

Vissim

(Version 11)

Module 1: Basic Three Intersection Model Setup

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Latest Update: 8/10/2021

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Disclaimer: The objective of these modules is to bring new users sufficiently (and quickly) up to speed so they can use the manual and other resources when they have questions on model development. These modules should not be considered as official guidance; users should always refer to official PTV Vissim or project sponsor documentation for the final word on a model feature question. Send any errors, issues, or comments to michael.hunter@ce.gatech.edu so any corrections can be made to the material.

Vissim (Version 11) Module Overview

This is the first in a series of Vissim modules. This module will guide you through the creation of a corridor that consists of three 4-approach intersections. The network is regulated by fixed-time traffic signals using ring barrier control. In the second module in the series you will convert one intersection to actuated control, in the third you will add an unsignalized intersection to the model, and in the fourth you will incorporate a freeway interchange.

This module will step through six main components of network creation:

1. Defining links and connectors: the “roads and intersections” of the network.
2. Defining traffic controllers: the signals controlling intersection traffic.
3. Setting traffic volumes and routing decisions: settings that control the entering traffic volume and vehicle paths.
4. Defining conflict zones: zones that specify right of way where vehicle movements conflict.
5. Setting performance measures and creating output files.
6. Running the model.

Starting Vissim

Go to *Start* → PTV_Vision 2018 → PTV VISSIM 11

Note: This assumes a computer running Windows 10; start-up may be slightly different for other operating systems. If you receive a start-up error, you are likely having an installation or license issue; please contact your IT support.


Navigating the View Screen

Several PTV Welcome messages may appear when you start Vissim. Close these by clicking on the × in the upper right corner of the *Start* page window (see Figure 1).



Figure 1: Vissim Start page window

Toggle Background Map


If your Vissim instance shows a map of the world in the *Network Editor* window, turn that off for now by left-clicking the *Toggle Background* icon  in the *Network Editor* ribbon (see Figure 2).

Note: The Network Editor layout should now be gray.




Figure 2: Network Editor icon ribbon

Link Display Setting

Vissim has two display settings: normal display (default) or centerline display. The default display shows each link (roadway segment) as a full-width roadway. This module is shown in the centerline display, which shows each link as just the centerline. You may toggle between these display modes by pressing Ctrl-A on the keyboard or clicking the *Toggle Wireframe* icon  in the *Network Editor* ribbon.


Note: Toggling this mode now will not produce any changes, as we have not yet created any network sections.

Zoom

To zoom in and out on the *View* screen, use the *Zoom* icons  in the *Network Editor* ribbon. To use these, click the left button (magnifying glass with the +) and draw a box around the area in which you want to zoom in closer, or click the right button (magnifying glass with the -) to zoom out.

Note: Depending on your setup, you may also be able to zoom in and out with the mouse wheel.

Pan

Click the *Shift* icon  to enable the ability to pan the map using them mouse. You will need to then deselect the *Shift* icon to use the mouse for other purposes in the *Network Editor* window.

Note: Depending on your setup, panning may also be done by holding down the mouse wheel and moving the mouse in the desired direction.

Units

The default Vissim units are metric. To change to imperial:

- step i. Left-click on *Base Data* → *Network Settings* → *Units*.
- step ii. Left-click *All Imperial*.
- step iii. Left-click *OK*.

Save

Save the file before you start building the module:

- step i. Left-click *File* → *Save as*.
- step ii. Name the file “Module 1” and select the directory where you wish to save your work.
- step iii. Select *OK*.

IMPORTANT: SAVE FREQUENTLY AS YOU WORK!

Building the Model, Part 1: Links and Connectors

Introduction

The basic element of a Vissim network is called a *link*. A link represents a single direction of flow for a single- or multi-lane roadway segment. Therefore, a two-way roadway is modeled using two links with opposite directions of flow.

For a vehicle to travel from one link to the next—for example, a mainline vehicle turning onto a side street—there must be a *connector* connecting the links. Only connected links allow for continuing traffic. Links that simply overlap or cross one another (without connectors) have no interaction with each other. Where overlapping links do not have a connector, vehicles will appear to “drive over” each other. Overpasses are loosely modeled in this way. Whereas you can add z-coordinates to the overlapping links to make the 3-D visualization look better, Vissim does not consider these coordinates when modeling interactions. Vehicles will drive over each other where links cross, even with the same z-coordinates, if there is not a connector and the other model features needed to reflect interactions.

For this module, a right-click will be used to create new objects. To confirm Vissim is set for this behavior:

- step i. Left-click on *Edit* → *User Preferences* → *Network Editor*.
- step ii. Under *Right-click behavior*, left-click on *creates a new object*.
- step iii. Left-click *OK*.

Links can now be created with a right-click, and the *context menu* is opened by pressing Ctrl + right-click.

Note: Selecting that option opens the context menu would result in flipping the right-click behavior between the two options.

Currently, the *Network Editor* map size is likely very large. You can see the current scale in the lower left-hand corner of the *Network Editor* screen. Zoom in until the total *Network Editor* window width is approximately 2000 ft. (This does not have to be too accurate, as it is simple to zoom in and out as needed.)

Creating Links

In this section, you will create the link layout as shown in Figure 3.

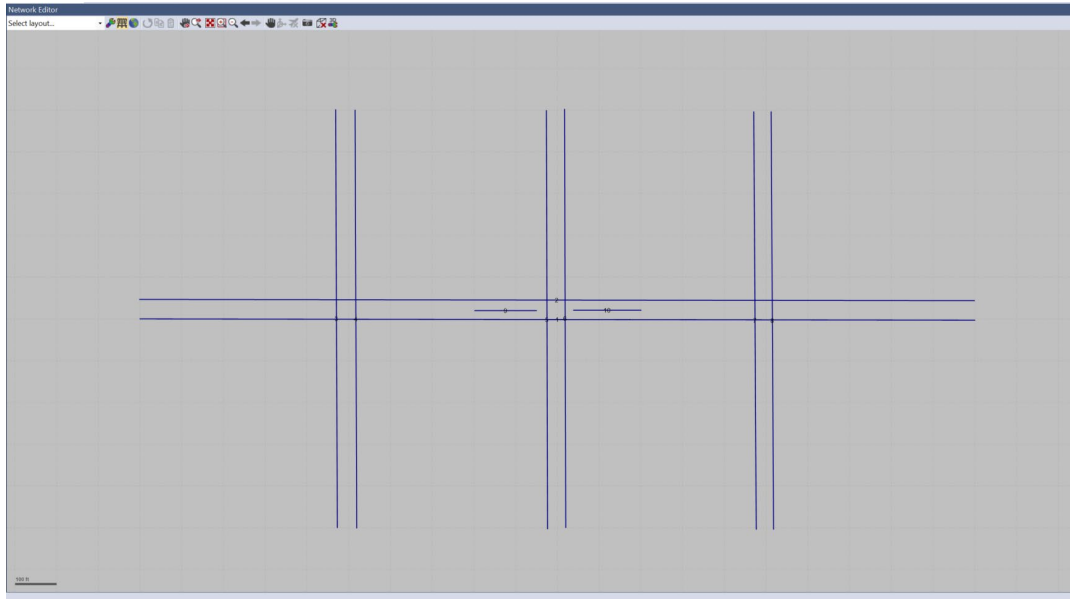


Figure 3: Link layout in Network Editor window

Creating East–West Main Roadway Centerline

You will first create the east–west roadway centerline, which will extend the length of the three–intersection arterial. The link should be approximately 2000 ft long, allowing for 500 ft between intersections and at the network entry points. To create the link:

step i. Left-click the *Links* icon  in the *Network Objects* toolbar.

Note: This is located to the left of the *Network Editor* window.

step ii. Right-click at the desired position of the link (roughly halfway down the *Network Editor* screen, near the left edge) and hold the mouse button.

step iii. Drag the mouse in the **direction of flow** (in our example, do eastbound first, i.e., left to right) to the destination point and release the button (see Helpful Hints on the next page).

Note: An exact 2000 ft is not necessary at this point, as you can adjust this later.

step iv. When you reach the end of the link and release the mouse button, the *Link Data* window containing the link data will pop up (see Figure 4).

- Set the *number of lanes* equal to 2.
- Type in the roadway name (for our example, use “Buzz Blvd EB”) in the *Name* box.

- Leave the other parameters at the default values for now, but take a few moments to review the other possible link inputs.

step v. Select *OK* to close the *Link Data* window.

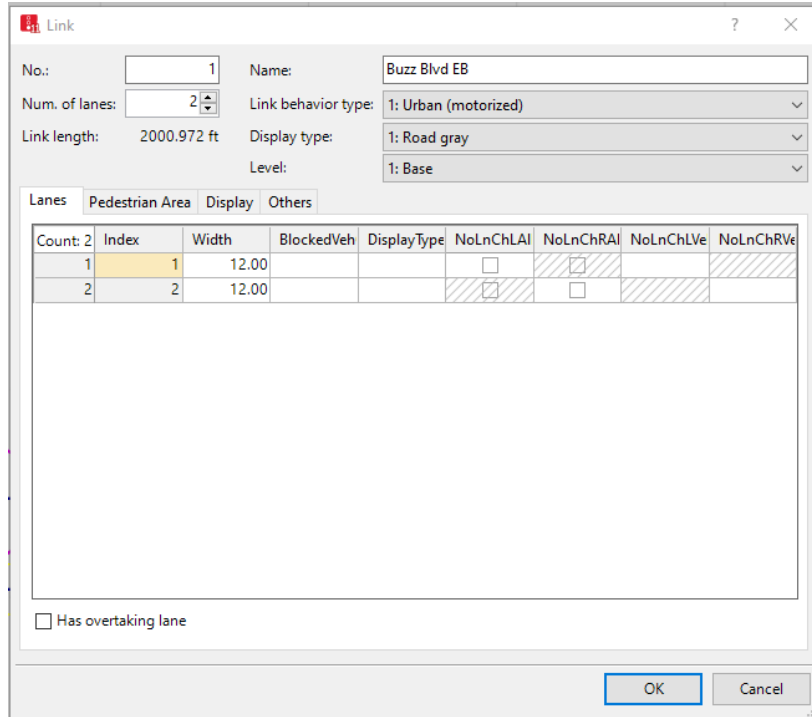
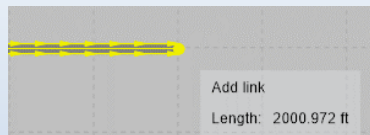


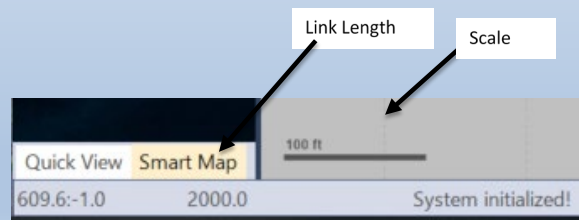
Figure 4: Link Data pop-up window

Helpful Hints

While dragging the mouse, the link length is visualized by the mouse pointer.



For version 11 or earlier of Vissim, the link length is visualized in the status bar at the bottom of the *Network Editor* window (Figure 2). The number on the right is the link length in feet, and the numbers on the left are the x and y length coordinates of the cursor in meters.



- step vi. Generate a link of equal length in the opposite direction:
- With the link selected, press Ctrl + right-click on the link, and click on *generate opposite direction*.
 - Select “2” for the number of lanes.
 - Update the *Name* to “Buzz Blvd WB”.

Note: You could also draw the lane with the mouse, as described previously. If you choose this method, be sure to drag from right to left for flow in the opposite direction.

Creating Cross-street Centerline Links

Repeat the procedure for creating links to add three north–south links, located at approximately 500 ft, 1000 ft, and 1500 ft along the east–west roadway.

Note: The locations do not need to be exact for the module. Use the grid in the background to estimate these locations.

- Make all north–south links approximately 1000 ft.
- Set the number of lanes to “1” for all north–south links.
- Name the westmost roadway “Burdell Dr”, the center roadway “Ramblin St”, and the eastmost roadway “Pi Pkwy”. Include the direction in your naming convention, i.e., “Burdell Dr NB” and “Burdell Dr SB”.

Helpful Hint

Avoid the temptation to skip over naming links, adding direction labels, and other “optional” information. The small amount of time invested now will save you significant time and effort (as well as reduce the likelihood of errors) later, during validation, calibrations, and model updates. Also, reviewing a model created by another person becomes a much easier task when the model elements are well labeled.

Creating Left-turn Bays

Next you will add turn bays for the center intersection (i.e., intersection of Buzz Blvd. and Ramblin St.):

- step i. Create turning pockets in the middle intersection by drawing two short links (approximately 150 ft) using the same method as above. To create these links:

- Draw turning pockets in between the through lane and in the direction of flow.
- Make room for the turning pockets by moving apart the horizontal centerline links of Buzz Blvd. The distance between the centerlines should be approximately 50 ft.
- To move a created link, left-click on the link and drag it to the desired position.
- Do not drag the turn-bay links all the way to the middle of the intersection, as you still need to add connectors. There should be approximately 75 ft to 100 ft between the turn-bay links.

