Oregon Department of Transportation

PTV Vision Software Network Setup Guide

May 2016

Transportation Planning Analysis Unit

Transportation Development Division, Salem, Oregon

TABLE OF CONTENTS

1 VISUM SUB-NETWORK GENERATION 1-5

2 VISTRO 2-7

2.1 VISUM IMPORT 2-7

2.2 SYNCHRO IMPORT 2-9

2.3 NETWORK BUILD 2-11

2.4 NEXT STEPS 2-15

2.4.1 VISUM EXPORT 2-15

2.4.2 VISSIM EXPORT 2-15

2.4.3 CONTINUED ANALYSIS IN VISTRO 2-15

3 2. VISSIM 3-16

3.1 NETWORK IMPORT 3-16

3.2 NETWORK BUILD 3-18

3.3 OPTIONAL NETWORK ELEMENTS 3-31

3.3.1 QUEUE COUNTERS 3-31

3.3.2 DATA COLLECTION POINTS 3-31

3.3.3 PEDESTRIANS 3-31

4 APPENDIX 4-33

4.1 EMME TO VISUM CONVERSION FOR ODOT MODEL NETWORKS 4-33

4.1.1 VOLUME DELAY FUNCTIONS 4-35

LIST OF FIGURES

Figure 1: Spatial Selection Mode 1-5
Figure 2: Subnetwork generator parameters 1-6
Figure 3: Vistro Import 2-7
Figure 4: Import Settings 2-8
Figure 5: Poly Point Removal 2-9
Figure 6: Zone Removal 2-9
Figure 7: Map Background Position 2-10
Figure 8: Adjust Leg 2-11
Figure 9: Vistro Toolbar 2-12
Figure 10: Selecting an Intersection 2-12
Figure 11: Intersection Setup Tool 2-13
Figure 12: Lane Configuration 2-13
Figure 13: Volume Input Tab 2-14
Figure 14: Traffic Control Tab 2-14
Figure 15: Vissim Export 2-15
Figure 16: Vissim Export Settings 2-15
Figure 17: Vistro Import 3-16
Figure 18: ANM export in Visum 3-17
Figure 19: Visum Network (Left) vs same network imported into Vissim (Right) 3-18
Figure 20: Network Settings 3-19
Figure 21: Standard View (Left) vs Wireframe Mode (Right) 3-19
Figure 22: Network Object Toolbar 3-20
Figure 23: Insert Link 3-21
Figure 24: Generate Reverse Direction 3-22
Figure 25: Connector Attributes 3-23
Figure 26: Link Volumes 3-23
Figure 27: Vissim Protocol Vehicle Composition 3-24
Figure 28: Static Vehicle Routing 3-25
Figure 29: Reduced Speed Area 3-26
Figure 30: Set Priority Status 3-27
Figure 31: Signal Control Drop Down 3-27
Figure 32: Add Signal Controller 3-28
Figure 33: Signal Control Detail 3-28
Figure 34: Signal group Settings 3-29
Figure 35: ODOT Standardized Detector Settings 3-30
Figure 36: Detector Attributes 3-30
Figure 37: Pedestrian Link Settings 3-32

LIST OF ACRONYMS

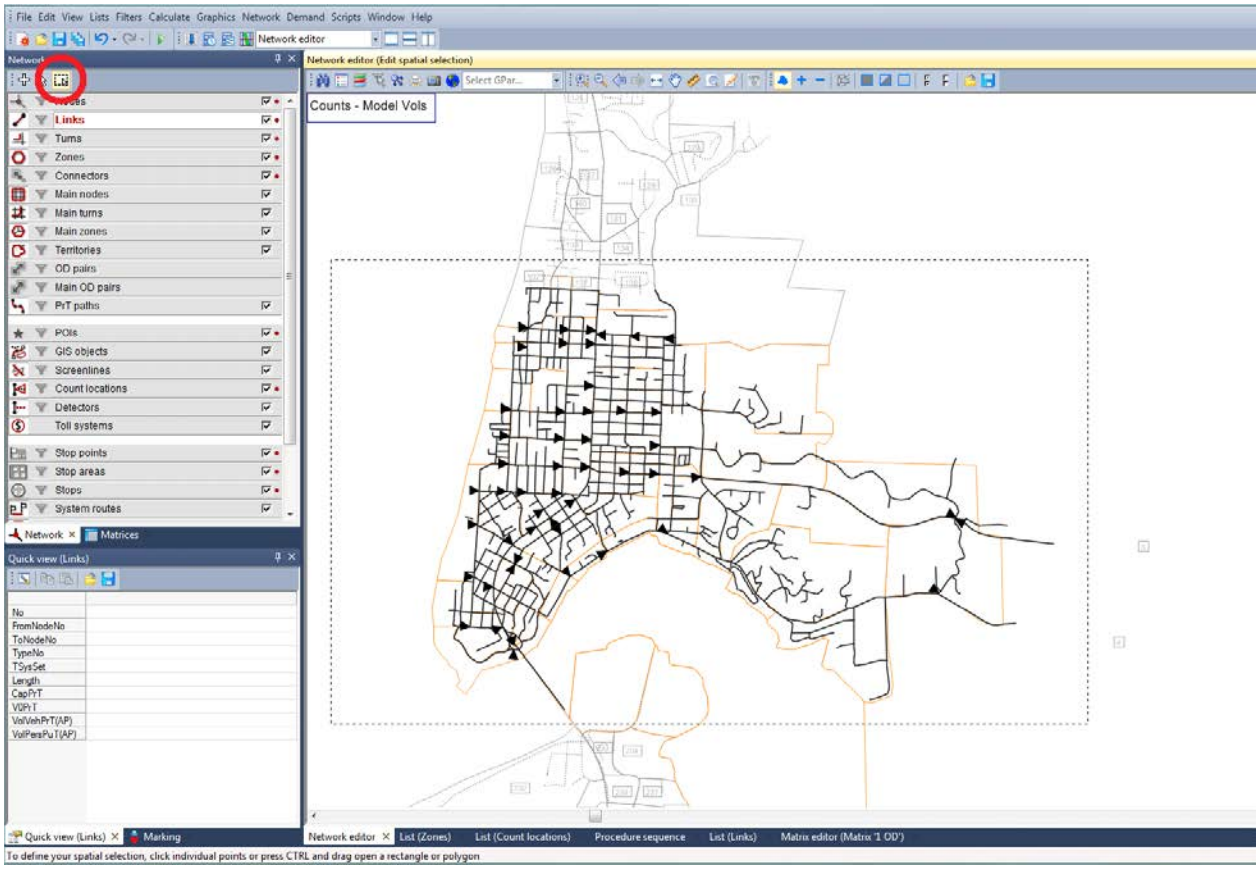
APM	Analysis Procedures Manual
HCM	Highway Capacity Manual
O-D	Origin - Destination
PT	Public Transit
RBC	Ring Barrier Controller
TIA	Traffic Impact Analysis
VAP	Vehicle Actuated Signal Control

1 VISUM SUB-NETWORK GENERATION

Introduction

Visum is a macroscopic traffic assignment software for use with travel demand models. Additional detail can be added to the network in a mesoscopic process by creating a “window” or sub-network of an existing network. The following will explain how to use the Sub-network Generator to produce “windowed” selection of the network for analysis.

Figure 1: Spatial Selection Mode

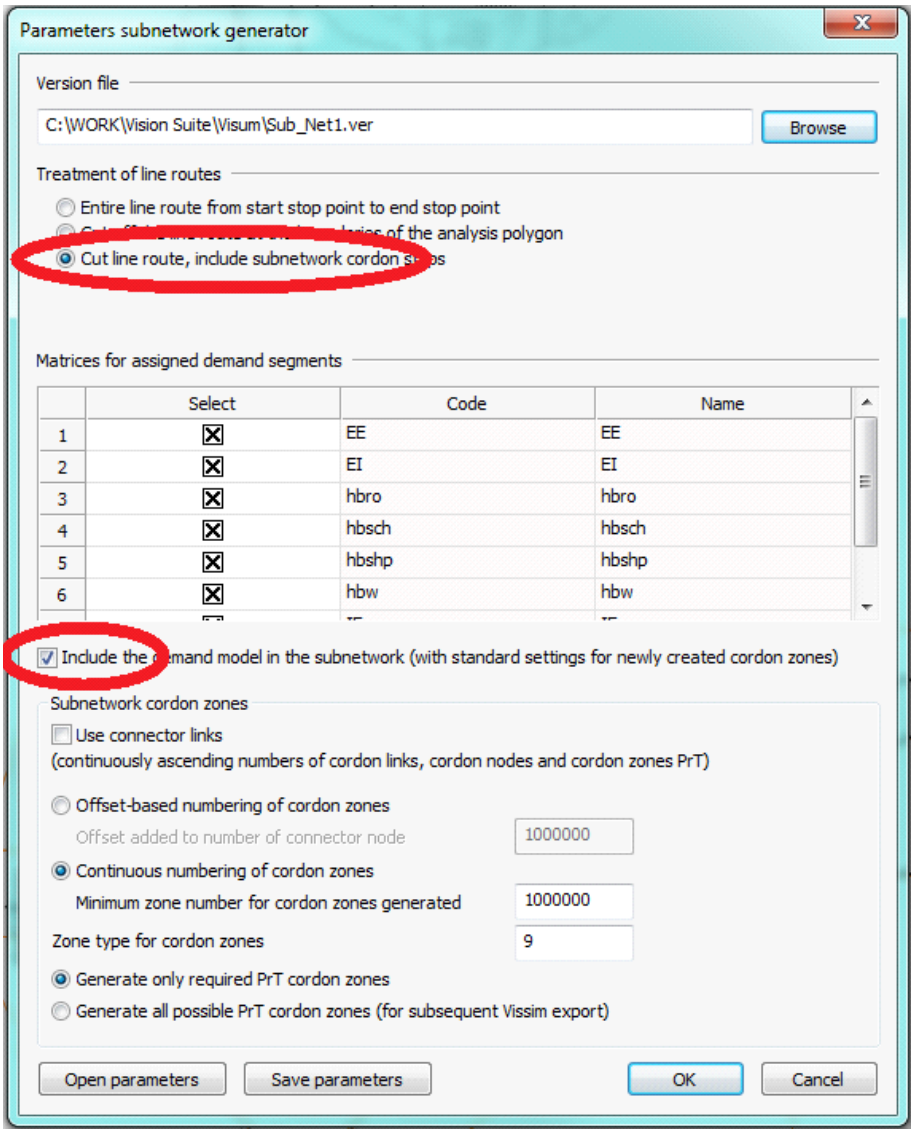


1. Open an existing model in Visum. Be sure that all filters are removed (Figure 1).
2. Use the Spatial Selection Mode tool to select a section of the network. The subarea can be selected either by using a bouding box/polygon or by selecting a territory, activated by the territory icon in the spatial selection toolbar
3. With the desired portion of the network selected, open the Subnetwork Generator from the Calculate drop-down menu, this will open the parameters dialog box (Figure 2)

4. In the Dialog box, set the save location and select the desired Matrices for assigned demand segments.
5. Insure that both of the following options are selected (as in Figure 2)
   a. Cut line route, include subnetwork cordon stops
   b. Include the demand model in the subnetwork

   Be sure to set the save location and version title.

Figure 2: Subnetwork generator parameters



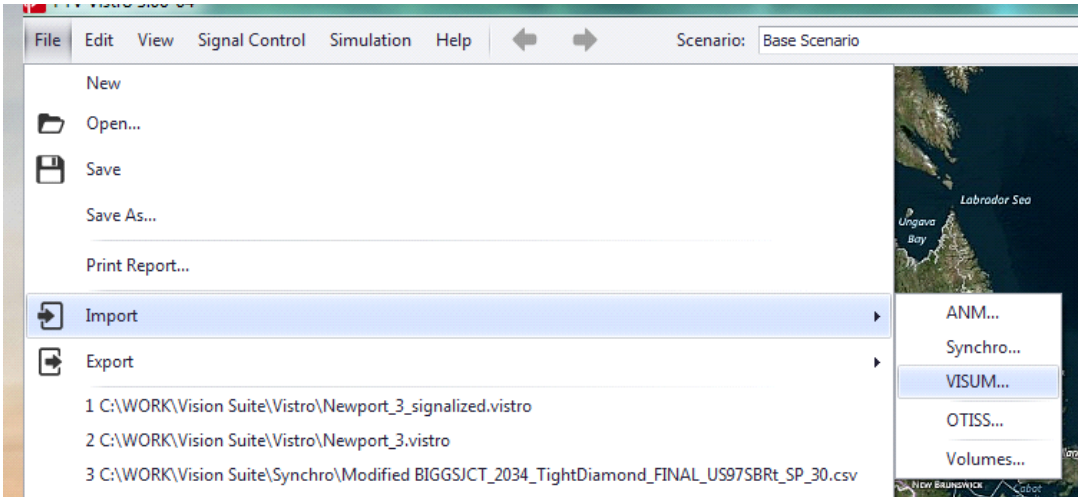
2 VISTRO

Vistro is a deterministic tool that is designed for HCM-based traffic analysis, and traffic signal optimization. The following is a guide outlining the steps for setting up networks in Vistro for HCM-based analysis, traffic impact analysis, and simulation. This guide will cover imports from Visum and Synchro, Vistro network construction, and exporting to Visum and Vissim.

