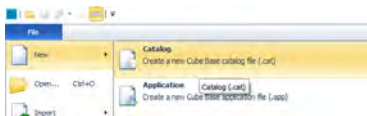





Importing Scenarios

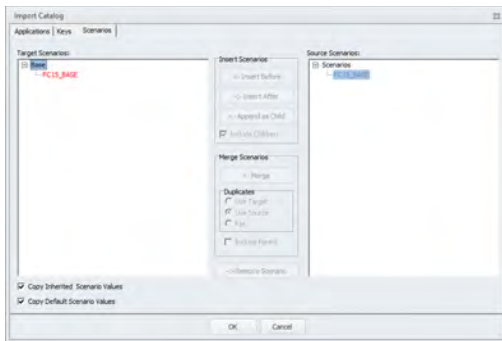
When the catalog is used for many scenarios or multiple catalogs are used, merging or cleaning the catalog might be needed. To copy or merge scenarios it is very important to remember the parent/child structure of the scenarios and is often best to either delete scenarios (using caution with parent)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

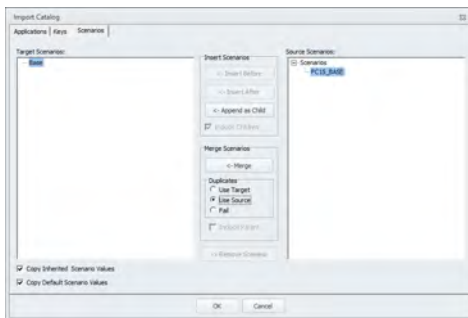


- Click on  and select the catalog that contains the scenarios to import.
- Select the Scenarios menu, and the scenario on the target and source. For new scenario most often the option will be Append as Child. The new scenario shows in red.

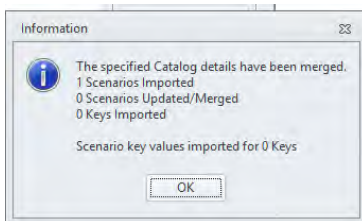




- When replacing the values in a scenario with the same name, select Merge and Use Source.



- Click OK and then save the catalog.

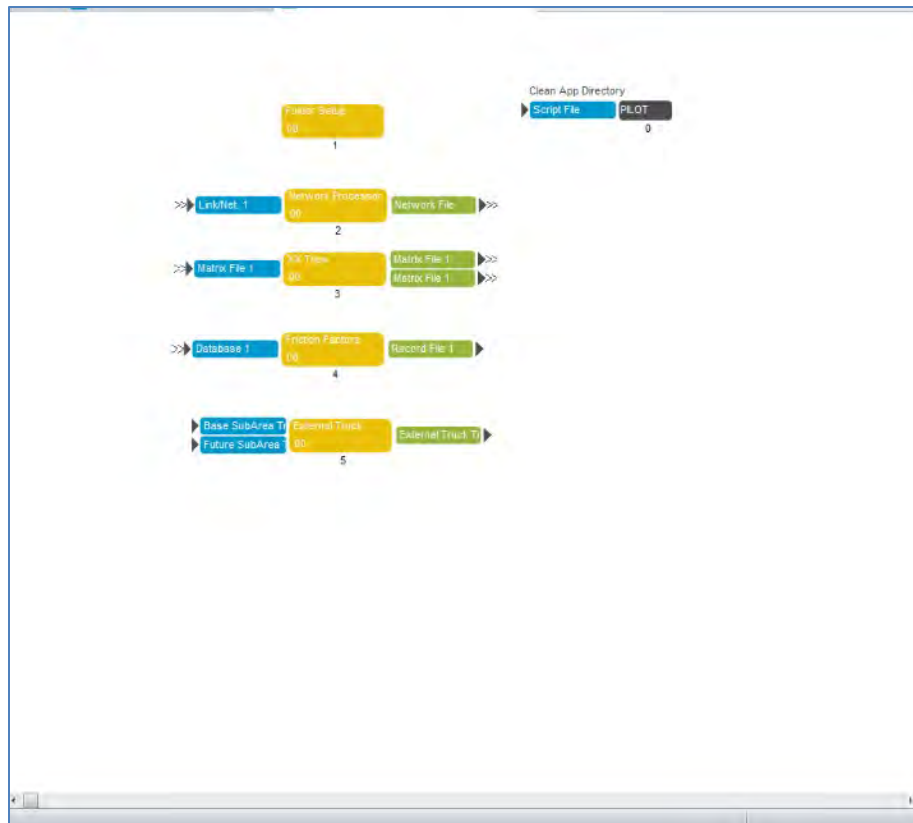


INPUT PROCESSING

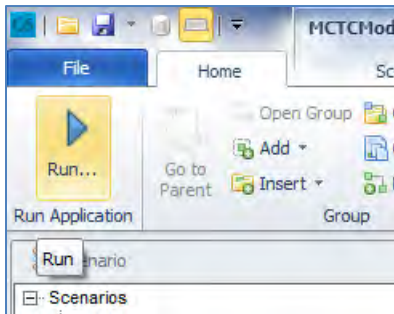
Before running the BCAG Model application, run the Input Processing application to prepare the input files and folder structure needed for the full model run.

- 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.

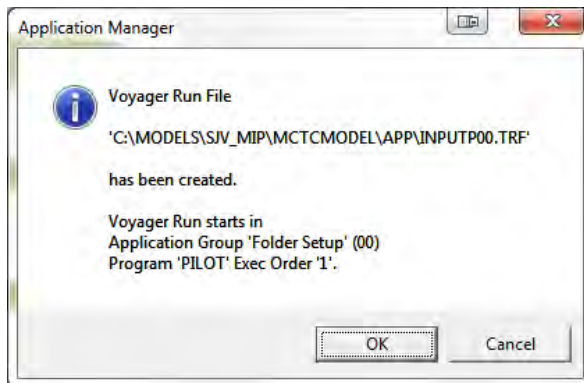




- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Select Run Application now from Task Monitor from the Run Settings list.
- Click **OK** . This should activate the Application Manager window.

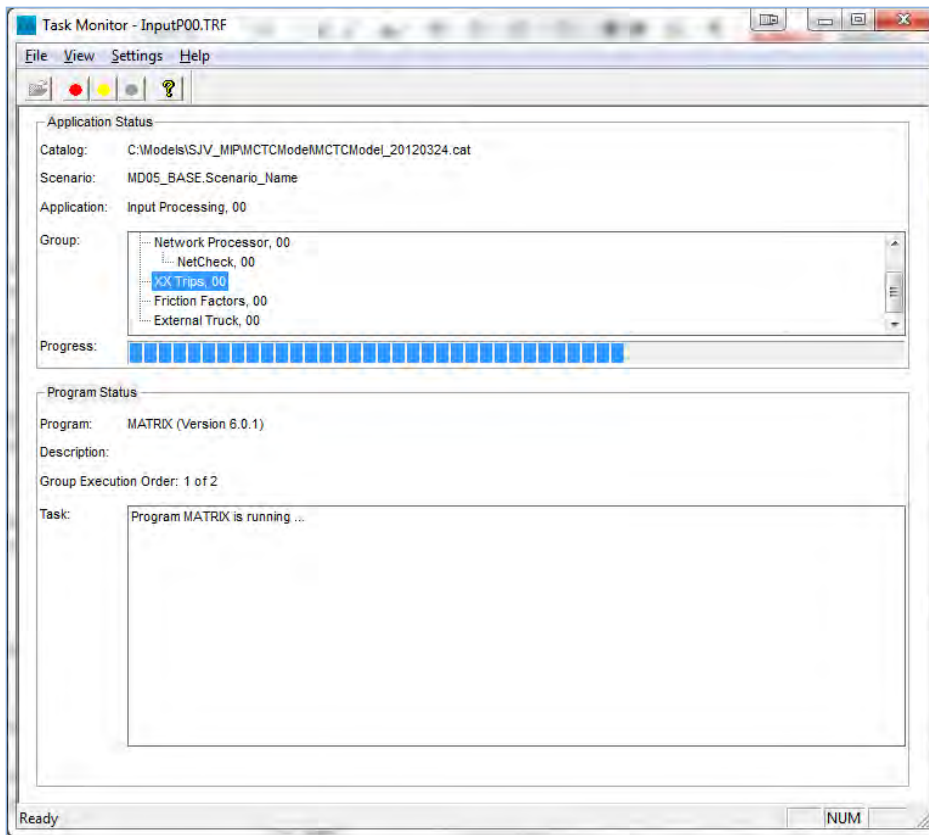


- Click **OK** . This should activate the Task Monitor window.

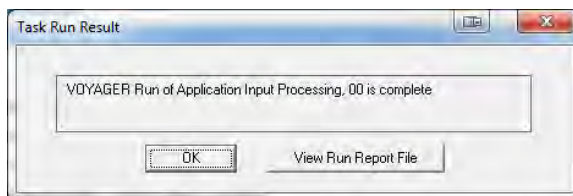
Checking Results of Input Processing

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.

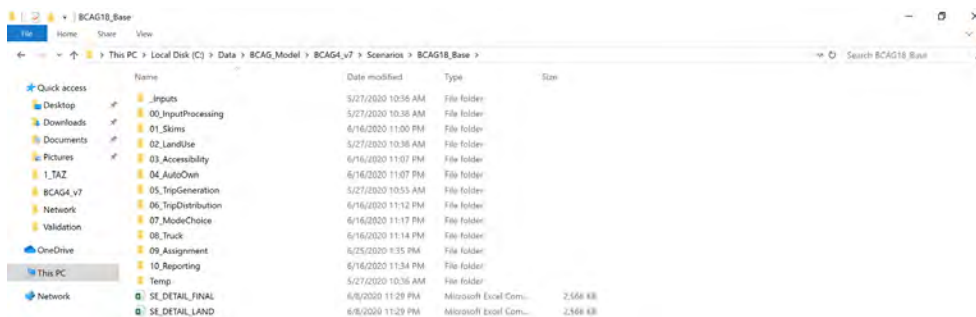




- Once the run has completed successfully, the Task Run Result window will pop-up. Click **OK**. If you would like to view the report file, click **View Run Report File**.



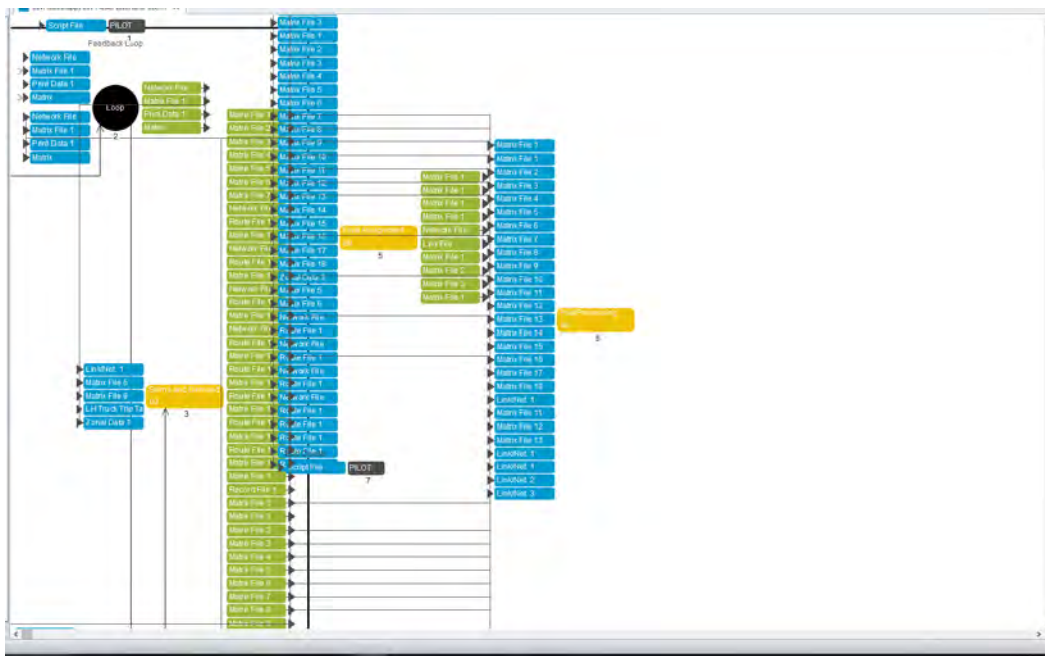
- Close the Inputs window.
- Check to see that the input files and folders were created in the appropriate model folder.



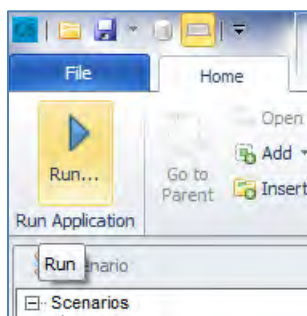
FULL MODEL RUN

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 **BCAG Model** in the App Pane. This will bring up the BCAG Model application flow diagram in the Catalog window.