Note: This is a rough estimate; you can fine-tune the locations as you add the connectors in the next section.

- Make each turn bay 1-lane. Be sure to include link names, i.e., “Buzz Blvd WB LT bay” and “Buzz Blvd EB LT bay”.
- You may also wish to space the cross-street links at all three intersections approximately 25 ft apart. While this will not influence the operation of the model, the graphic will look better.

The network layout should be similar to that in Figure 5.

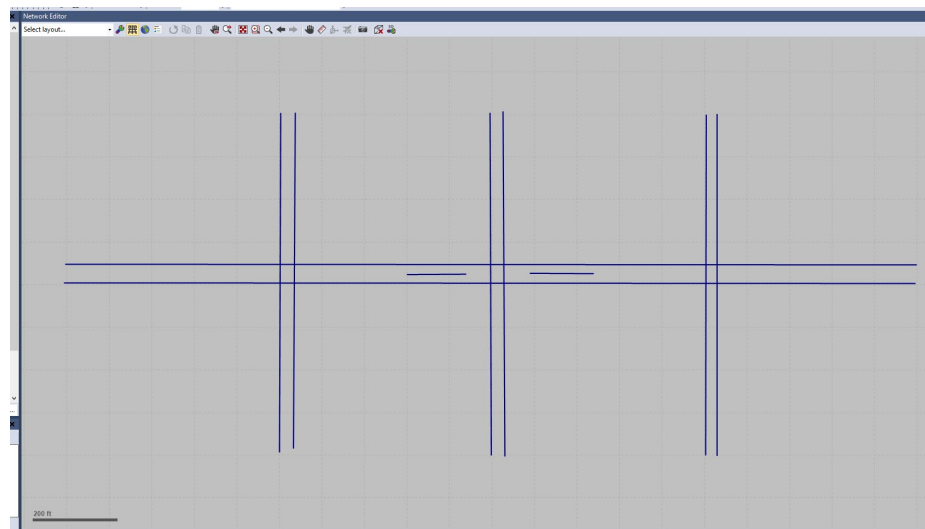


Figure 5: Network link layout with left-turn bays

Creating Connectors

Connectors are used to connect links, allowing vehicle flow from one link to the next. In this module they are used to:

- Enable the turning movements connecting Buzz Blvd. and the cross streets.
- Allow cars to travel from the Buzz Blvd. through lanes to the turn bays.

In this module, we will assume left-turn, through, and right-turn movements are allowed for all approaches of the three intersections, with EB and WB left-turn bays at the intersection of Buzz Blvd. and Ramblin St. However, if a movement is not allowed at an intersection, you may exclude the connector—with the exception that if you wish to prohibit a movement at certain times but not others (e.g., peak hour left-turn prohibition), then the connector for that movement must be included in the model. In that case, other methods are utilized to restrict traffic based on time of day or vehicle type.

Creating Buzz Blvd. / Burdell Dr. Intersection Connectors

Start by adding a connector at the westmost intersection, i.e., Buzz Blvd. and Burdell Dr.

Note: You may find it helpful to position this intersection in the center of your screen and zoom in.

Add the connector for the EB movement left-turn lane, from the east–west roadway to the cross street as follows:

step i. Right-click with the mouse at the desired start position of a left-turn movement on the inside lane of the Buzz Blvd. EB link (leftmost lane on the eastbound link).

Note: Connectors are lane-specific and you must ensure you select the desired lane on a given link.

step ii. Drag the mouse in the direction of flow to the position on the receiving link where the vehicle will merge with the link.

step iii. Release the mouse button. Upon releasing the button, the *Connector* edit window will pop up.

step iv. Name the connector “Buzz Blvd EB to Burdell Dr NB – LT”.

step v. Check the *from link* and *to link* boxes to make sure you have correctly placed the connector:

- Lane 1 is always the closest to the edge of the road (i.e., lanes are numbered from the curb to centerline).
- Thus, for the given example (i.e., west-to-east Buzz Blvd. EB left to Burdell Dr. NB), *Lane 2* should be selected in *from link* and *Lane 1* in *to link*.

step vi. Change the *Spline* value, i.e., the number of points in the spline. Generally, use a range from 2 to 4 for a straight connector and 5 to 15 for turning connectors. The higher the value, the rounder the turn. Try 5 points for right turns and 10 points for left turns. You can change this attribute later if you are not satisfied with the roundness of the turn.

Note: This value does not influence vehicle operations; it is simply for creating a pleasing network visualization.

step vii. Keep all the other default settings and click *OK*.

Figure 6 provides a sample *Connector* dialog window and visual of the connector.

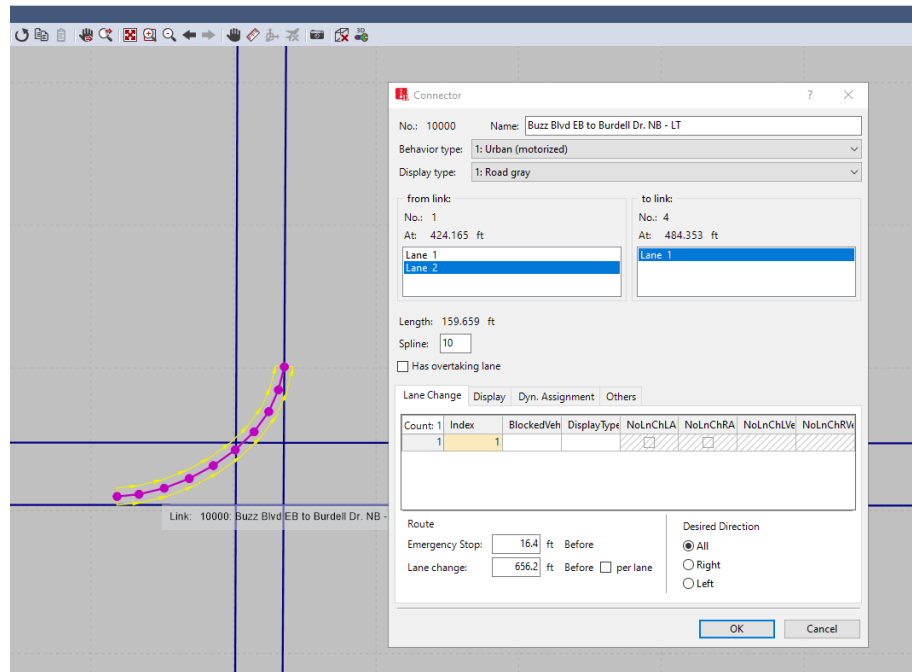


Figure 6: Connector dialog box, EB left at Buzz Blvd. and Burdell Dr. intersection

Repeat this procedure for EVERY movement of the intersection. There should be a total of 8 connectors, allowing for left and right turns from all four approaches. Be sure to label all connectors. For this effort, place the right-turn connectors slightly further upstream than the left-turn connectors. We will use this placement later in the module to facilitate right-turn-on-red (RTOR). Figure 7 shows the final connector layout for the Buzz Blvd. and Burdell Dr. intersection.

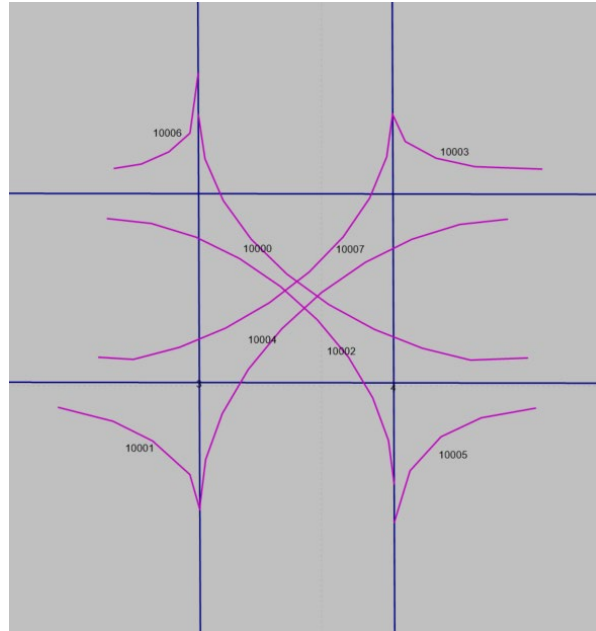


Figure 7: Connector layout for Buzz Blvd. and Burdell Dr. intersection

Creating Buzz Blvd. / Ramblin St. and Buzz Blvd. / Pi Pkwy. Intersection Connectors

Repeat the procedure for the remaining two intersections. The intersection of Buzz Blvd. and Ramblin St. (the center intersection) should have two additional connectors to the turning pockets. For each direction of travel, draw a connector from the east–west road centerline to the upstream end of the turning pocket. This is where vehicles will enter the turn bay. The connector for the left turn from the east–west roadway to the cross street is then drawn starting at the end of the turn bay. Figure 8 shows the connector layout for the full corridor.

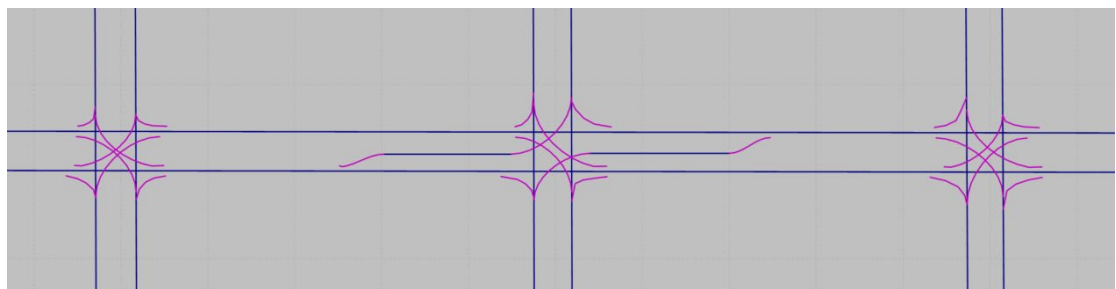


Figure 8: Corridor connector layout

Save Often! This would be a good place to save your Vissim file.

Helpful Hints – Interface

Overlapping Endpoints

Sometimes you will be unable to click on the desired link/connector endpoint because multiple links/connectors come together and overlap one another at the endpoints. To toggle from one link/connector endpoint to another, left-click the desired location with the mouse (without holding the click) and then press Tab on the keyboard to toggle through the overlapping items.

Color Coding

Connectors are purple and *links* are blue. If you are trying to draw a connector and it shows as blue, you did not successfully connect to an existing link but have drawn a new link. Delete the link and try to draw the connector again.

Turn-bay Entrance

Vehicles will only enter the turn bay at the point where the connector connects with the turn bay. They will not enter a turn bay partway down the turn bay after the connector. Generally, the entrance point to the turn bay should capture the longest observed queue in the turn bay (which may exceed the “painted” turn bay).

Toggle Link/Connector Labels

You can toggle off and on the link/connector labels. Right-click on the right side of the *Network Object – Links* icon, and select *edit graphic parameters*. In this table, you can turn off and on labels as well as adjust other graphic attributes.

List Current Links and Connectors

To see a list of all of the links and connectors you created, right-click on the right side of the *Network Object – Links* icon, and select *show list*. This will create the *Links/Lanes* list window below the *Network Editor* window. Some of the link attributes may be edited from this table. You can open similar windows for the other *Network Objects*; these will be very useful as your models become increasingly complicated.

Building the Model, Part 2: Traffic Controllers

Important: This module assumes that the reader has a basic knowledge of intersection phasing and signal timing. These concepts are not reviewed in the module.

Introduction

Adding traffic control devices in Vissim is a two-step process. First, *Signal Controllers* (SCs), *Signal Groups* (SGs), and timing plans are created. Next, *Signal Heads* (SHs) are placed at the intersections and associated with the appropriate SG and SC. For this module, we will use the Vissim *Ring Barrier Controller* (RBC), which implements dual ring logic. We will use the RBC SG (i.e., phase) numbering scheme shown in Figure 9.

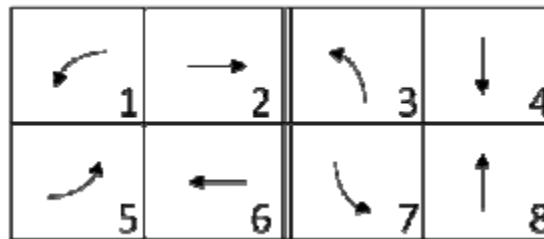


Figure 9: Dual ring diagram

Setting Signal Controllers and Signal Groups

In implementing signal timing, an SC is associated with each intersection.


Note: Similar to the field, a 1-to-1 association between controllers and intersections is not required in Vissim. However, such complex control strategies should be reserved for more advanced applications and are beyond this module.