2.1 Visum Import

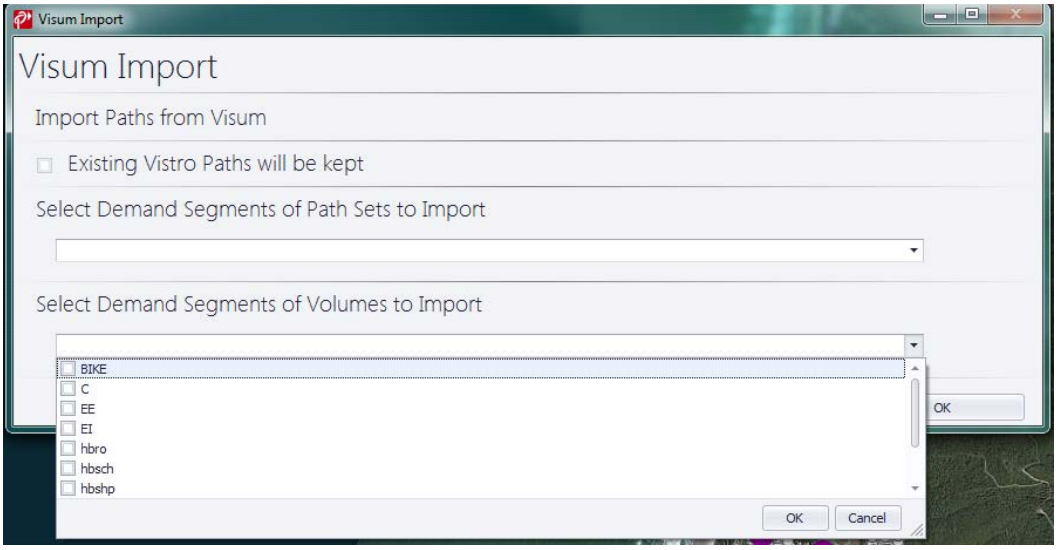
Vistro and Visum are built on the same platform which allows for easy transfer between the two software programs. Imported Visum networks generally include geometric inaccuracies. These inaccuracies occur due to the graphical nature of Vistro, which has difficulty rendering the complex geometry of some intersections and roadway alignments. It may be necessary to simplify the intersection or roadway to do the proper analysis. Depending on the elements within the Visum network, much of the information in the Vistro network is automatically populated. In an instance where the Visum network contains analysis zones, these will be imported as Vistro Zones, which are used for traffic impact analysis (TIA). These zones will have to be addressed correctly depending on the intended use for importing the network into Vistro.

Figure 3: Vistro Import



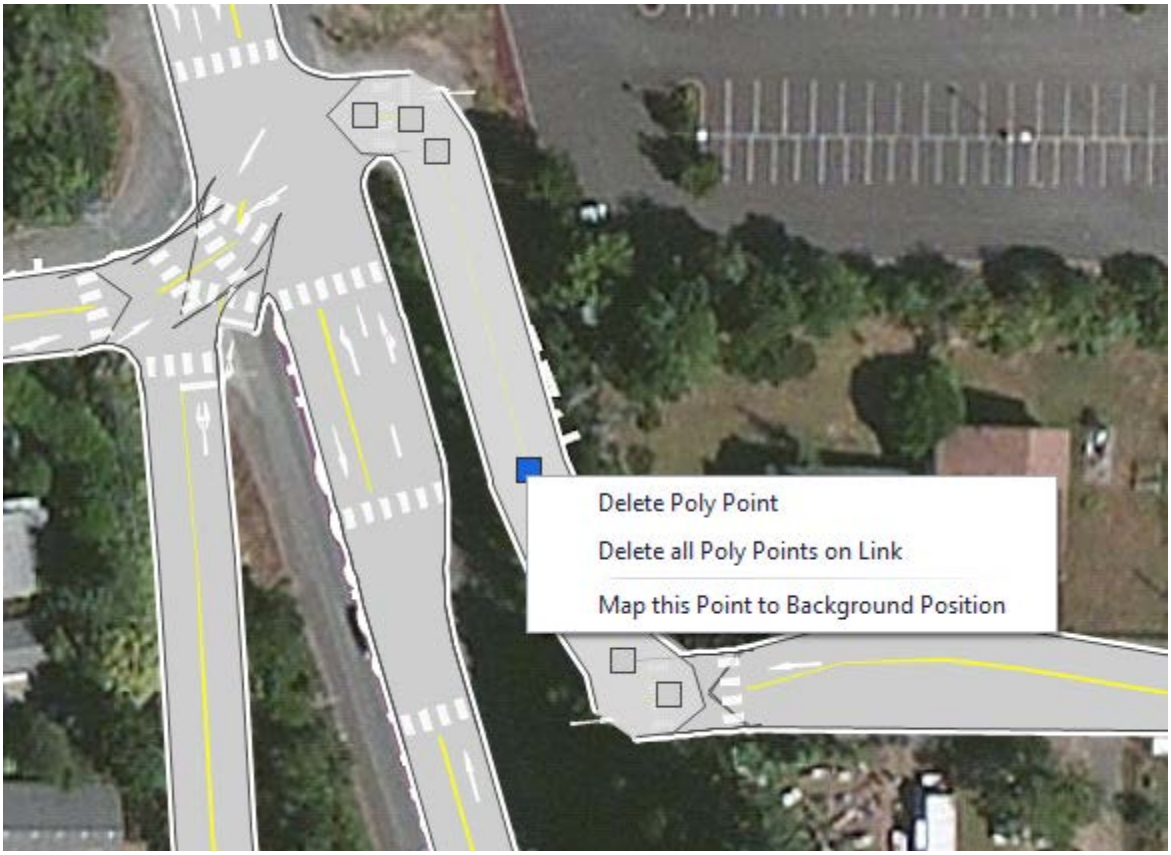
1. In a new map, navigate to File, Import, VISUM (Figure 3)
2. In the Open dialog box, navigate to the desired version file (.ver)
3. Select the file and click Open
4. After the file loads, the Visum Import dialog box will open (Figure 4). From that select one of the options for importing Demand Segments. Each option is explained below.

Figure 4: Import Settings



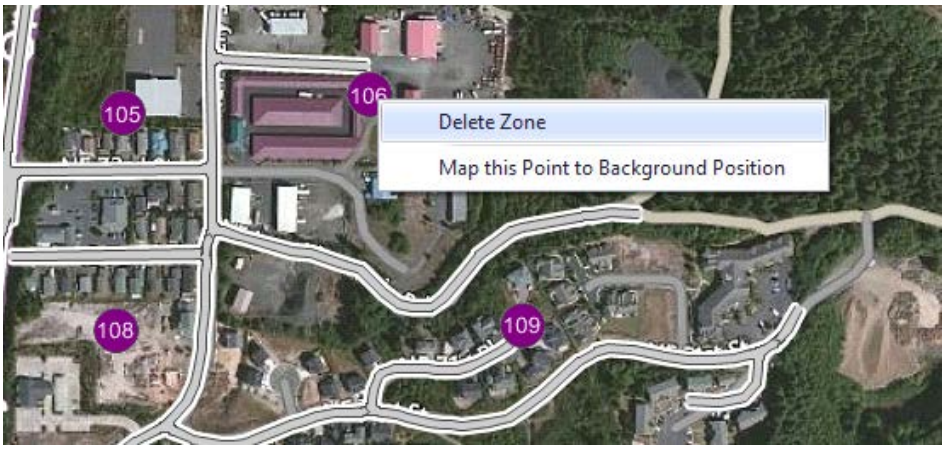
5. The first drop down menu “Select Demand Segments of Path Sets to Import”. Use this option when the user wants to include all O-D paths, or to perform TIA. This option is still viable for signal optimization as all the corresponding volumes will be imported.
6. The Second drop down menu “Select Demand Segments of Volumes to Import”, check all desired demand segments. Use this option if the user does not need to perform TIA or wants to perform TIA on a specific set of zones. The user will need to add these zones, and paths before analysis can be used.
7. Visually examine the imported network for incorrect geometry
8. Remove or add poly points as need to correct the network. Right click on a poly point to select delete, or click on a leg to add a poly point (Figure 5).

Figure 5: Poly Point Removal



9. Simplify intersections if needed.
10. Importing from Visum includes the import of analysis zones. Imported zones do not contain the information necessary for traffic impact analysis and should be removed (Figure 6). However, if the zones are deleted they will not transfer back to Visum.

Figure 6: Zone Removal

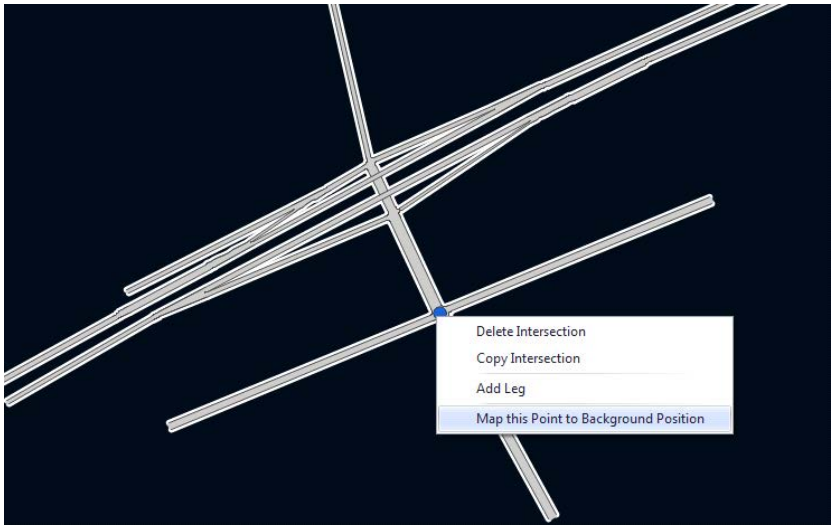


2.2 <u>Synchro Import</u>

Vistro is programmed to support import of Synchro 7 files or newer and is not able to import files exported

from Synchro 6 or older because the export file structure is different. The Synchro “Combined Data File” file must be saved in csv format to be correctly imported. The imported network retains a portion of the intersection settings from Synchro, and automatically assigns them to their corresponding Vistro attribute. Unless explicitly set in Synchro, the imported network will not correctly align with the live background map in Vistro and will need to be updated. The geometry will also need to be adjusted for continued use in the Vision software suite.

Figure 7: Map Background Position



1. In a new map, navigate to File, Import, Synchro
2. In the Open dialog box, navigate to the desired Synchro .csv file, select the file and click open.
3. Adjust the background (version 3.00-04 or newer)

   Right-click on an intersection. Select the option “Map this Point to Background Position” (Figure 7). Navigate to the desired location, and left-click to relocate the network. Adjust the legs and intersections as desired (Figure 8).
4. Review all intersection settings for correctness

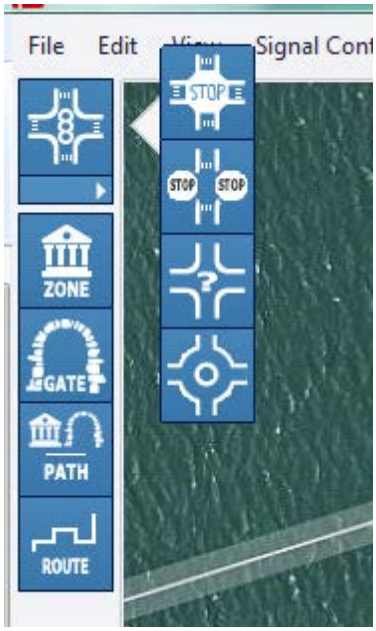
   As of version 3.00-04, Vistro does not handle multiple detectors (HCM 2010 limitation). Instead it automatically assigns the information for the detector nearest to the intersection. Keep in mind that split time is assigned the **total split** time from Synchro.

Figure 8: Adjust Leg

2.3 **Network Build**

The Network section covers the required steps for creating a new intersection network within Vistro. The level of effort is dependent on the number of intersections in the desired section. As a reference, it took an unfamiliar user approximately two hours to complete an eight intersection network from start to finish. All of the data is input into three main tables. These tables are arranged to the right of the screen, and are separated by three tabs. All of the fields to be attributed are arranged vertically with the tables and can be expanded and collapsed using the arrows. Vistro tables are set up so that normal text represents fields that can be altered by the user, and italicized fields represents attributes that are automatically calculated. The majority of the fields to be filled are noted within the procedure below.

Figure 9: Vistro Toolbar



1. In the File menu, select New File.
2. Navigate to the appropriate world location
3. From the tool bar on the left, click the arrow under the Intersection Tool (the first tool from the top), select the desired intersection type (Figure 9), and place the intersection at the desired location.
4. Click the node at the center of the intersection (Figure 10), and select the Intersection Setup table to the right (Figure 11).

