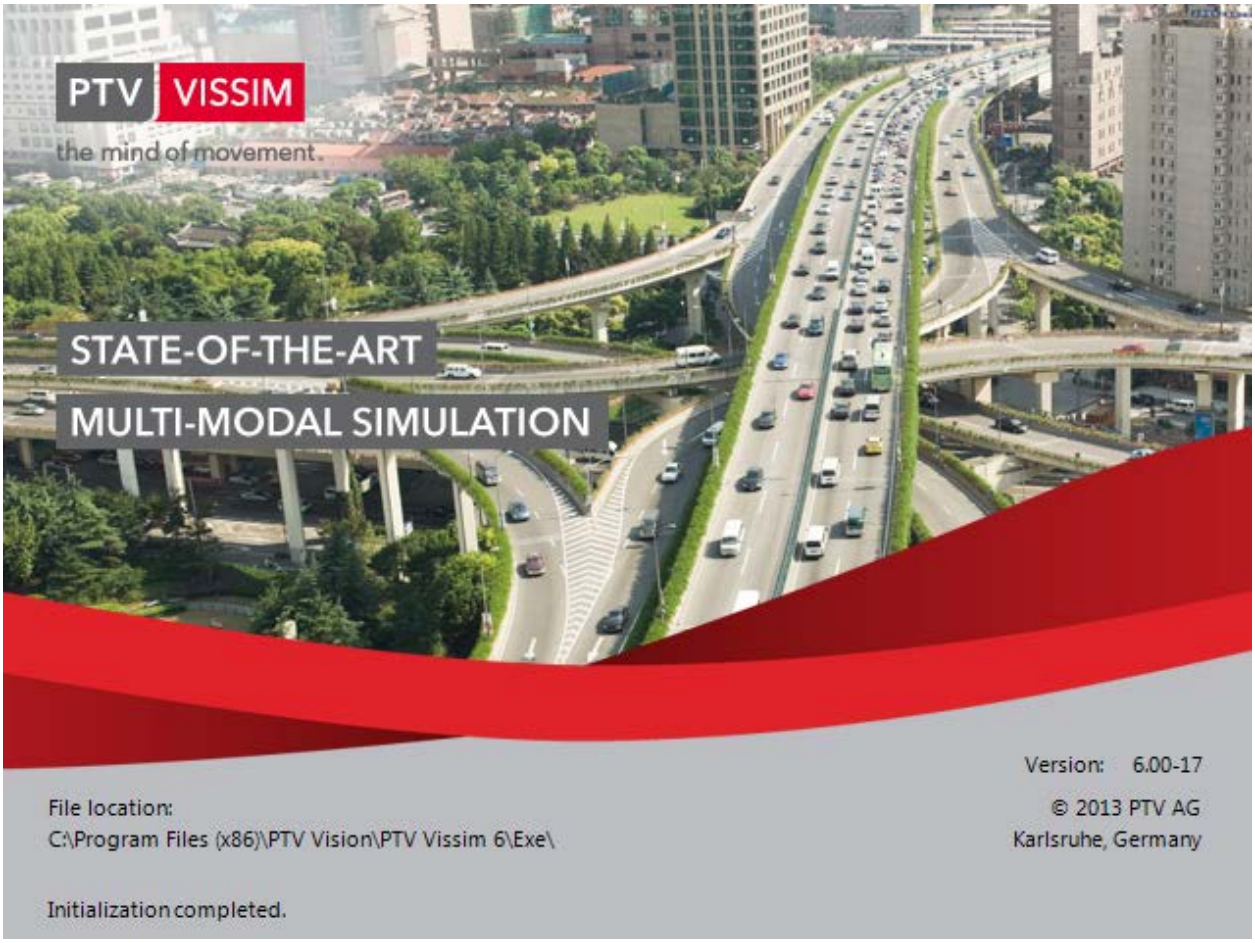
Getting Started:
VISSIM



Version 1.2: July 10, 2015

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Section 1:

Introduction

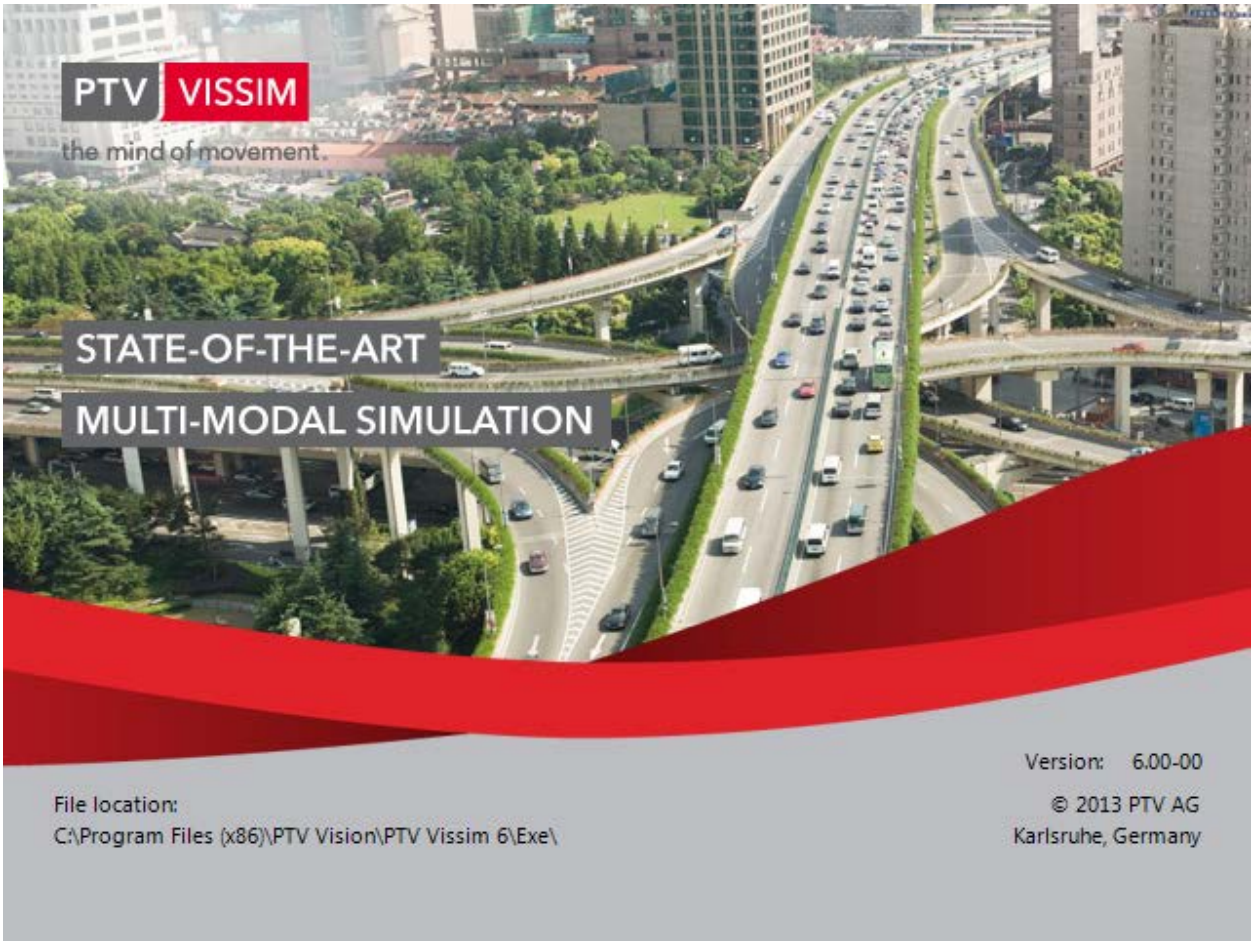
This guide will provide a basic understanding of how to use the VISSIM 6 software package. This guide was designed to walk a user through the necessary steps to create a network simulation from star t to finish. The network will include signalized and stop controlled intersections.

NOTE: This guide does not teach signal phasing or signal timing.

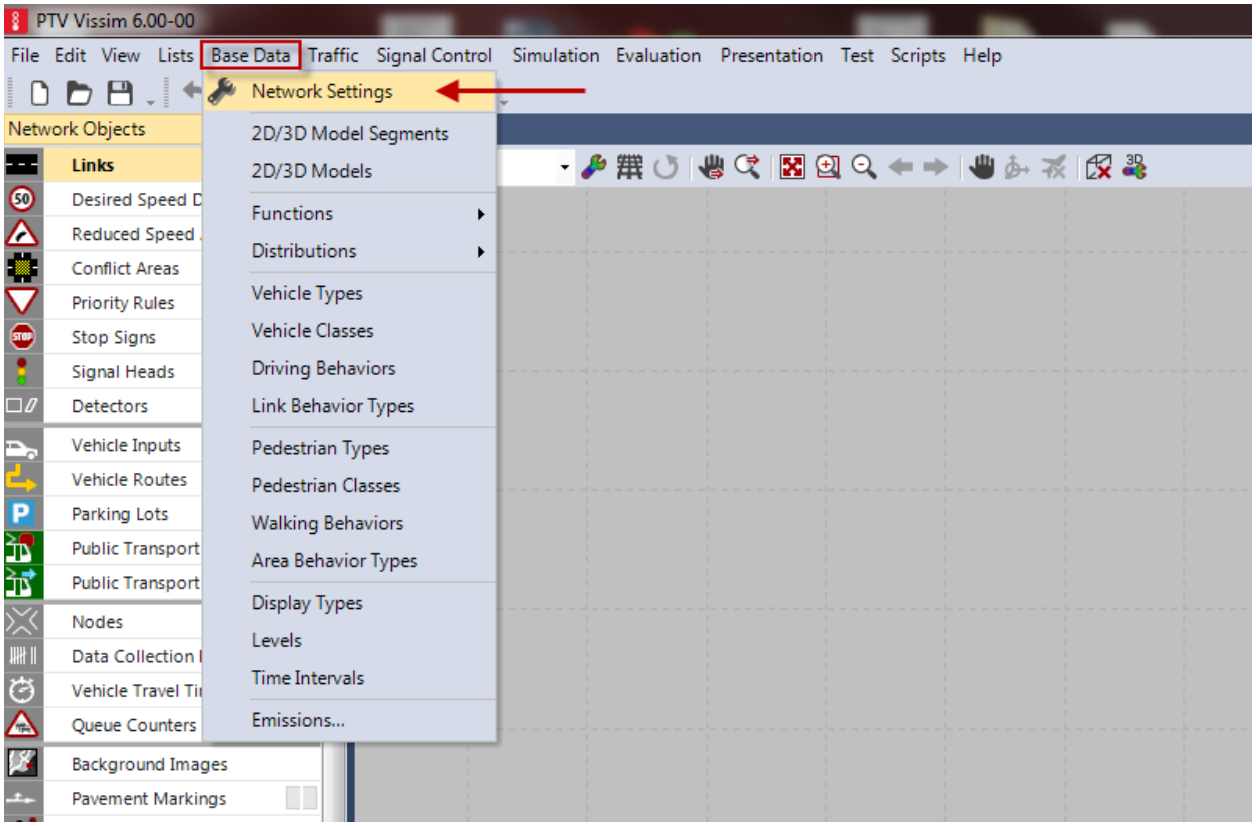
Please contact Tiffany Turner (tturner@dot.ga.gov) if you have any questions, suggestions about this guide or if you notice any errors or discrepancies.