To implement RBC SCs, Vissim utilizes signal groups. Each SC has associated SGs. You may think of SGs in Vissim as being synonymous with phases. In the next section of the module, an SH in Vissim is then associated with the appropriate SG for a given SC.

For our corridor, we will use permitted-only left turns on all approaches of the westmost (Burdell Dr.) and eastmost (Pi Pkwy.) intersections. Thus, these intersections will utilize SGs 2, 4, 6, and 8 (see Figure 9). The center intersection (Ramblin St.) will incorporate EB and WB protected lefts; thus, this intersection will utilize SGs 1, 2, 4, 5, 6, and 8.

Coding Signal Data

First, you will define the SC for the intersection of Buzz Blvd. and Burdell Dr. as follows:

- step i. From the menu bar, select *Signal Control* and then select *Signal Controllers*. The *Signal Controllers* window will pop up at the bottom of the screen.
- step ii. In the *Signal Controllers* menu, left-click on the green cross icon  to add a controller. The *Signal Controller* menu will pop up.
Note: Similarly, you could right-click in the white space on the left side of the menu and click add.
- step iii. Beginning with the Buzz Blvd. and Burdell Dr. intersection, assign it the No. 111.
- step iv. Change the controller *Type* from *Fixed time* to *Ring Barrier Controller*.
Note: You may need to scroll to that option.
- step v. For *Name*, enter “Buzz Blvd and Burdell Dr”.

Next, you will define the SGs associated with the SC as follows:

- step vi. Click on *Edit signal groups* and a new *Ring Barrier Controller* window will pop up.

Helpful Hint

On the RBC pop-up, the tree on the left contains all signal settings, advanced options, and patterns used for more complex controllers. Clicking on the + or – expands or collapses options, and checking and unchecking the boxes will show or hide settings. Take a moment to scan through these menus. We will use many of these in a later module where you will learn how to incorporate actuation in Vissim. For now, we will simplify the timing and utilize max recall to ensure all phases are called.

- step vii. Check the *Base Timings* box.
- step viii. Expand *Base Timings*.
- step ix. The *Basic* table for the signal controller should display. In the first four columns of the first row, *SG Number*, enter 2, 4, 6, and 8, respectively.
- step x. Insert the signal timing data as shown in Figure 10.
Note: Be sure to check the Max Recall boxes. The rest of the data in the Basic table can remain blank.

(RBC_Mod1_Buzz_and_Burdell_v1.rbc)

		Notes				
Basic						
SG Number	2	4	6	8		
SG Name	EB	SB	WB	NB		
Min Green	10	8	10	8		
Veh Extension						
Max 1	60	50	60	50		
▶ Yellow	3	3	3	3		
Red Clearance	2	2	2	2		
Ped SG Number						
Walk						
Ped Clear (FDW)						
Start Up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Min Recall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Max Recall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ped Recall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soft Recall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NSM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 10: Basic Timing table parameter values for Buzz Blvd. and Burdell Dr.

- step xi. Scroll down to the *Sequence* table. Arrange the signal group numbers into separate rings and form barriers to model the dual ring logic. Enter the numbers 2 and 4 in Ring 1, and 6 and 8 in Ring 2 (see Figure 11).
- step xii. To set up the barrier, move the mouse to the area between and directly above 2 and 4. Your cursor will turn into “+/-”. Double-clicking will add/remove the barrier.
- step xiii. Leave the rest of the *Sequence* table blank or at the defaults.

Sequence	
Ring 1	2 4
▶ Ring 2	6 8
Ring 3	
Ring 4	

Figure 11: Sequence table for Buzz Blvd. and Burdell Dr.

- step xiv. Click *OK* in the *Ring Barrier Controller* dialog box.
- step xv. When prompted, save the RBC file in your working folder as “RBC_Mod1_Buzz_and_Burdell_v1” and click *OK*.
- step xvi. Close the *Signal Control* window by clicking *OK*.

For this module, you have generated a simple timing plan, providing each phase with a maximum green and placing all phases in *Max Recall*. This will result in the signal operating in a pretimed fashion, serving the max green on each phase, every cycle. In

Module 2 you will see how to insert actuation and run the signals in free operation on coordination.

Repeat the same procedures for the intersection of Buzz Blvd. and Pi Pkwy., using the same timing values.

- Number the intersection 333.
- Save the file as “RBC_Mod1_Buzz_and Pi_v1”.

Repeat the procedure again for the intersection of Buzz Blvd. and Ramblin St., noting the following:

- Number the intersection 222.
- For this intersection, you will also include SGs 1 and 5.
- Similar to the other intersections, place the barrier after 2 and 6 (by default a barrier is also placed after 4 and 8, the last phases listed in each ring).
- Save the file as “RBC_Mod1_Buzz_and Ramblin_v1”.

The RBC timing information for Buzz Blvd. and Ramblin St. is shown in Figure 12.

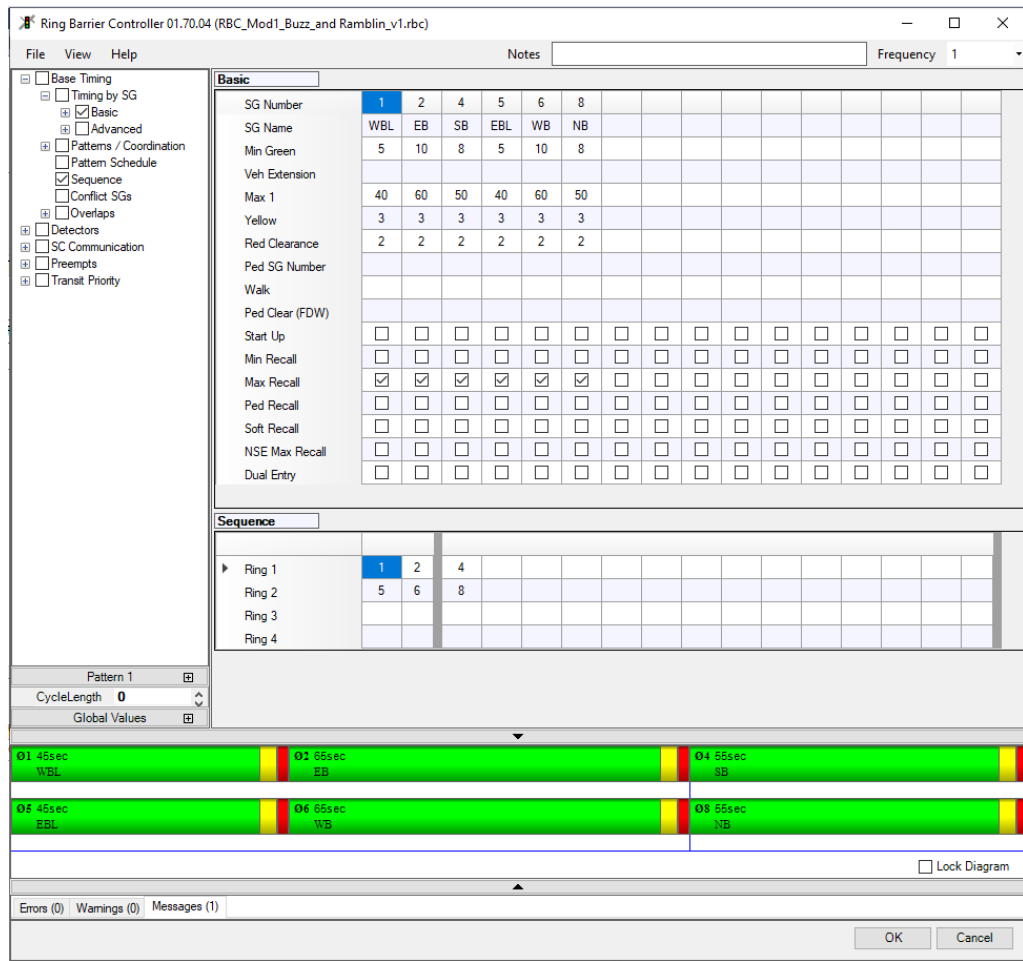


Figure 12: RBC controller for Buzz Blvd. and Ramblin St.

Save Often! This would be a good place to save your Vissim file.

CRITICAL CONCEPT

When you save an intersection RBC, it is saved as a separate file from the Vissim file. Vissim is linking to that file. If you save your Vissim file under a new name, the new Vissim file continues to link to the same RBC file. If you wish to update the signal timing, while allowing the original Vissim file to retain its current timing, you must save the RBC under a new name and link the new Vissim file to the new RBC file.

Example

Say you create a Vissim file “Base_Case.inpx”. In that Vissim model, you create an RBC for an intersection and name it “Int_1_Base.rbc”. Now you want to work on your build scenario, so you save the existing “Base_Case.inpx” as “Build.inpx” and make changes to the model. If you change the timing in the RBC file without changing the RBC name, then “Int_1_Base.rbc” will have the build condition timing parameters. If you run the “Base_Case.inp”, the timings for intersection 1 will now be the build parameters!

There are reasons for this setup—some good and some not—but that is not important for now. The critical aspect is to understand the linkage between the Vissim file and the RBC files and to avoid making a significant mistake when you start working with modeling multiple design alternatives of a corridor.

Placing Signal Heads

After defining the signal controller characteristics, you can now place the signal heads at the intersections:

step i. Return to the *Network Editor* window.

Note: If you have not already done so, you may close the Signal Controllers / Signal Groups window to increase the Network Editor window size.

step ii. Zoom in to the Buzz Blvd. and Burdell Dr. intersection.

step iii. Left-click the *Signal Heads* icon  in *Network Objects*.

step iv. Left-click a link to select it (i.e., select the Buzz Blvd EB link).

- step v. Place the signal head on the link by right-clicking at the desired location on the link. Note the following:
- The SH is placed at the stop bar location, not on the intersection far side as an in-field signal head.
 - Place the SH in the left lane.
- Note: Each lane will need an SH.*
- The *Signal Head* data window will pop up. Figure 13 shows the *Signal Head* pop-up window and the SH placed on the lane.
- step vi. Assign a number (the default is okay) and a descriptive name (“Buzz and Burdell, EB, Lane 2”) to the signal head.
- Note: These are specific to each signal head in each lane.*
- step vii. In the *Link - lane* field, assign the *link* and *lane* number that the signal head is controlling.
- Note: Vissim will show default values, i.e., the first in the pull-down list, but you must update the selection to the correct values.*
- step viii. Assign to the *SC - Signal group* field the *signal controller* and *signal group* associated with the intersection and lane movement. Recall, you set the *SC* for the Buzz Blvd. and Burdell Dr. intersection as 111. The *SG* will follow the dual ring number given in Figure 9. Thus, for the EB through lane use, the *SG* is 2.
- Note: For now, a shared lane will receive the through movement SG, although more advanced models may utilize more than one signal head in a lane.*
- IMPORTANT: YOU MUST SELECT THE CORRECT SC - Signal group; VISSIM WILL NOT DEFAULT THIS CORRECTLY!**
- step ix. Left-click *OK*.

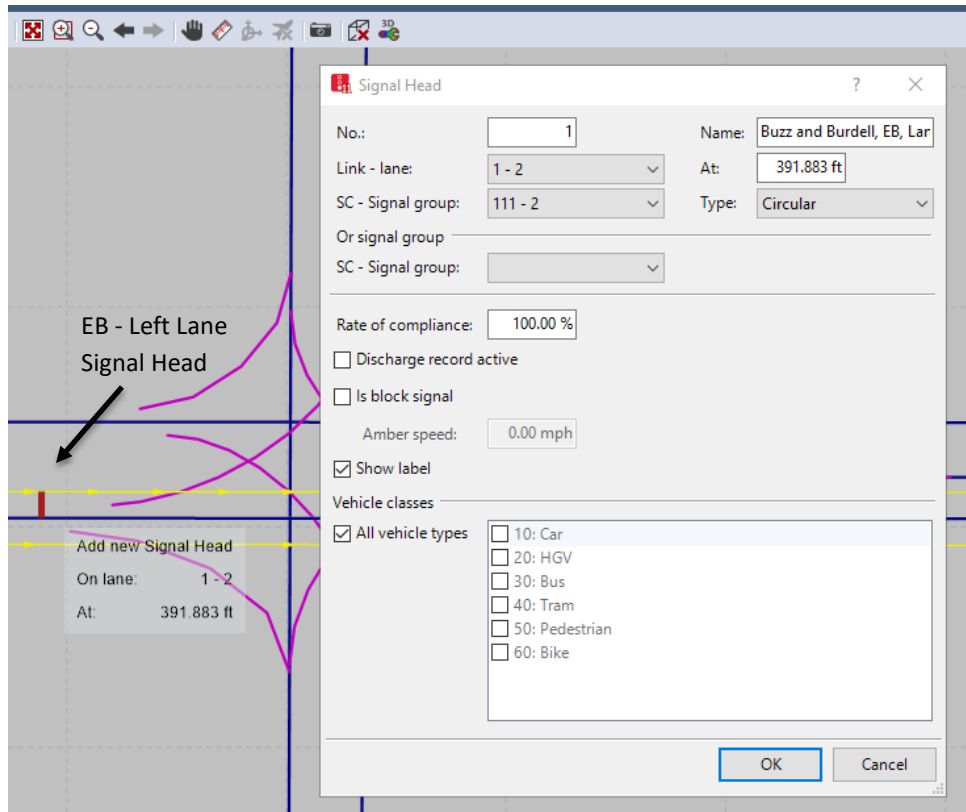


Figure 13: Signal head placement and pop-up window

Helpful Hints

Naming Convention

Vissim does not impose an SH naming convention, but it is helpful to develop a naming convention that eases model debugging and review. For example, for the EB signal head placed above, we used “Buzz and Burdell, EB, Lane 2”.