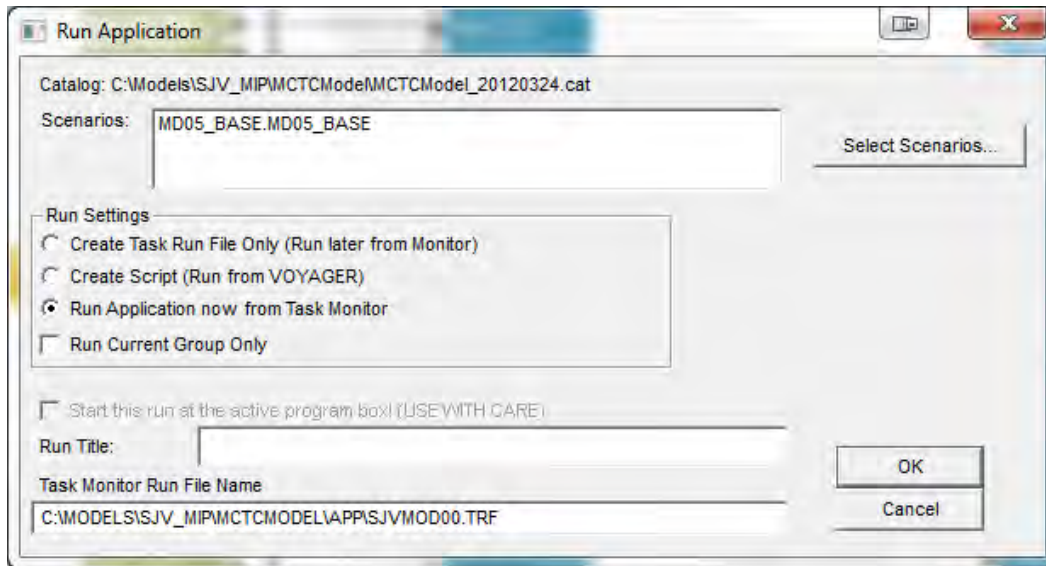


- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.

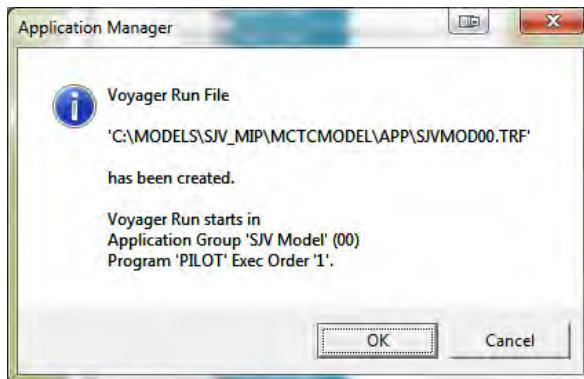


- Select **Run Application now from Task Monitor** from the Run Settings list.



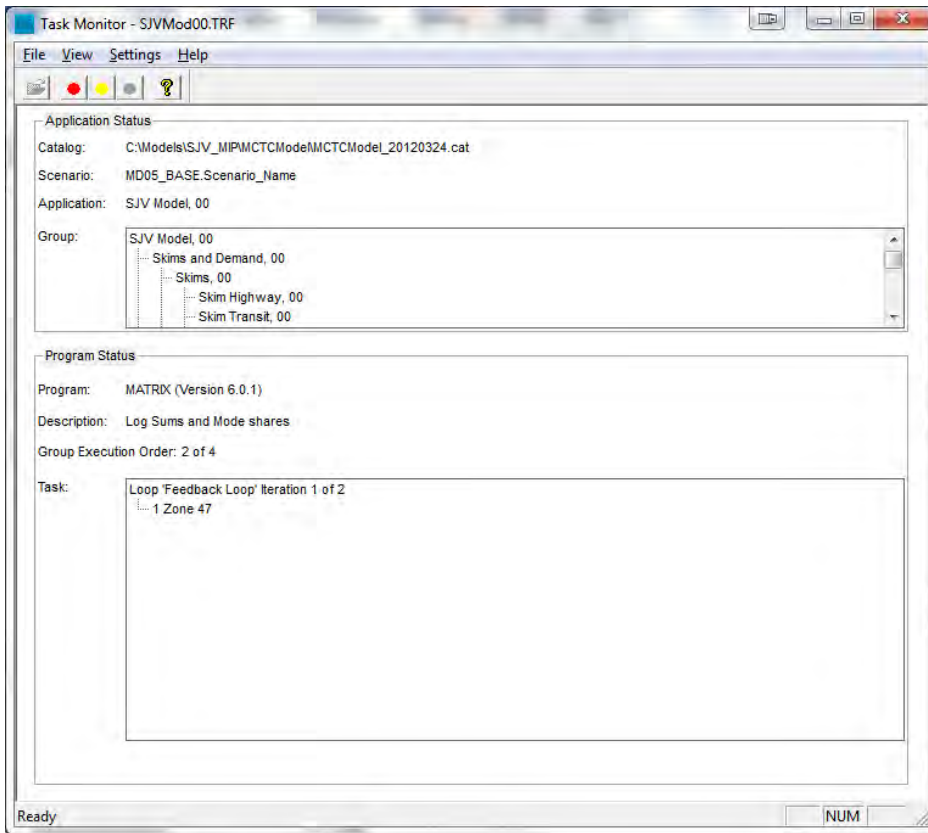


- Click **OK**. This should activate the Application Manager window.

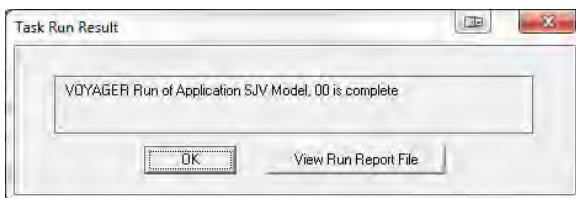


- Click **OK**. This should activate the Task Monitor window.





- 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



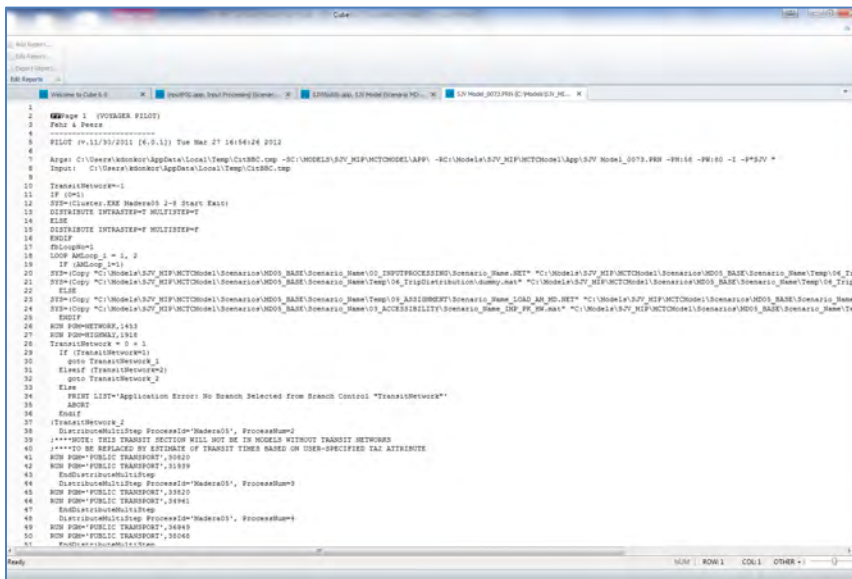
- Click on the **Scenario** ribbon tab



- Click **See Run Report**.



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

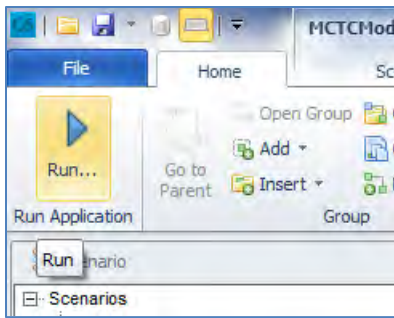


RUNNING MULTIPLE SCENARIOS

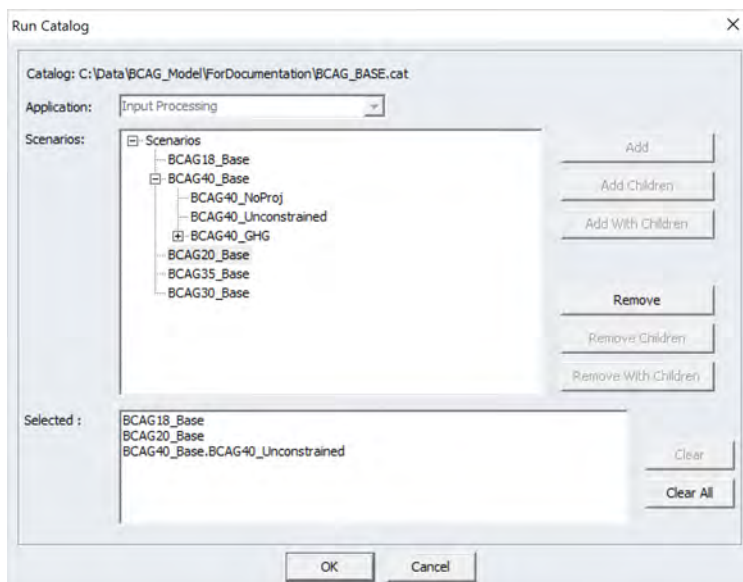
To run multiple scenarios automatically, you can specify what scenarios to run before you run the model.

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



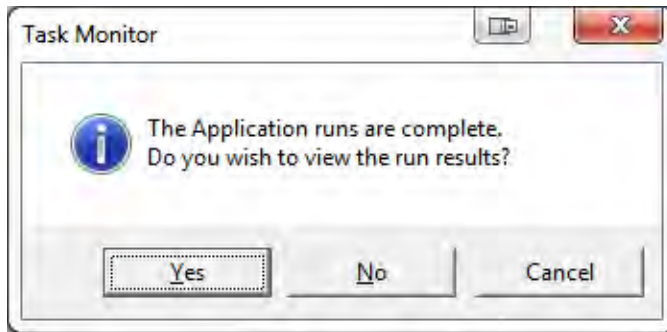


- Click the **Select Scenarios...** button in the upper right corner.
- Select additional scenarios you would like to run in the **Scenarios:** window. Click **Add**.
- The additional scenario will be listed in the **Selected:** window.
- To remove a scenario listed in the **Selected:** window, click 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.

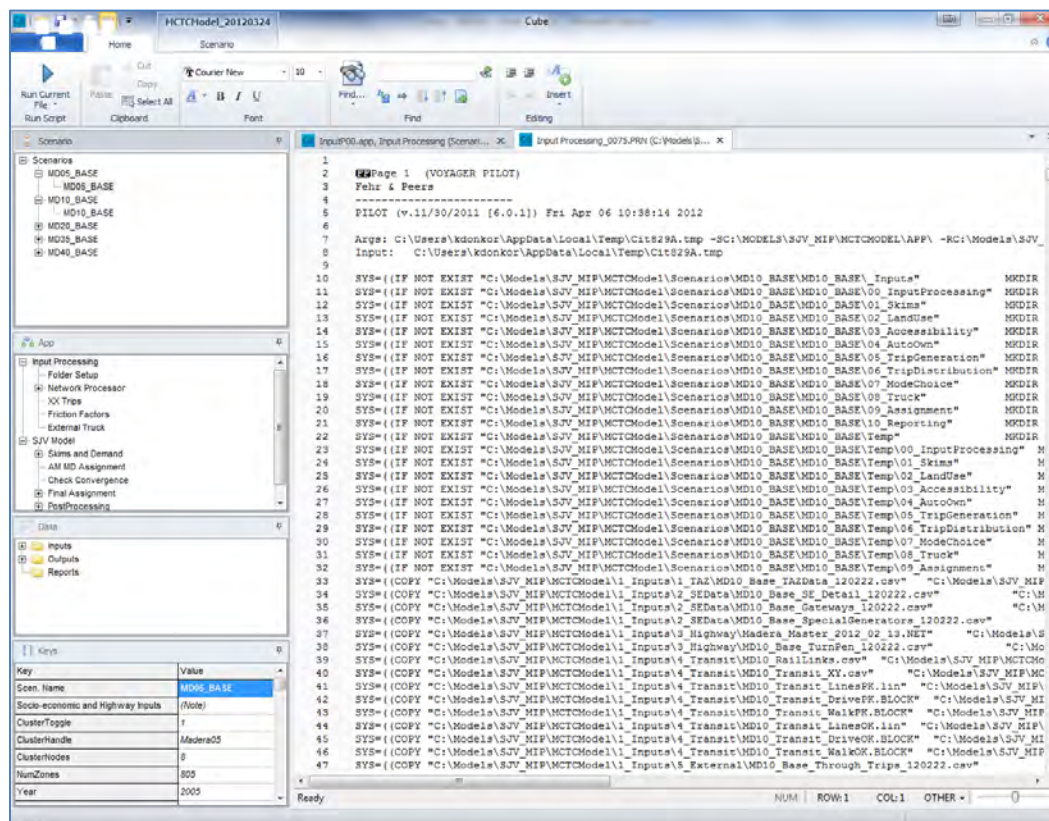


- Select **Run Application now from Task Monitor** from the Run Settings list.
- Click **OK** to proceed with the run. The scenarios will run in series (i.e. one after another).
- Once the run has completed successfully, a Task Monitor window will pop-up. If you would like to view the run results for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





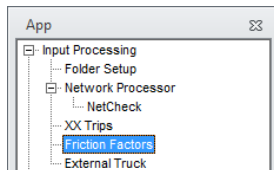
- If you click **Yes** to view the run results, the Multiple Run Results window will open. Double-click the **Application** name for the scenario you would like to view. This will open the Task Run Result window for your scenario.
- Click on the **View Run Report File** button. Click **OK**.
- Click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



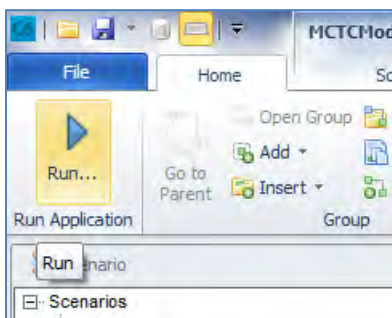
RUNNING INDIVIDUAL SUB-GROUPS

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.