Section 2:

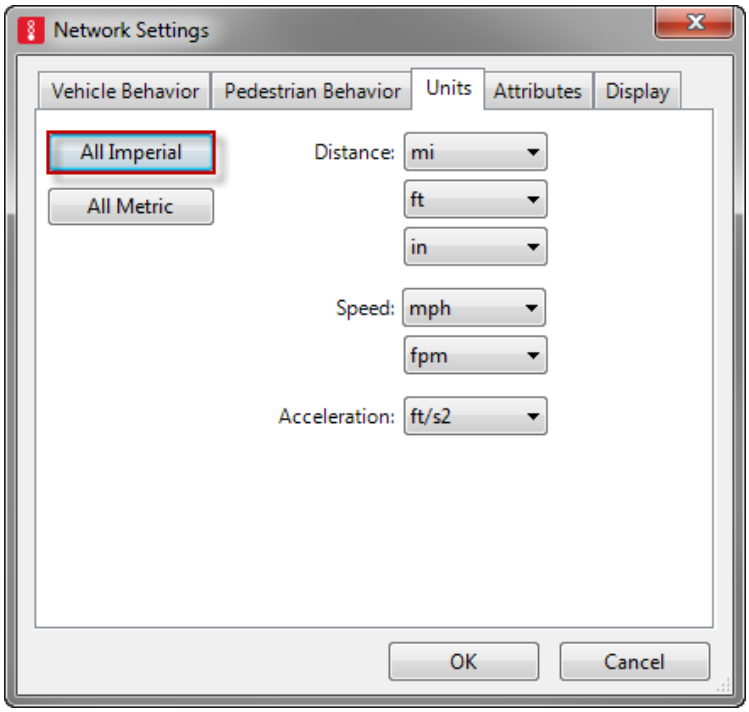
General Settings



1. Go to **Base Data**, then **Network Settings**

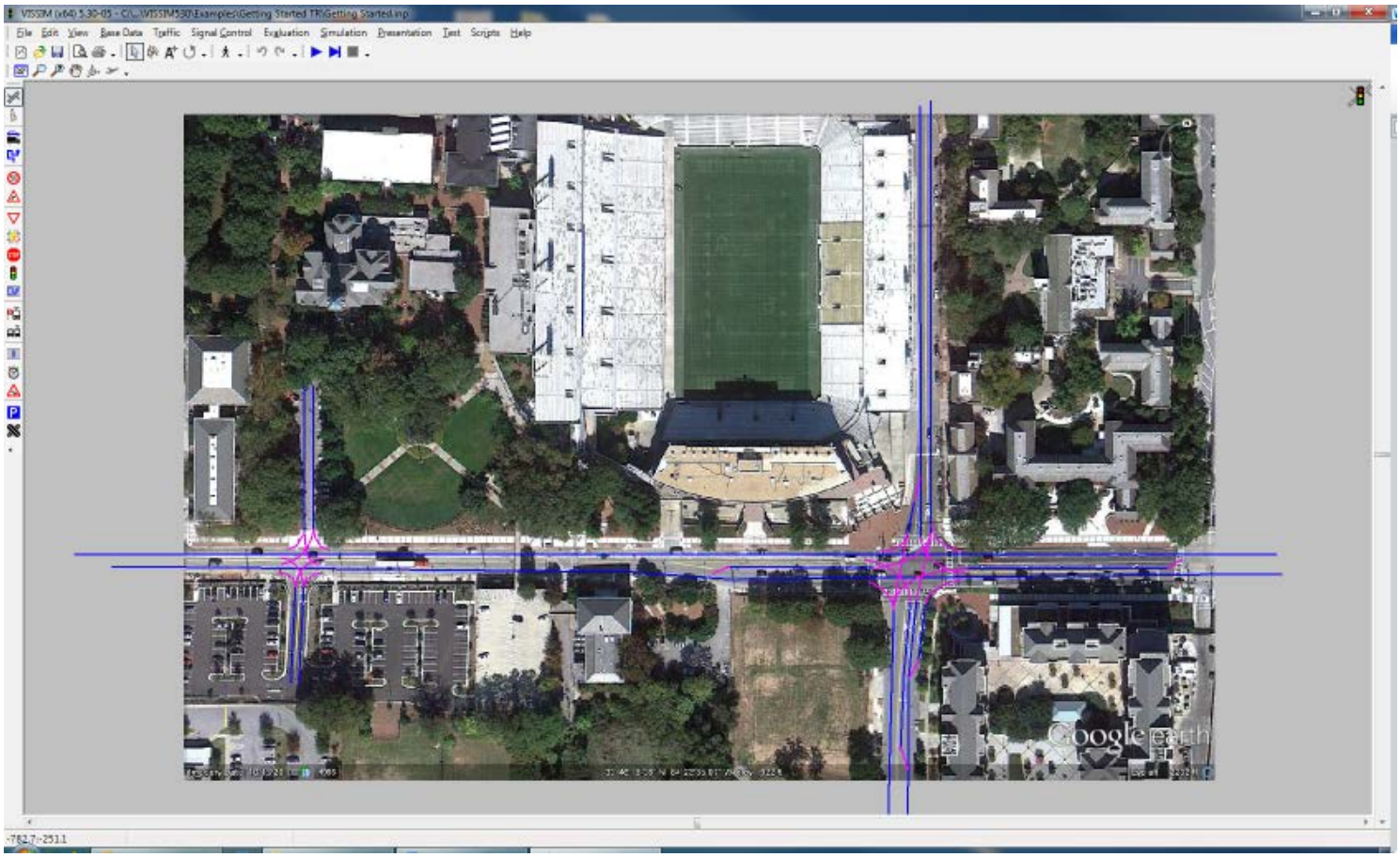


2. Select the **Units** tab. Click **All Imperial** to change to English units.



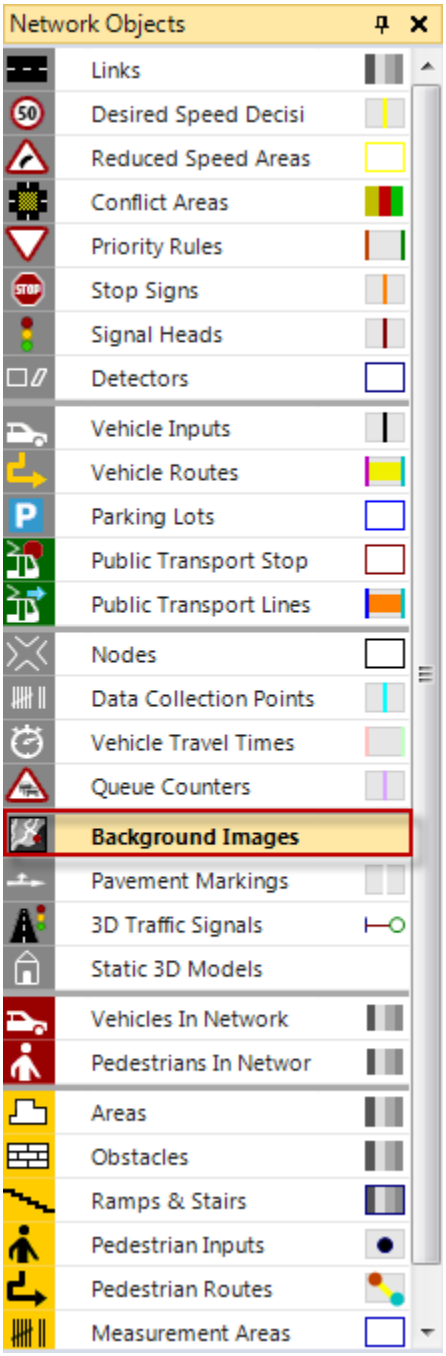
Section 2:

Build a Network

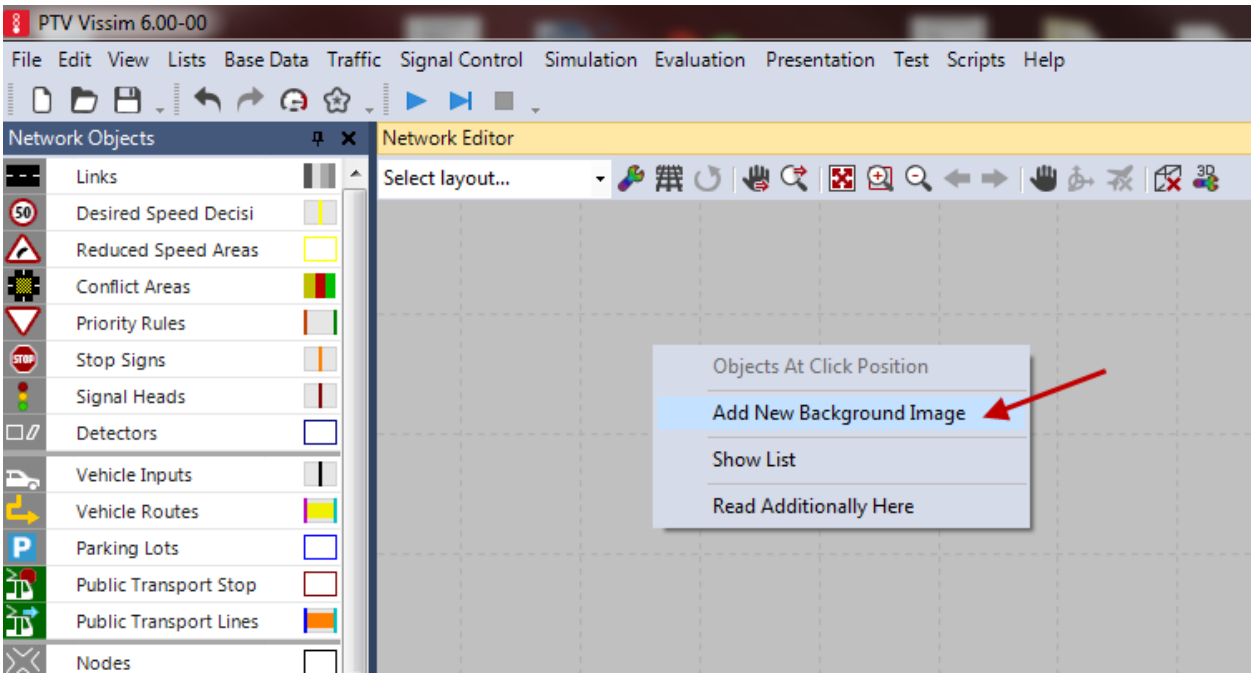


Lesson 1: Add a background image

1. Select **Background Images** from the **Network Objects** side menu



2. Right click in the Network Editor window and select **Add New Background Image**



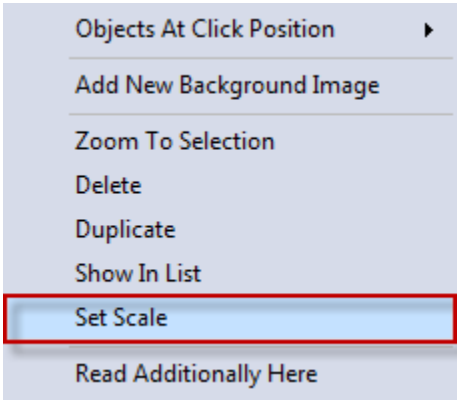
Vissim supports the following file formats for graphic files:

Raster formats	Vector formats
**.bmp*	**.dwg*: Is updated for each new version of Autodesk AutoCAD™
**.jpg*	**.dxf*: Is updated for each new version of Autodesk AutoCAD™
**.png*	**.emw*
**.tga*	**.wmf*
**.tif*: uncompressed or PackBits-compressed	**.shp*: shape files
**.sid*: Mr. SID, display with the best possible resolution	
**.ecw*: only with a determined resolution	

3. Browse to your project folder to find and select the background image to import.
   to follow along with this tutorial you can access the example image here .