Numbering System

Unless you prefer to develop a numbering system, the Vissim default number in the *No.* field is fine. If you develop a system, however, you cannot use the same number for multiple intersections.

Link Information

If you do not recall the link number, Vissim 11 will show it when you click on the link. For earlier versions, you can double left-click on the link for the link’s dialog box. Also, if the *Quick View* window is open, left-click a link to see the link information. You can also toggle on the link labels when setting up an SH.

SH Removal

If you incorrectly place an SH and wish to delete it, select the SH and drag it to a point on the map with no links, or press the delete key on the keyboard.

Repeat this procedure for every signalized lane at all three intersections. There should be a total of 20 signal heads (6 on the intersection of Buzz Blvd. and Pi Pkwy. and 8 on the intersection of Buzz Blvd. and Ramblin St.). Signal heads in adjacent lanes in a multilane link should be approximately aligned. (See Figure 14 for example signal head placement locations.)

For this module, we are treating the EB and WB left turns to Ramblin St. as protected only. However, if you wish to use protected-plus-permitted phasing, then in the *Signal Heads* pop-up window under *Or signal group*, you would add the SG associated with the given left turn, i.e., phase 5 goes with phase 2 and phase 1 goes with phase 6.

Save Often! This would be a good place to save your Vissim file.

CRITICAL CONCEPT

When placing an SH, it will only apply to those vehicles on the associated link and lane. That is, if an SH is placed downstream of a link-connector join location, the vehicles that utilize that connector will not be influenced by the SH. This is true even though on the Vissim network map it may look as if the SH is covering the connector. When reviewing a model, it is sometimes seen that turning movements appear to ignore the SH. This typically is due to a signal head being placed downstream (often very slightly) of the connector join location on the link. Similarly, an SH may be placed on a connector; in such a case, that signal will not influence vehicles that remain on the link.

Figure 14, showing the Buzz Blvd. and Burdell Dr. intersection SH placements, illustrates that the right-lane mainline signal heads are placed just downstream of the right-turn connector. This will result in right-turn vehicles not following the signal and enable right-on-red behavior, to be discussed in the next section. Figure 15 shows the SH placement for the Ramblin St. and Pi Pkwy. intersections with Buzz Blvd.

Note: You may find it easiest to place the SH upstream of the right-turn connector and then drag it to the desired place. Just be sure not to drag it onto the connector!

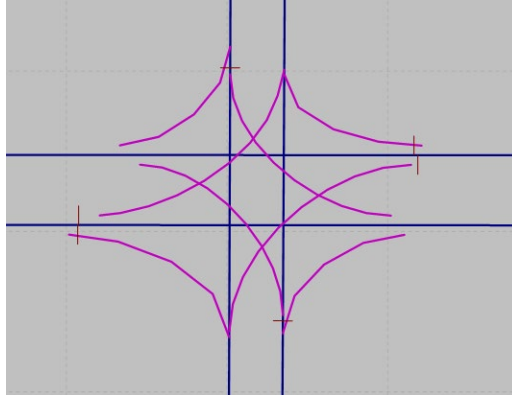


Figure 14: SH placement for the Buzz Blvd. and Burdell Dr. intersection

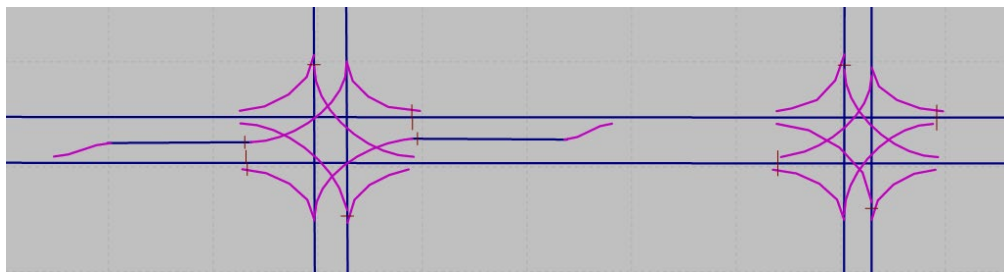
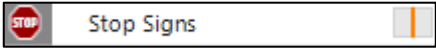


Figure 15: SH placement for the Ramblin St. and Pi Pkwy. intersections with Buzz Blvd.

Setting up for Right-Turn-on-Red

For those right turns where it is desired to allow right-turn-on-red, the through link SH is placed downstream of the right-turn connector, as described in the previous section. To implement RTOR, Vissim utilizes *stop signs*, with the signs set to only be active during the RED indication of the phase. Thus, right-turning vehicles will flow freely during the associated GREEN and YELLOW through indications. The right-turn connector does not need a separate SH. The following steps implement the stop sign:

- step i. Click the *Stop Signs* icon .
- step ii. Left-click on the right-turn connector.
Note: Start with Buzz and Burdell EB right.
- step iii. Right-click at the location where the vehicles will stop to make the right-turn-on-red movement, and the *Stop Sign* pop-up window will appear (see Figure 16).
- step iv. In *Connected to SC - signal group*, assign the proper signal group to the stop sign. For the EB right at Buzz Blvd. and Burdell Dr., this would be intersection 111 and SG 2, i.e., “111 - 2”.
- step v. Give the stop sign a name related to its position, e.g., “Buzz and Burdell EB”

step vi. Repeat steps i through v for the remaining right turns in the network.

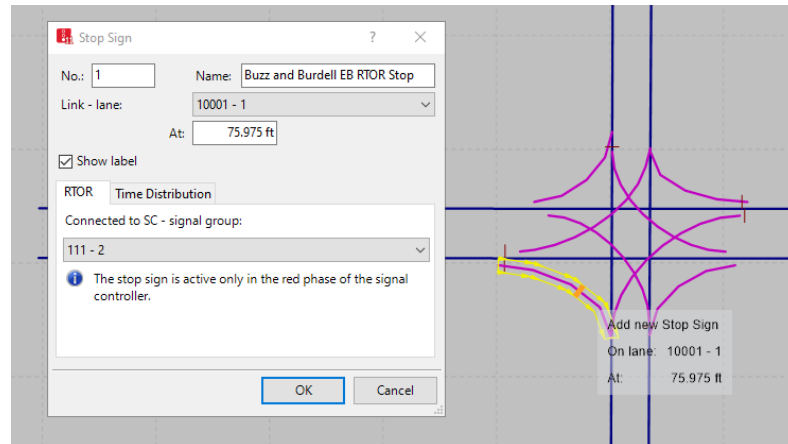


Figure 16: Stop Sign pop-up window

CRITICAL CONCEPT

There are several right-turn control configurations:

- A dedicated right-turn lane would be handled as above.
- A free-flow (channelized) right turn would have neither an SH or stop sign, with the merge onto the receiving lane (i.e., YIELD sign) handled using *conflict zones*, which are discussed later in this module.
- A right-turn lane overlap (i.e., the right turn has a green arrow but not a dedicated phase assignment) would be handled with Vissim overlap logic; refer to the Vissim manual for this procedure.

Save Often! This would be a good place to save your Vissim file.

Building the Model, Part 3: Traffic Volume and Routing Decisions

Setting Traffic Volume

Traffic enters Vissim models on the boundary links, i.e., the links on the edge of the model. Remember that links are directional, so the entry point is the upstream end of a link. In this module example, almost all links are boundary links; only the left-turn bay links at the intersection of Buzz Blvd. and Ramblin St. are not. However, in a more complicated model, there would likely be many internal links on which volumes do not enter the model. In addition, there are other means for traffic to enter a model; however, we will not worry about those at this time. Input the traffic volume as follows:

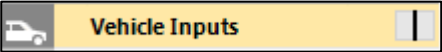
- step i. Left-click the “Vehicle Inputs” icon  .
- step ii. Left-click a link to activate it, and then right-click on the link to insert a vehicle input.
Example: Left-click the EB mainline link. A black line will appear at the start of the link (see Figure 17), and the Vehicle Inputs chart (see Figure 18) will appear under the Network Editor window.
- step iii. In the input chart (left chart), enter a name (e.g., “Buzz Blvd, EB inp”), number (use default if desired), and volume for each section of the roadway. For our example, use 300 veh/hr for north/south entry volumes and 600 veh/hr for east/west entry volumes.
- step iv. Keep all other default settings.
- step v. Repeat steps i through v for all volume entry links.

Figure 19 shows the completed *Vehicle Inputs* table.

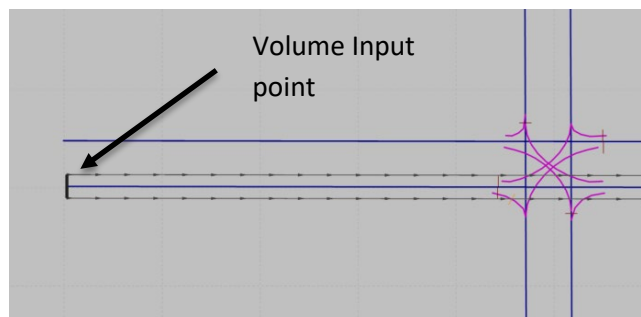


Figure 17: Volume input point

Vehicle Inputs / Vehicle Volumes By Time Interval

Select layout... Vehicle volumes by ti

Co	No	Name	Link	Volume(0)	VehComp(0)
1	1	1: Buzz Blvd		0.0	1: Default

Count	Cont	TimeInt	Volume	VehComp	VolType
1	<input type="checkbox"/>	0-MAX	0.0	1: Default	Stochastic

Figure 18: Vehicle Inputs window

Vehicle Inputs / Vehicle Volumes By Time Interval

Select layout... Vehicle volumes by tir

Count	No	Name	Link	Volume(0)	VehComp(0)
1	1	Buzz Blvd, EB inp	1: Buzz Blvd EB	600.0	1: Default
2	2	Burdell Dr., NB inp	4: Burdell Dr. N	300.0	1: Default
3	3	Burdell Dr., SB inp	3: Burdell Dr. S	300.0	1: Default
4	4	Ramblin St., NB inp	6: Ramblin St.	300.0	1: Default
5	5	Ramblin St., SB inp	5: Ramblin St.	300.0	1: Default
6	6	Pi Pkwy, NB inp	8: Pi Pkwy NB	300.0	1: Default
7	7	Pi Pkwy, SB inp	7: Pi Pkwy SB	300.0	1: Default
8	8	Buzz Blvd, WB inp	2: Buzz Blvd W	600.0	1: Default

Figure 19: Complete Vehicle Inputs table

Helpful Hints

If you select a row (i.e., left-click the leftmost cell of the row) in the *Vehicle Inputs* table, the associated vehicle input will display as bold on the map. Likewise, selecting a vehicle input bar on the map will highlight the associated row in the *Vehicle Inputs* table.

Save Often! This would be a good place to save your Vissim file.

CRITICAL CONCEPTS – Flow Rate vs. Volume

When entering *volume*, you are entering flow rates, that is, the 1-hour equivalent volume. Thus, if you enter an entry value of 500 vehs for a link but run the simulation for 5400 seconds (i.e., 1.5 hours) then a total volume of 750 vehs will enter.

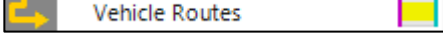
In the *volume inputs* for the module, we have set the entry flow rates to a constant value throughout the simulation duration. However, it is possible within Vissim to subdivide a run into time intervals and set different flow rates within each interval—for instance, you may want to input 15-minute flow rates to better reflect the variability in traffic. Time intervals are set in the *Base Data* → *Time Intervals* menu. Additional details can be found in the Vissim manual.

Note: Again, inputs would be flow rates (hourly equivalent volumes) when entering interval volume data.

Assigning Routing Decisions

To assign a vehicle to turn left, turn right, or travel straight through an intersection, it is necessary to set up routing decisions. For this module, we will assign routing decisions at the approach level, similar to the type of data you might have from the intersection turning-movement counts.