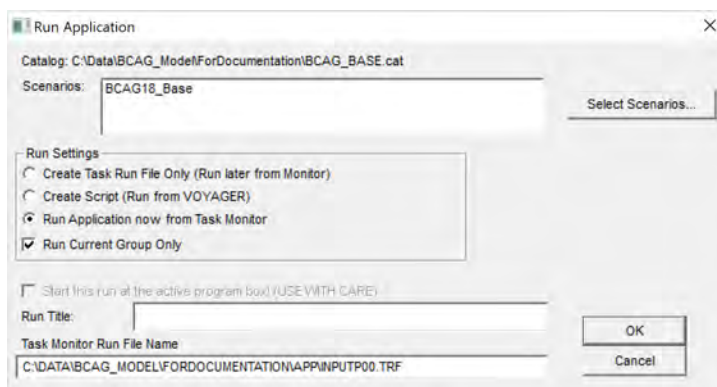
- Click on the application sub-group you would like to run.



- 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.

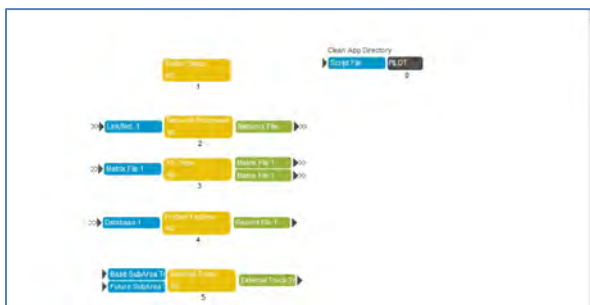


APPLICATION DIRECTORY MAINTENANCE

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.

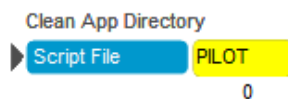
- Double-click on **Input Processing** in the App Pane. This will bring up the Input Processing application flow diagram in the Catalog window.



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

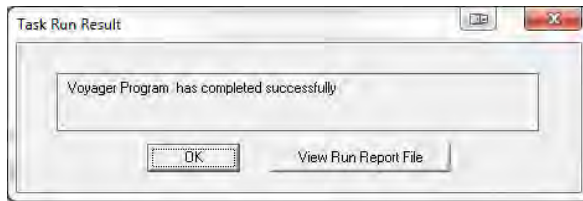


- Double-click on the PILOT icon.



- The Task Monitor window will automatically open.
- Click **OK** after the run has completed successfully.





POST PROCESSORS

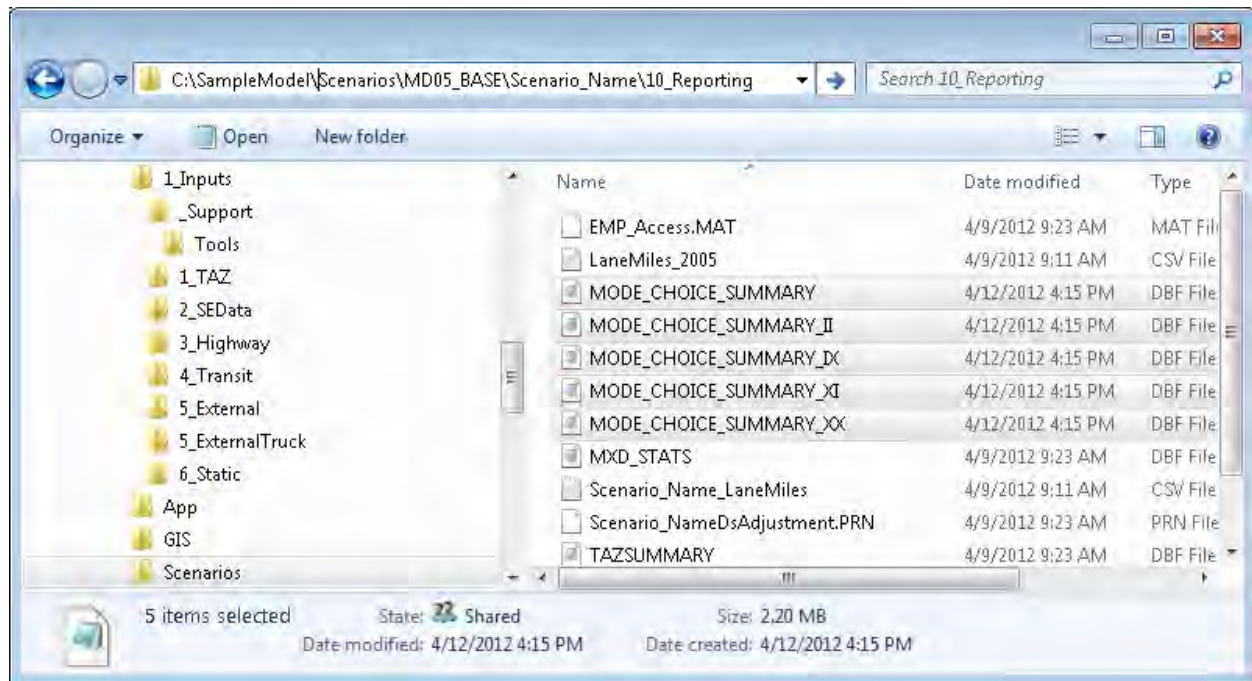
After the model is run there are a number of post-processors that can be run to prepare model data. The post-processors can be found in the App Pane in the BCAG Model application group. Many of these post-processor results are used in model validation and scenario comparison.

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.
- 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



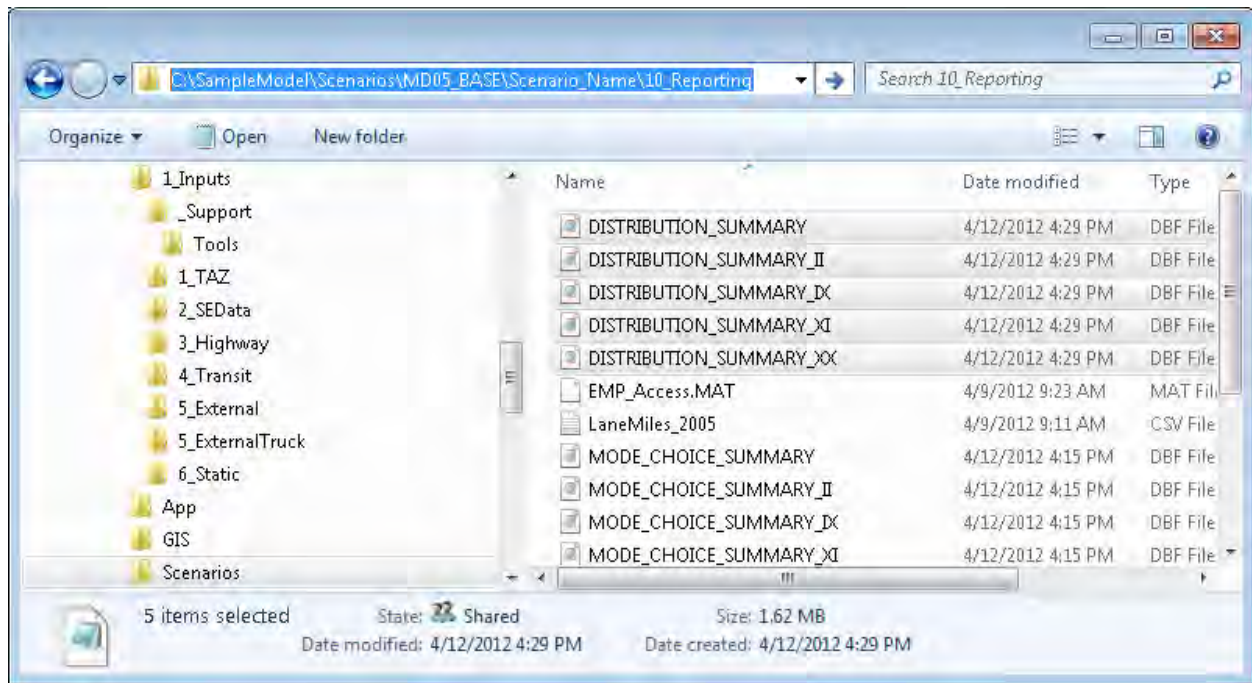


DISTRIBUTION SUMMARY

Outputs detailed distribution by purpose summary information.

- Double click on **DISTSUM** in the App Pane. This will bring up the **DISTSUM** application group.
- 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 five summaries are generated in Scenario_Name\Reporting
 - DISTRIBUTION_SUMMARY
 - DISTRIBUTION_SUMMARY_II
 - DISTRIBUTION_SUMMARY_IX
 - DISTRIBUTION_SUMMARY_XI
 - DISTRIBUTION_SUMMARY_XX

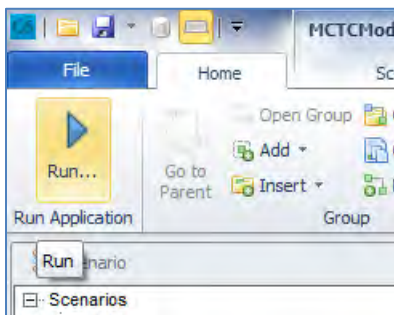




TRIP LENGTH FREQUENCY SUMMARY

Outputs trip length frequency summary information.

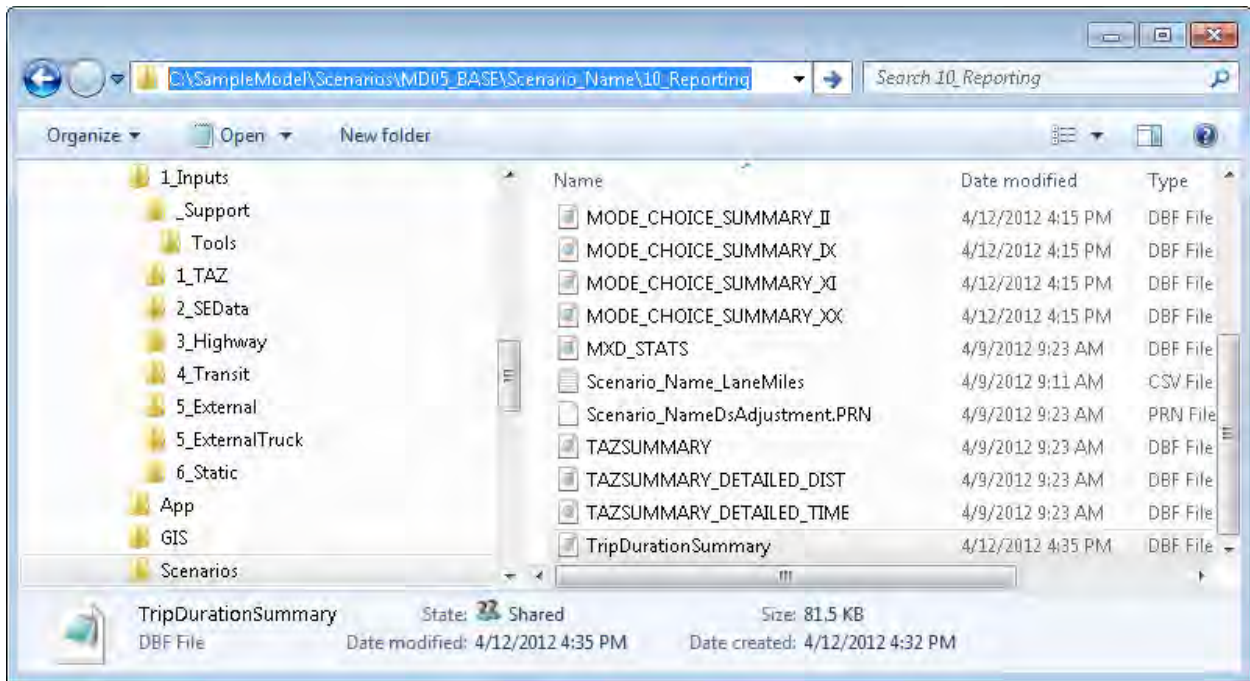
- Double click on **TLFSUM** in the App Pane. This will bring up the **TLFSUM** application group.
- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



- Check the **Run Current Group Only** button.
- Click **OK** and proceed with model run.
- The following summary is generated in Scenario_Name\10_Reporting



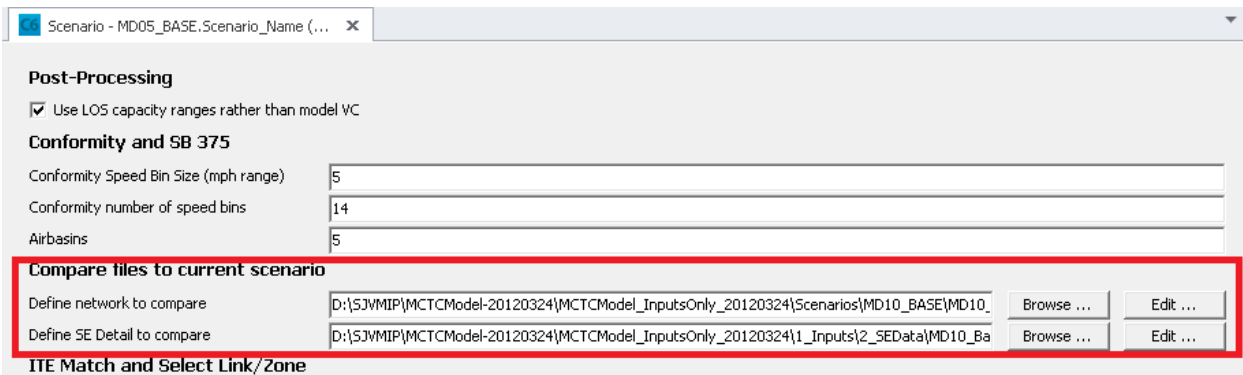
- o TripDurationSummary.DBF



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



- 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.
- 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