Figure 10: Selecting an Intersection

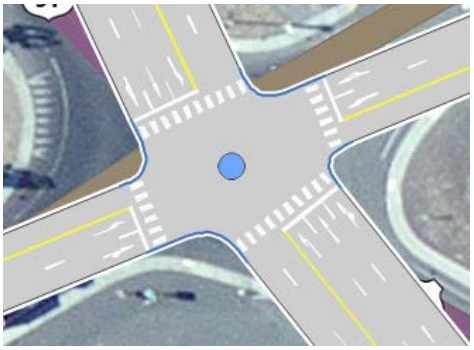
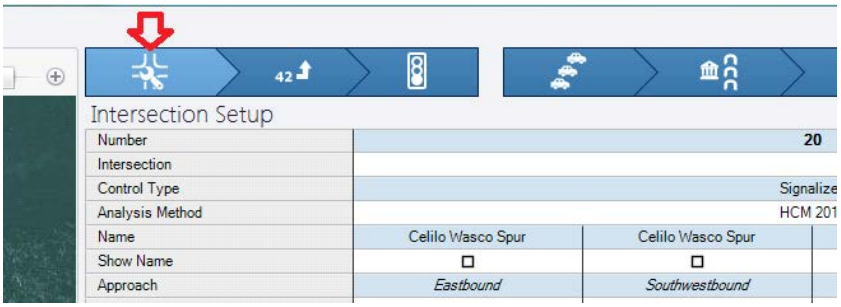
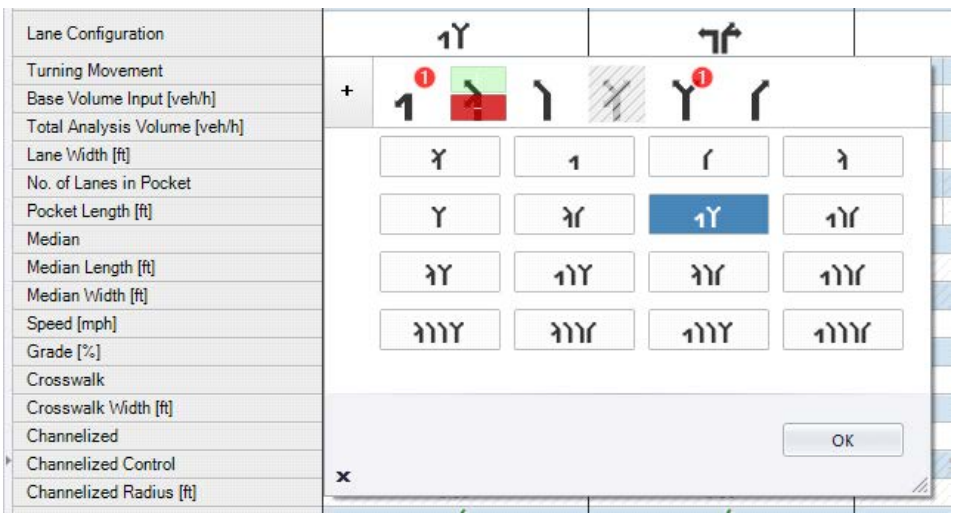


Figure 11: Intersection Setup Tool



5. Adjust the leg alignment geometry of the intersection as needed.
6. To change the lane configuration, click the box labeled "Lane Configuration" (Figure 12). Select the correct lanes, and lane types from the interface. Use the plus sign on the left to view more lane types. Hover over the lane configurations in the top bar to add or remove multiples of that lane type. A red circle shows the current number of each lane type in the configuration.

Figure 12: Lane Configuration

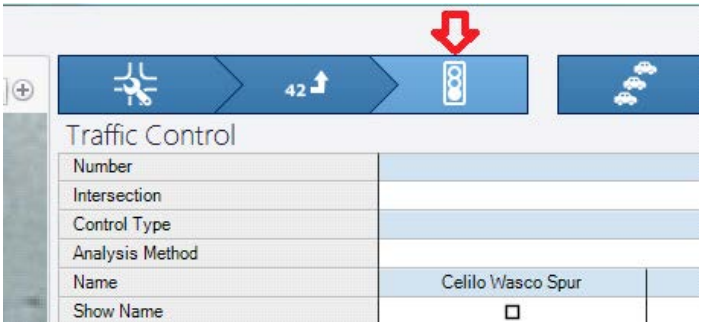


7. Input the correct values for lane width, storage (turn pocket) length, median width/length, link speed, approach grade, crosswalks, channelization islands, and right turn on red.
8. Within the same intersection, next select the Volume tab (Figure 13) and input the appropriate values for the intersection volume. Many of the setting are specific to the Control Type.

Figure 13: Volume Input Tab

9. Input values for percent Heavy Vehicles, Growth Rate (for sensitivity analysis only), peak hour factor, saturation flow rate, on-street parking, and pedestrian and bicycle volumes.
10. Some values can be overwritten but require an Overwrite check box to be selected. This includes calculated headway, and calculated follow up time for roundabouts, and 2-way stops.
11. Select the Traffic Control tab (Figure 14) and input the appropriate intersection settings. The number and presence of attributes change based on the control type. In addition, certain values must be input on the Volume tab in order to attribute specific fields in the Traffic Control tab.

Figure 14: Traffic Control Tab



12. Set analysis period.
13. Input controller attributes, cycle length, coordination type, actuation type, offset, and lost time.
14. Input Phasing and Timing. Pay specific attention to the control type of each turn movement. The control type of left turns must be set to Protected, Protected/Permissive, or overlap in order for it to be added to a signal group. Once added to a signal group the remaining values can be attributed. Fields for Right turns and Permissive or Split left turn movements will remain greyed out and cannot be changed.
15. Once the intersection has been created, it can be copied and pasted as needed within the network. One strategy for faster network building is to enter only the common values into the first intersection of each type, and then copy it to all of the applicable locations. Then return to each intersection and input the attributes specific to only that intersection.
16. After all the intersections are in place, connect the legs of the intersections, and adjust the geometries using poly points.

2.4 Next Steps

At this point the intersection information is complete. Depending on the desired end product, there are three directions that can be pursued. The intersection network can be exported to Visum for additional modeling, exported to Vissim for simulation, or remain in Vistro for continued analysis.

2.4.1 Visum Export

Vistro and Visum files are built on the same platform. As a result, if the user originally imported the network from Visum the file will retain all of the information from the original Visum network. If the network was imported from Synchro, or built in Vistro it will only contain the information stored in the Vistro tables. To import the Vistro file into Visum, save the file in Vistro. Open Visum, and then Import the Vistro file by navigating to File, Import, Vistro.

2.4.2 Vissim Export

1. Within Vistro, select Export from the File menu (Figure 15)
2. Select Vissim (ANM), select Vissim 7 or Higher (Figure 16)
3. Select "With RBC Controllers"(this is the easiest way to code signals) and click Export
4. Browse to the desired location and save the ANM file

Figure 15: Vissim Export

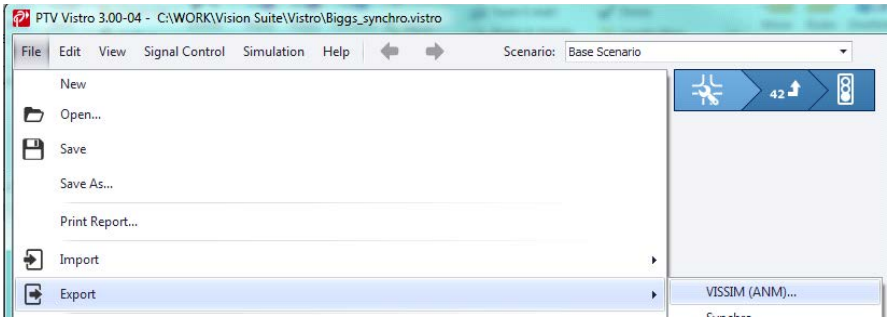


Figure 16: Vissim Export Settings

2.4.3 Continued Analysis in Vistro

Two of the main functions of Vistro are Highway Capacity Manual (HCM) analysis and traffic impact analysis (TIA). Additional information needs to be input into Vistro in order to complete these processes. The Analysis Procedures Manual (APM) states that raw volumes should not be used for either HCM or TIA analyses. The user must insure that any turn movement volumes input into the intersection network are design hour volumes (including post-processing if from a travel demand model). (See APM version 2 Chapters 5 and 6.) Volumes imported directly from a Visum network are generally not acceptable for HCM and TIA analyses. Other elements of imported networks may also need correction, prior to completing either of these. As stated in the

Visum Import section, zones imported from the Visum network are incorrect, and will cause errors in the TIA. These zones should be removed and replaced, according to desired analysis.

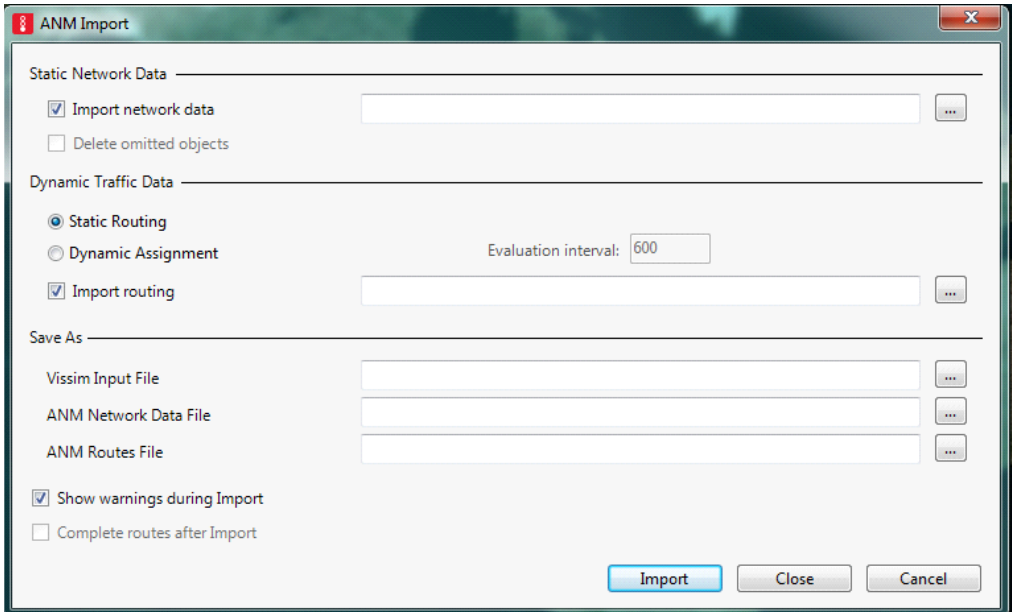
3 VISSIM

This user guide is written in coordination with the Vissim Protocol. Refer to Chapter 4 in the Vissim Protocol for additional guidance on network coding and related settings. The following section outlines the import and construction of networks within Vissim.

3.1 Network Import

Vissim supports import from both PTV and non-PTV software. This section outlines the steps to import networks from Vistro, Visum, and Synchro.

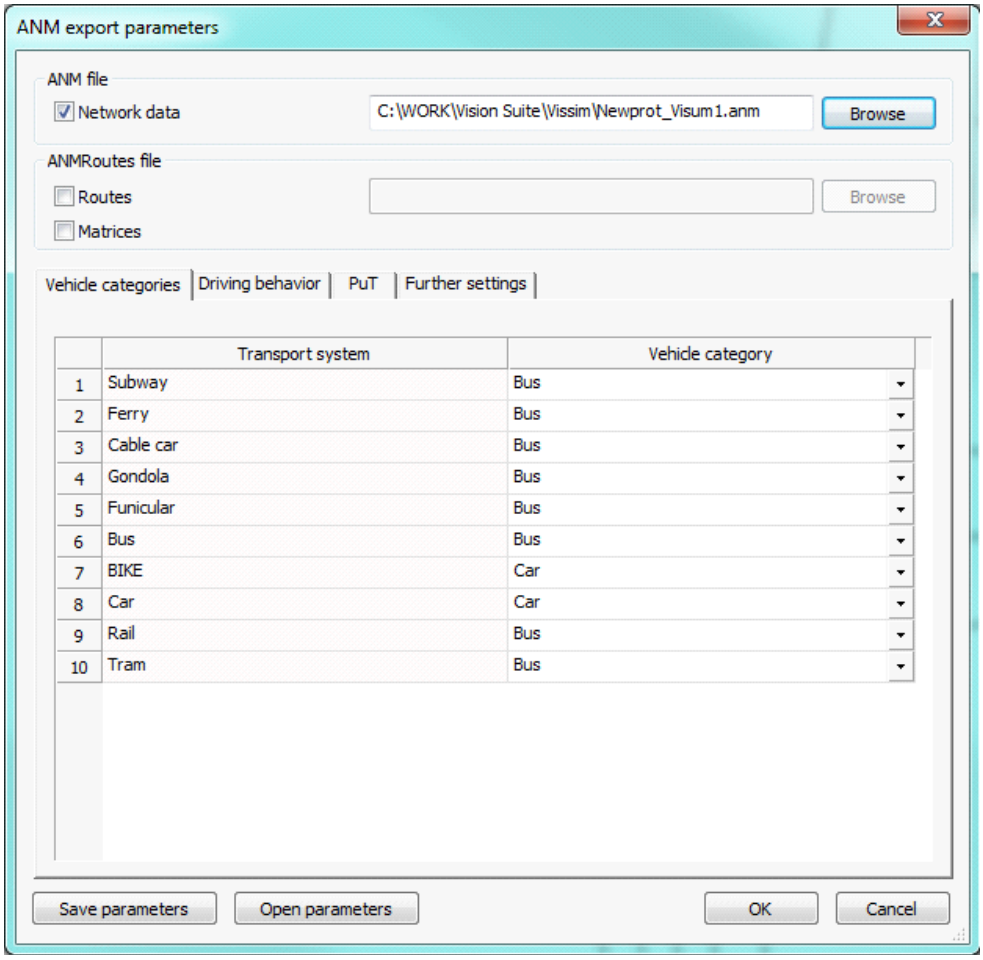
Figure 17: Vistro Import



2. Vistro Import.
   a) After exporting the Vistro file in ANM format, ANM (see section 2.5.2), it can be imported into Vissim.
   b) Within Vissim navigate to File, Import, ANM
   c) Browse to and select the .anm file (Figure 17)
   d) If routing exists, browse to and select the routing file. Dynamic routing is the preferred method, however if no routing is available select Static Routing. Browse to the desired location under Vissim Input File and save the file.
3. Visum Import

   The Visum import is similar to the Vistro Import. Importing a Visum network starts by exporting to ANM format in Visum, and then importing the ANM file in Vissim.