To create routing decisions, you need to define the allowed movements (or routes) for each link entering an intersection. For instance, for the EB approach on Buzz Blvd. and Burdell Dr., the right, left, and through movements are allowed. The procedure to create routes is as follows:

- step i. Left-click the *Vehicle Routes* icon .
- step ii. Left-click a link that enters an intersection. Start with the EB approach on Buzz Blvd. and Burdell Dr.
- step iii. Right-click a point inside the link approximately 200 ft from the intersection (see Figure 20). A bar will appear at that location on the link; this is your routing decision starting point.

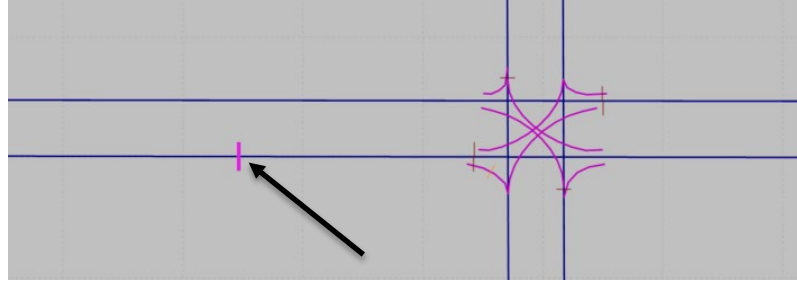


Figure 20: Routing decision start

CRITICAL CONCEPT

When placing the starting point of the routing decision, it must be sufficiently upstream of the SH to allow a vehicle adequate time to react to the SH after crossing the routing decision. If an adequate distance is not provided, vehicles will ignore the SH and drive through the red.

step iv. Define one of the possible routing destinations, starting with the through route, as follows.

- Move the mouse 50 ft past the intersection on the path that would be traversed by a through vehicle; this will drag a blue line to that point.
- Left-click at that end location. You will see the blue bar at the decision endpoint and the path will be highlighted in yellow (see Figure 21).

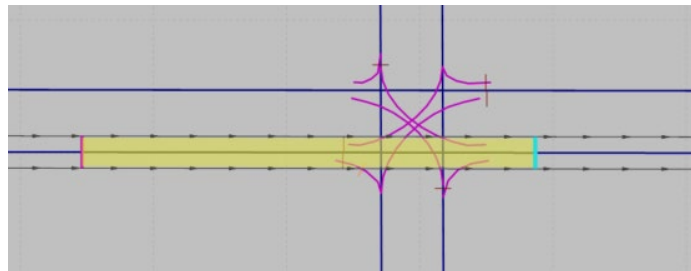


Figure 21: Through vehicle route

step v. Define the left-turn routing destination, as follows:

- Move the mouse to a point 50 ft past the intersection on the path that would be traversed by a left-turning vehicle.
- Left-click at that end location. You should again see the path highlighted in yellow (see Figure 22).

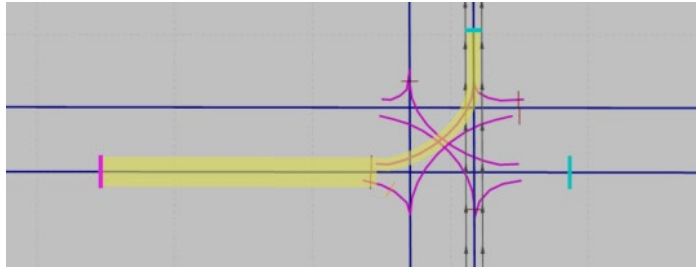


Figure 22: Left-turn vehicle route

step vi. Define the right-turn routing destination, as follows:

- Move the mouse to a point 50 ft past the intersection on the path that would be traversed by a right-turning vehicle.
- Left-click at that end location. You should again see the path highlighted in yellow (see Figure 23).

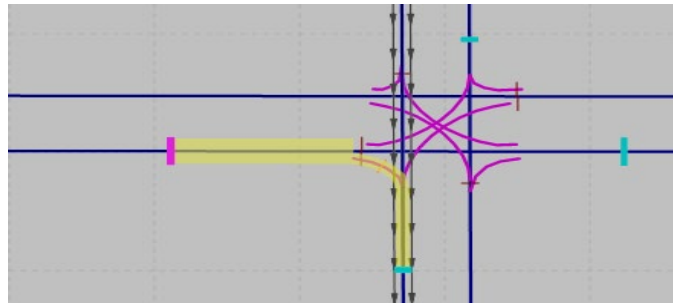


Figure 23: Right-turn vehicle route

step vii. Left-click on the map screen anywhere that is not a link or connector (the mouse pointer will become an ×). The *Static Vehicle Routing Decisions* box should appear at the bottom of your screen (see Figure 24). The left-hand side of the box lists all the routing decision starting points that have been created (at the moment there should be just one) and the right-hand side lists all of the destination points associated with the starting point selected in the left-hand box.

Note: If you click on a route in the right-hand box, it will be highlighted on the map.

step viii. Fill in *Name* for the routing decision starting point and destination points, for example, “Buzz and Burdell, EB App”, and “RT”, “Thru”, and “LT”.

Note: The name for the starting point will carry over to the destination points, so it is not necessary to repeat the intersection approach name.

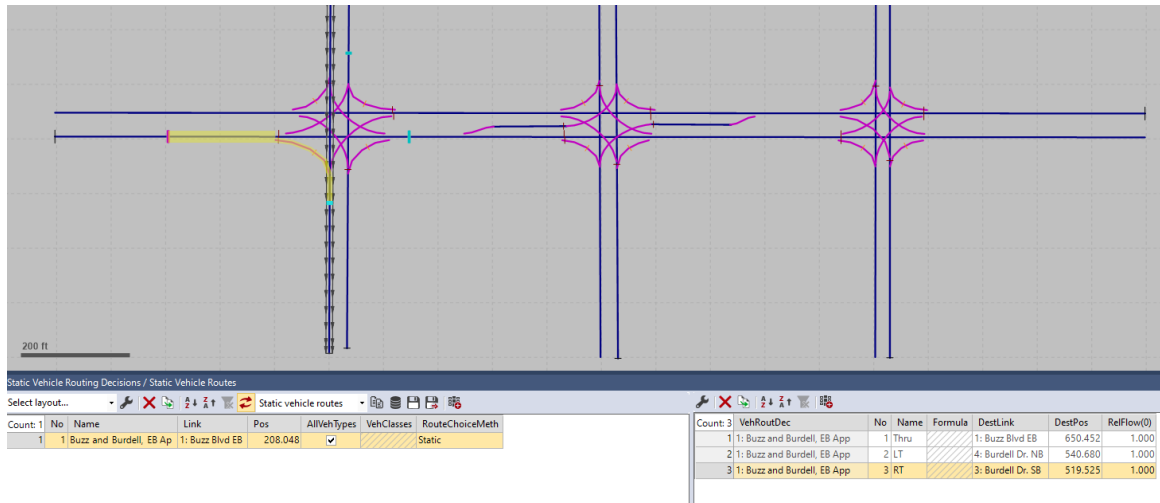


Figure 24: Static Vehicle Routing Decisions

There are now three routes (left, straight, and right) associated with the EB routing decision just created. When crossing a routing decision starting point, Vissim randomly assigns vehicles to one of the route destinations according to the relative flows, i.e., with the likelihood proportional to the demand assigned to each destination point. The Vissim default is equal percentages of vehicles assigned to each destination. The relative flows need to be updated for your given scenario.

CRITICAL CONCEPT

You may enter relative flows equal to your intersection count data; however, this is not required in Vissim. The values in the relative flows will be converted to proportions. Thus, the Vissim default of using a “1” for the relative flow of each route in our example is converted to a 33.3% likelihood that an arriving vehicle will take each path. If you use your intersection count values, Vissim does not ensure that the total arrivals sum to the input movement total; it simply assigns any vehicles that arrive according to the given proportions. Thus, using the intersection count absolute values does not guarantee that number of vehicles will be processed, only that arriving vehicles will be processed according to the given proportions.

For example, assume for the EB approach at the Buzz Blvd. and Burdell Dr. intersection that the turning movement counts are 75 left, 375 through, and 150 right. This would result in turning percentages of 12.5% left, 62.5% through, and 25% right. In Vissim, entering

any of the following tuples {75, 375, 150}, {12.5, 62.5, 25}, or {0.125, 0.625, 0.25} in the relative flow data will result in the same assignment of vehicles on the approach.

Now, enter flow data for the routing decision as follows:

step ix. Select the routing decisions in the left box by clicking on the routing decision row.

Note: To open the Static Vehicle Routing Decisions window—if it is not currently open—right-click on Vehicle Routes in the Network Objects menu, and select Show List.

step x. Insert the relative flow for each route in the RelFlow column in the right box. For the EB traffic, use 75 left, 375 through, and 150 right.

Note: Be sure you are assigning the flow to the correct movement. Movements will be listed in the order created. (If you click on a row in the right-hand box, the route path will be highlighted on the map.)

step xi. When you are ready to assign your next set of routing decisions, left-click on the map away from any links or connectors.

step xii. Repeat this process for every approach on all three intersections, entry, and internal approaches. Use the volumes provided in Table 1. For Buzz Blvd. and Ramblin St. EB and WB traffic, the routing decisions must be placed upstream of the turn-bay entrance, and the left-turn routing decision should follow the left-turn bay (see Figure 25). There is no need to carry the routing decision to the side street, as a vehicle in the turn bay has only one possible path; however, you may carry the routing decision through the intersection, if desired.

Table 1: Intersection volume counts

	EB			WB			NB			SB		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Buzz Blvd. and Burdell Dr.	75	375	150	25	300	25	25	150	50	25	200	25
Buzz Blvd. and Ramblin St.	25	350	75	50	300	25	25	50	25	25	50	25
Buzz Blvd. and Pi Pkwy.	25	350	25	25	275	50	50	50	25	25	250	50

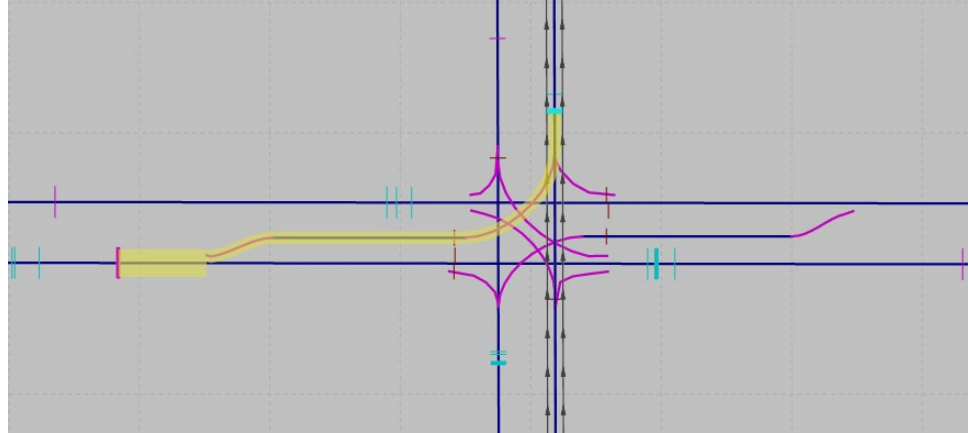


Figure 25: Buzz Blvd. and Ramblin St. left-turn route

Save Often! This would be a good place to save your Vissim file.

Discussion About Routing Decisions

Routing decisions are critical to the implementation of a reasonable model and there are several potential pitfalls. A few items to keep in mind when setting routing decisions include the following:

1. While a vehicle is on a routing decision, it will ignore all other routing decision starting points it crosses until it passes the endpoint of its current decision.
2. Similarly, only vehicles not currently on a route will observe a routing start point. Should there be overlapping routes, the modeler needs to exercise caution to be sure the model is capturing the desired overall system behaviors (e.g., turning-movement ratios).
3. The position of the routing decision starting point is the earliest point at which a vehicle may begin pre-positioning for a downstream route destination. Where vehicles need more time to pre-position into the correct lane (i.e., a left-turning vehicle needs to get into the left-most lane), consider moving routing decision start points further upstream. Fine-tuning routing decision start points can be a critical step in getting the Vissim-simulated vehicles to behave like field observations or behavioral expectations. There are no hard-set rules on where to place these starting points, instead it requires trial and error fine-tuning by the model builder (i.e., you!).

4. While we limited the route path to traversing a single intersection in the module, this is not a necessary constraint. Routing decisions can provide significant control over vehicle movements. A routing decision may cross many links and connectors (i.e., a single routing decision may traverse many intersections), creating complex paths through a network. We can quickly see how more complex routing decisions could improve the modeling of interchanges, closely spaced intersections, etc.
5. When crossing a routing decision starting point, Vissim randomly assigns vehicles to one of the route destinations, with the likelihood proportional to the demand assigned to each destination point. Typically, this will result in acceptable behavior but can create unrealistic vehicle paths, particularly in a grid network. That is, a vehicle may be randomly selected as a turning movement at multiple points and “drive around the block.” Should such behaviors become an issue, more complex multi-intersection routes may provide a solution, as well as utilizing vehicle types (not discussed in the module).
6. It is critical to understand that Vissim is only concerned with proportional volumes and not absolute volumes when assigning vehicles to paths. Vissim will not consider it an error if the total volume count does not sum up to the volumes entered in the relative flow. It is up to the modeler to check the absolute volumes and determine if there is an error in the model (e.g., an unexpected upstream bottleneck).
7. Finally, rather than manually assigning routes, it is also possible to use Vissim origin–destination assignment. This is typically reserved for large networks and is beyond the scope of this module.