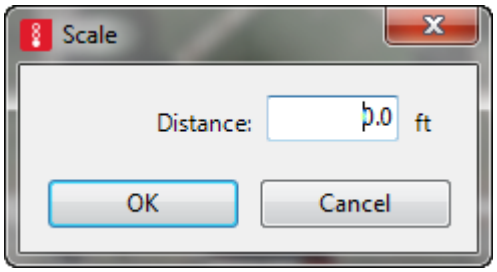
   **click the show entire network button to locate image*

4. Press **CTRL +** Right click on the background image and select **Set Scale** to scale the image.



5. Select a known distance (say a distance between intersections, a width of a building, a crosswalk or lane width). Place the center of the crosshair at the first point of the known distance click and drag to the second point of the known distance. *(a yellow line will appear*)

6. Enter the known **distance** and select **OK**.



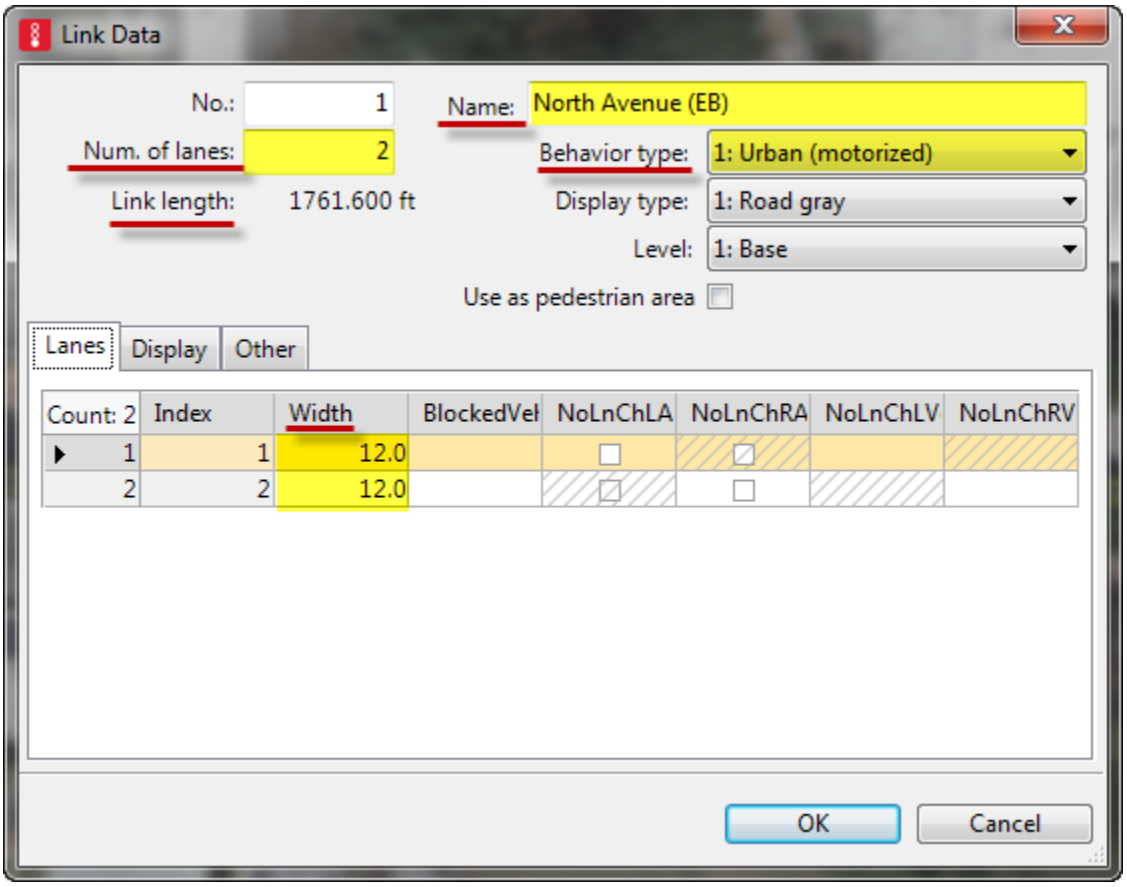
7. The image will resize. Click the show entire network button again.

Lesson 2: Draw/Edit links (*links are one way*):

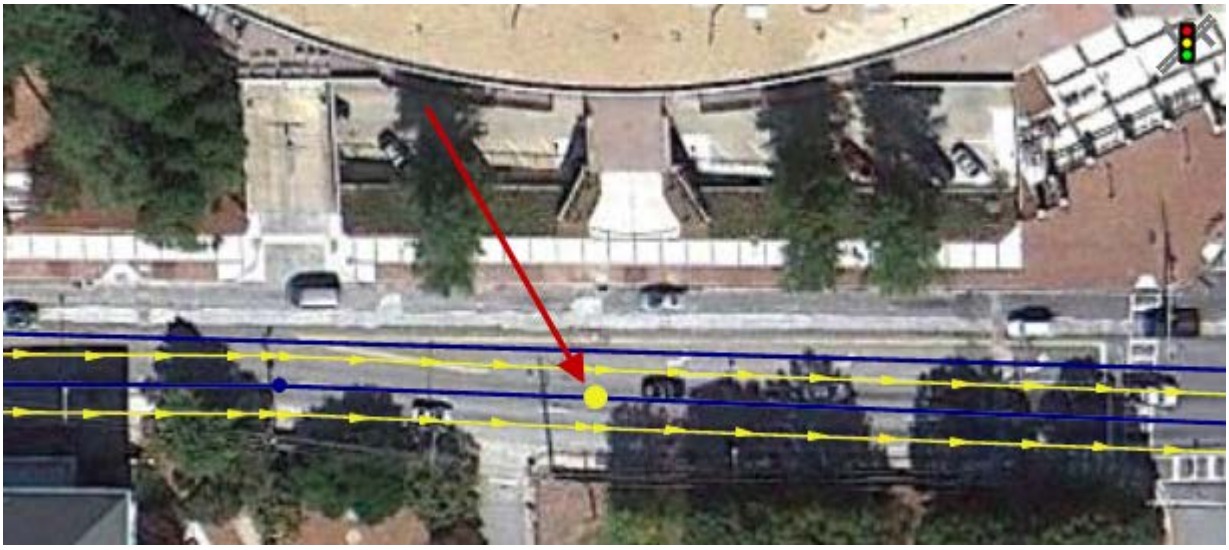
1. Select **Links** in the **Network Objects** menu

2. Click and Hold the right mouse button and drag in the direction of travel to create a link.
   **draw the link in the center of the direction of travel. If one lane- the middle of that lane, if two lanes-the center line, if three lanes-the middle of the center lane, etc….*
   ***start the link outside of the background graphic*
3. Enter the following in the **Link Data** Window
   a. **Name**: Street Name
   b. **No. of Lanes** : # of lanes in one direction (thru lanes)
   c. **Behavior Type:** Urban or Freeway
   d. **Lane Width**: leave at 12ft (or reduce to 11ft to view line striping on background image)

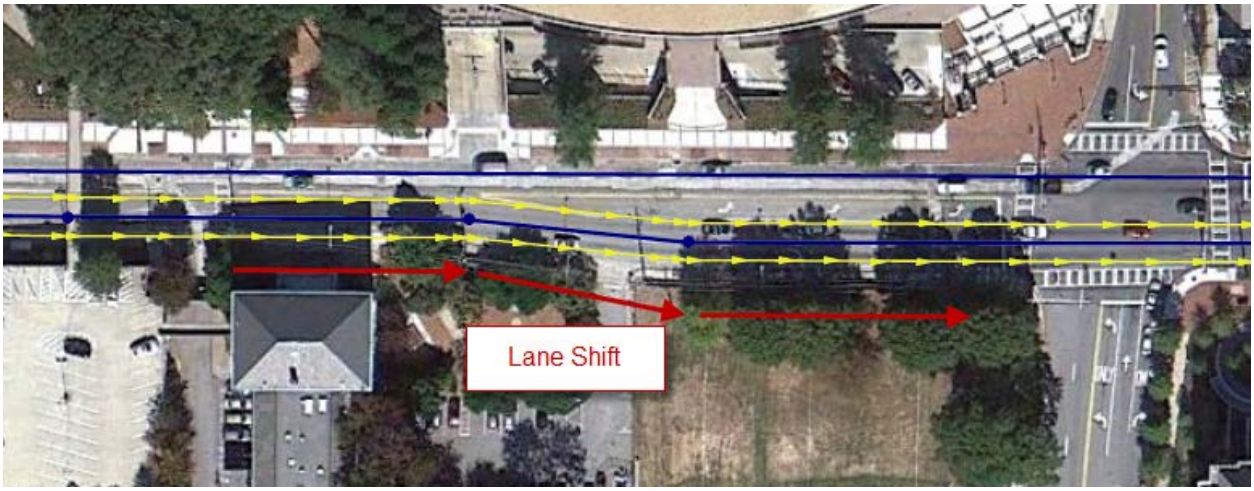
   Note: check the link length of the first link to ensure the scale is correct