Figure 18: ANM export in Visum



a) In Visum navigate to File, Export Vissim (ANM) (Figure 18)

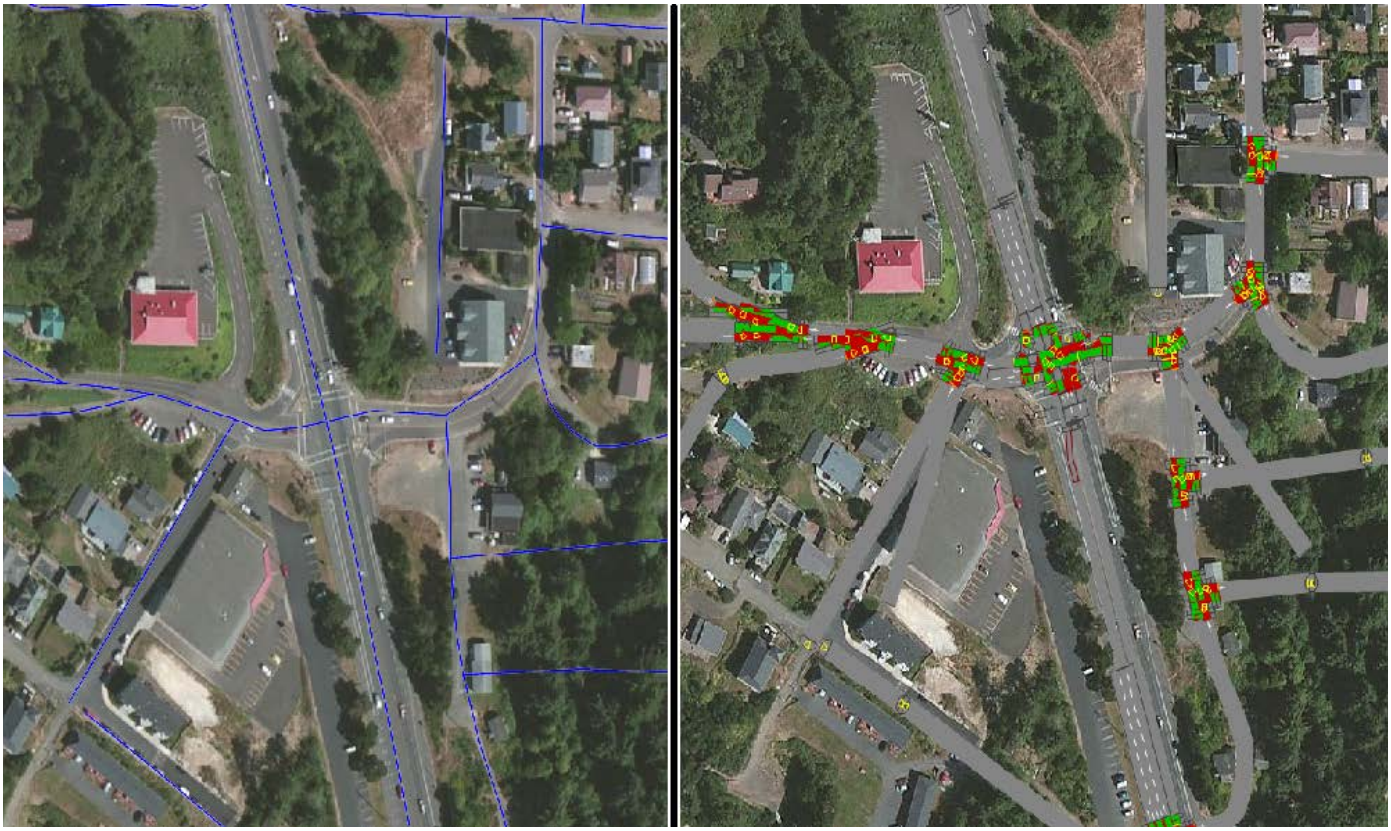
b) Check Network Data, click browse and save file

c) Click OK to complete the export

d) In Vissim, follow the steps outlined above to import the ANM file into Vissim

Importing from Visum has the potential to cause inaccuracies within the network geometry (Figure 19). Follow the procedure outlined in the Network Build section to adjust the network.

Figure 19: Visum Network (Left) vs same network imported into Vissim (Right)



4. Synchro import

   Like Vistro, Vissim has the capacity to import networks directly from Synchro 7. Synchro networks do not sync to the live Bing Map background automatically and must be relocated. As with Vistro, the network generally must be adjusted to align with the background.

   a) This is a basic overview of the steps in Vissim. The process is almost identical to the Synchro 7 import detailed in the Vistro section.
   b) Navigate to File, Import, Synchro 7.
   c) Browse to and select the Synchro .csv file and the project path then import the network.
   d) The background adjustment occurs by the same process outlined in the Vistro section. Right click the network, and select Map this point to location.

3.2 **Network Build**

This section details the necessary steps to create a network within Vissim. While network creation in Vissim is possible it requires a large number of steps, specifically in regards to intersections. While importing a network is much faster than building the network within Vissim it is necessary to understand all of the attributes within Vissim. Knowledge of network construction will aide in reviewing imported attributes for correctness. This section is written as a compliment to the Vissim Protocol and covers similar steps. Information from the Vissim Protocol pertinent to network setup has been referenced in this section.

1. Network Tips
    a) Prior to network construction, ensure that the units are changed to Imperial. Navigate to Base Data, Network settings. Select the Units Tab, and click All Imperial (Figure 20).
    b) Wireframe Mode is useful tool when attributing a complex intersection. Use Ctrl +A to toggle between Wireframe mode, and standard mode (Figure 21).

Figure 20: Network Settings

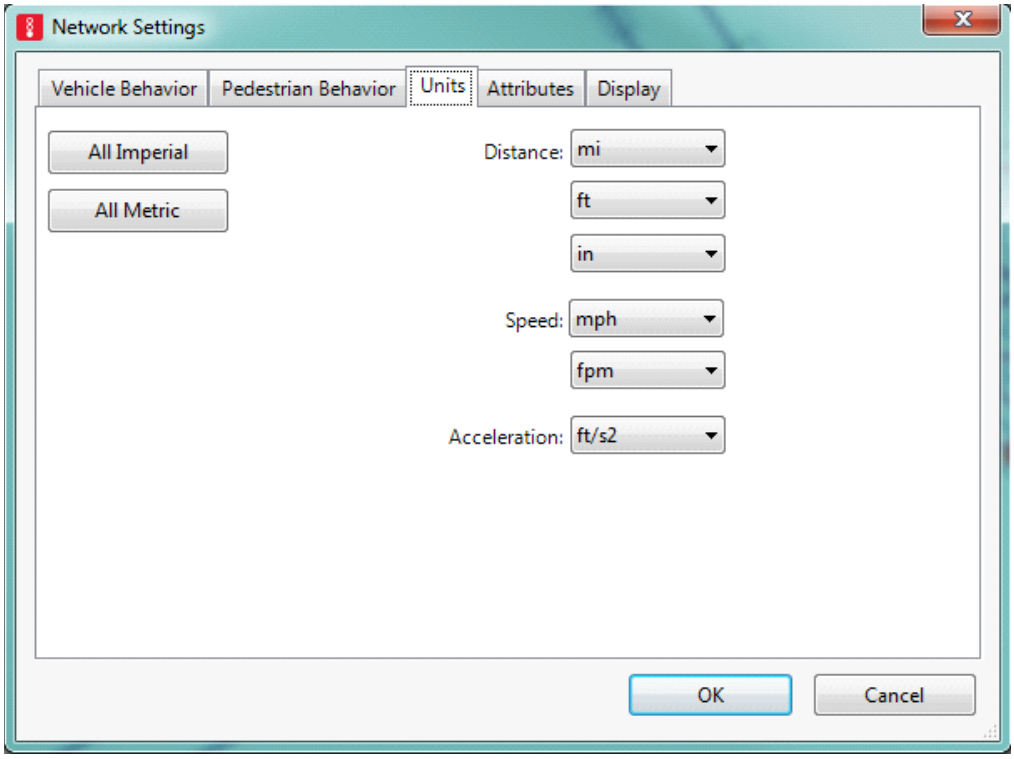
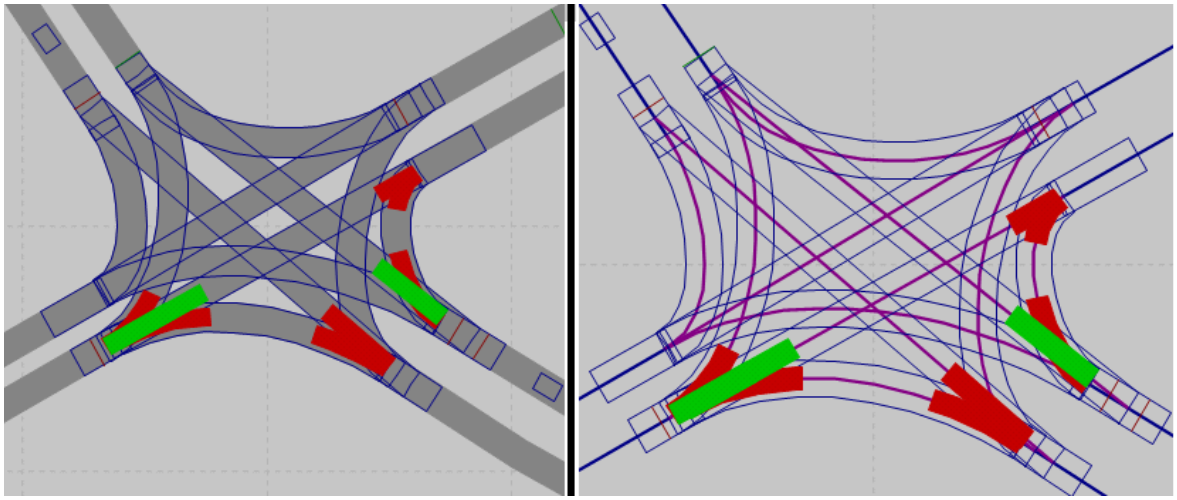


Figure 21: Standard View (Left) vs Wireframe Mode (Right)

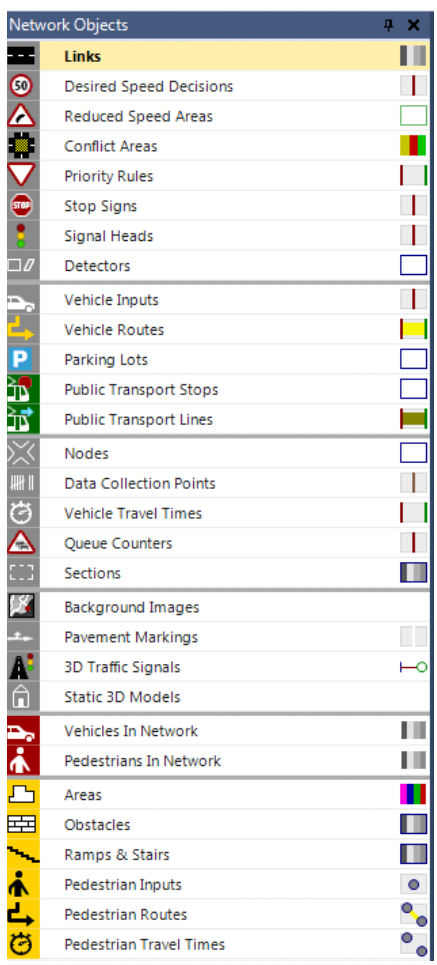


2. Overview

In order to construct a simulation-ready network in Vissim, it requires the construction of several attributes. The following is an overview of the attributes needed. This can be used as a checklist during construction. The process for each of the following is outlined later in this section

- Links
- Connectors
- Vehicle inputs
- Turning movements (Vehicle Routes)
- Turn Volumes (Static Vehicle Routing Decisions)
- Speed Reductions
- Right of Way (Conflict Area)
- Traffic control
  - Stop Signs
  - Signal Control
  - Signal Groups
  - Signal Head
  - Detectors

Figure 22: Network Object Toolbar

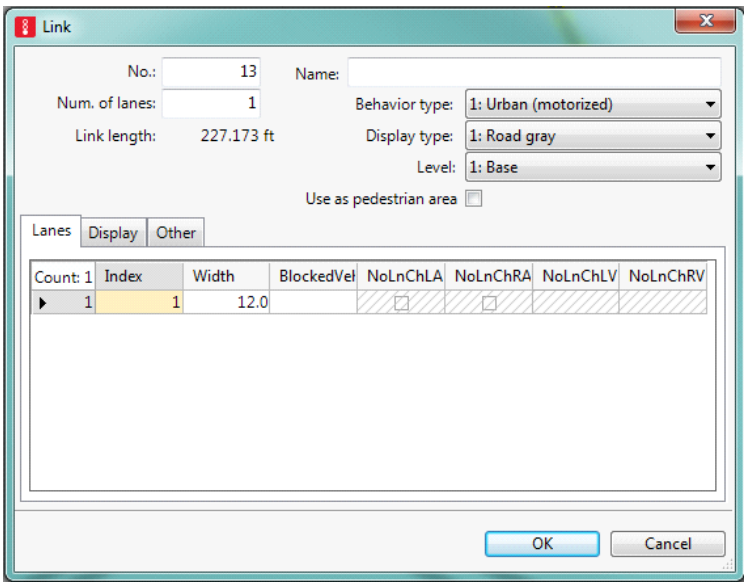


3. Create Links

a) Select Link from the Network Objects toolbar (Figure 22). The selected attribute is highlighted in yellow-orange. When highlighted, the attribute is in Insert Mode.

b) Hold Ctrl key and right-click at the desired location, generally at the beginning of one intersection. Drag the mouse to the next intersection and release. For signalized or all-way stop intersections, stop the link before the center of the intersection. For two-way stop intersections, or for a T-intersection, continue the major route through the intersection to the next major intersection.