CRITICAL CONCEPT – Vehicle Speed



Thus far we have not considered vehicle speeds. In Vissim, desired speed is a vehicle characteristic rather than a link characteristic. To see this, we first look at the *Vehicle Inputs* in Figure 19. In the last column we see *VehComp(0)*, which stands for the *Vehicle Composition*. It is currently set to *Default*. To see the default *Vehicle Composition*, go to *Traffic* → *Vehicle Compositions*. There is currently only one *Vehicle Composition*, the *Default*. Select the *Default Vehicle Composition* in the left window. In the right window you will see the *vehicle types* in the composition (*Car* and *HGV*) and desired speed for each vehicle type (*DesSpeedDistr*, the speed the vehicles will try to maintain). Currently, the desired speed is set to 50 km/h (30 mph). We will use this as the speed for the arterial.

Note: If you wish to change it, select the DesSpeedDistr input and select a new value.

Strictly speaking, the desired speed will be drawn from a distribution, so there will be some variability in the desired speed among vehicles. Additional discussion on using desired speed, altering the underlying distribution, etc., will be provided in Module 5. Vehicle composition, vehicle types, and vehicle classes will also be discussed in detail in Module 5.

Building the Model, Part 4: Conflict Areas

To avoid collisions at conflict or merge points at an intersection not controlled by a traffic signal, it is necessary to set up *conflict areas*. At each conflict or merge point, it is necessary to define the right of way among the permitted movements:

- step i. Left-click the *Conflict Areas* icon  Conflict Areas . This will result in all possible conflict areas being highlighted. When a conflict area is undefined, both approaches will be highlighted yellow. Figure 26 shows the Buzz Blvd. and Burdell Dr. intersection.
- step ii. Right-click on the color bars to the right of the *Conflict Areas* icon, and select *Show List*.

At signalized intersections, conflict areas only need to be defined for movements that could conflict during the same green phases. For instance, it is not necessary to define the conflict area for the SB left with the EB through, as the signal prohibits this conflict. Scrolling over the conflicts with your mouse pointer will outline each conflict area.

Note: If you are having trouble separating the conflict area, click on the row of a conflict in the Conflict Area table to highlight the conflicts in the network map, or use the down arrow to scroll through the conflicts.

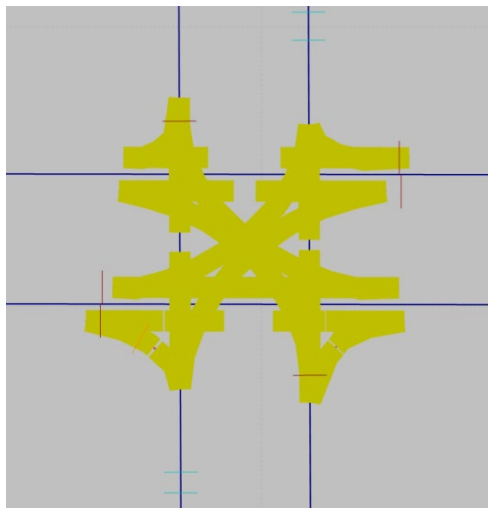


Figure 26: Conflict areas before defining right of way

- step iii. Left-click on one of the two conflicting movements of the conflict area you wish to define. Figure 27(a) highlights the Buzz Blvd. and Burdell Dr. intersection EB through conflict with the WB left.

step iv. Right-click on the highlighted conflict until the zone is correctly defined; the movement highlighted as green will have the right of way and the movement highlighted as red will yield. Figure 27(b) shows the EB through with priority over the WB left.

Note: If you define an area you did not intend to define, continue right-clicking until both movements return to yellow.

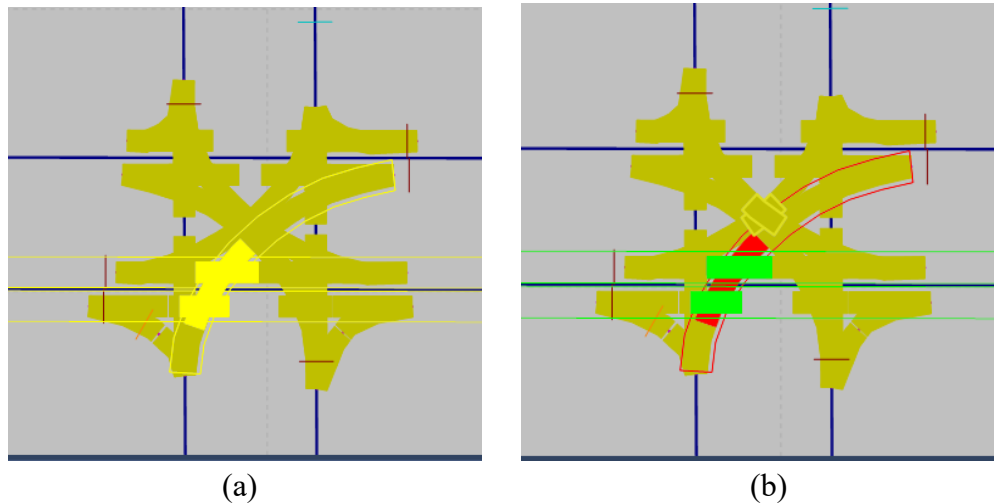


Figure 27: Buzz Blvd. and Burdell Dr. EB through with WB left: (a) conflict area highlighted, and (b) conflict movement priorities

step v. Select and define the remaining conflicts for the Buzz Blvd. and Burdell Dr. intersection. You need to define a total of 10 conflict areas, as follows:

- Four *crossing conflicts*, one for each of the left turns conflicting with opposing through movements, which give the through movements priority.
- Two *merging conflicts*, one for each left-turn and opposing right-turn movement entering into the same lane of the NB and SB receiving lanes, which give the right-turn movements priority.

Note: There is not a conflict on the EB and WB approaches, as the left and right turns are received by different lanes.

- Four *merging conflicts*, one for each through movement with the merging right turn on red, which give the through movements priority.

Note: All other conflict points will still be highlighted in yellow while the conflict area icon is selected, as in Figure 28(a), and will disappear once it is deselected, as in Figure 28(b).

step vi. Define the conflict areas for the intersection of Buzz Blvd. and Pi Pkwy. It has the same conflicts as Buzz Blvd. and Burdell Dr. (see step v).

step vii. Define the conflicts for Buzz Blvd. and Ramblin St. The conflicts are the same as in the other intersections except that the EB and WB lefts no longer conflict with the opposing through movements, as these are now protected-only movements.

Note: If we had set these as protected plus permitted, then the conflict areas would still need to be defined.

Also, as the EB and WB lefts are protected, the merge with the RTOR should now give priority to the left. The center intersection should have eight conflicts, as shown in Figure 29.

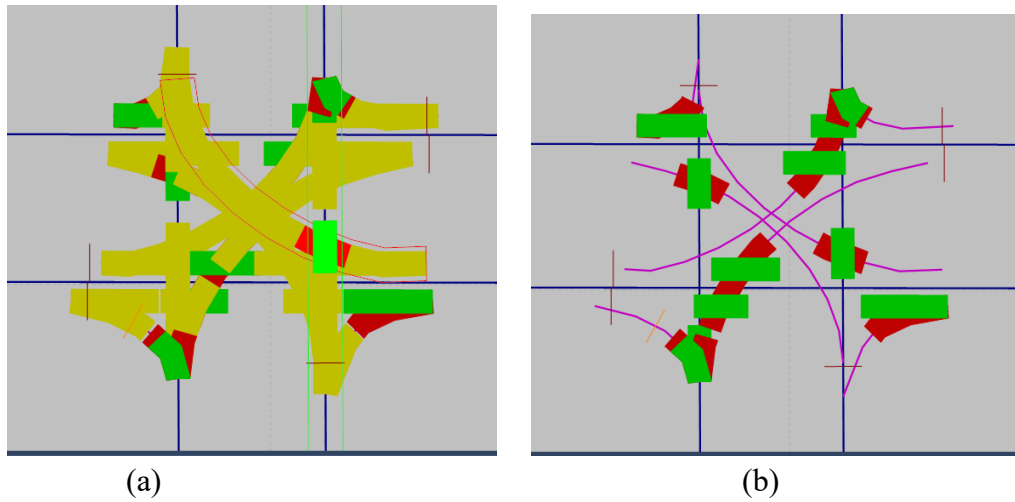


Figure 28: Buzz Blvd. and Burdell Dr. conflict areas defined: (a) with undefined conflicts, and (b) without undefined conflicts

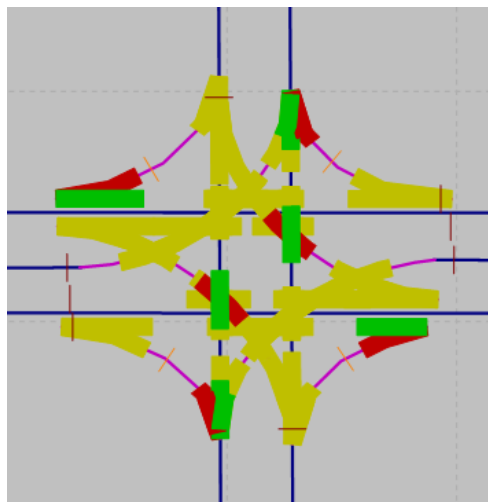


Figure 29: Buzz Blvd. and Ramblin St. conflict areas

Congratulations!!!

You have constructed a Vissim model!

In the remaining two sections you will set up data collection and run your model.

Building the Model, Part 5: Creating Output Files

Once the network is created, the simulation can be run; however, the simulation will only provide a visual representation of the system unless outputs are specified. Vissim can provide information on travel times, delays, queue lengths, green time distribution, specific vehicle information, etc. We will create output files that provide the delay measures.

Setting Evaluation Criteria

First, we need to set the evaluation criteria:

- step i. In the main menu bar, click on *Evaluation* → *Configuration*. The *Evaluation Configuration* pop-up box should appear (see Figure 30).
- step ii. Select the *Result Attributes* tab if it is not already selected. The *Result Attributes* tab creates the display of results in *list* windows (typically a window under the *Network Editor* window) for the respective attributes.
Note: The generated files may also be opened post analysis, e.g., using Excel or SQL.
- step iii. In the lower box, you should see the potential measures listed. For *Delays* click the *Collect Data* box and fill in the values with a *From-time* (i.e., start time) of 900, *To-time* (i.e., end time) of 4500, and an *Interval* of 900. This will give us 1 hour of simulation data, starting at time = 900 seconds. Data will be output for the entire hour as well as each of the 15-minute (900-second) intervals.

CRITICAL CONCEPT

As the model starts, the beginning of the simulation has no vehicles. Typically, we want to wait some amount of startup time for the model to “fill.” Data collected before this point would not be representative of desired conditions, likely providing biased performance measures such as low delays and travel times. We will go into a model startup in much more detail in the Model Calibration module; however, for now, we will just use a 15-minute warm-up period.