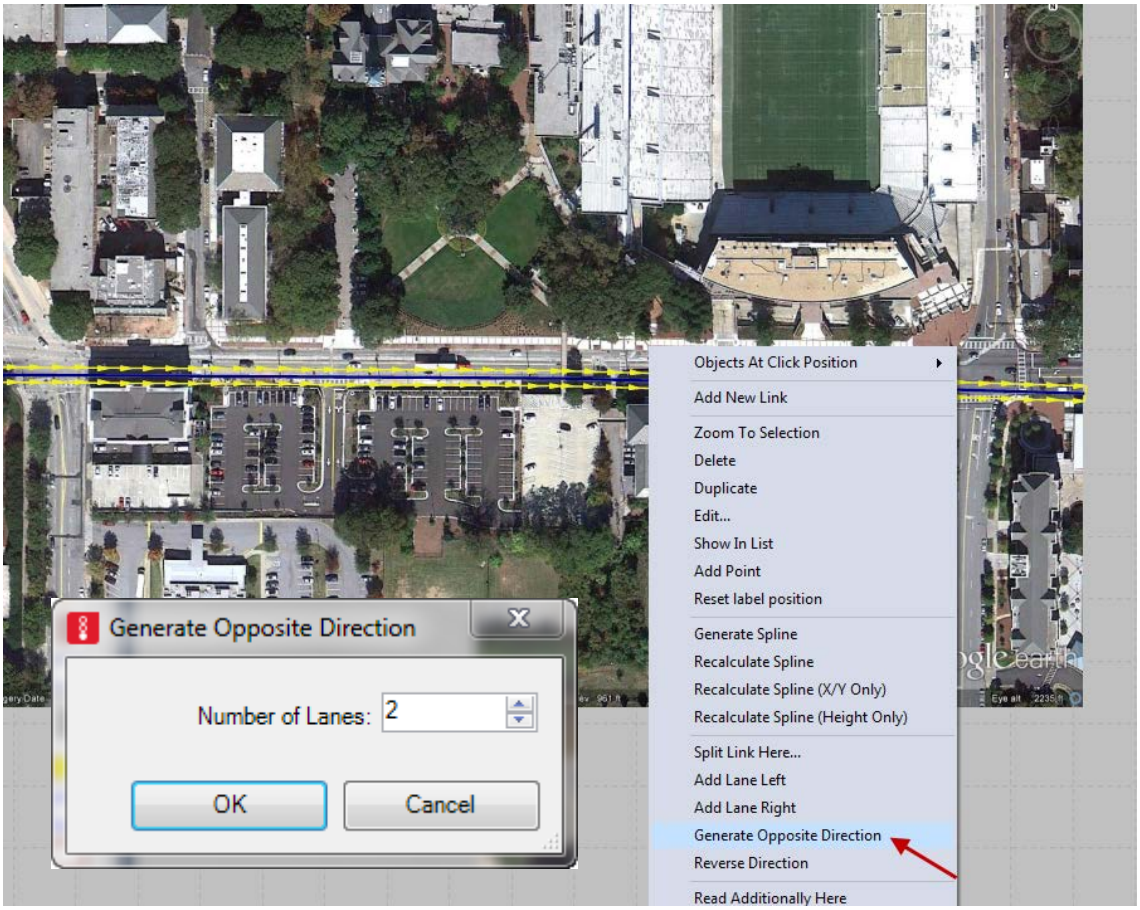
4. Right click on the link to create moveable points.



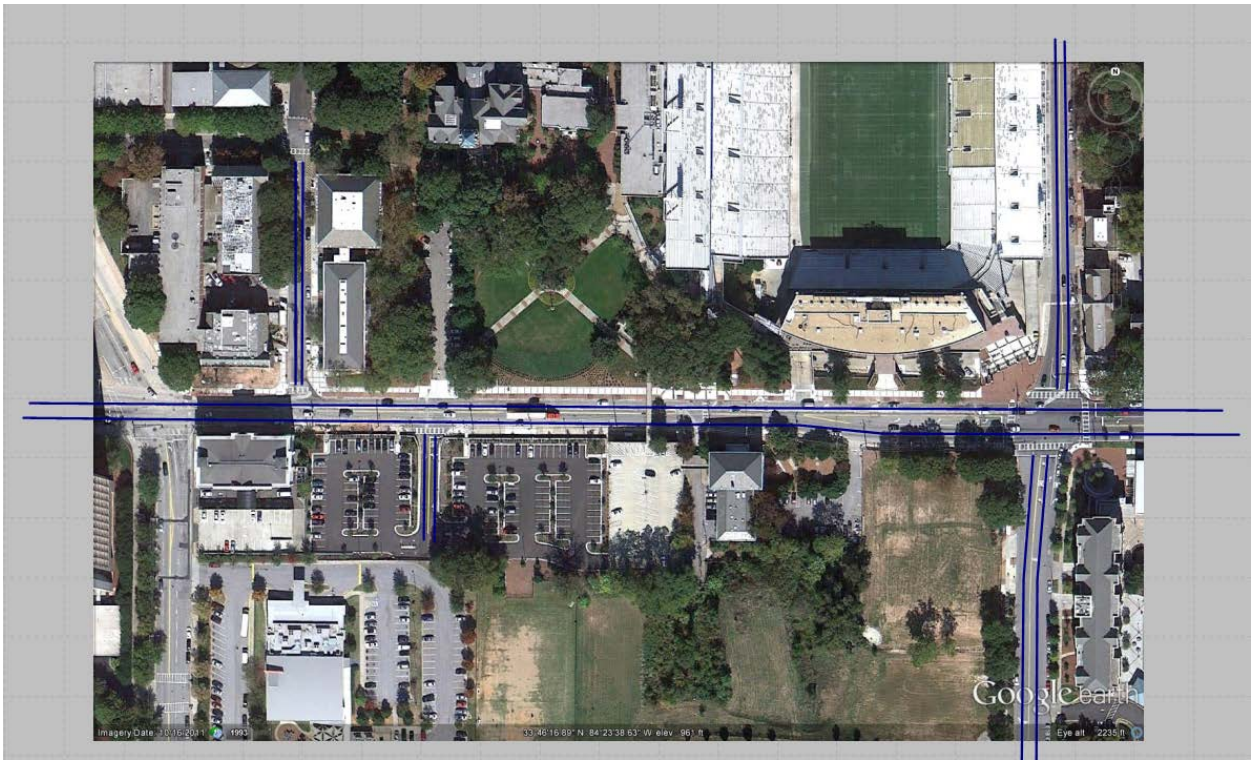
5. Left click and drag the point to follow the alignment



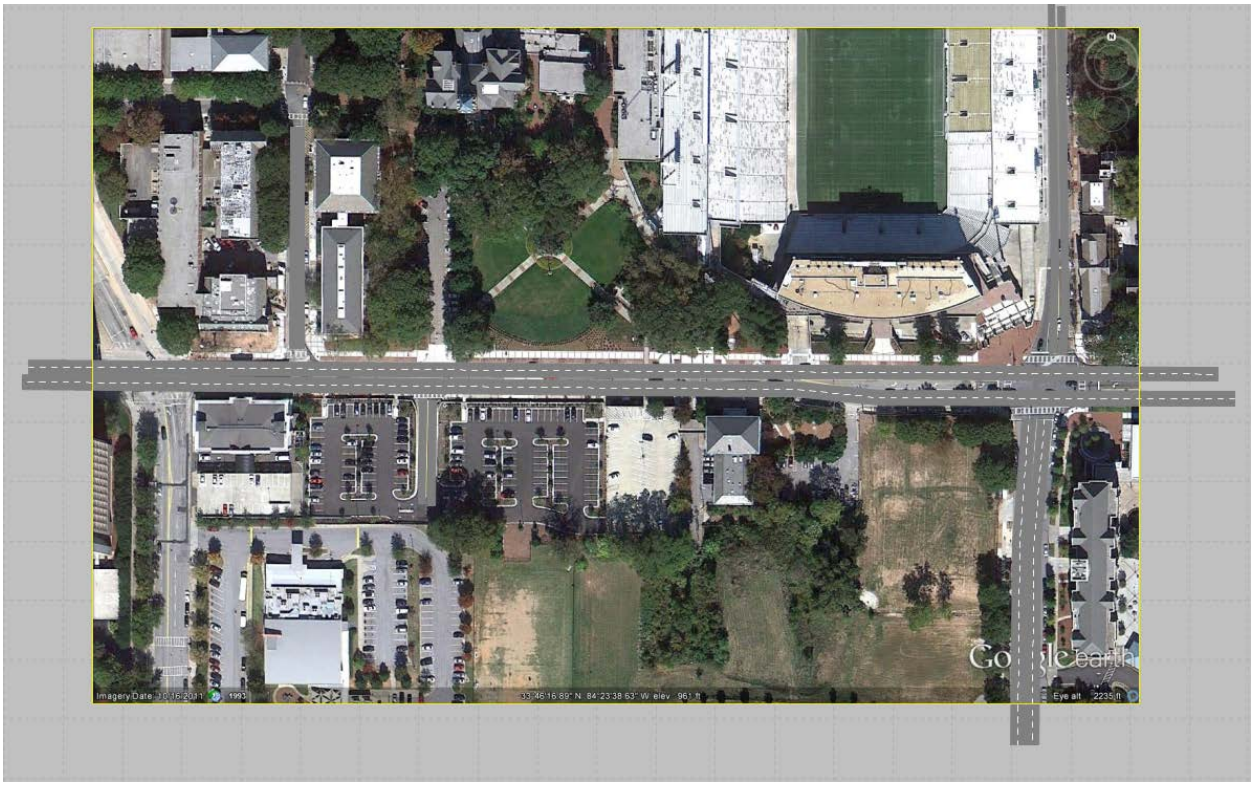
6. *NOTE*: *Copy link in the opposite direction*
    a. Press **Ctrl** + Right click on the link and select **Generate Opposite** Direction
    b. Select **Number of lanes**



7. Repeat to recreate the entire network to be modeled. (break side streets at the mainline)

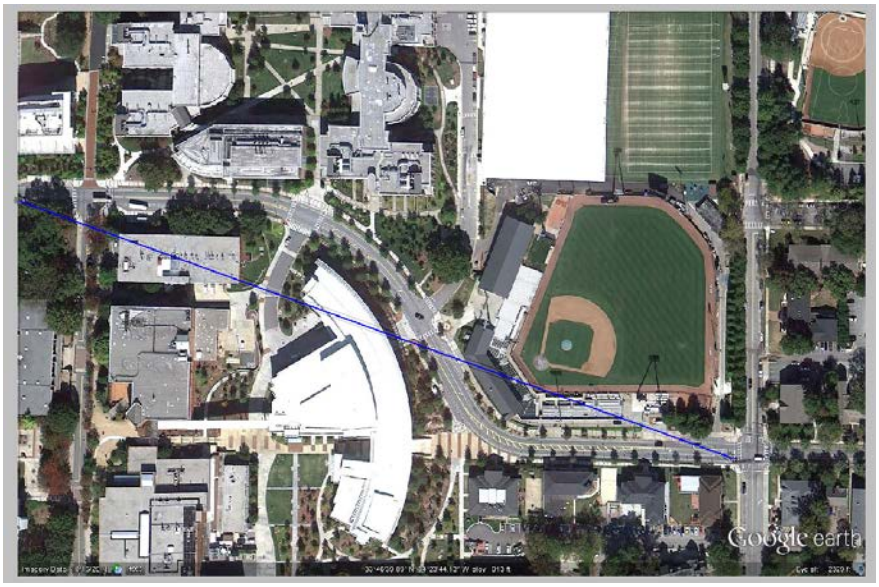


*CTRL + A will change the link view from centerline (above) to lane (below)