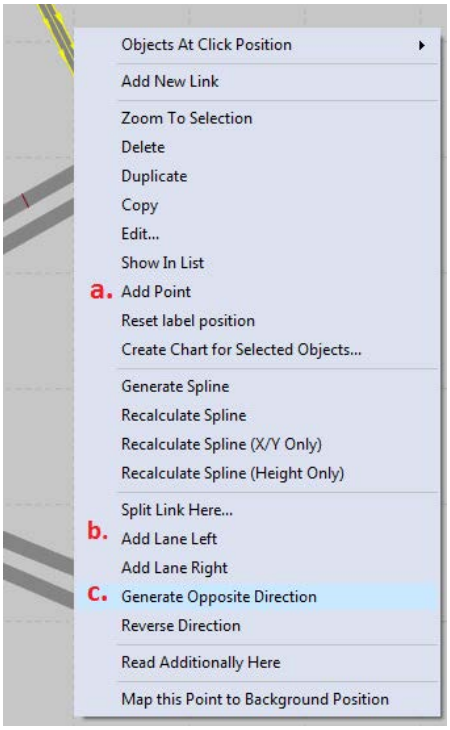
Figure 23: Insert Link



c) The Insert Link dialog will open (Figure 23). Attribute the Number of lanes, and the width of the roadway.

d) To add geometric points, also called spline points, right click line at desired location. Insert point and then drag to map location.

Figure 24: Generate Reverse Direction



e) This only creates a single direction. To create the opposite direction, right-click the link and select Generate Opposite Direction (Figure 24).

f) Additional lanes can be added by right clicking and selecting either, Add Left Lane, or Add Right Lane.

g) Repeat for all needed links

4. Insert Connector

Connectors are used to connect links as Vissim does not use nodes. A connector must be created for every movement at an intersection. If a lane has more than one movement, that lane will have multiple connectors.

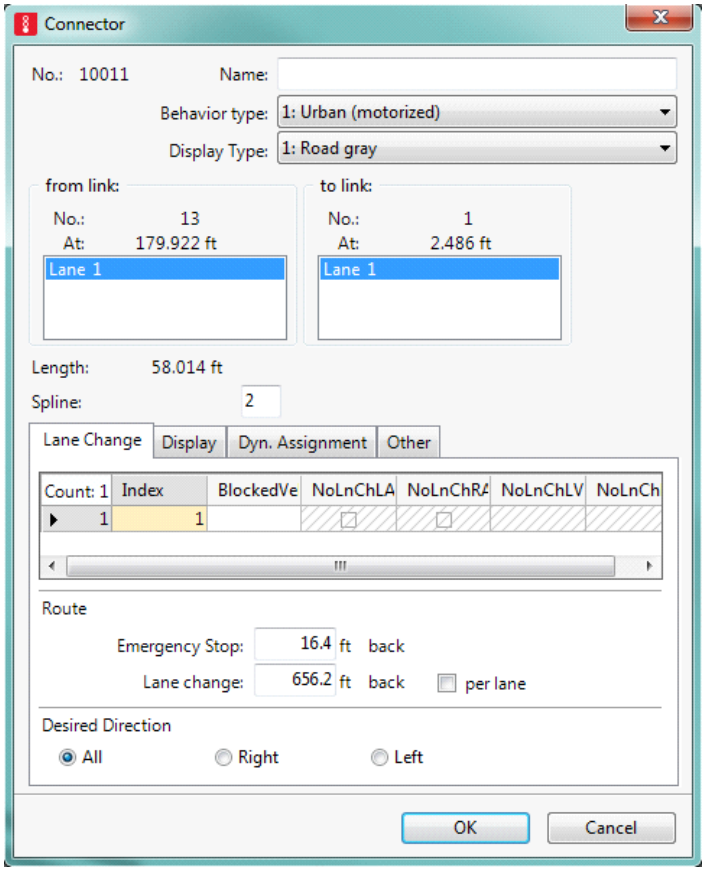
a) While still in link insert mode

b) Hold Ctrl and right-click inside the link near the end and drag to the desired connection

c) Add spline distance, the number of points within the turn (Figure 25)

d) Repeat for all turn movements

Figure 25: Connector Attributes



5. Vehicle Inputs

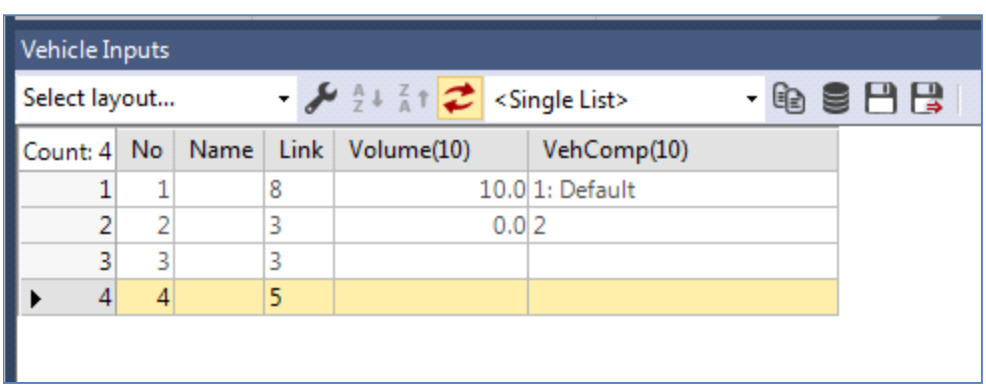
   a) Select Vehicle Inputs from the Network Objects

   b) Ctrl-right-click inside a link

   c) Input the Link Volume (Figure 26)

   Link volumes should be input following the method of the Vissim Protocol Section 4.9. The protocol instructs that link volumes should be input in 15-minute demand increments. Hourly volumes are acceptable only if the volumes are consistent throughout the hour. Also include truck percentages where appropriate

Figure 26: Link Volumes



Count: 4	No	Name	Link	Volume(10)	VehComp(10)
1	1		8	10.0	1: Default
2	2		3	0.0	2
3	3		3		
4	4		5		

d) Select VehComp. The list of vehicle compositions can be accessed from the Traffic drop down menu. Vehicle Composition needs to follow the guidelines section 4.3 of the Vissim Protocol. If a vehicle classification count was not performed for the project, a default composition can be used (Figure 27).

Figure 27: Vissim Protocol Vehicle Composition

Table 4-1: Suggested 3D Models by FHWA Vehicle Class for Heavy Vehicles

#	AASHTO Vehicle Class	VISSIM 3D Model	
		Tractor	Trailer
4	Buses	bus.v3d	
5	2 Axle, 6 Tire, Single Unit Trucks	van.v3d	
6	3 Axle Single Unit Trucks	truck.v3d	
7	4 or more Axle Single Unit Trucks	HGV_flatbed_truck.v3d	
8	Four or Fewer Axle Single-Trailer Trucks	HGV_wb40_tractor.v3d	HGV_wb40_trailer.v3d
9	Five-Axle Single-Trailer Trucks	HGV_wb50_tractor.v3d	HGV_wb50_trailer.v3d
10	Six or More Axle Single-Trailer Trucks	HGV_wb65_tractor.v3d	HGV_wb65_trailer.v3d
11	Five or fewer Axle Multi-Trailer Trucks	HGV_wb67d_tractor.v3d	HGV_wb67d_trailer.v3d HGV_wb67d_trailer_conn.v3d HGV_wb67d_trailer.v3d
12	Six-Axle Multi-Trailer Trucks	HGV_wb50_tractor.v3d	HGV_wb67d_trailer.v3d HGV_wb67d_trailer_conn.v3d HGV_wb67d_trailer.v3d
13	Seven or More Axle Multi-Trailer Trucks	HGV_wb50_tractor.v3d	HGV_wb40_trailer.v3d HGV_wb67d_trailer_conn.v3d HGV_wb40_trailer.v3d

6. Insert Vehicle Route (Turn Movements)
   a) Select Vehicle Routes
   b) Hold Ctrl key + right-click and drag to first location
   c) Right click in the next link or connector to continue the path
   d) Click twice outside the link to end the path
7. Vehicle routing section

   The Vissim Protocol recommends using dynamic, or Origin-Destination (O-D) routing. This can be output from using an assignment in Visum. For more information, see section 4.10 of the Vissim Protocol. If no O-D assignment is available the analyst can input static vehicle routing. However, this is only recommended for an analysis area of five intersections or less. The following section outlines how to input Static Vehicle routing (Turn Volumes).

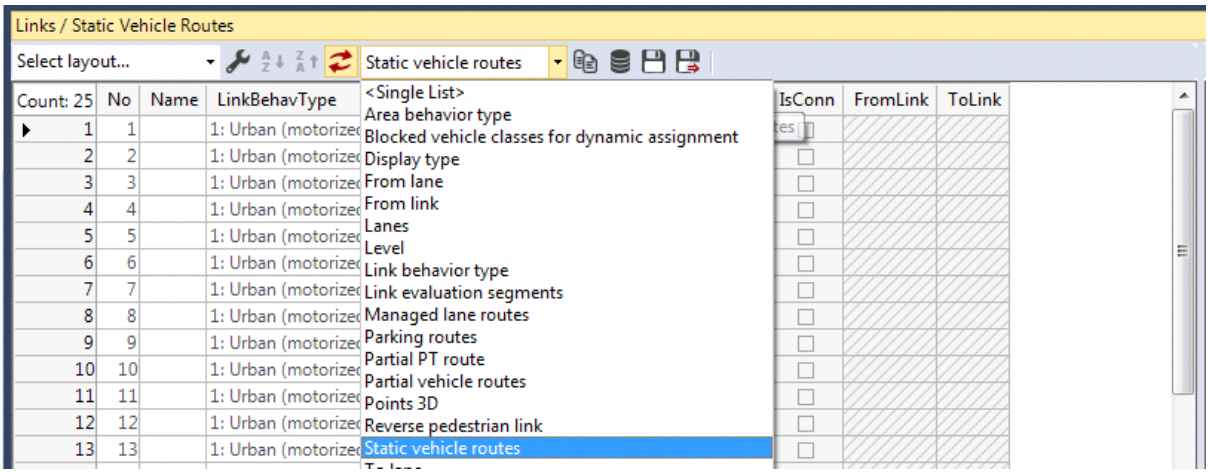
   a) Right click the Network Objects toolbar

b) Select Show List-Static (Figure 28)

c) From the drop down menu, select Static Vehicle routes

d) Edit the relative flow (RelFlow) value for all routes starting at the same position. The relative flow is proportion of the traffic volume to be assigned to each destination of a routing decision. The relative flow is used to determine the total volume of traffic from each origin to their perspective destinations. As noted above this method should only be used for a very limited number of intersections.