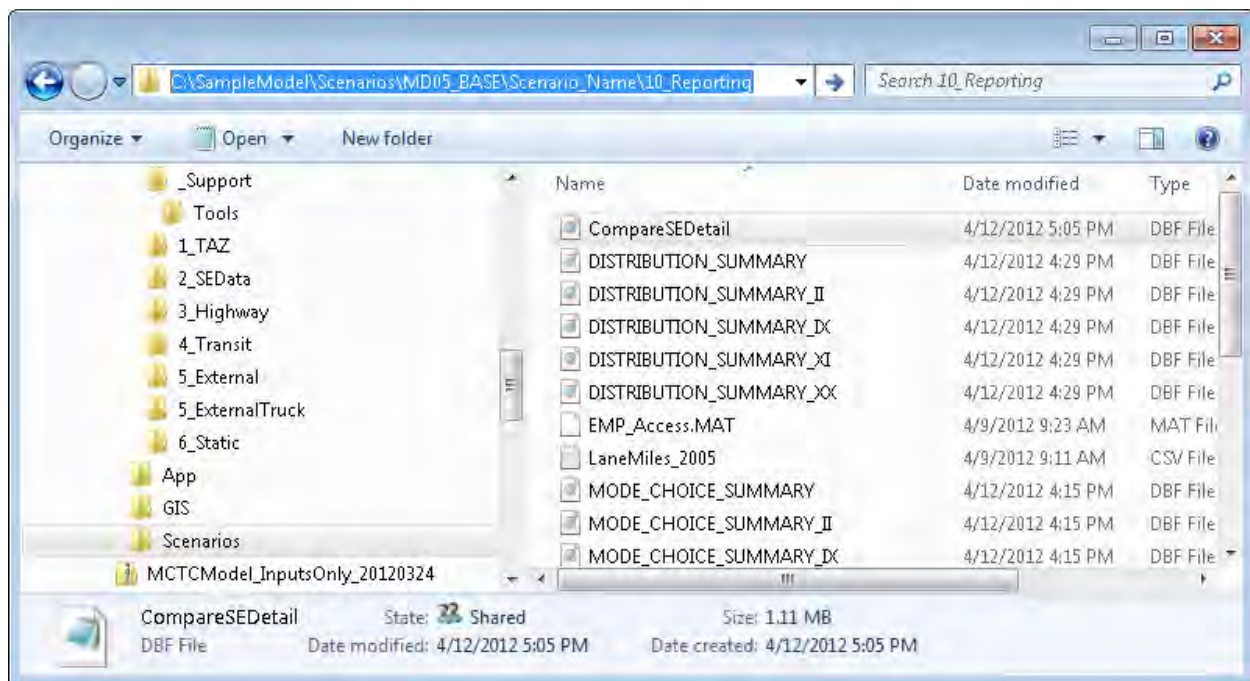
Define SE Detail to compare

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



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.

- Appendix A contains maps of the TAZ numbers.
- 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.

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

<input type="checkbox"/> 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:\WMIP\Training\TCM\1_Inputs\Support\Tools\FratarTrips.dbf
Select Link/Zone Listing	C:\WMIP\Training\TCM\1_Inputs\3_Highway>SelectLink_Assign.txt
Select Zone/Link Summary	C:\WMIP\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

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.

; 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

Define the select node or link

; 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

- Update the Select Link summary file (1_Inputs\3_Highway>SelectLink_Summary.txt)



- o Copy or Save As the current example file
- o Copy and paste the block of text for the number of select links/nodes desired
- o Update the volume set numbers with the clean name to refer to the appropriate Select Link volume group
- o 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.

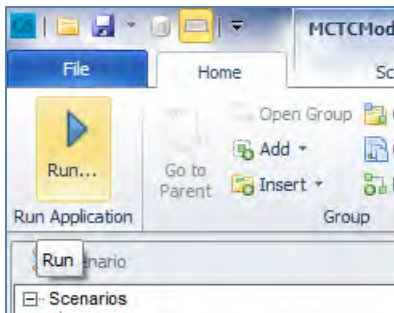
Zones to adjust to match (ex. 101-105,107)

trip targets by zone (tbl: With zone; A1_IN, A1_OUT, P1_IN, P1_OUT, DAT_IN, DAT_OUT)

Select Link/Zone Listing

Select Zone/Link Summary

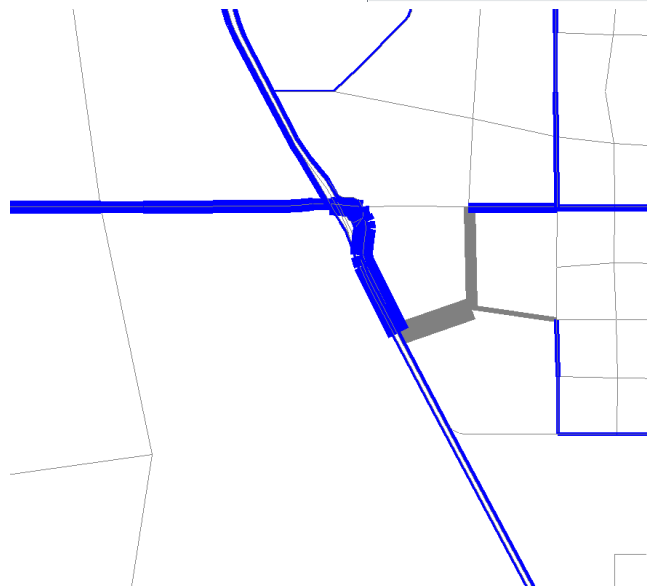
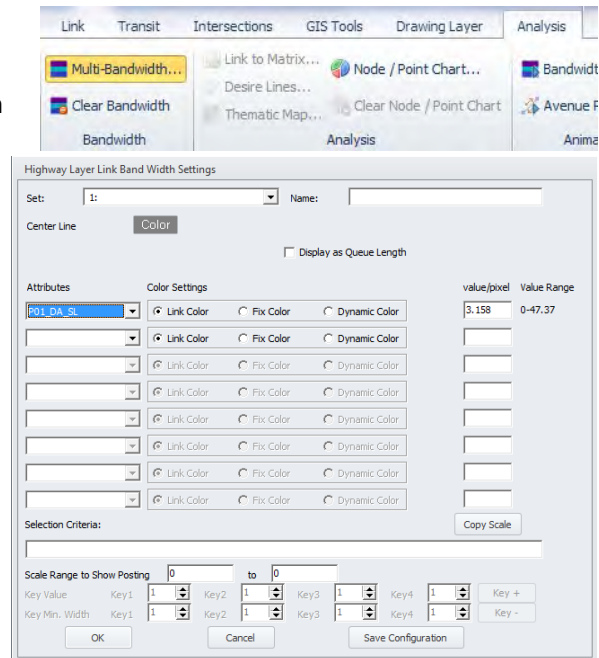
- Save and exit the scenario
- Select the scenario for evaluation
- Browse in the Applications to SelectLink
- Click on the **Run...** button located on the top **Home** ribbon. This will open the Run Application window.



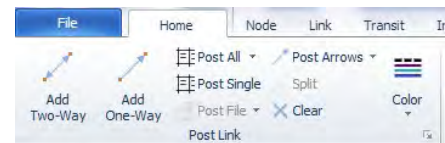
- Check the **Run Current Group Only** button.
- Click **OK** and proceed with model run.
- To view results double click on the personal geodatabase in the Data pane



- 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.

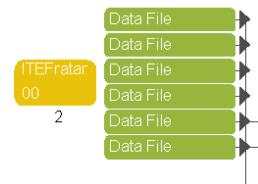


- Next, to post the values, select Home and then Post All in the Link section, and one or more variables to be posted. Click ok and zoom to the study zone(s) to view the results.

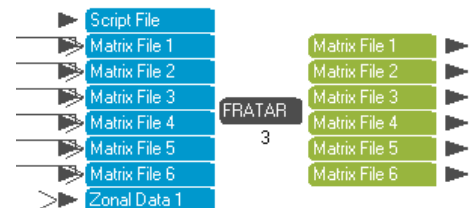




- Percentage of project trip distributions can be calculated using the Link Calculation functions, as needed.
- If the result are not matching the target, verify that the Catalog Keys and the input file are correct. The ITEFratar step applies the targets to the AM 1hr, PM 1hr, and proportional to the 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.



TU17_DOF_VEHTRIPS_AM1_FRATIN.mat...					TU17_DOF_VEHTRIPS_AM1_SL.mat-*1 A...				
*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

INTERREGIONAL TRANSIT

Purpose

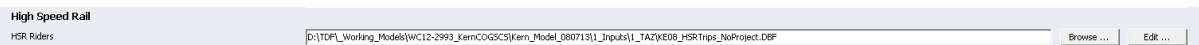
The post-processor is intended to shift auto trips traveling using the gateways parallel to interregional transit (transit exiting the model area) from the gateway to the park-and-ride lot of the rail station. The implementation is most useful for interregional rail (i.e. Chico to Sacramento Commuter Bus Service), 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 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. I5-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

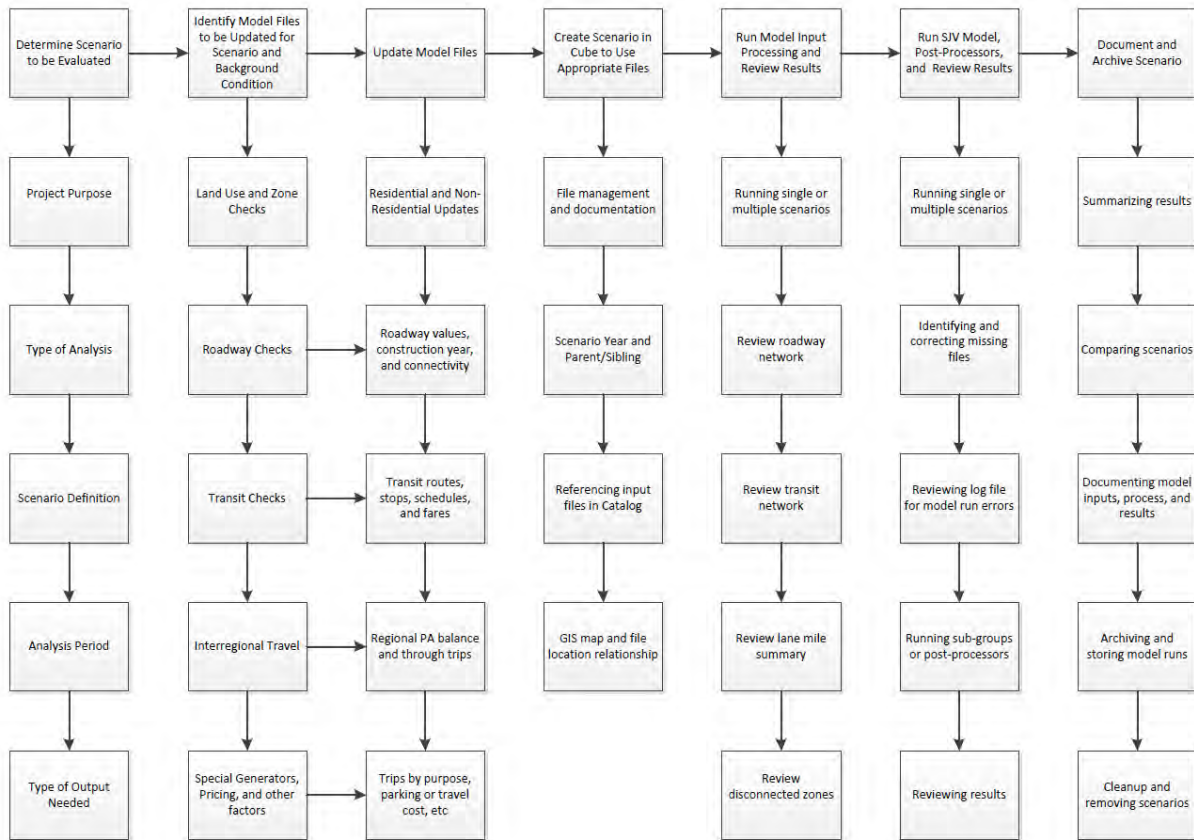
CREATING A NEW SCENARIO

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 2018) 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).

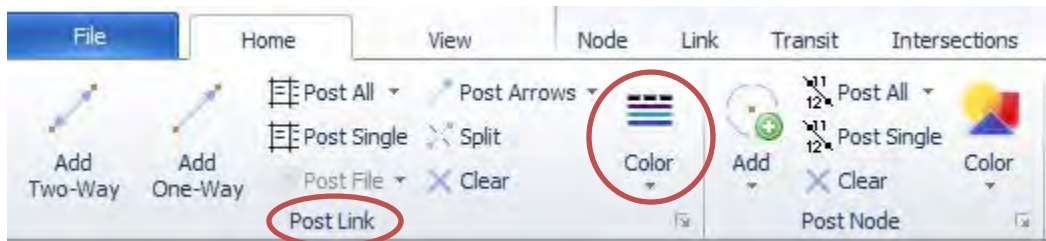


Highway Network

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**.

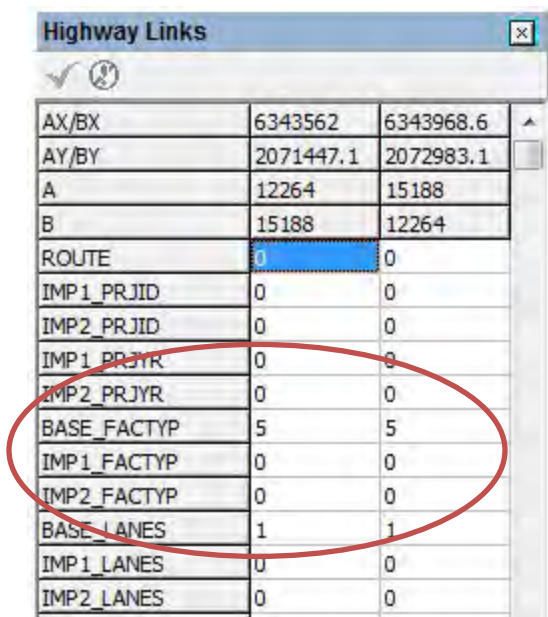


Any errors in facility types can be fixed in two ways.