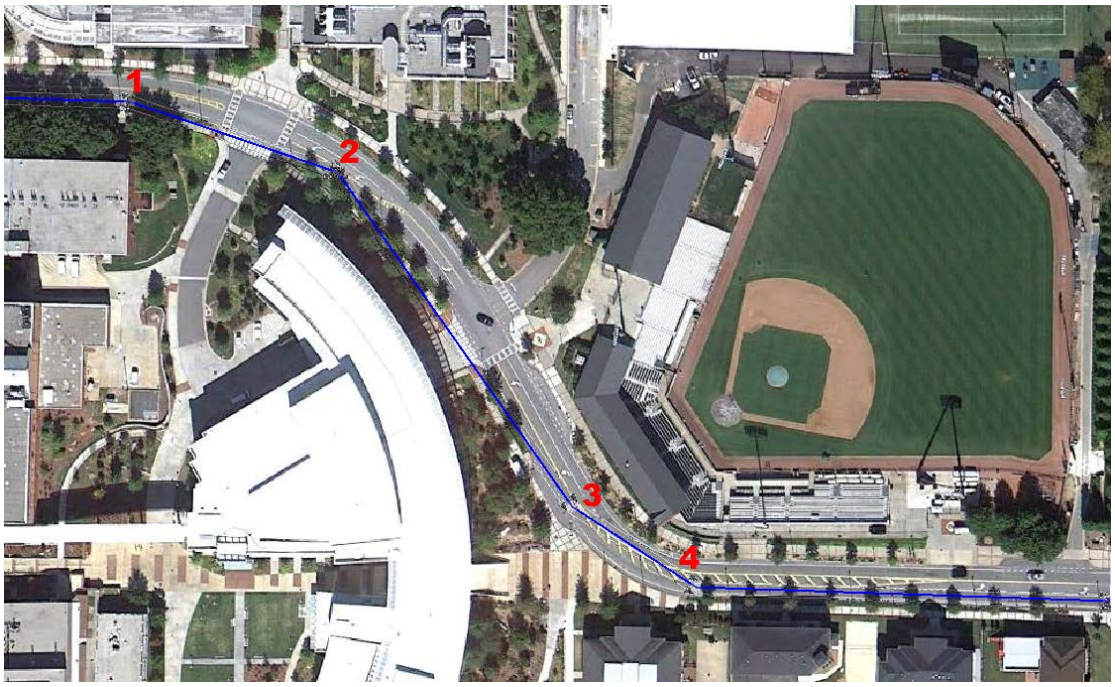


Create a curve:

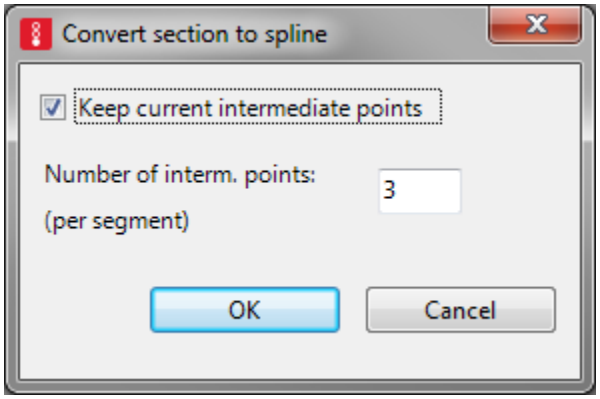
1. Draw a line that closely follows the alignment
    a. Draw a straight line for begin to end.



    b. Right click to add four additional points (one before and after each curve)



2. Hold **Alt**+ left click and drag from inside of Point 1 (be careful not to select the point itself), along the link and release just before Point 2. This box will appear.



3. Enter the number of points desire d (the higher the number of points the smoother the curve)

4. The curve is created

5. Select individual points to smooth out the curve if need. Or repeat the process from step 1.

Lesson 3: Draw connectors

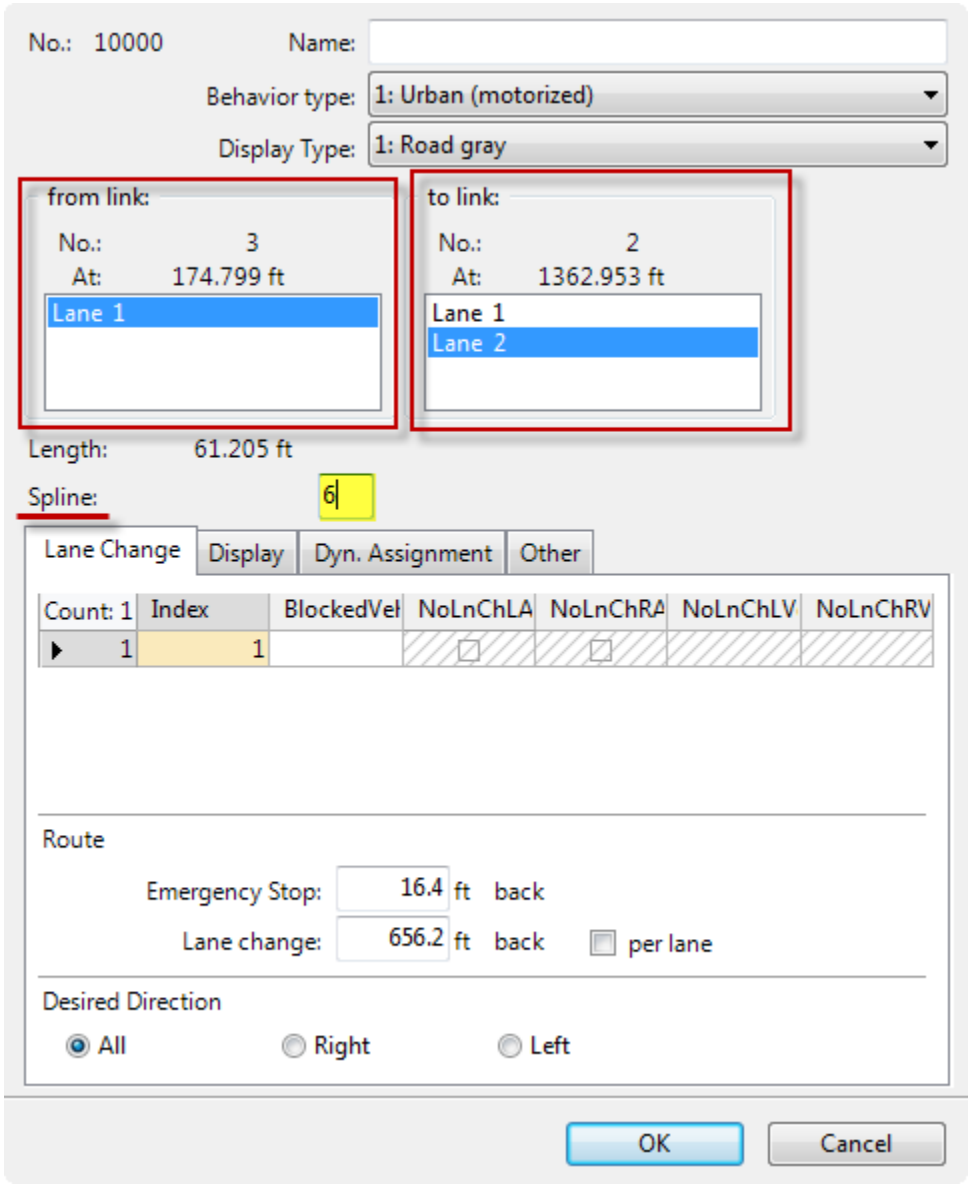
(*connectors are used for turn movements or transitions from one link to another*)

1. Select **Links** in the **Network Objects** menu

2. Zoom in around the parking lot off of North Ave. / Techwood Dr. intersection.

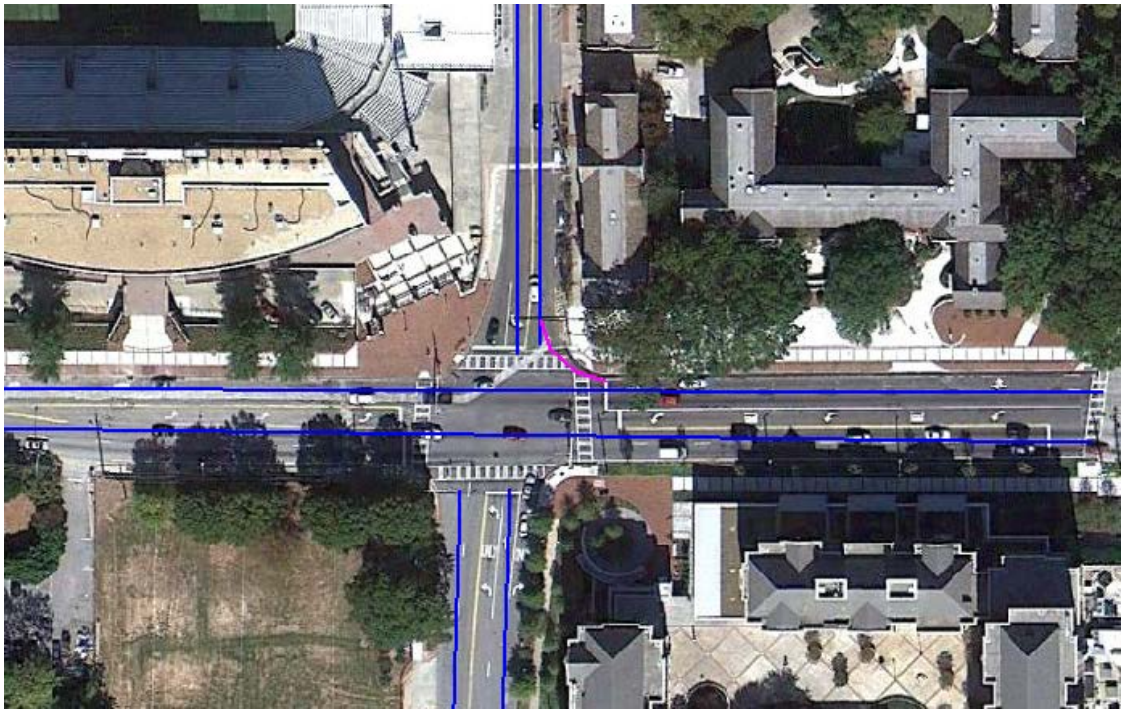
3. Right click on the exit lane of the parking lot and hold + drag to the westbound lane of North Ave creating a left turn movement. A pink link will appear. (*if it is blue, delete and redraw*)