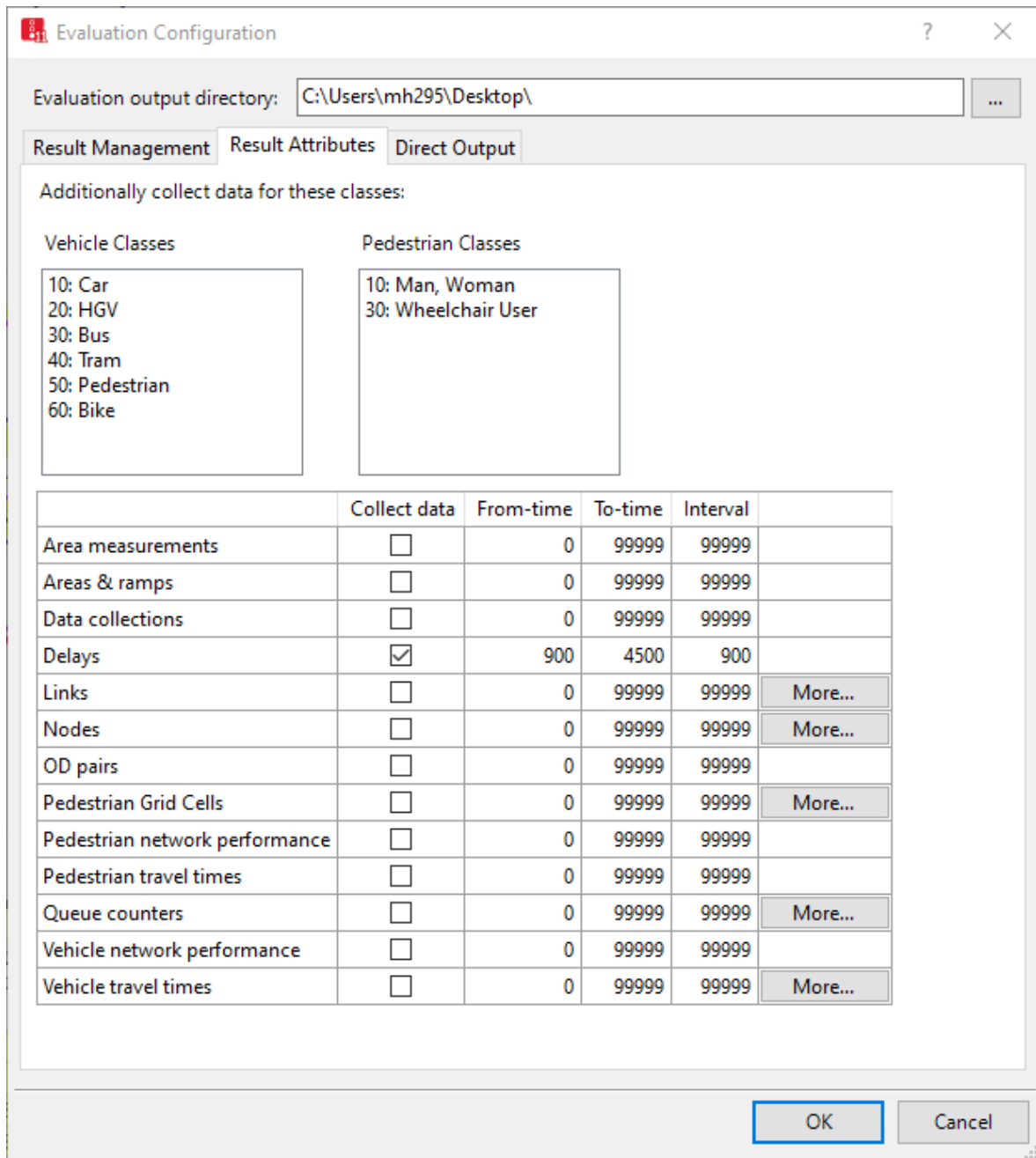


Figure 30: Evaluation Configuration pop-up window, Result Attributes tab

- step iv. Click on the *Direct Output* tab (see Figure 31). In the *Direct Output* tab, you designate results you would like to have written to a file.
- step v. In the *Write to file* column, select *Vehicle record* and *Vehicle travel times (raw data)*.
- step vi. For *Vehicle record* and *Vehicle travel times (raw data)*, set the *From-time* and *To-time* attributes to 900 and 4500, respectively.

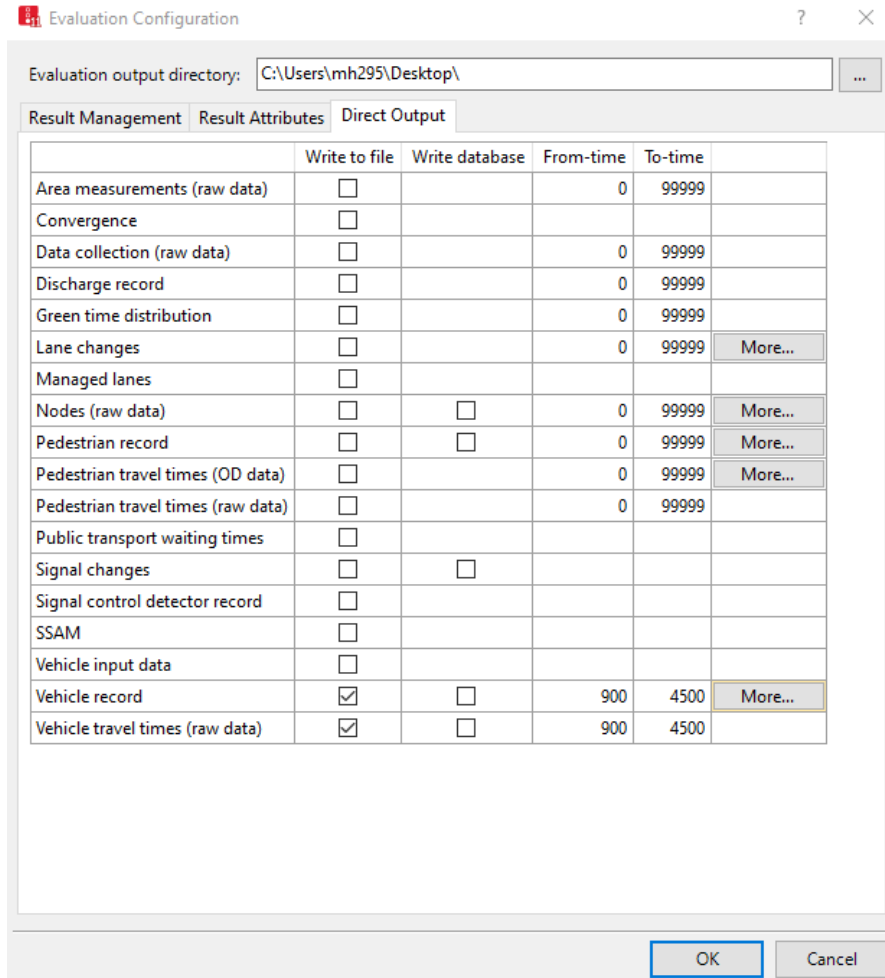


Figure 31: Evaluation Configuration pop-up window, Direct Output tab

- step vii. Click on the *Result Management* tab (see Figure 32).
- step viii. Under *Keep result attributes of previous simulation runs*, select *of current (multi-)run only*.
- Note: Keeping the result attributes of only the current run will overwrite any output files of previous simulation runs with the most recent run.*
- step ix. Make note of the output file destination given in *Evaluation output directory* at the top of the window.
- Note: If you do not want to use the default, change the directory to your preferred location.*
- step x. Select *OK*.

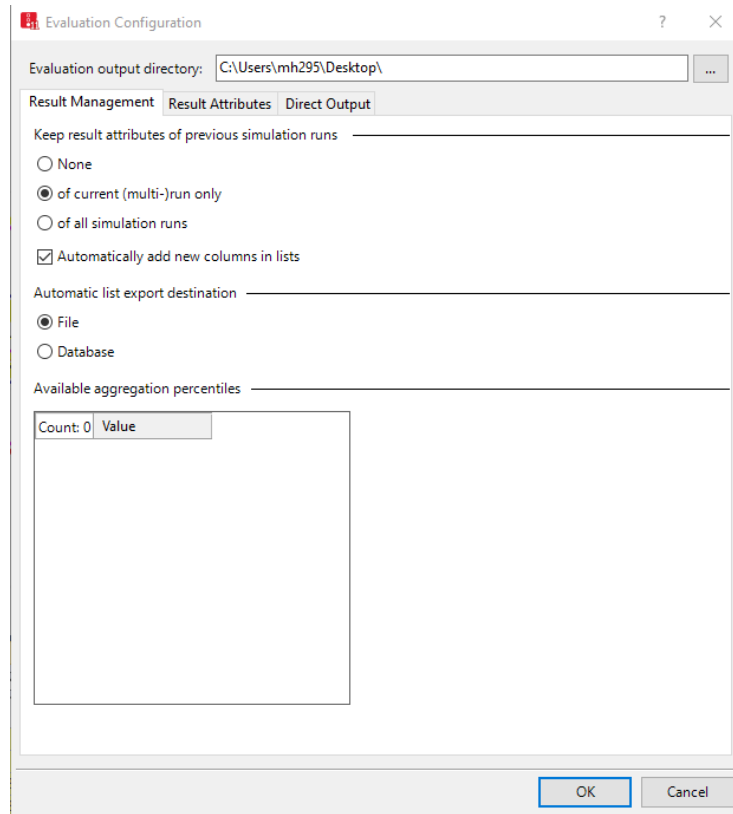



Figure 32: Evaluation Configuration pop-up window, Result Management tab

Creating Travel Time Segments

In order for Vissim to collect travel times, delays, and other vehicle data, you will need to add travel time segments, as follows:

- step i. Left-click the *Vehicle Travel Times* icon  in the *Network Objects* list on the left side of the Vissim window.
- step ii. Left-click on the desired link of the starting position. We will put a travel time segment on the mainline EB link (see Figure 33).
- step iii. Right-click to select the desired start location. The start location will be shown with a red bar.
Note: Select a couple hundred feet downstream of the EB entrance.
- step iv. Right-click to select the desired end location. The end location will be shown with a green bar.
Note: Select a couple hundred feet after the Buzz Blvd. and Pi Pkwy.
- step v. The *Travel Time Measurement* pop-up window should appear. Add a name for your travel time segment (see Figure 34).
- step vi. Select *OK*.

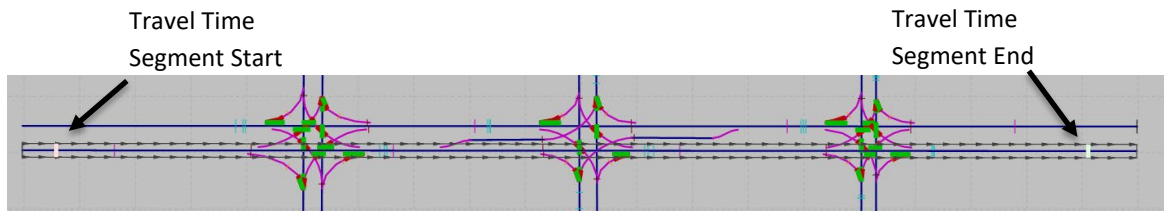


Figure 33: Buzz Blvd. EB, end-to-end travel time segment

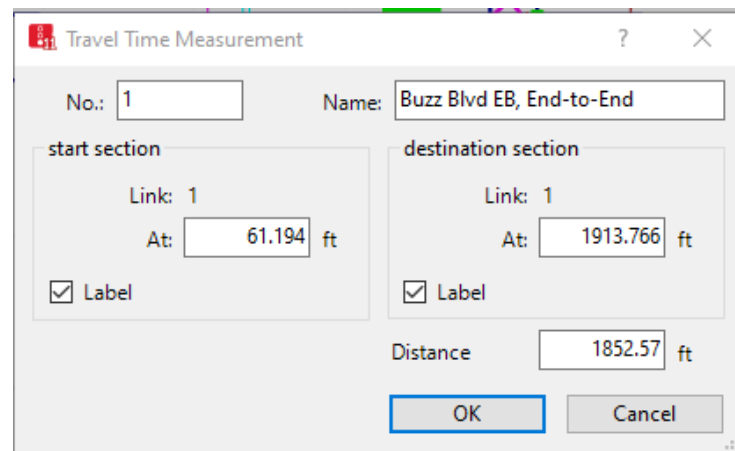


Figure 34: Travel Time Measurement pop-up window

step vii. Using the procedure above, set seven more travel time segments, as follows:

- WB end-to-end on Buzz Blvd. (i.e., the main E–W street).
- NB on the intersection of Buzz Blvd. and Ramblin St.

Note: Again, start a couple hundred from the model entrance and end a couple hundred after the intersection.

- SB on the intersection of Buzz Blvd. and Ramblin St.
- EB for only Buzz Blvd. and Ramblin St.

Note: Start on Buzz Blvd. EB approximately a hundred feet past Burdell Dr. and end a couple of hundred feet after Ramblin St.

- WB for only Buzz Blvd. and Ramblin St.

Note: Start on Buzz Blvd. WB approximately a hundred feet past Pi Pkwy. and end a couple of hundred feet after Ramblin St.

- EB left at Buzz Blvd. and Ramblin St.

Note: Start on Buzz Blvd. EB approximately a hundred feet past Burdell Dr. and end a couple of hundred feet after the intersection on Ramblin St. NB (i.e., the receiving lane).

- WB left at Buzz Blvd. and Ramblin St.

Note: Start on Buzz Blvd. EB approximately a hundred feet past Pi Pkwy. and end a couple of hundred feet after the intersection on Ramblin St. SB (i.e., the receiving lane).

Creating Delay Measurements

Next, you will create delay measurements for the travel time segments, as follows:

- step i. In the main menu at the top of the screen, left-click *Lists* → *Measurements* → *Delay Measurements*.
- step ii. Left-click the green cross in the *Delay Measurements* pop-up window menu.
- step iii. Name the measurement after the direction of travel, starting with “Buzz Blvd. EB, End-to-End”.
- step iv. Select the box in the *VehTravTmMeas* column, select the pull-down arrow, and assign the correct travel time segment.
- step v. Repeat the procedure for the other travel time segments. Figure 35 shows the completed travel times.