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.

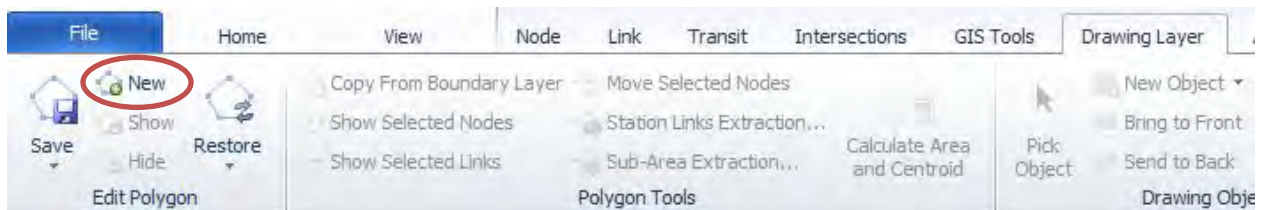




Attribute	Value 1	Value 2
AX/BX	6343562	6343968.6
AY/BY	2071447.1	2072983.1
A	12264	15188
B	15188	12264
ROUTE	0	0
IMP1_PRJID	0	0
IMP2_PRJID	0	0
IMP1_PRJYR	0	0
IMP2_PRJYR	0	0
BASE_FACTYP	5	5
IMP1_FACTYP	0	0
IMP2_FACTYP	0	0
BASE_LANES	1	1
IMP1_LANES	0	0
IMP2_LANES	0	0

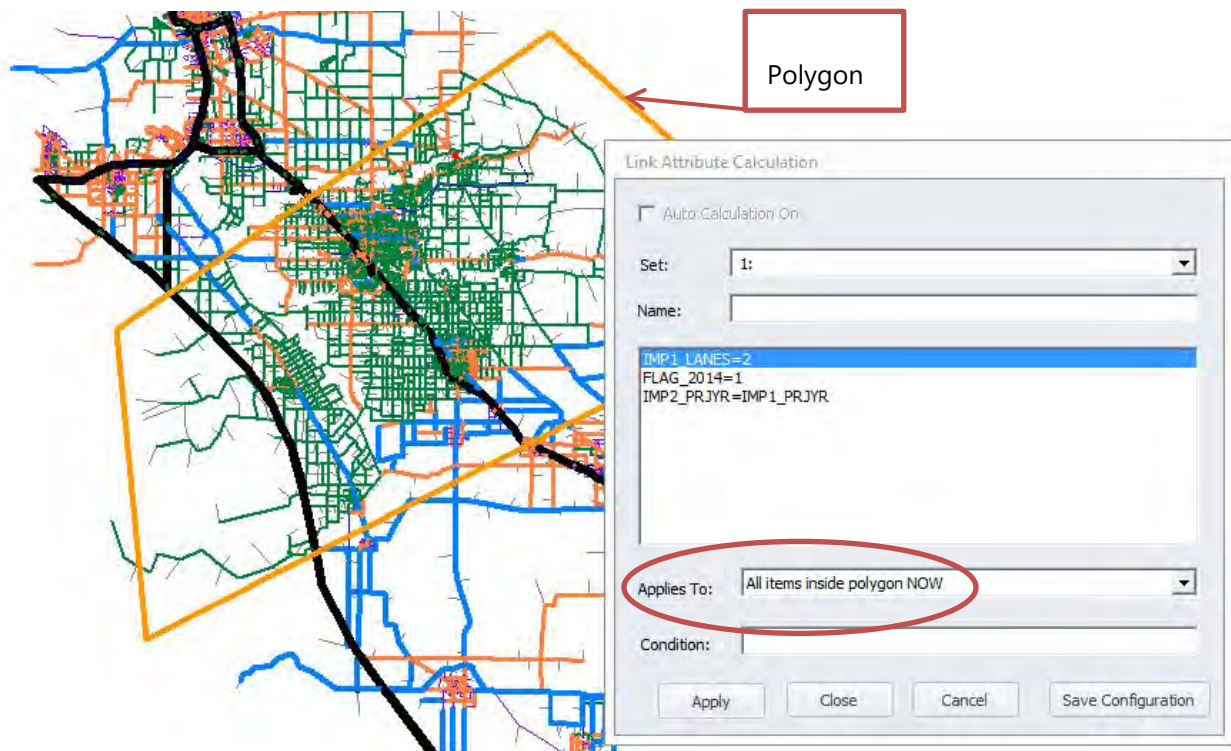
2. Fixing facility type errors by calculation – best for editing many links

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.



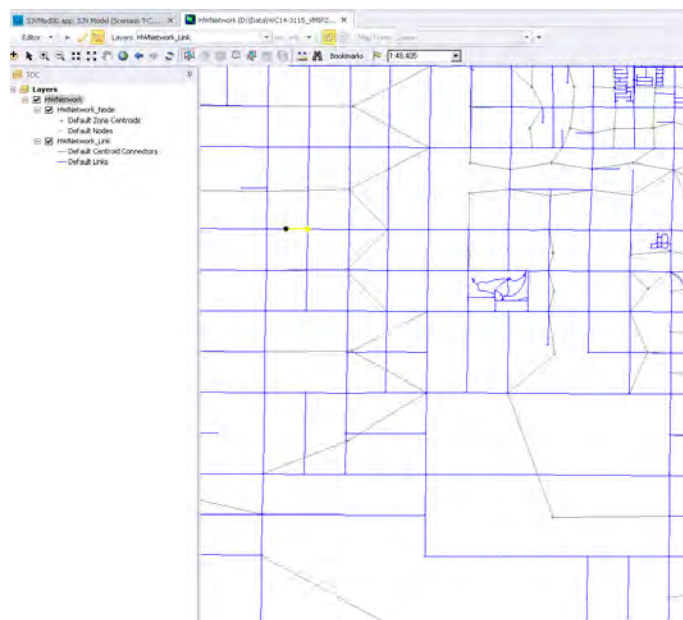
Once the polygon is drawn, the facility types can be changed using **Link, Compute** and applying changes inside/outside the polygon boundaries. Additional conditions can be added if needed.



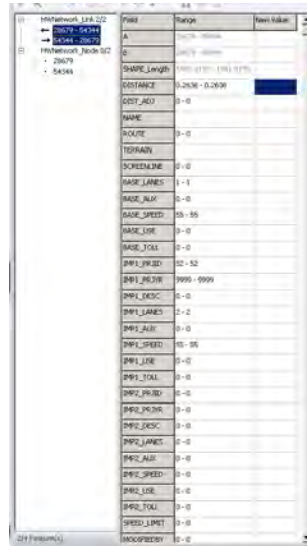


The same process can be repeated for **speeds**, **number of lanes**, and **area type**.

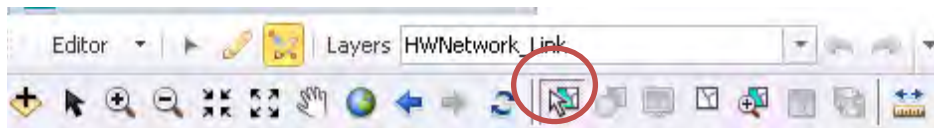
1. To edit the network in GIS, edit the highway network and the file will automatically open in an ArcGIS editor window.



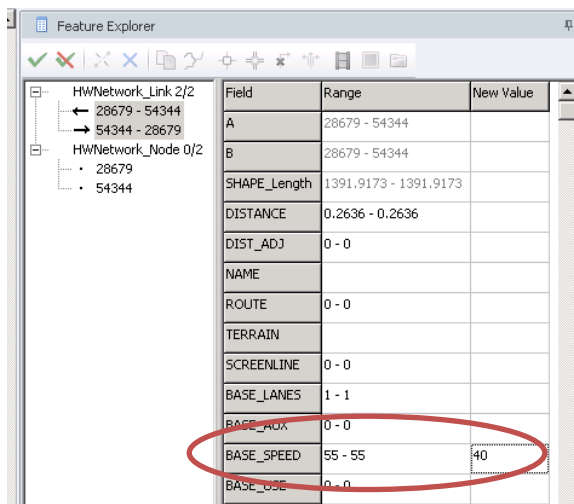
- Switch the active layer to the HWNetwork_Link and select under the Edit menu.
- Feature explorer is used to view and edit the attributes of the links and nodes, and is often hidden to the right of the screen. Click it and then click the pin to have it easily accessible.



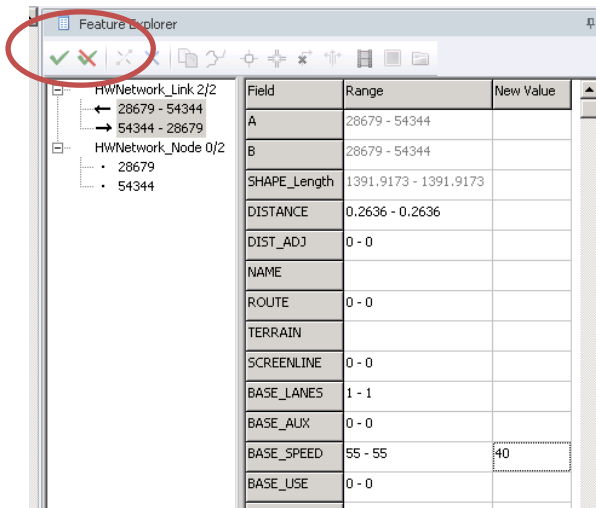
- Using the Select Feature tool, select the link(s).





- To edit all links at once, enter the new value in the column on the right. To edit links by direction, first select roadway based on direction and A-B node.



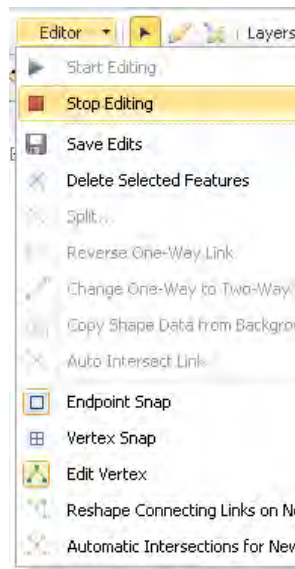
6. To save the changes on the link, click . To reject the changes, click .



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

8. After making edits, keep or reject them in the Feature Explorer and then click  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 #
 - o IMP1_PRJYR<>0 & (BASE_LANES=IMP1_LANES) or
 - o IMP2_PRJYR<>0 & (IMP1_LANES=IMP2_LANES)
2. Lanes # change but no IMP_PRJYR
 - o (IMP1_LANES<>0 & (BASE_LANES<>IMP1_LANES)) & IMP1_PRJYR=0 or
 - o (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.
 - o BLDYEAR<>0 & IMPYEAR<>0 & DELYEAR<>0 or
 - o BLDYEAR<>0 & IMPYEAR<>0 & IMPYEAR1<>0 or
 - o BLDYEAR<>0 & DELYEAR<>0 & IMPYEAR1<>0 or
 - o IMPYEAR<>0 & DELYEAR<>0 & IMPYEAR1<>0
4. Out-of-order years
 - o (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 MPO staff. If incorrect nodes are removed, the model will not complete a full estimation.

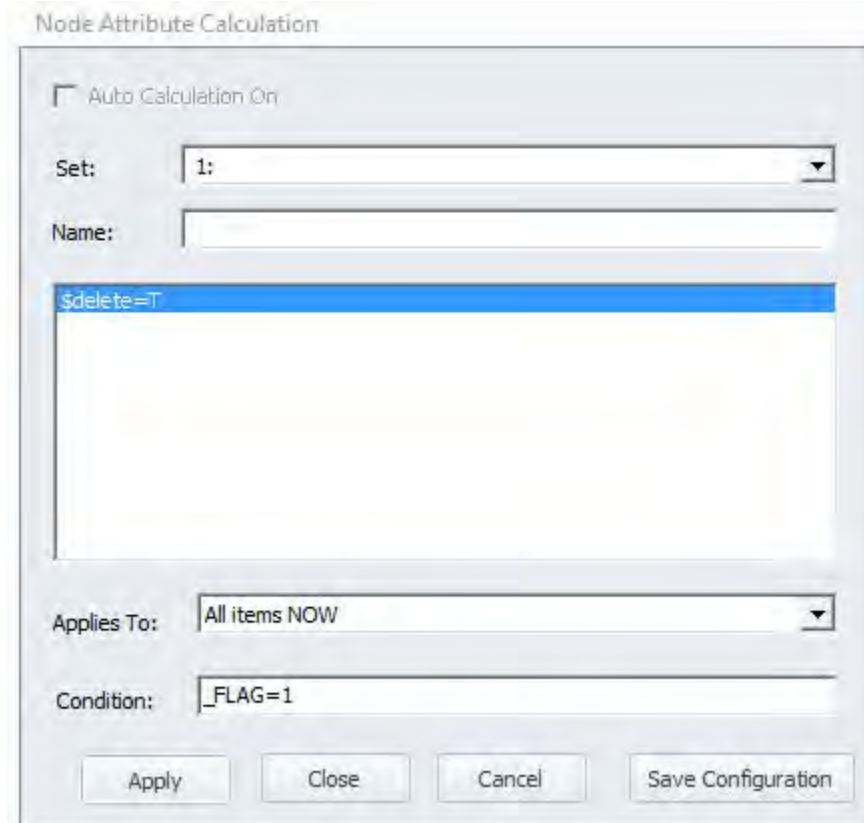
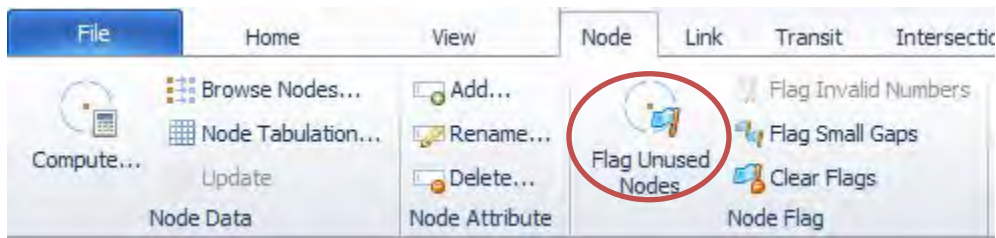
A common error is the presence of 'overlapping' nodes where one node is not connected and therefore an 'unused' node. If scenario land use is associated to the unused node, the model will run, but it will estimate no impact from the scenario inputs. Since the land use inputs are located in a separate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



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.