4. Complete **connector** window
    a. Select the **from** and **to** link lane (lane 1 is the outside lane)
    b. Enter the number of points for **Spline** (curvature)
    (3-5 for right turns, 4-8 left turns)
    c. Click **OK**



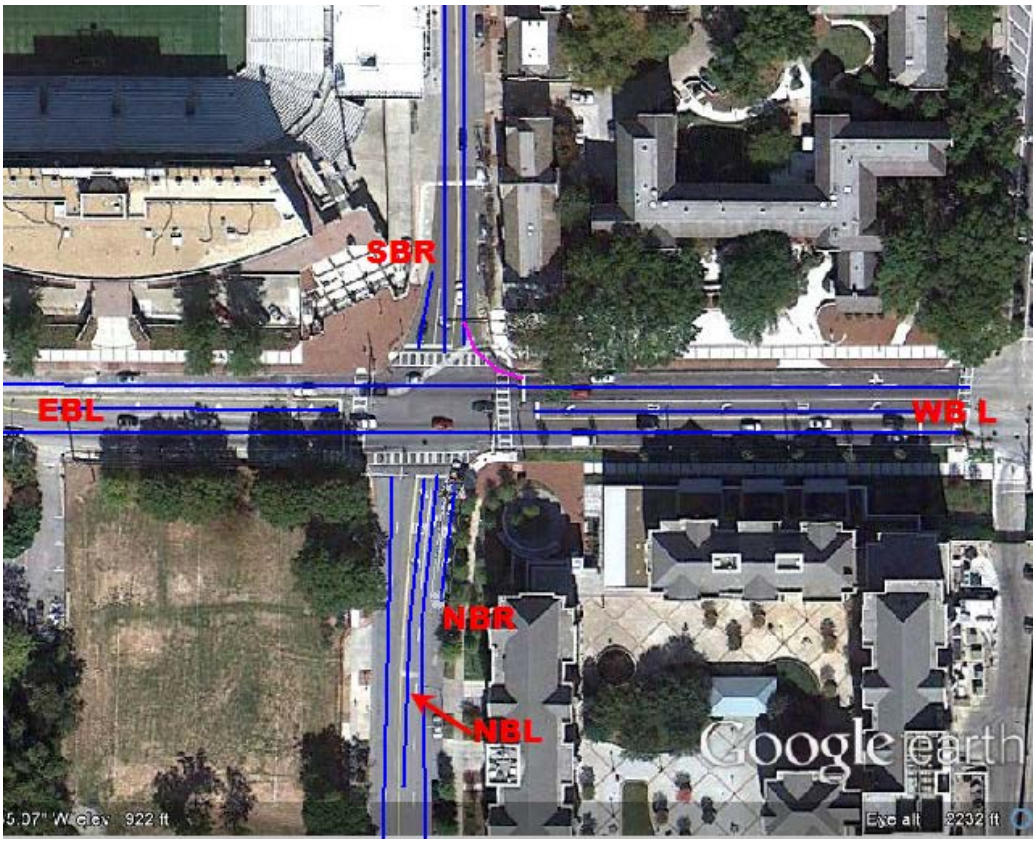
5. Repeat for all the turn movements

Add turn lanes

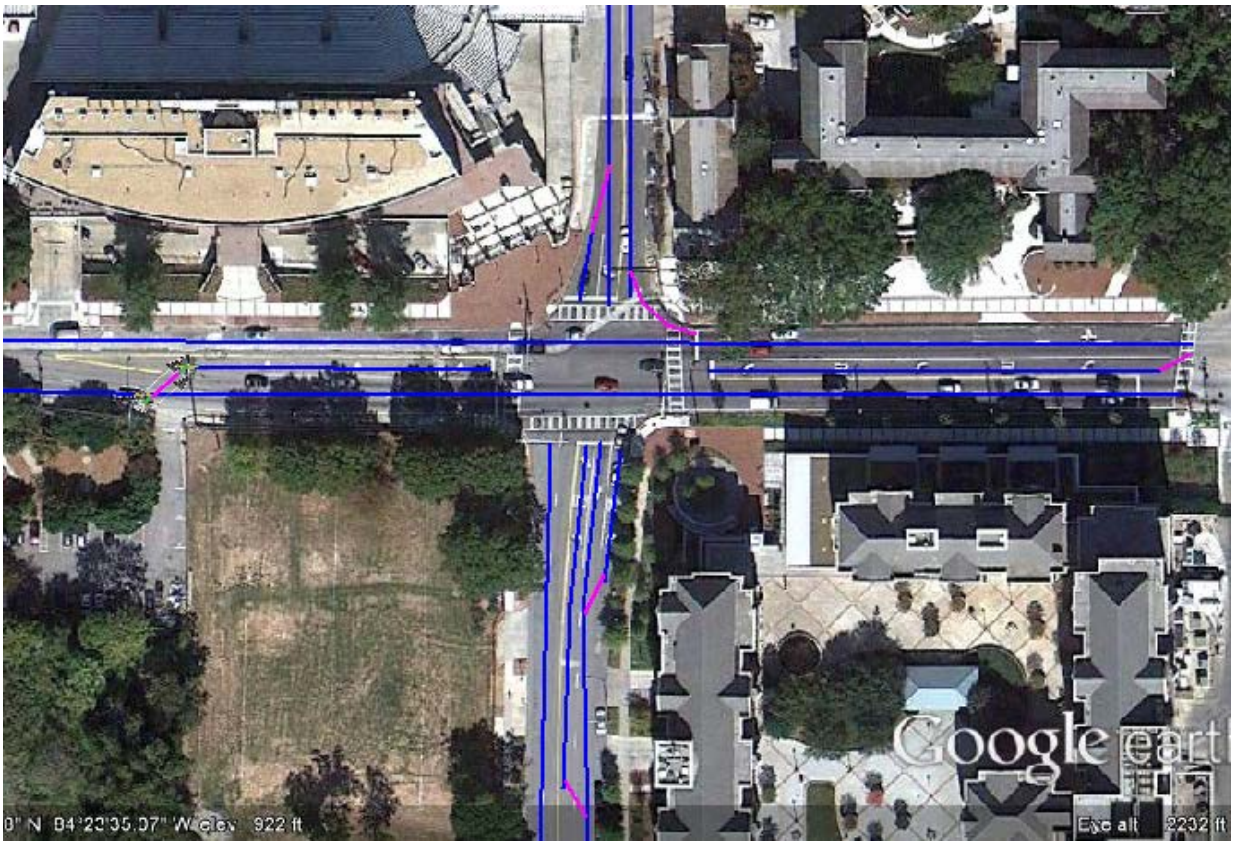


In this example turn lanes are needed for the WB left turn, SB right turn, EB Left turn and NB left and right turns.

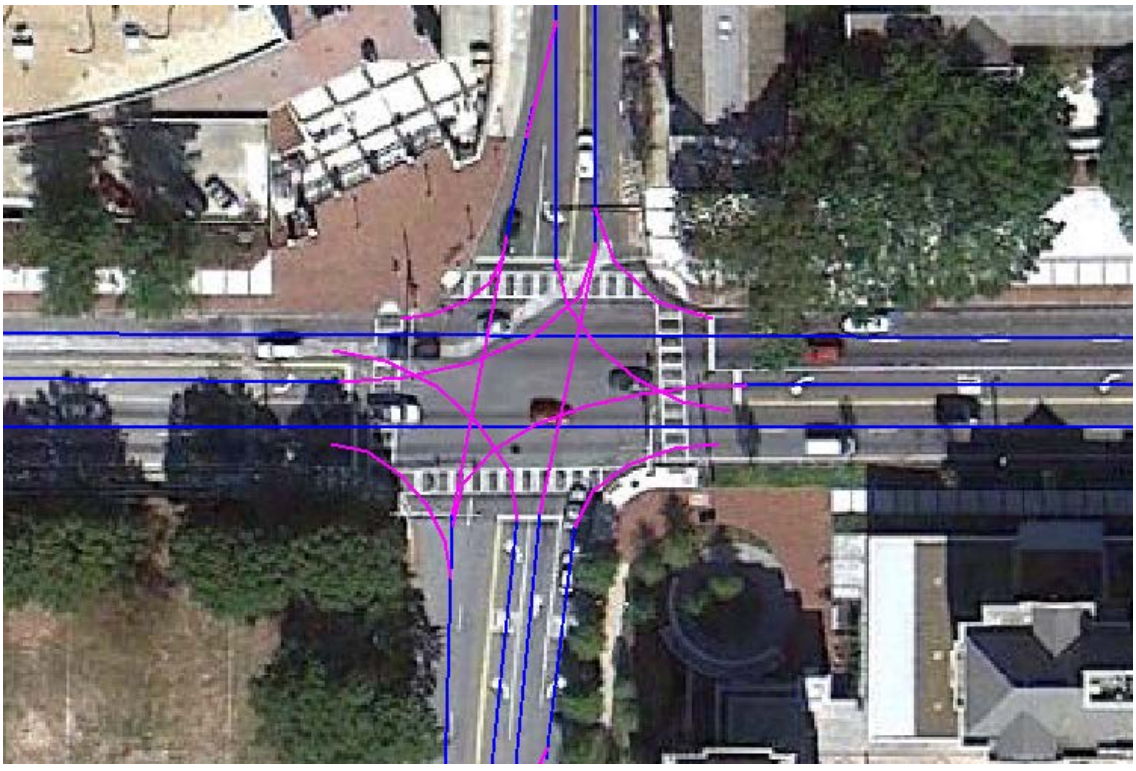
1. Create a separate link for the turn bays.