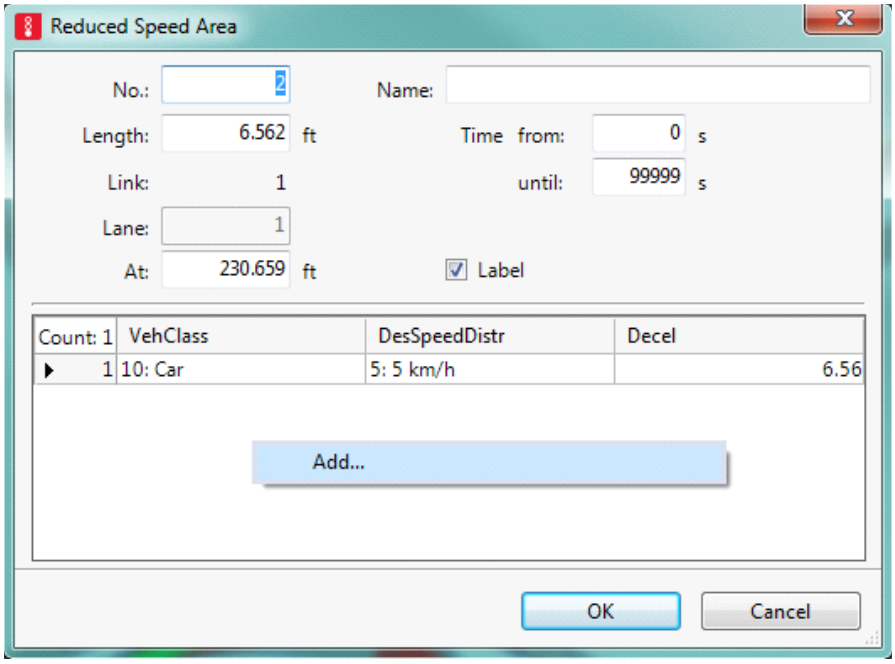
Figure 28: Static Vehicle Routing



8. Insert Speed Reduction

a) Reduced Speed Areas are not required for the network but are used to model curves and the lower negotiation speed for turning movements within intersections. Select Reduced Speed Area from network objects (see Figure 29)

Figure 29: Reduced Speed Area



b) Select a link, right-click

c) Right-click in the list, and add a new reduction

d) For each Speed Reduction, select the desired vehicle class (VehClass) as defined in section 3.2.5.4, set the speed for the reduced area (DesSpeedDistr), and input the average deceleration rate for the vehicle type (Decel). The Deceleration rate will also be the acceleration rate for when the vehicle exits the reduction area.

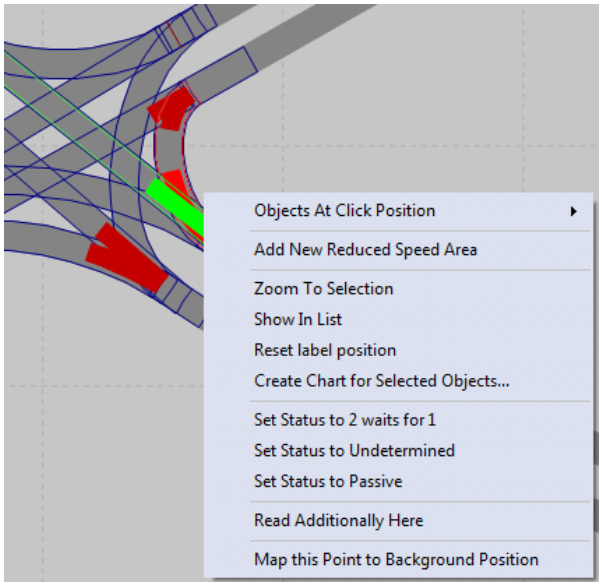
9. Conflict areas, and their alternative priority rules, are covered in greater detail in section 4.4.3 of the Vissim Protocol. In general, priority rules provide greater flexibility and control for most applications. Conflict areas are the recommended method for roundabouts, and simple intersections. For a more in depth information on when to use conflict areas and priority rules, please reference the Vissim Protocol.

   a) In the Network Objects tool bar select Conflict areas

   b) Right click on one the conflict areas

   c) Set the status to indicate the desired right of way. The number of options depends on the number of individuals conflicts at one location. See Figure 30 for a sample of the options.

Figure 30: Set Priority Status

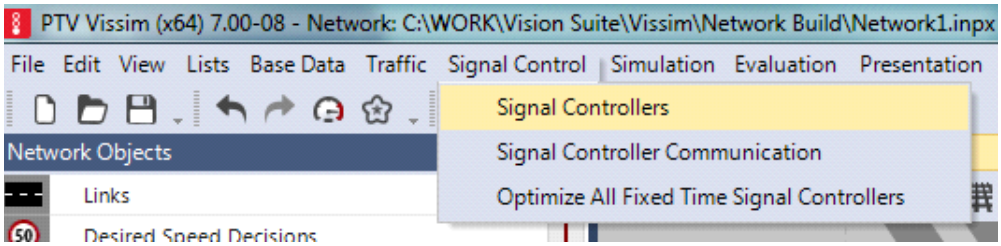


10. Insert Stop sign
    a) Select Stop Signs on the network object interface
    b) Select a converted node (i.e. click on the node portion of a link)
    c) Right click, add stop sign

11. Insert Signal

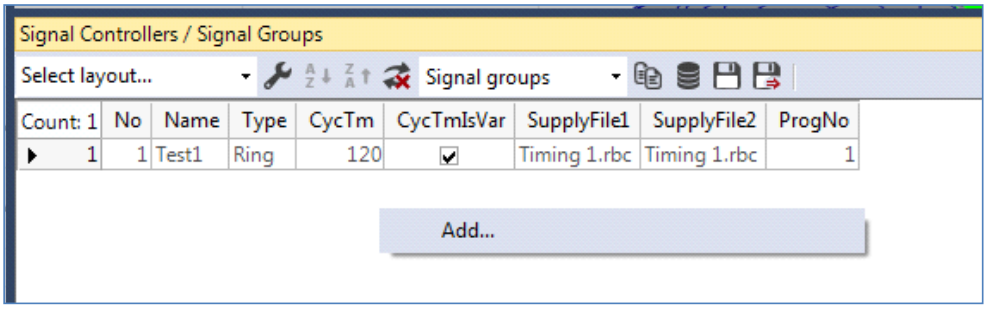
    Inserting a signal is completed by setting up all the individual elements. The first entity is the Signal Group. There are four main types of Signal Control: External, Fixed Time, ring Barrier (RBC), Vehicle Actuated Signal Control (VAP). Each Type has a specific list of information needed. The Signal Group must be set up prior to inputting the signal timing and the Signal Head. There is one signal head for each approach within the intersection.

Figure 31: Signal Control Drop Down



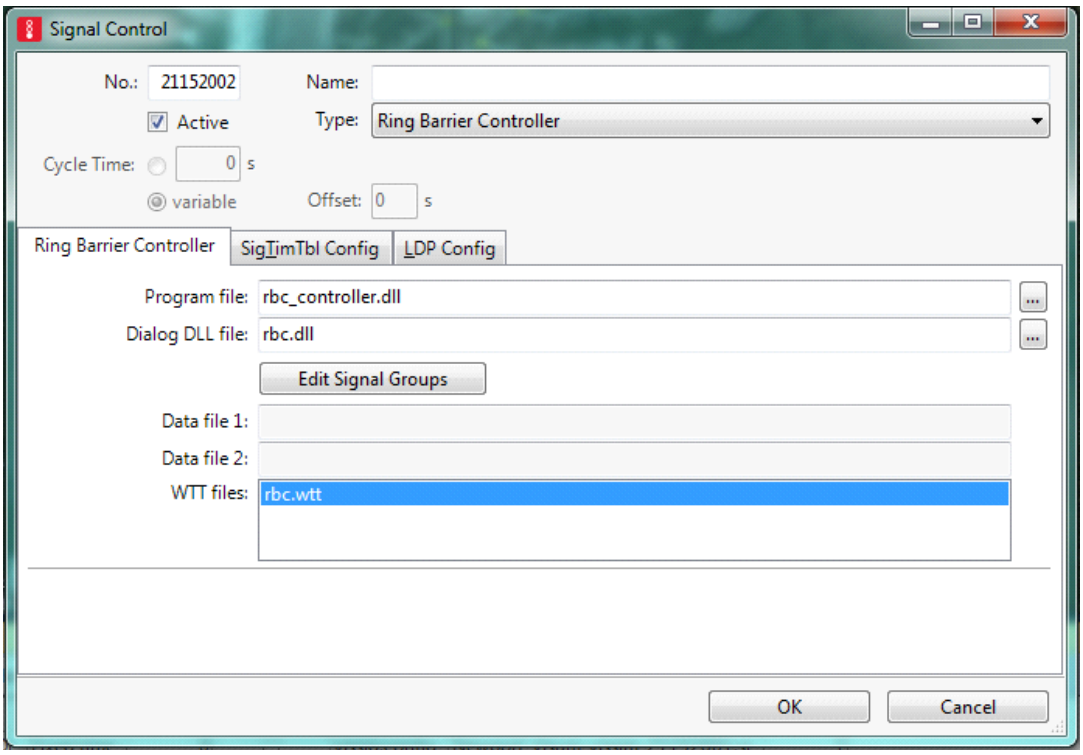
    a) To set up the signal group open Signal Control, from main drop down menu (Figure 31)
    b) Right click in signal control list, select add (Figure 32)

Figure 32: Add Signal Controller



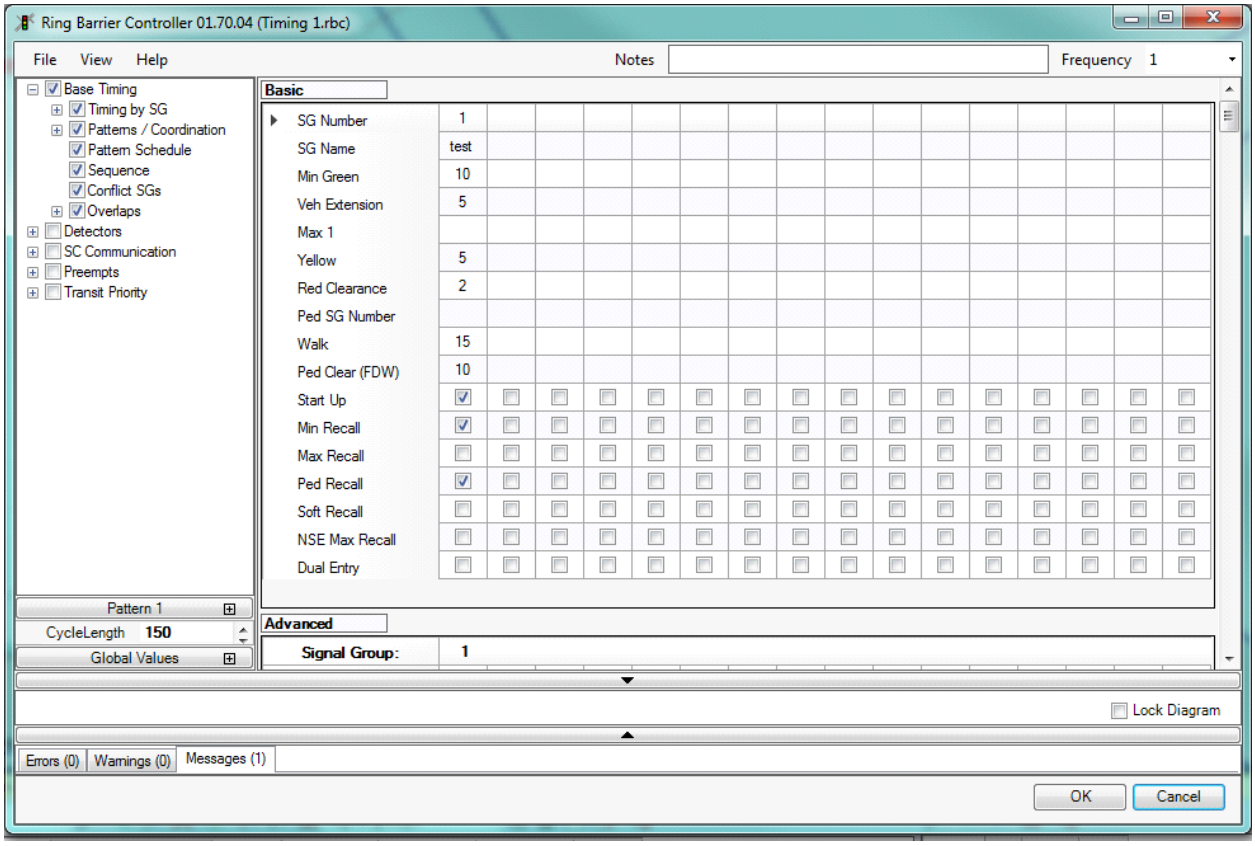
c) In the Signal Control Interface select the signal control type from the drop down menu (Figure 33)

Figure 33: Signal Control Detail



d) Click the Edit Signal Control button. This opens the Ring Barrier Controller Settings (Figure 34). The attribute types can be selected from the window on the left, and the information is entered to the right. Entered timing data should be optimized timing from Synchro or Vistro and manually coded or imported into Vissim. Close the External Controller window, Click Okay to finish adding the Signal Control group.

Figure 34: Signal Group Settings



12. Insert Detector

ODOT has developed standards for coding detectors within micro-simulation software. These standards are outlined in the Analysis Procedures Manual Version 1, Chapter 7. Please refer to the table in Figure 35 when filling out the detector attributes.

a) Select Detectors from Network Objects
b) Select a link, right-click
c) Add New Detector, select the Type from the drop down list (Figure 36). There are four types of detectors within Vissim: Standard, Pulse, Presence, and PT calling. In most cases Standard detectors will be used. For definitions of each type please see the Vissim user's manual, section 6.14.3.
d) Add in the length of the detector, this is the detection range of the detector itself, length for rectangular detectors, and diameter for loop detectors.