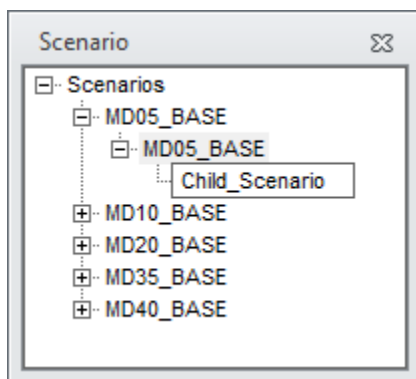
- In the Scenario pane, Click on the scenario from which you would like to create a new child scenario.
- Click on the **Scenario** ribbon tab.



- Click on **Add Child**.

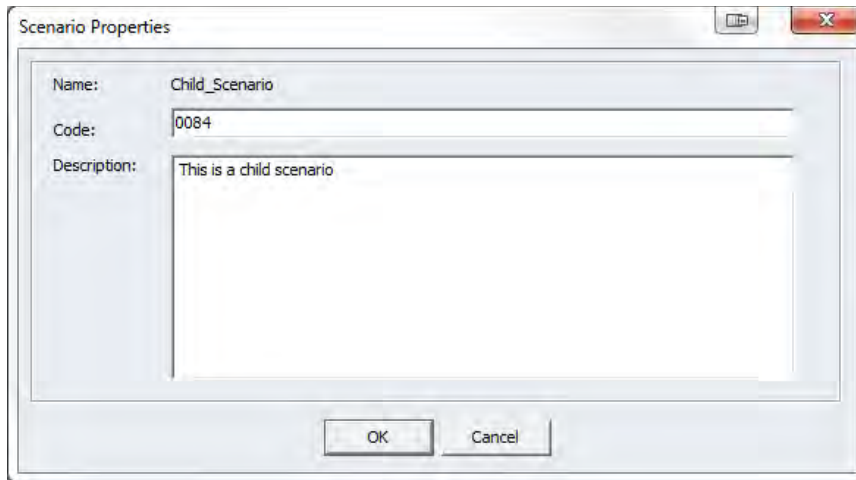


- Type in the name of the new scenario. Press **Enter**. This will open the Scenario Properties window.



- 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.

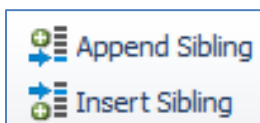
Sibling Scenario

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.

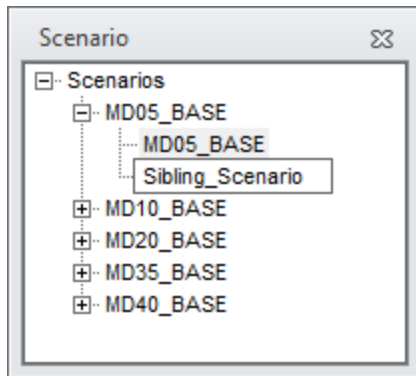


- Click on **Append Sibling** or **Insert Sibling**.

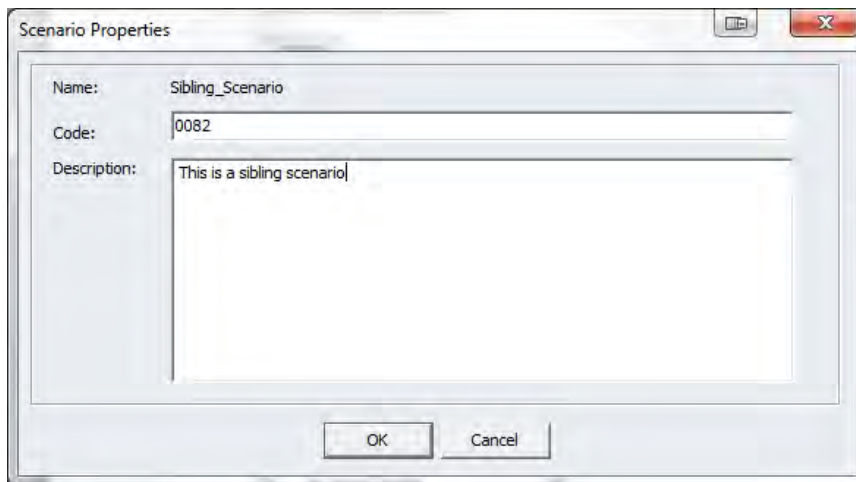


- Type in the name of the new scenario. Press **Enter**. This will open the Scenario Properties window.





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

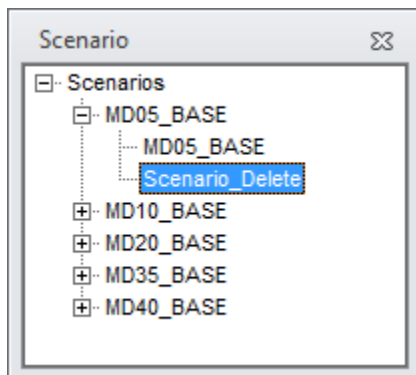


- To edit scenario specific input data, double-click on the sibling scenario to open the input key window.

Delete Scenario

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

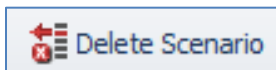
- In the Scenario pane, Click on the scenario you would like to delete.



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



- Click on **Delete Scenario**.



CREATING SUBAREA MODELS

The 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 comparing 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).

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.

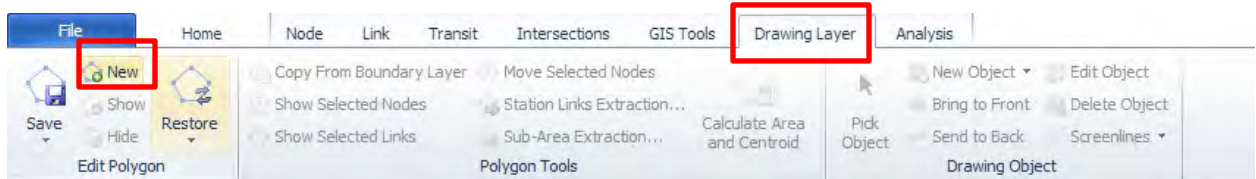
CREATING SUBAREA ROADWAY NETWORK

The example below uses the .NET 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](#).

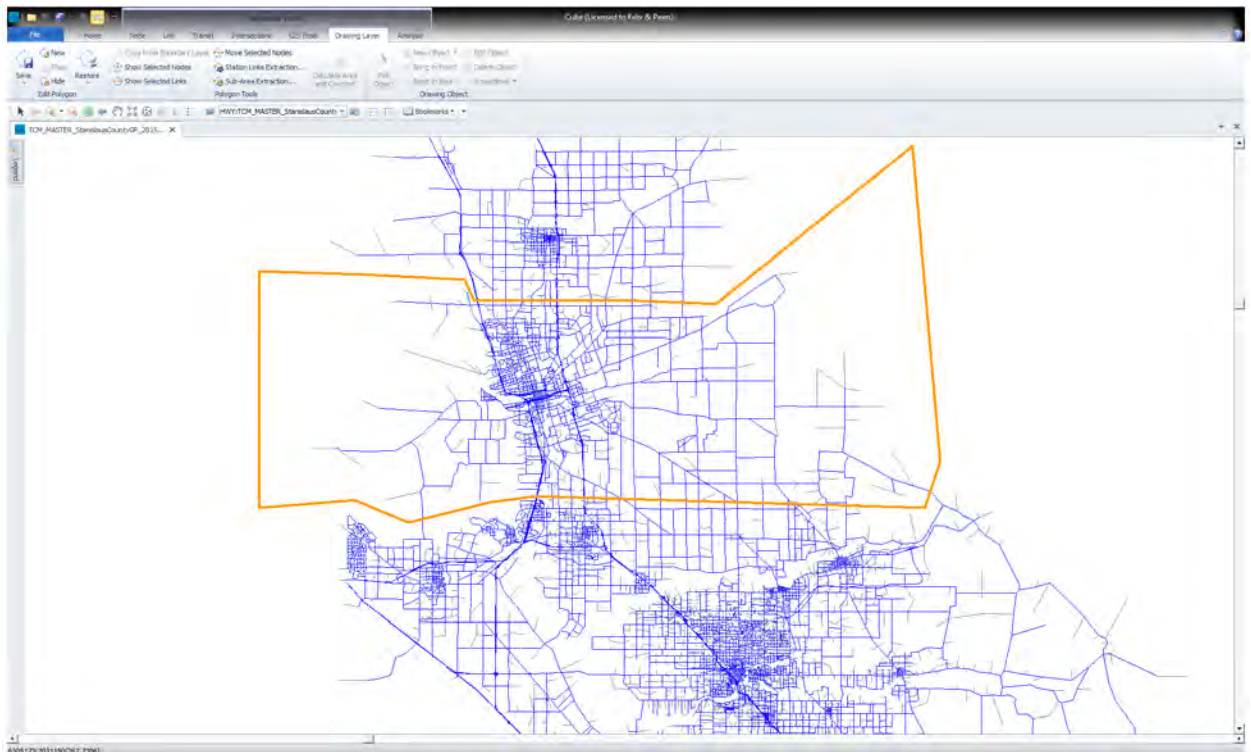
1. Copy all original model files to a new directory

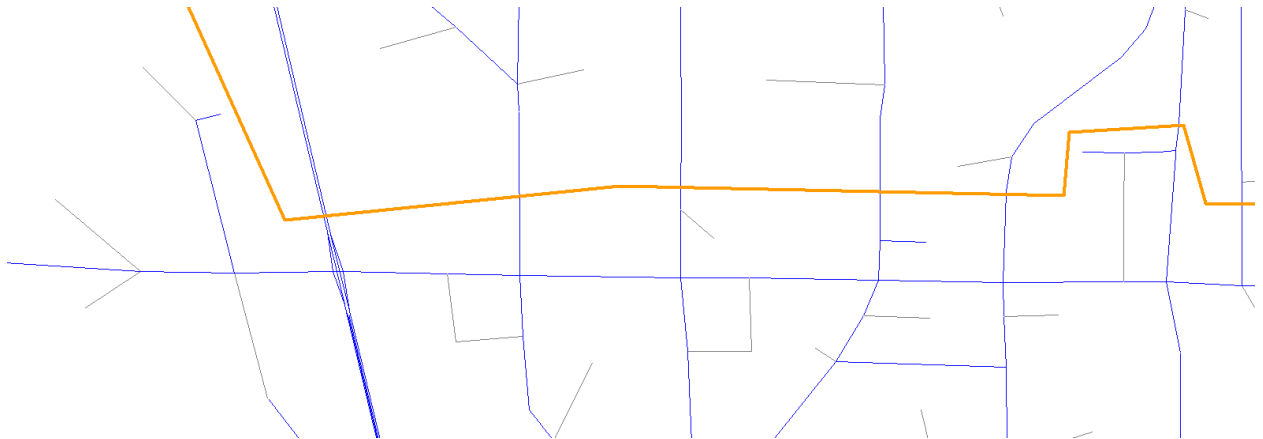


2. Open the master highway network
3. Identify the geographic coverage of the sub-area model and create a polygon from the Drawing Layer menu and then select New. A boundary file from a planning area, city limits, etc could also be used and loaded to select from instead and loading the model TAZ boundary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

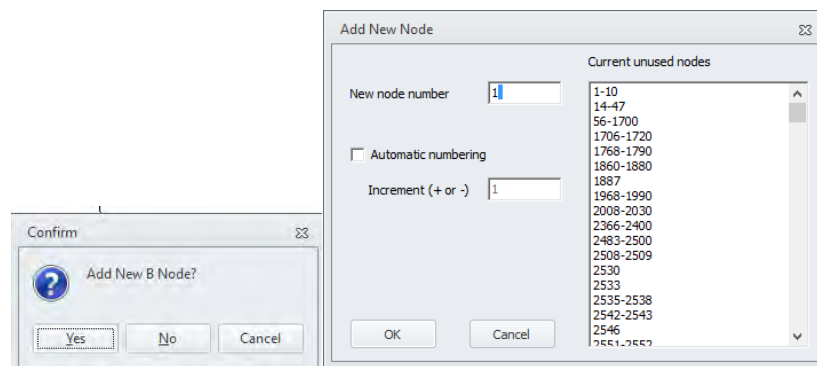




UPDATING GATEWAYS FOR SUBAREA

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.