2. Connect the through lanes to turn bays with connectors



3. Now you can add the connectors for the turn movements for the intersection



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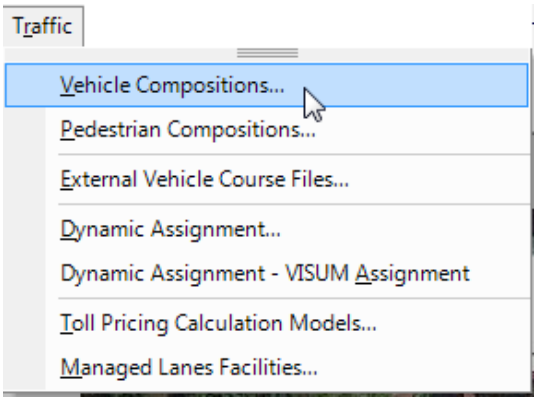
Section 3:

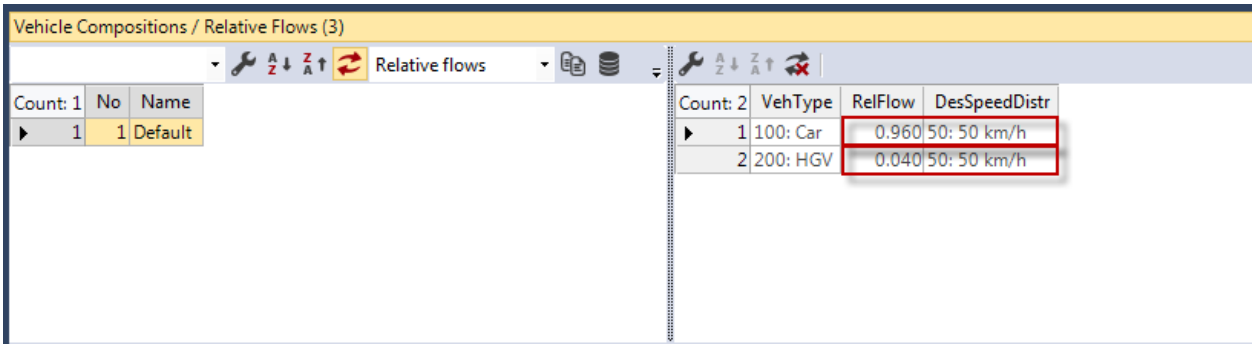
Add Vehicles

Lesson 1: Enter Vehicle Composition (% Heavy Vehicles and desired speed)

1. Go to **Traffic>Vehicle compositions**

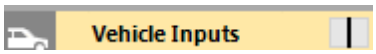


2. Change the **Rel. flow** (relative flow) for Cars to 0.960 (the percentage of cars). Change the **desired speed** (this shows in km/h)
   Repeat for **HGV**. Change **Rel. flow** to 0.040 (truck percentage). Check **desired speed.**

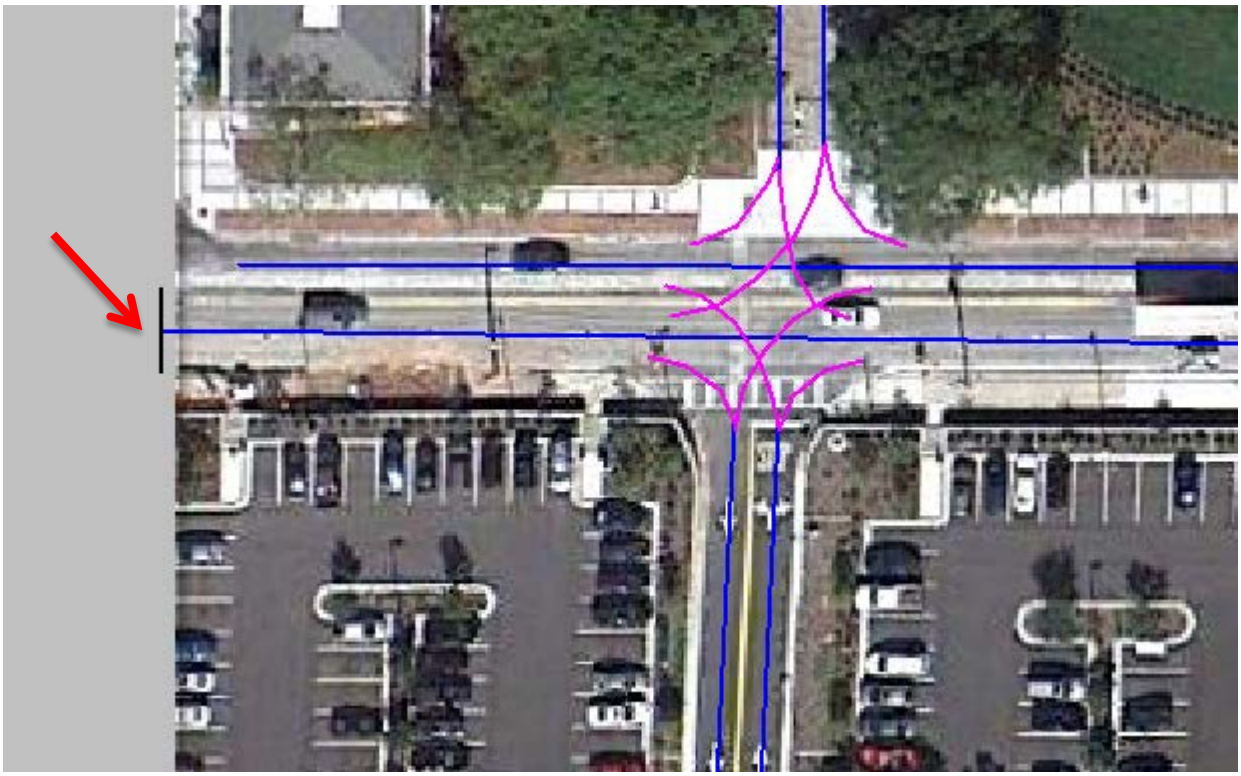


Lesson 2: Enter Entry Volume

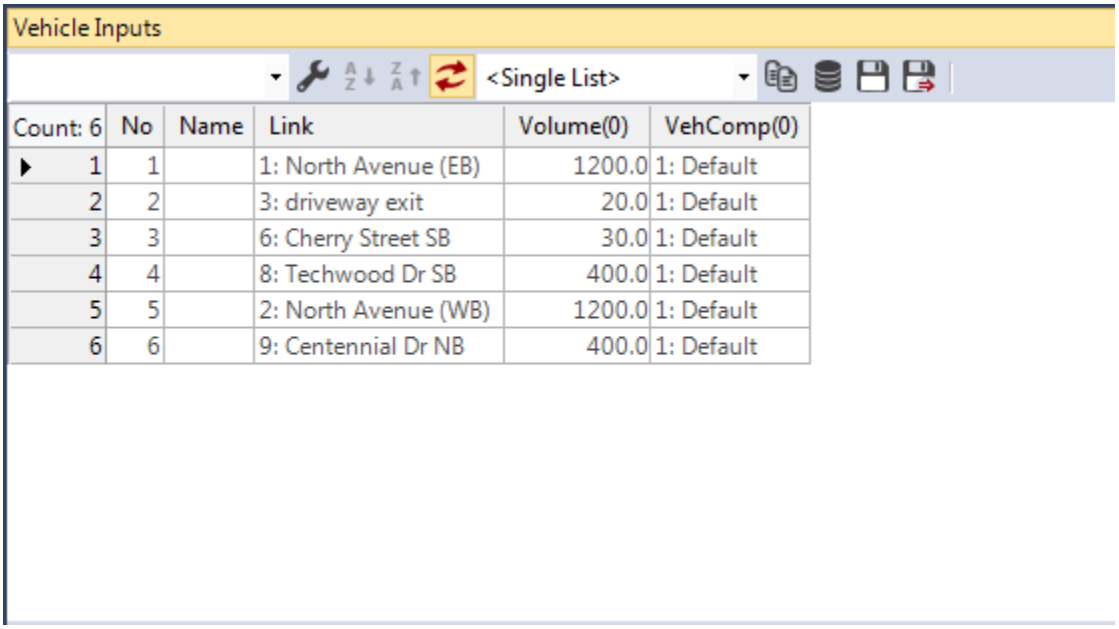
Vehicle inputs are to be added ONLY at the entry lanes of the network. They do not control turn movemets but simply place cars on the system.

1. Right click **Vehicle Inputs** 

2. Right click on a link near the entry point *(a black line will appear)*



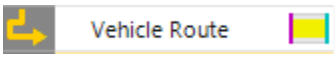
3. Ctrl+right click on the input and select show in list to view the Veh**hicle Inputs** window
    a. Enter the **Volume**



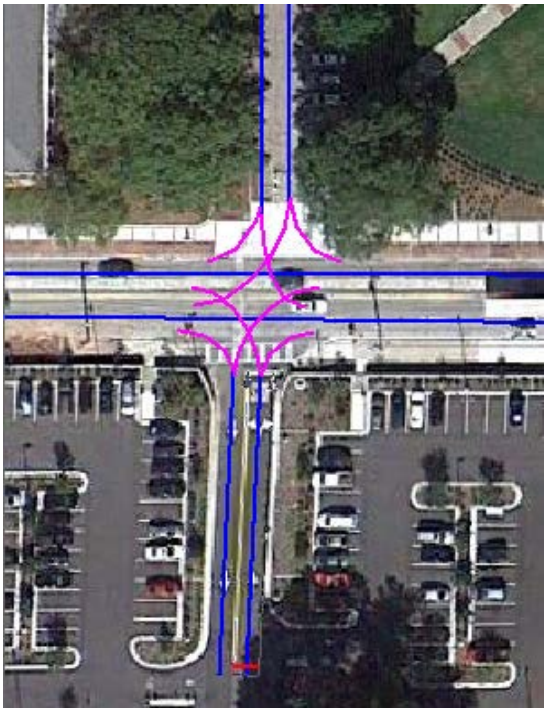
Count: 6	No	Name	Link	Volume(0)	VehComp(0)
1	1		1: North Avenue (EB)	1200.0	1: Default
2	2		3: driveway exit	20.0	1: Default
3	3		6: Cherry Street SB	30.0	1: Default
4	4		8: Techwood Dr SB	400.0	1: Default
5	5		2: North Avenue (WB)	1200.0	1: Default
6	6		9: Centennial Dr NB	400.0	1: Default

4. Repeat for every entry link (1 each for each entry to the system)

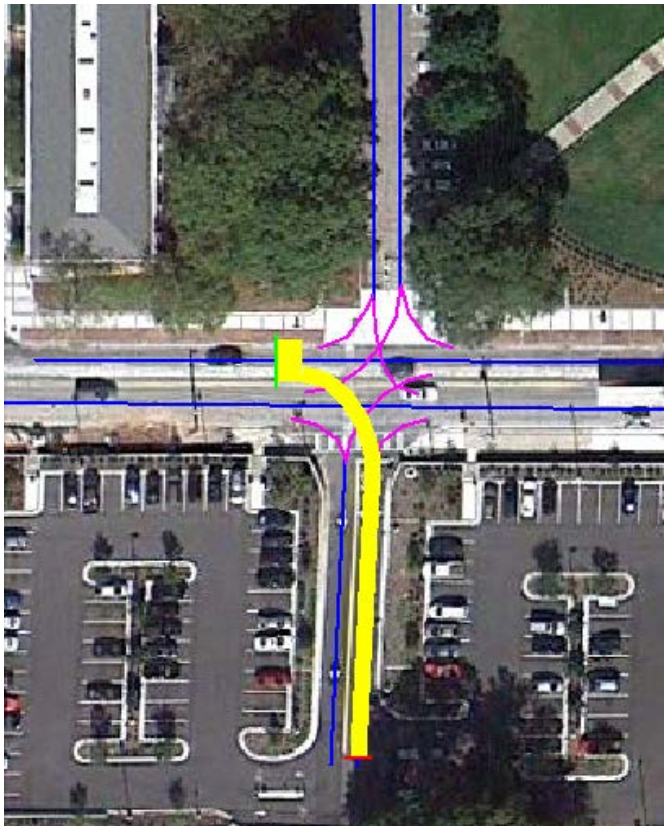
Lesson 3: Enter Route Decisions (turn movements)