Note: The order of your list may be different, depending on the order in which you set it up.

Helpful Hints


You may need to go back to the list of travel time segments if you cannot remember them. You can do this by right-clicking on the *Vehicle Travel Time* icon in the *Network Objects* toolbar and selecting *Show List*. You can now flip between the *Travel Time Segment* list and the *Delay Measurements* list by selecting the associated window tab at the bottom of the Vissim window.

Count	No	Name	VehTravTmMeas
1	1	Buzz Blvd, EB End-to-End	1
2	2	Buzz Blvd WB, End-to-End	2
3	3	Ramblin St. NB	3
4	4	Ramblin St. SB	4
5	5	Buzz Blvd EB LT at Ramblin St.	5
6	6	Buzz Blvd WB LT at Ramblin St.	6
7	7	Buzz Blvd EB Thru at Ramblin St.	7
8	8	Buzz Blvd WB Thru at Ramblin St.	8

Figure 35: Delay Measurements list

Creating Delay Results

As a final step, you will select which delay results you want to display and send to the output files, as follows:

- step i. In the main Vissim menu, click *Lists* → *Results* → *Delay Results*.
- step ii. Click on the *Attribute Selection* (wrench) icon  in the *Delay Results* pop-up window. The pre-set attribute list will collect data such as stops and stop delay for all six vehicle classes. The Vissim default composition is for all vehicles to be class 10 (i.e., cars). You can add and eliminate attributes using the horizontal arrows (see Figure 36).
- step iii. Set your list to be the same as in Figure 36. As the model runs, you will be able to see the delay results in the *Delay Results* list window.

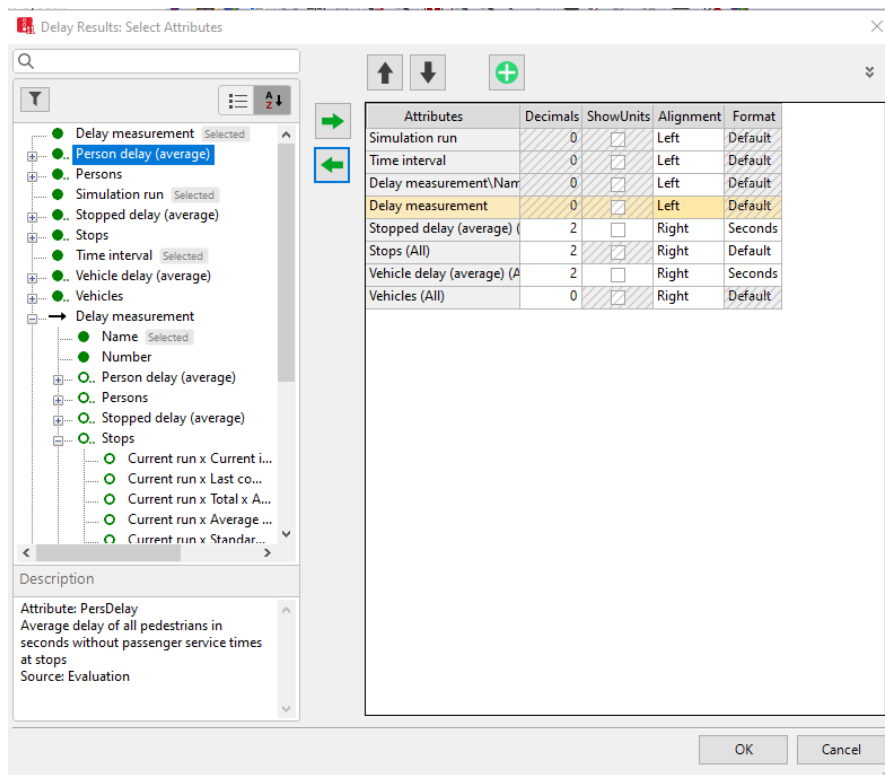




Figure 36: Delay Results: Select Attributes screen

- step iv. Click *OK*, and then ensure the sigma  and floppy disk with red arrow  icons are selected (see Figure 37).

Note: The plain floppy disk button cannot be pressed until after the simulation is run.

The floppy disk with red arrow icon sets up the delay files to autosave to the location you select.

Note: This location is selected after you run the simulation by pressing on the plain floppy disk icon and choosing a path location.

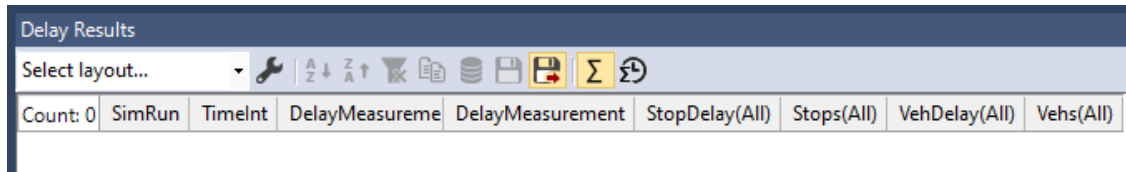


Figure 37: Delay Results: Autosave and Simulation Run Aggregate buttons selected

Helpful Hint

Take a few minutes to explore the list on the left side of *the Delay Results: Selected Attributes* pop-up window. Skimming through the list, you can observe a significant number of delay measures that you can collect.

CRITICAL CONCEPTS

When setting up performance measures, such as delay, using travel time segments, the measure is ONLY captured within the travel time segment. Thus, if a queue should go past the starting point of the travel time segment, any delay experienced beyond this point would not be captured in the measure. This is why we set the starting point of a travel time segment as far upstream of an approach stop bar as possible. We also set the endpoint sufficiently downstream of a stop bar to capture delay due to acceleration from a stop. The delays from the end-to-end travel time segment will capture the aggregate delay experience at all three intersections.

In addition, measures from travel time segments only reflect vehicles that travel the full length of the segment. Thus, if a vehicle only travels on a portion of the travel time segment, that vehicle's metrics will not be included in the segment results.

All of the measures in this section are dependent on the vehicle speeds. In this module we did not adjust the vehicle's desired speed (i.e., the speed of the vehicle in free-flow conditions), but left it at the default value. To see the default desired speed, go to the pull-

down menu *Traffic* → *Vehicle Compositions*. The *Vehicle Compositions* list will open under the *Network Editor*. For the default setting, both the car and heavy vehicle are set to 50 km/hr (31 mph). This will be the desired speed for all vehicles as they enter the model. For our arterial example, this speed is fine. In Module 4 we will see how to change the desired speed for different segments of the network, e.g., to have a higher desired speed on the freeway.

Note: Vissim actually uses a distribution for desired speed. For instance, for 50 km/hr, each vehicle will have a randomly selected value between 50 km/hr and 55 km/hr. We will discuss how to set these ranges in Module 5.




Building the Model, Part 6: Running the Simulation

To run the simulation, we must first set the simulation run length. Then we will run the simulation and review the collected performance measures.


Setting Final Parameters

- step i. In the main menu bar, click *Simulation* → *Parameters*.
- step ii. Set the simulation *Period* to 4500 seconds.
- step iii. Set the *Start time* to 00:00:00.
- step iv. Set the *Simulation speed* to *Maximum*.
- step v. Click *OK*.

Running the Simulation

- step i. Run the simulation by clicking the *Run* icon . Cars should start going through the intersection.
 - You can toggle between the wireframe and roadway view by clicking on  or pressing Ctrl+A on the keyboard.
 - You can toggle between 2D and 3D views by clicking the *3D Toggle* icon  or pressing Ctrl+D on the keyboard. The × over the icon means that 3D is turned off. Clicking the icon switches the view to 3D and removes the ×.

Note: Switching over to 3D will potentially slow the simulation speed, as the computer now has to render in 3D.
 - Under *View* in the main menu, select *Simple Network Display* if you wish to hide the conflict zone, travel time segment, etc. graphics that can clutter the screen.
- step ii. Wait for the simulation to finish.

*Note: Run time can be sped up by selecting the *Quick Mode* icon  prior to selecting the *Run* icon. Quick mode turns off the animation. However, for now we recommend that you leave animation on, as this is one of the best ways to check a model.*

Finding and Saving Your Files

You should see your results in the *Delay Results* table at the bottom of the Vissim screen. The results should look similar to those in Figure 38.

To save the file:

- step i. Click the *Floppy Disk* icon.
- step ii. Choose a file name and location for the output file.

Note: Remember that earlier the output files were set to only have data for the most recent simulation run. This can be changed in the Evaluation Configuration menu. Clicking the autosave will result in saving delay results in the location of your choosing. Only click this if you understand you will lose the delay outputs for past simulation runs.

The file will output as an .ATT file, and other raw data will be output as .FZP and .RSR files. These may all be opened in Excel or any text editor (such as Notepad).

Delay Results								
Count	SimRun	TimeInt	DelayMeasureme	DelayMeasurement	StopDelay(All)	Stops(All)	VehDelay(All)	Vehs(All)
1	1	900-180	Buzz Blvd, EB En	1: Buzz Blvd, EB End	71.32	1.81	88.66	63
2	1	900-180	Buzz Blvd WB, En	2: Buzz Blvd WB, En	64.32	1.74	81.81	70
3	1	900-180	Ramblin St. NB	3: Ramblin St. NB	37.04	0.71	43.17	59
4	1	900-180	Ramblin St. SB	4: Ramblin St. SB	35.69	0.57	40.82	47
5	1	900-180	Buzz Blvd EB LT a	5: Buzz Blvd EB LT a	20.16	0.80	26.76	5
6	1	900-180	Buzz Blvd WB LT	6: Buzz Blvd WB LT	54.98	0.89	63.57	27
7	1	900-180	Buzz Blvd EB Thr	7: Buzz Blvd EB Thru	37.13	0.64	43.41	81
8	1	900-180	Buzz Blvd WB Th	8: Buzz Blvd WB Thru	35.83	0.88	44.74	113
9	1	1800-27	Buzz Blvd, EB En	1: Buzz Blvd, EB End	64.11	1.73	81.73	56
10	1	1800-27	Buzz Blvd WB, En	2: Buzz Blvd WB, En	62.95	1.58	80.28	78
11	1	1800-27	Ramblin St. NB	3: Ramblin St. NB	52.87	0.96	61.86	26
12	1	1800-27	Ramblin St. SB	4: Ramblin St. SB	48.06	0.71	54.57	35
13	1	1800-27	Buzz Blvd EB LT a	5: Buzz Blvd EB LT a	49.28	1.00	57.40	5
14	1	1800-27	Buzz Blvd WB LT	6: Buzz Blvd WB LT	49.98	1.09	58.60	23
15	1	1800-27	Buzz Blvd EB Thr	7: Buzz Blvd EB Thru	33.28	0.74	40.56	90

Figure 38 Partial Delay Results table

Your results may differ slightly from those in Figure 38, as we have not been overly precise in the geometry and your evaluation points may be in slightly different locations. You may also be using a different random seed (which we will discuss in a later module).

Helpful Hints

A similar process can be followed to collect travel time information, as follows:

- step i. In the *Main Menu*, select *Evaluation* → *Configuration*, check the box for *Vehicle Travel Times*, and set the From-time, To-time, and Interval in the *Result Attributes* tab.
- step ii. Next, go to the menu *Lists* → *Results* → *Vehicle Travel Time Results* and under the attribute list select the types of data you want to collect.
- step iii. After you run the simulation, select the folder in which to save the data.

CRITICAL CONCEPT

An important question is: “Are my results valid?” In a later module, we will provide guidance on calibration and validation. However, do not underestimate your ability to evaluate your results for reasonableness. Review your findings; if they do not seem reasonable to you, then they probably are not. Carefully review the model, watching each part during the run. Too often, modelers try to calibrate parameters to fix what is in actuality a modeling error. It is critical that you first verify the model is working correctly, i.e., is the model behaving as you think it is supposed to behave? For instance, when watching a model run:

- Do vehicles always stop at each red signal head or do they “run the light”? If they are running the light, you may have set the routing decision point too close to the signal head or have the signal head past the connector, or some other setup issue.
- Is the RTOR behaving as you expected?
- Are the permissive lefts stopping for the opposing through vehicles?
- Are all of the signal heads changing as expected?
- Are vehicles utilizing all of the turning movements?
- Are any queues building far beyond expectations?
- Are the volumes being processed in the right “ballpark”?
- Are the travel times and delays “reasonable”?
- Etc.

You may not know what the delays, travel times, etc. should be exactly—that is why you are creating the model! However, you should have a sense of order of magnitude and be able to identify likely erroneous results, whether too bad or too good.

In addition, Vissim will provide warning messages at the end of the run. Review the messages and try to eliminate all warnings.

Helpful Hint

Carefully step through and observe the animation for each component of the model and confirm the vehicle behaviors are correct!!!

CONGRATULATIONS!!!

**You have completed your
first VISSIM model!**

Way to go!!!