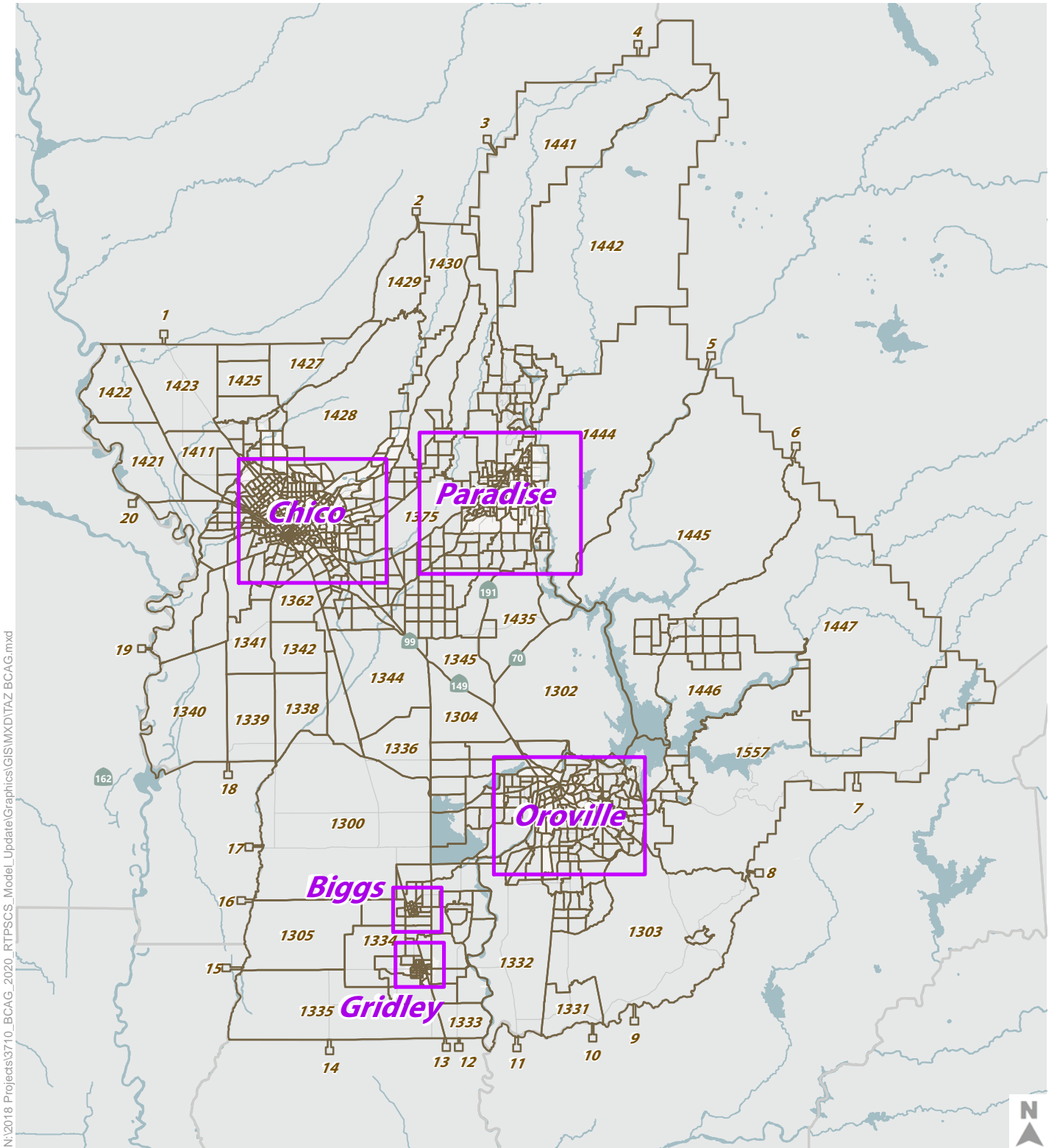
TAZs

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.



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.

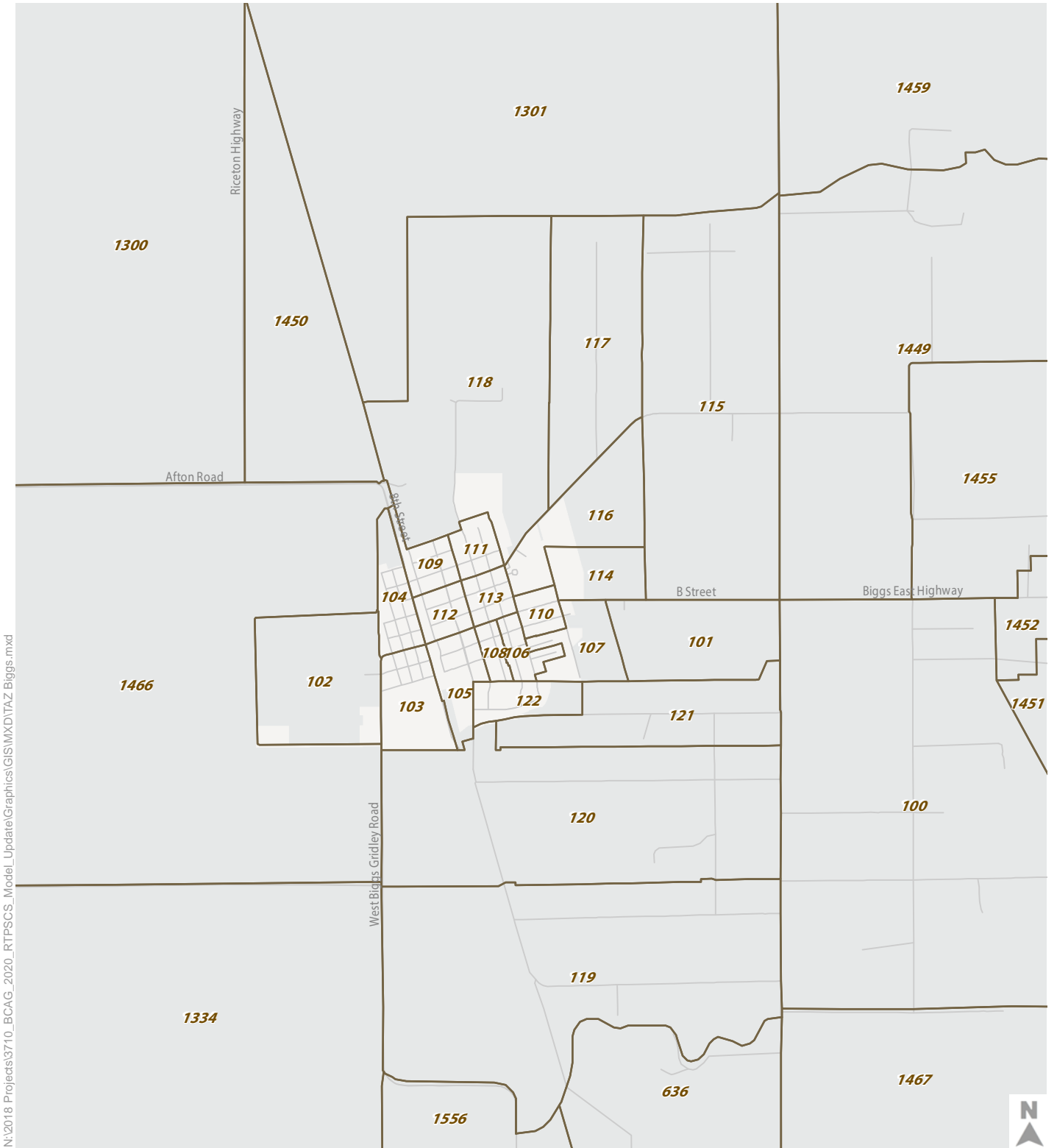






N:\2018 Projects\3710_BCAG_2020_RTP\PCS_Model_Update\Graphics\GIS\MXD\TAZ_BCAG.mxd

-  Traffic Analysis Zone Boundaries
-  City Limits

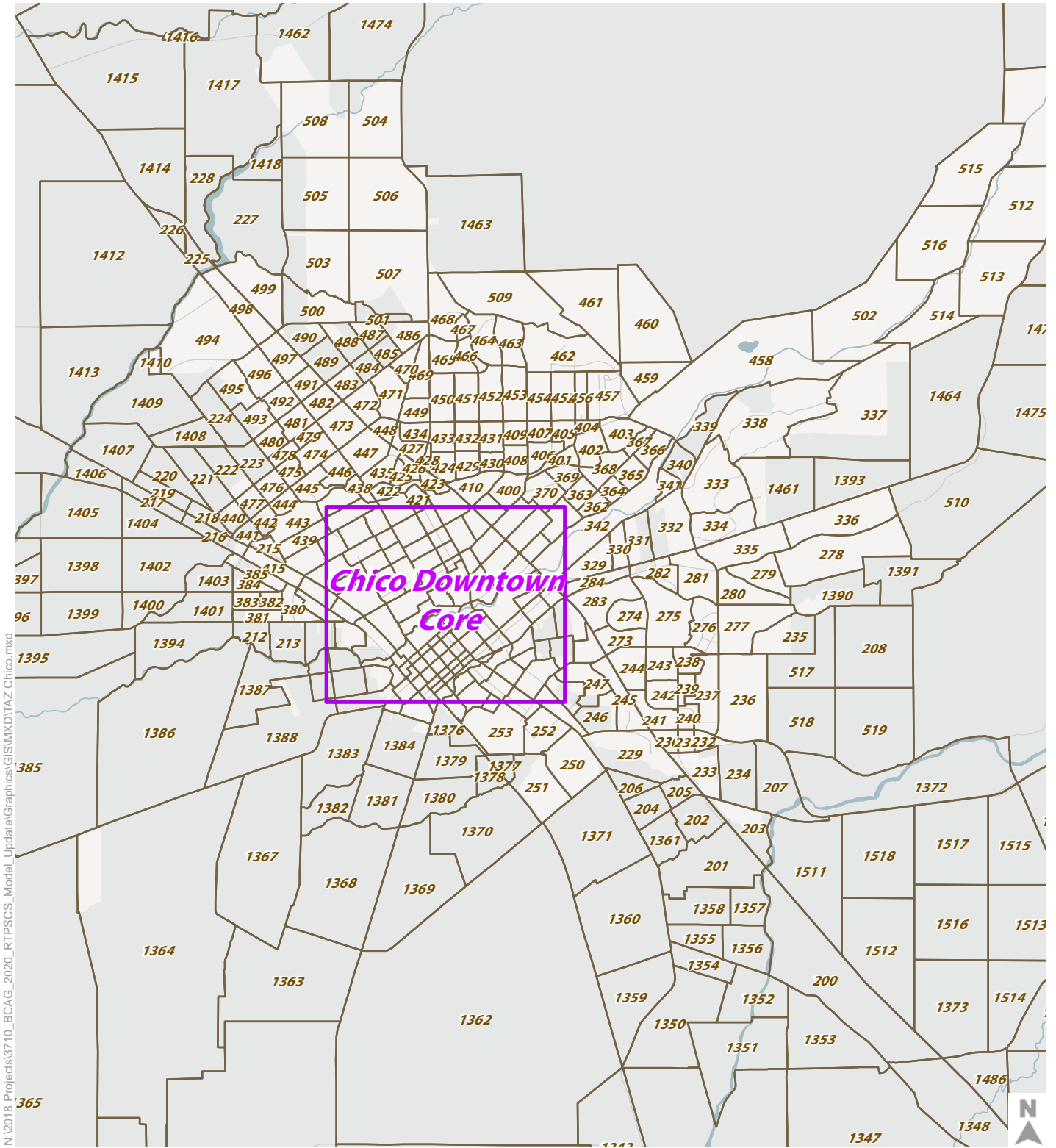






N:\2018 Projects\3710_BCAG_2020_RTPSCS_Model_Update\Graphics\GIS\MXD\TAZ_Biggs.mxd

-  Traffic Analysis Zone Boundaries
-  City Limits

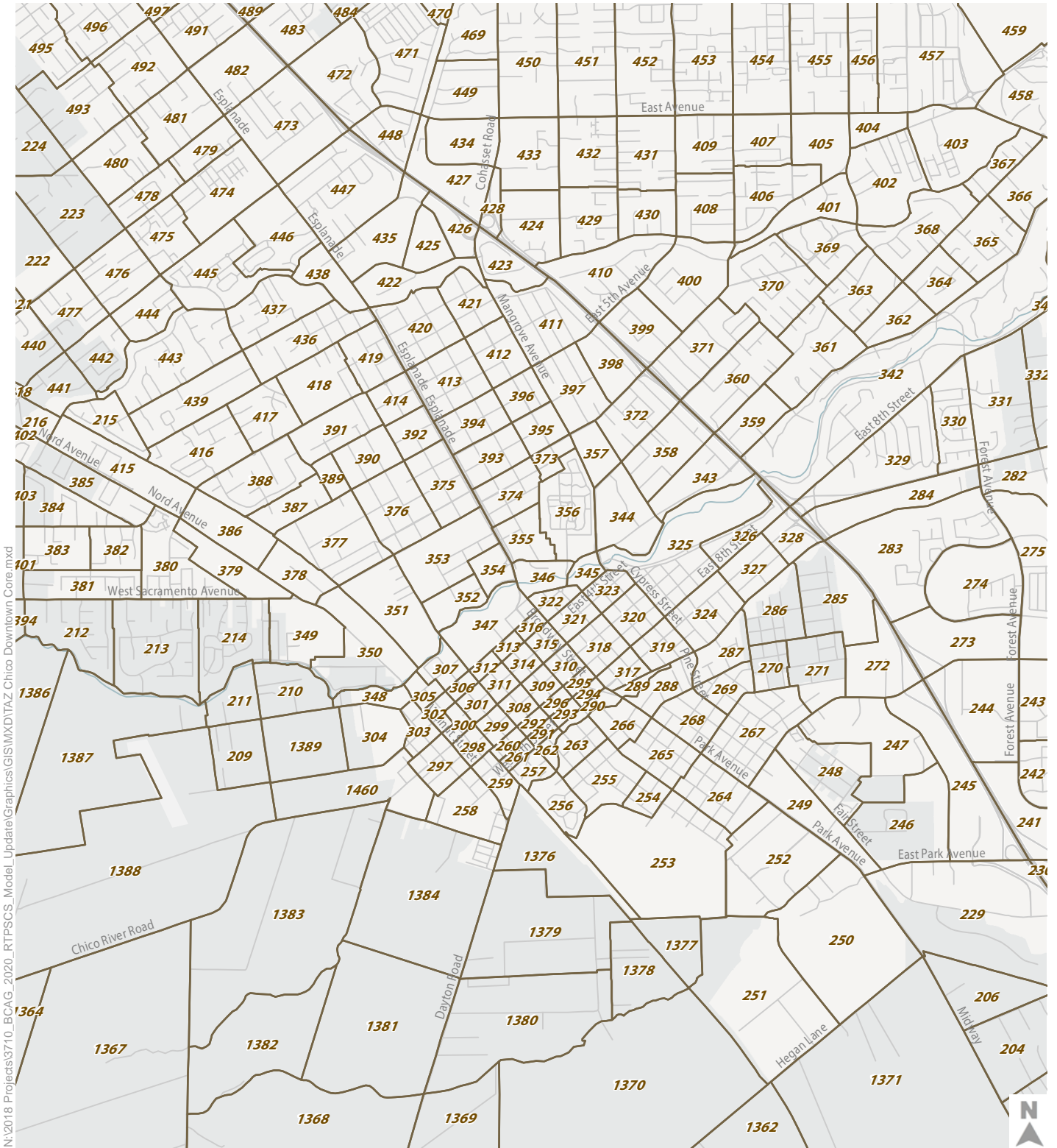






N:\2018 Projects\3710_BCAG_2020_RTP\PCS_Model_Update\Graphics\GIS\MXD\TAZ_Chico.mxd