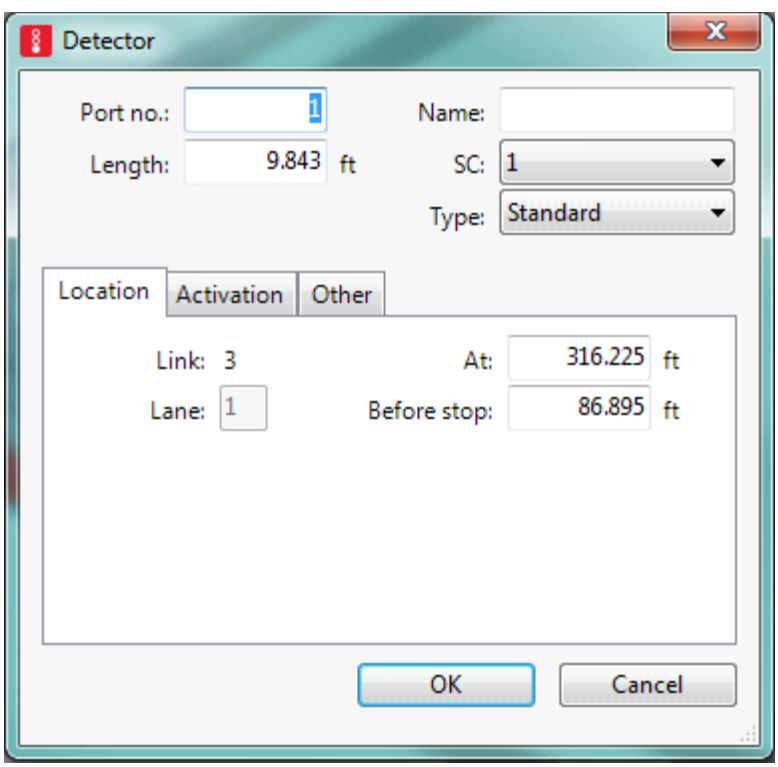
Figure 35: ODOT Standardized Detector Settings

Lane Type	Speed (mph)	Number of Detectors	Position (distance from stop bar to leading edge of detector, in feet)		
			Detector 1	Detector 2	Detector 3
Side or Left	All	2	2	72	
Right	All	1	137		
Ramp	<45	3	2	72	132
High-speed Ramp	45+	3	2	107	207
Mainline Through	25	1	137		
	30	1	177		
	35	2	107	217	
	40 & 45	2	157	317	
	50	2	187	377	
	55	2	222	447	

e) Input the distance from the start of the link. The Before Stop distance is the distance from the front end of the detector to the signal head.

f) Verify the desired vehicle classes from the Activation tab. For most cases, the Activation Type will be “All vehicle types.

Figure 36: Detector Attributes



3.3 Optional Network Elements

The following section details several optional network elements. These elements are not necessary for simulation but are most likely desired for complete analysis. They include:

- Queue Counters
- Data Collection Points
- Pedestrians
- Transit

3.3.1 Queue Counters

Queue counters are used to determine the simulated queue length within the Vissim network. They count in the upstream direction and output the number of stops, as well as the maximum and average queue length.

1. From the Network Object Toolbar (refer to Figure 22), select Queue Counters.
2. Use Ctrl + right-click to add the counter at the desired location on the link. Additionally, queue counters can be added by selecting a link, right clicking on the desired location, and selecting Add New Queue Counter from the menu.

3.3.2 Data Collection Points

Data collection points are used to count the number of simulated vehicles, and types of vehicles within the network.

1. Select the Data Collection Points from the tool bar, use either Ctrl-right-click or right-click the link and select add to place the counter
2. Double click the counter after it has been placed; open the Data Collection Point table. Use the table to input the desired position in the link.

3.3.3 Pedestrians

In addition to modeling vehicles, Vissim also has a robust pedestrian simulation. Vissim can be used to simulate a wide variety of pedestrian movements, interactions with obstacles, and vehicles. This setup guide will only cover the necessary network objects for simulating pedestrian movements through cross walks. Additional guidance for this section can be found in the Vissim Users Manual, section 10.10.

1. Pedestrian Links

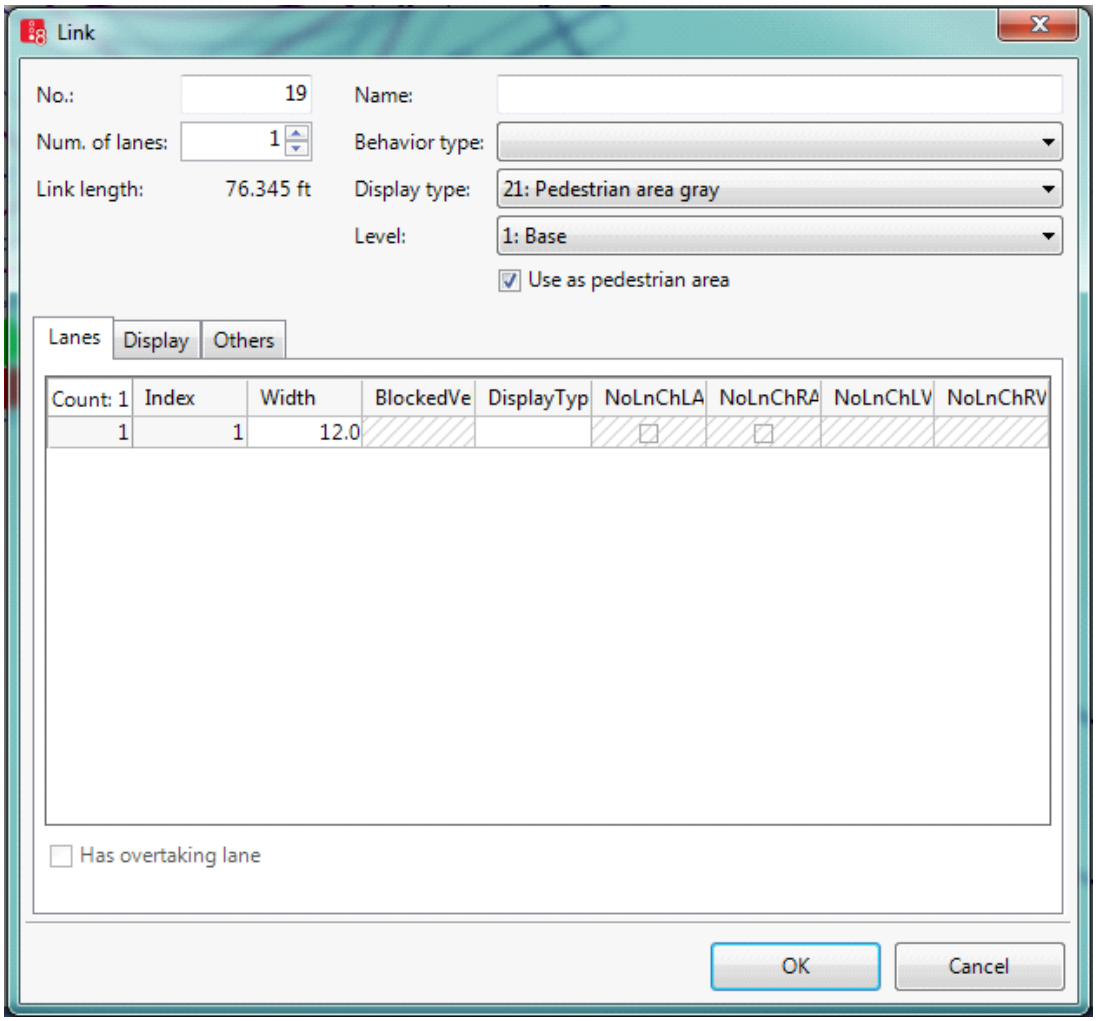
   Pedestrian Links are created in the same way that vehicle links are created. The major change in the procedure is specific attributes selected when creating the link. As before select the Link tool from the tool bar and Ctrl Click to insert the link. When attributed correctly as a pedestrian area (Section 3.3.3.2) Vissim automatically generates the reverse direction.
2. Pedestrian Link Attributes

   In the Link dialog box, check the “Use as pedestrian area” option (Figure 37), and set the Display type to “21: Pedestrian Grey” from the drop down menu. Change the lane width if desired, otherwise the default is 12 ft.

3. Vehicle Interaction

There are four methods for modeling pedestrian-vehicle interaction: Signal Control, Conflict areas, Detectors and Priority Rules. Conflict Areas are automatically generated when two links overlap, and default to passive. For additional guidance on setting priority or using one of the other methods, please referee to section 10.10 of the Vissim User's manual accessible from the help menu.

Figure 37: Pedestrian Link Settings



4 APPENDIX

4.1 Emme to Visum Conversion for ODOT Model Networks

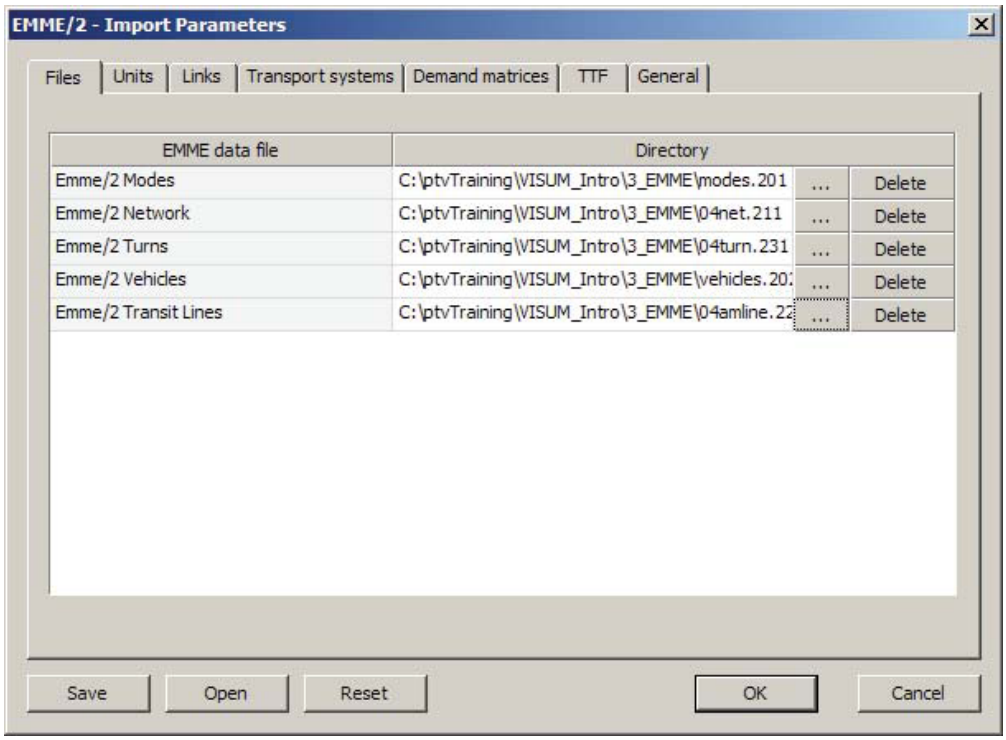
The following is a brief summary of the process to convert an ODOT EMME model network into a Visum network. This will be necessary when working in an MPO urbanized area as the MPO models are EMME format. This process should be performed by or in coordination with ODOT transportation modeling staff.

Step 1: Open Network to be converted in Emme, select scenario, and punch out the following files:

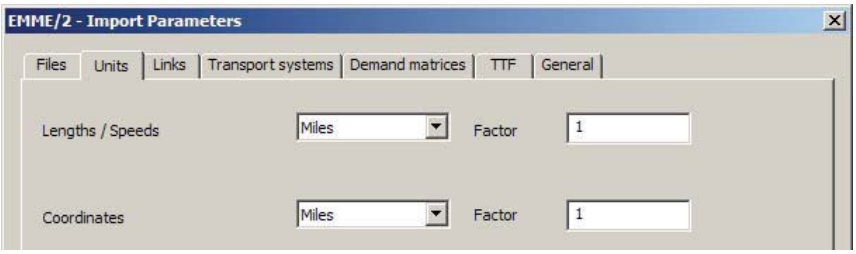
- The Network
  - 2.14 -> 5 -> Net.txt -> y -> y -> 7 ->
- The turns
  - 2.31 -> 5 -> 2 -> y -> Turns.txt -> 8 ->
- The modes
  - 2.01 -> 6 -> y -> Modes.txt -> 8 ->

Step 2: Create a new version file. Import the network from EMME using the following steps:

1) Go to File > Import > EMME/2
2) Under the tab File, enter file names for the network text files created in Step 1:

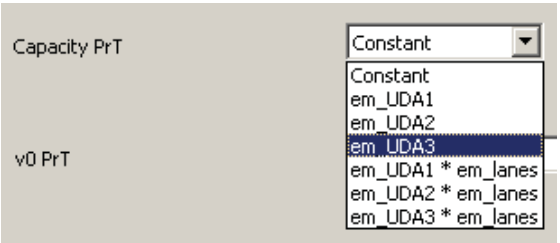


3) Under the tab Units, select Miles as the units and keep the factor to 1:

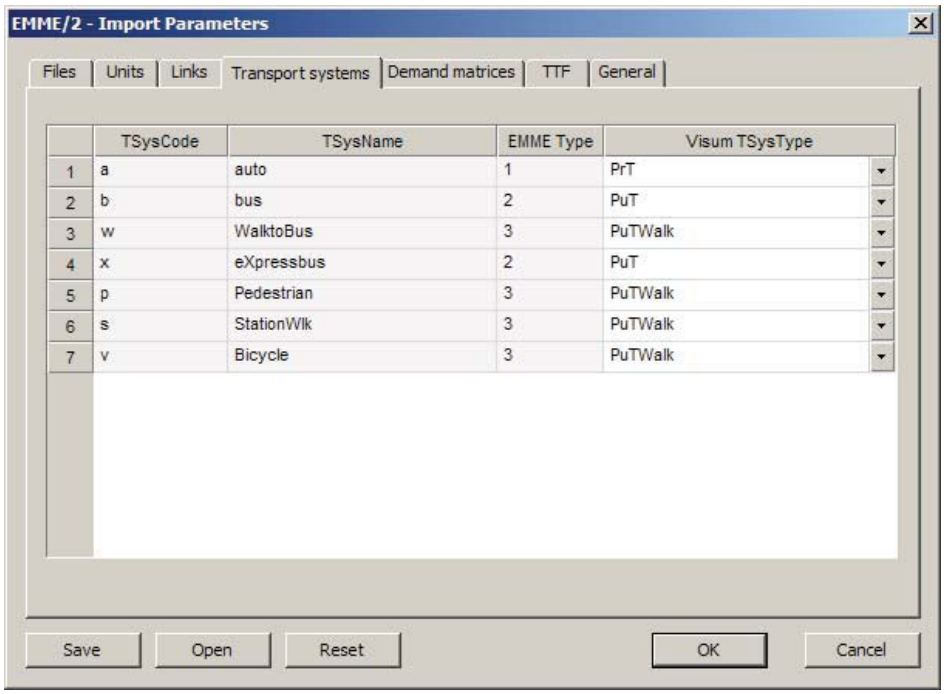


**Note: the importer assumes that EMME link speed is in MPH if length is in Miles and KPH if length in KM.

4) Click the "Links" tab, Change the Capacity_PrT Tab to "em_UDA2 * em_Lanes", leave v0_PrT as "em_UDA1"



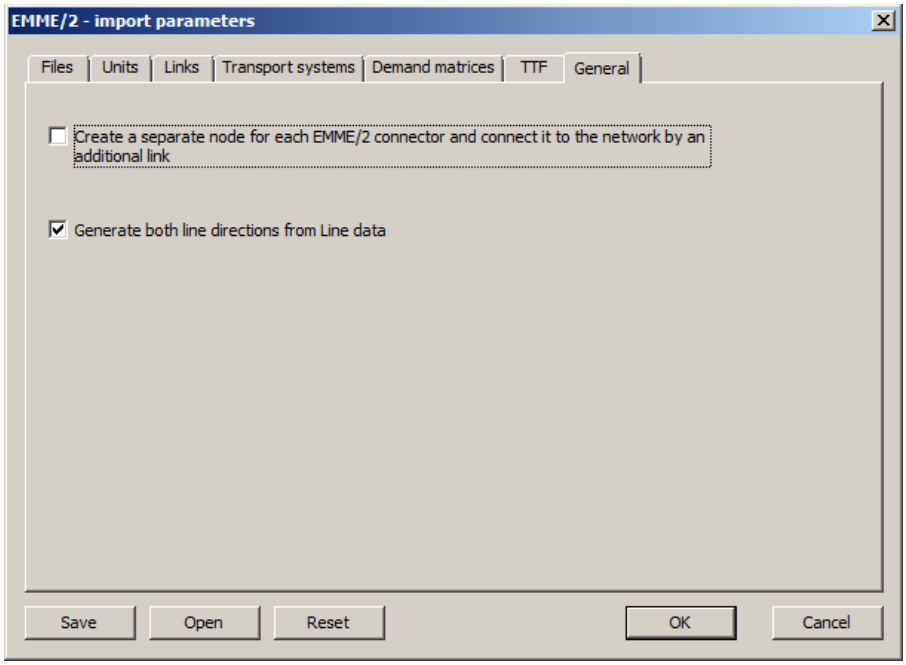
5) Under the tab Transport Systems, define transport systems and modes: typically, you do not need to make changes.



	TSysCode	TSysName	EMME Type	Visum TSysType
1	a	auto	1	PrT
2	b	bus	2	PuT
3	w	WalktoBus	3	PuTWalk
4	x	eXpressbus	2	PuT
5	p	Pedestrian	3	PuTWalk
6	s	StationWlk	3	PuTWalk
7	v	Bicycle	3	PuTWalk

6) Under the tab Demand matrices, you can open trip tables for each mode that has been defined based on your transport systems.

7) Option on General tab: how to import EMME centroids into VISUM. By deactivating the checkbox, EMME Centroid Links become VISUM connectors. This is the recommended setting. If you import the centroid links as links (checkbox activated), be sure to check turn penalties at these new links.



* The last Tab, "General", of the EMME/2 Import is very important and should not be over looked. The first check box (the one referring to making connectors into links), needs to be left **UN**-checked. Checking this box will give you an entirely different network and it has been decided by the members of TPAU that when building these networks, the connectors will be represented as connectors and the links will be represented as links. Checking this box will mean that each connector is represented with a connector, node, link combination.

8) Click OK to run the import

9) After the import is complete, be sure to review the network and ensure all attribution and network connectivity is accurate and complete. Follow the steps below to do this:

a) Run a "Calculate -> Network Check"
b) Ensure that the connector travel time and attribution came over correctly, as this can sometimes be an issue since Visum handles connectors differently than Emme
c) Verify that the Emme network did not have a coordinate shift and that the background mapping looks correct against the base network; you will likely need to identify the correct projection of the coordinates for this to work (ODOT networks are typically in OGIC projection)

*It is recommended that a zone shapefile be brought in, along with any other points-of-interest shapefiles that will help with the users understanding of the area and features. If a zone layer is brought in, ensure to save the original x-y coordinates of the zone centroids because the shapefile import usually resets the centroids to the geometric center of the shape. After the shapefile is imported, the centroids can be re-adjusted to their original location by pasting back in the saved coordinates.

10) Save the imported network as a version file

4.1.1 Volume delay functions

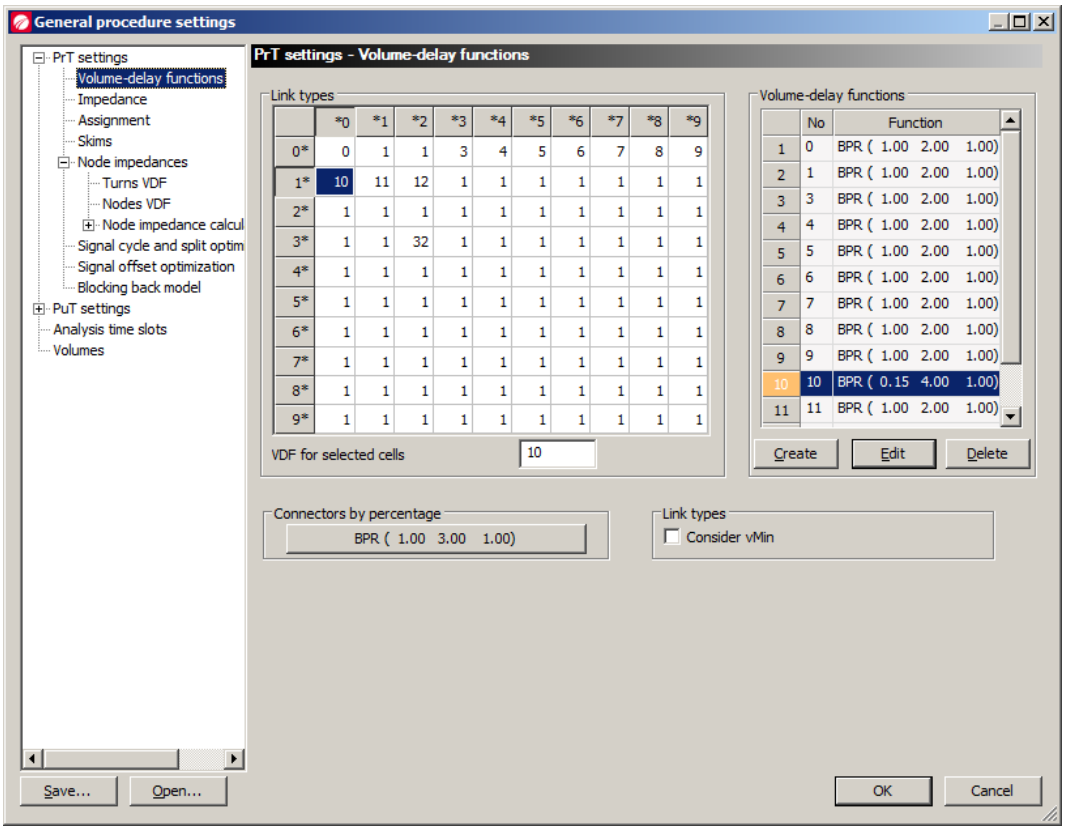
Volume delay functions in VISUM are implemented based on a lookup table where the lookup value is the 'Link Type' for links, 'Turn Type' for turns and 'Node Type' for nodes. Node based delay functions are a

specialty of VISUM and as a result these typically don't exist in the networks imported from third-party software. As a result, the link and turn lookup are explained in this section.

Link delay function

To set link volume delay functions in VISUM, follow the steps below:

1) Go to Calculate > General procedure settings
2) In the dialog, go to PrT settings > Volume delay functions

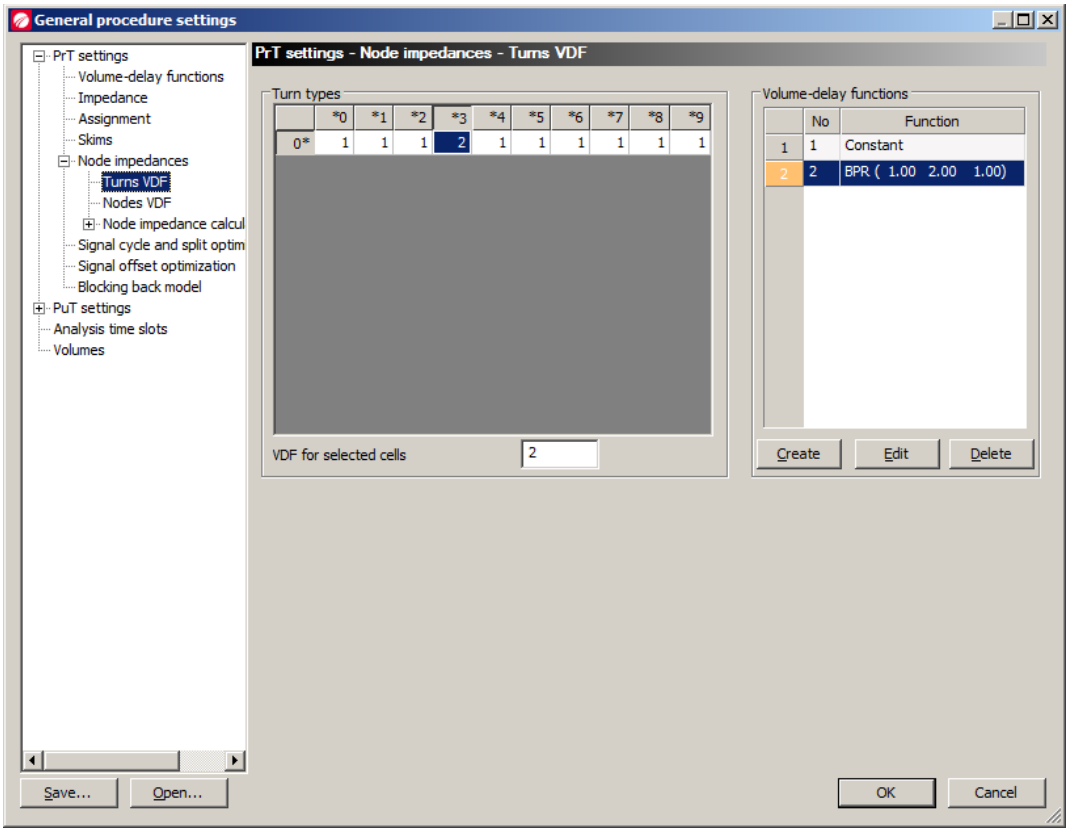


3) Add as many unique volume delay functions as applicable to the network by clicking Create in the delay function dialog
4) Enter the required coefficients for the created delay functions
5) In the table, set the required delay function with appropriate functional form and parameters. As an example, if link type 10 has delay function no 10 associated with it, then enter 10 in the cell where 1* and *0 intersect

Turn delay function

To set turn volume delay functions in VISUM, follow the steps below:

1) Go to Calculate > General procedure settings
2) In the dialog, go to PrT settings > Node impedances > Turns VDF



3) Add the volume delay functions as applicable to the network by clicking Create in the delay function dialog and enter the required coefficients as applicable
4) In the table, set the required delay function with appropriate functional form and parameters. As an example, if turn type 3 (left-turn) has delay function no 2 associated with it, then enter 2 in the cell below column *3

   The predefined turn types in VISUM are: 1: Right turn, 2: Thru/straight, 3: Left turn, 4: U-turn