-  Traffic Analysis Zone Boundaries
-  City Limits



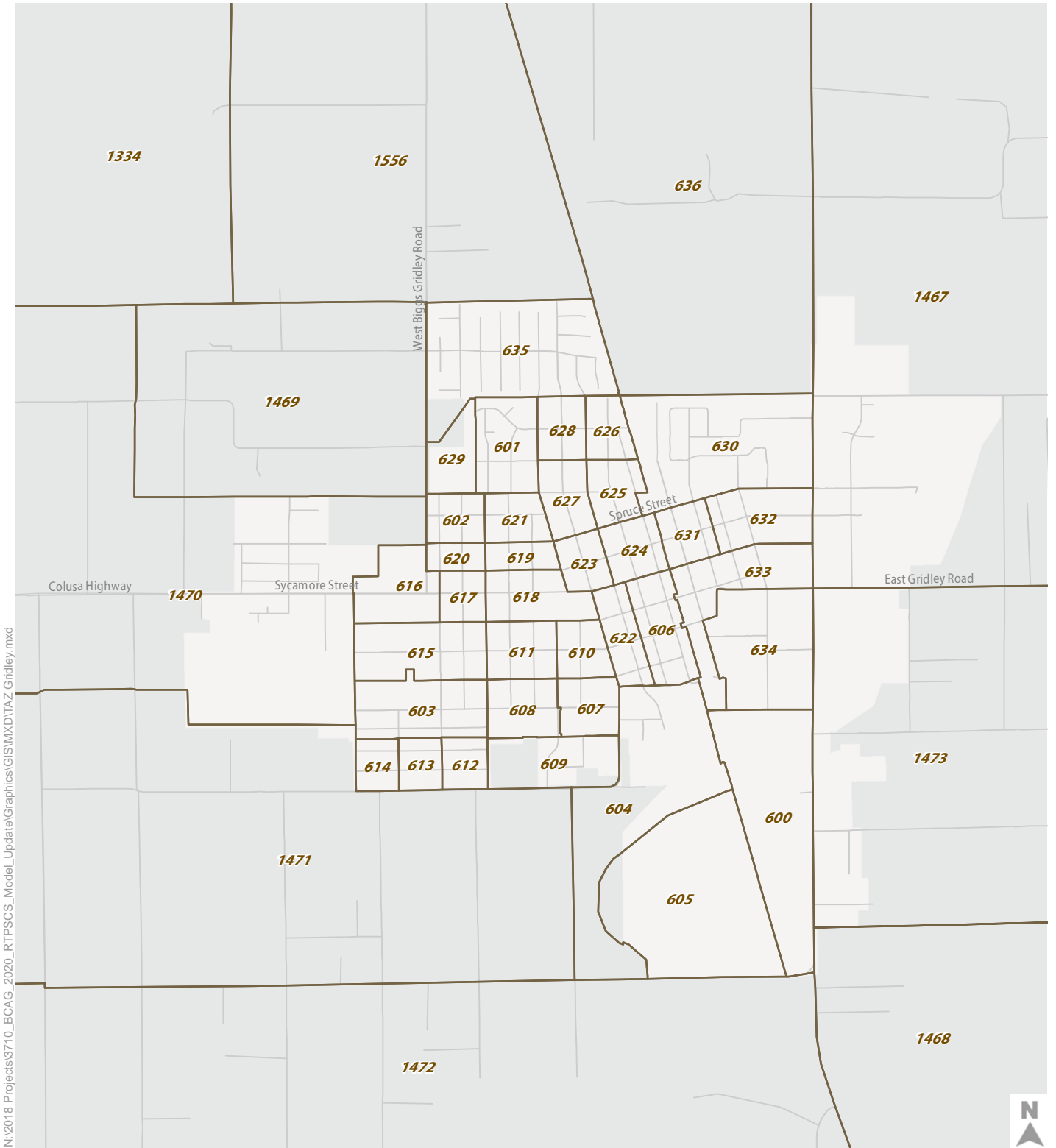


N:\2018 Projects\3710_BCAG_2020_RTP\PCS_Model_Update\Graphics\GIS\MXD\TAZ_Chico_Downtown_Core.mxd



-  Traffic Analysis Zone Boundaries
-  City Limits



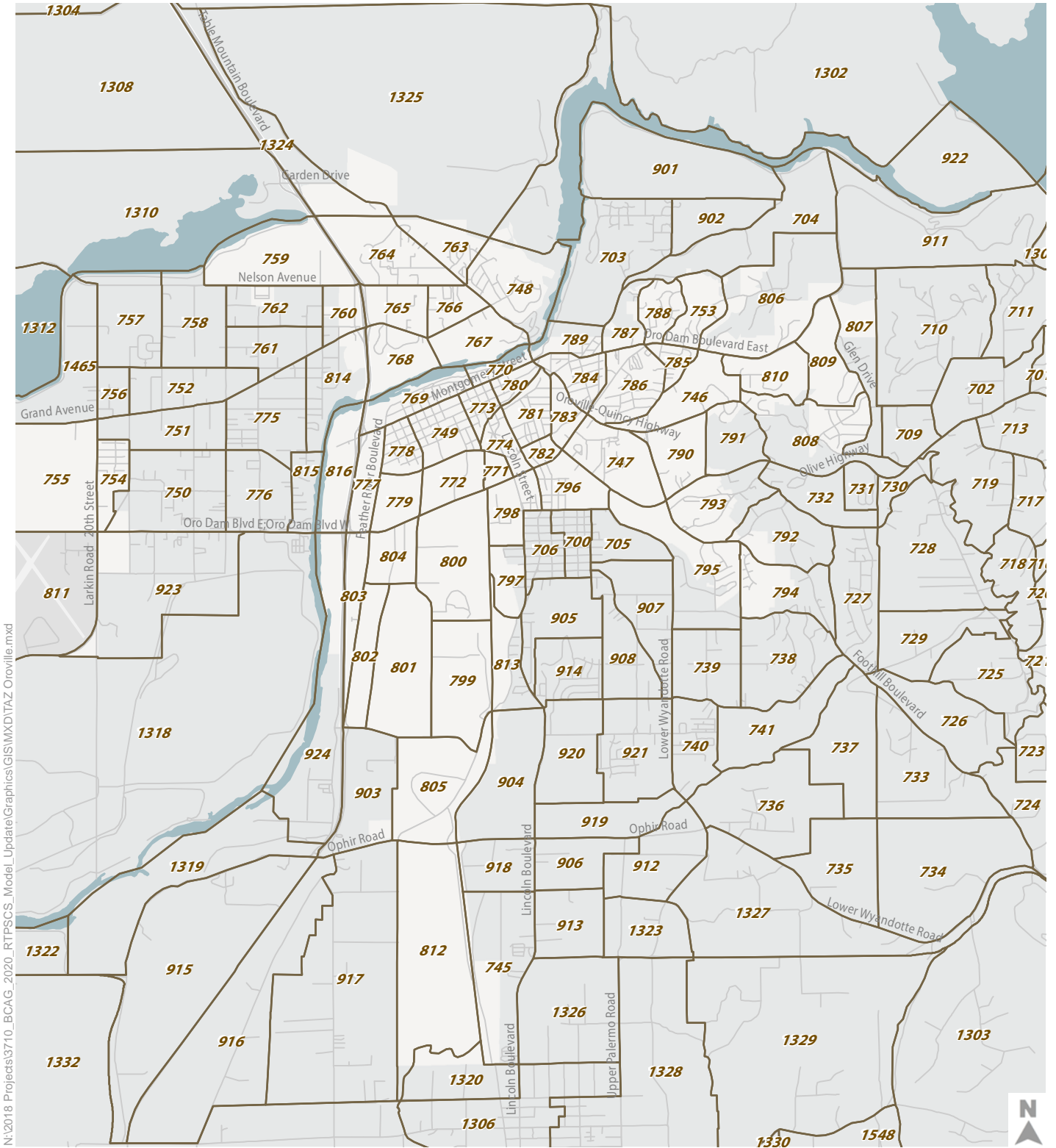
BCAG Model Update - Chico Downtown Core TAZ Boundaries





N:\2018 Projects\3710_BCAG_2020_RTPSCS_Model_Update\Graphics\GIS\MXD\TAZ_Gridley.mxd

-  Traffic Analysis Zone Boundaries
-  City Limits

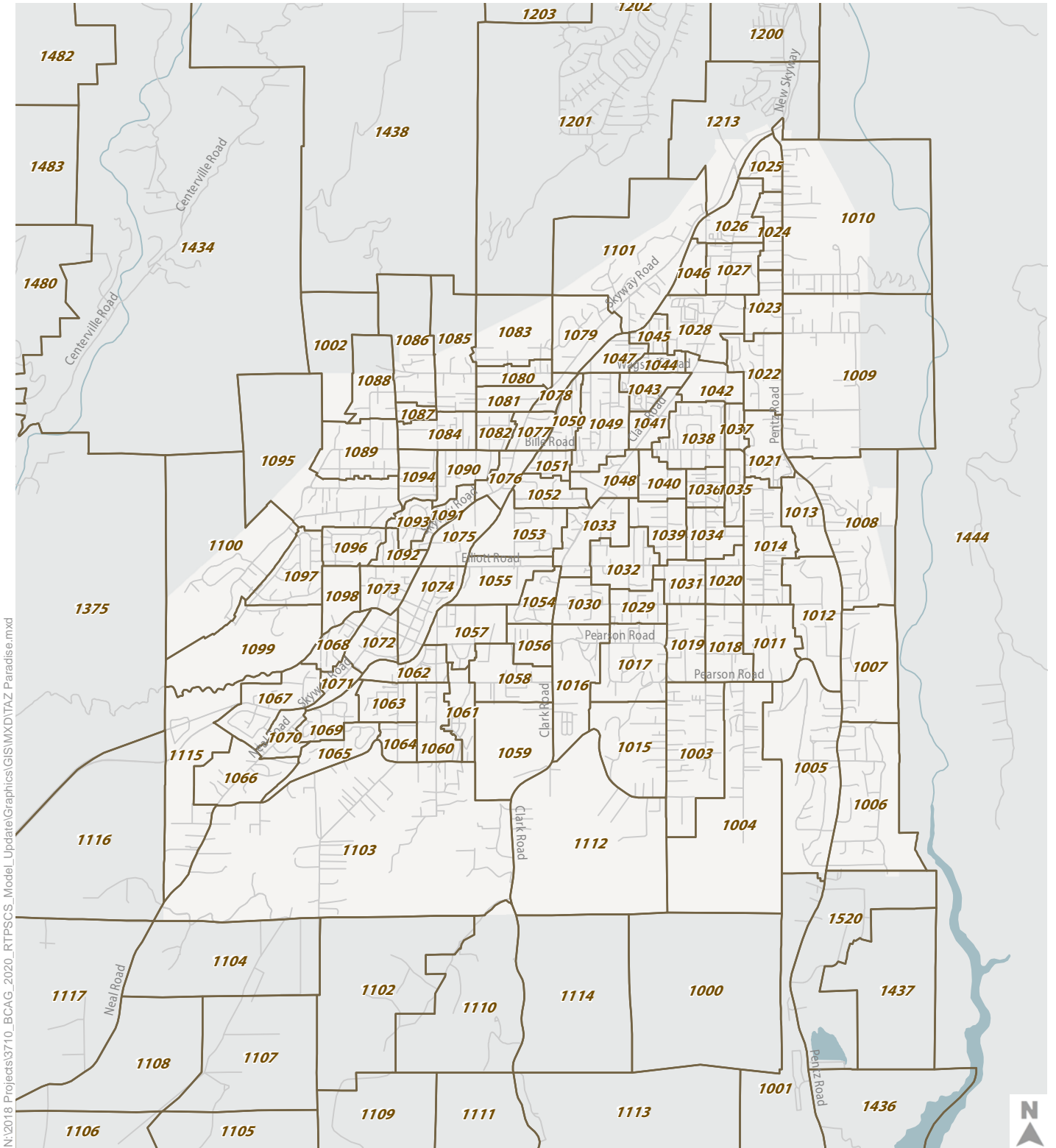






N:\2018 Projects\3710_BCAG_2020_RTP\PSCS_Model_Update\Graphics\GIS\MXD\TAZ_Oroville.mxd

-  Traffic Analysis Zone Boundaries
-  City Limits





N:\2018 Projects\3710_BCAG_2020_RTP\PCS_Model_Update\Graphics\GIS\MXD\TAZ_Paradise.mxd

-  Traffic Analysis Zone Boundaries
-  City Limits