1. Right click on the **Vehicle Routes** 

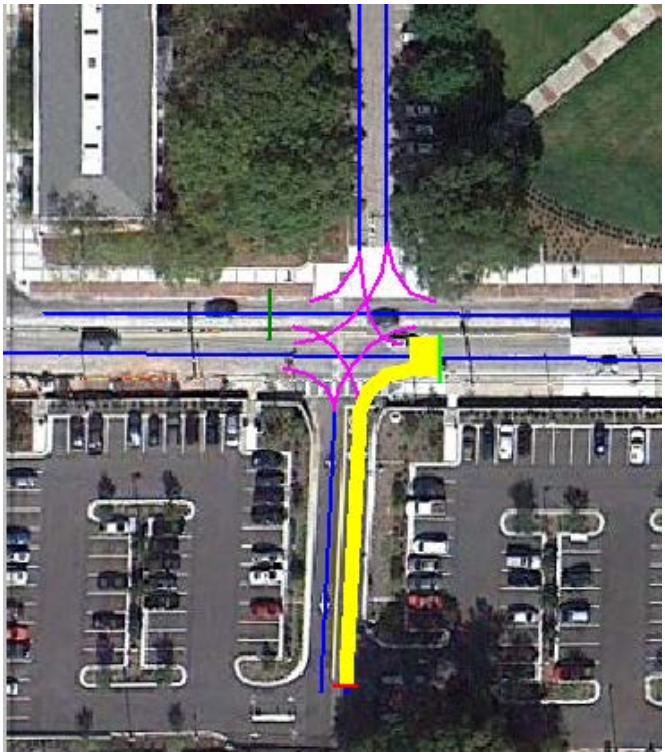
2. Select S**how List > Static**
3. Right click on the desired link to place the beginning of the route. *(appears as magenta line)*



4. Drag your cursor to highlight the desired path/movement (ex. Left turn) and left click. A cyan line will indicate the end of the route. The route is highlighted in yellow. DO NOT RIGHT CLICK



5. Repeat for the right turn movement (as well as any other movements) by left clicking.



6. Left click off of the link to complete that leg of an intersection.

7. Notice in that each **Decision No.** has a multiple Route Numbers. Each Route No. represents a turn movement. Enter the turn volume for each movement (Route No.) in the **RelFlow** column (*Notice the route will highlight in the background as you select a Route No.)*

Static Vehicle Routing Decisions / Static Vehicle Routes

Static vehicle routes

Count: 10	No	Name	Link	Pos	AllVehTypes	VehClasses
1	1		1: North Avenue (EB)	7.350	☑	
2	2		6: Cherry Street SB	3.402	☑	
3	3		2: North Avenue (WB)	1429.422	☑	
▶ 4	5		3: driveway exit	8.896	☑	
5	6		1: North Avenue (EB)	434.867	☑	
6	7		2: North Avenue (WB)	14.858	☑	
7	8		9: Centennial Dr NB	11.511	☑	
8	9		8: Techwood Dr SB	20.281	☑	
9	10		1: North Avenue (EB)	742.070	☑	
10	11		16	12.076	☑	

Count: 2	VehRoutDec	No	Name	DestLink	DestPos	RelFlow(0)
▶ 1	5	1		2: North	1418.821	10.000
2	5	2		1: North	721.826	10.000

8. Repeat this for every approach at each intersection.

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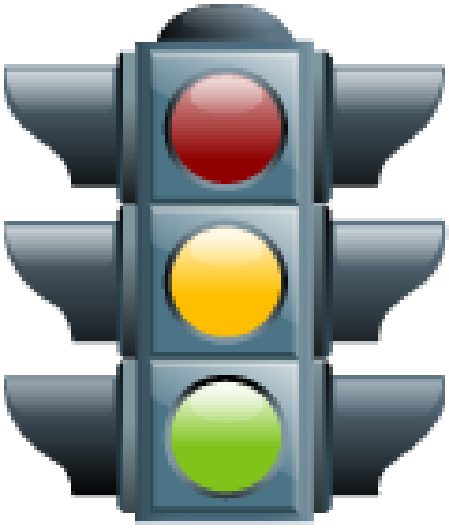
Section 4:

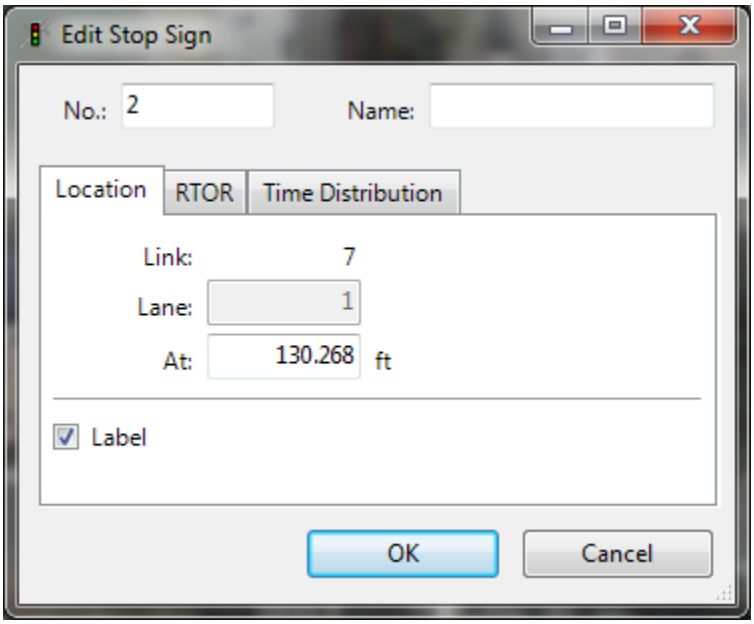
Add Controls



Lesson 1: Add Stop Control

Place stop sign

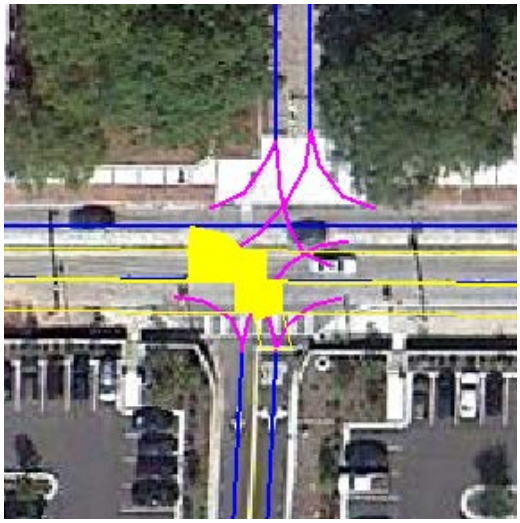
1. Select the **Stop Sign** Button
2. Left click the link you wish to add a stop control to select
3. Right click on the link (at the stop bar location) to place the stop sign.



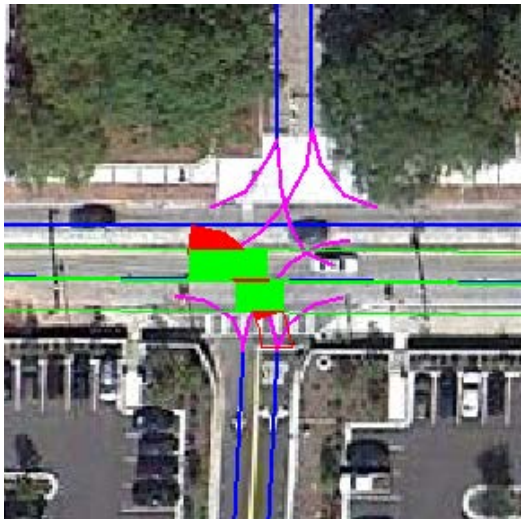
4. Click **OK**

Set conflict areas:

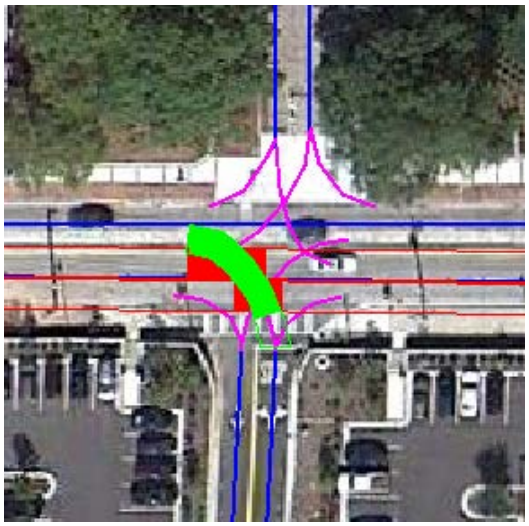
1. Select **Conflict Area** Button
2. Click on a conflict area. Let say the left turn from the parking lot onto North Ave.
3. The conflicting movements are now hightlighted in all yellow. Right click on the area to rotate through the priority options. The movement highlighted in green has the ROW while the movement in red has to yield/giveway to the green movement.



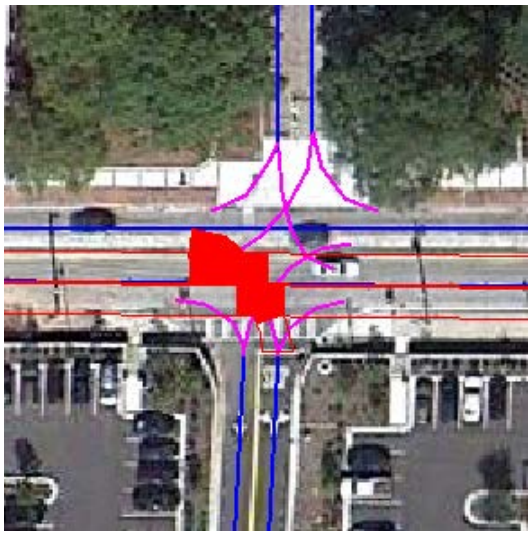
a. All movements yield



b. Left turners yield to thru movment



c. Thru movement yields to left turner



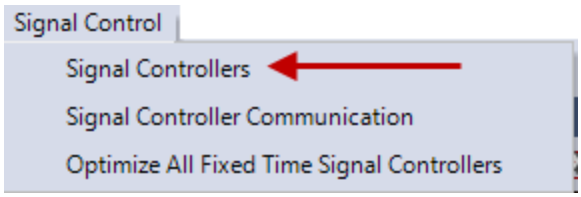
d. All movements yield

4. Select (b.) to reflect the stop control on the minor road.
5. Repeat for all conflicting movements (NBR & EBT, WBL & EBT, SBL & WBT, SBR & WBT, EBL & WBT)

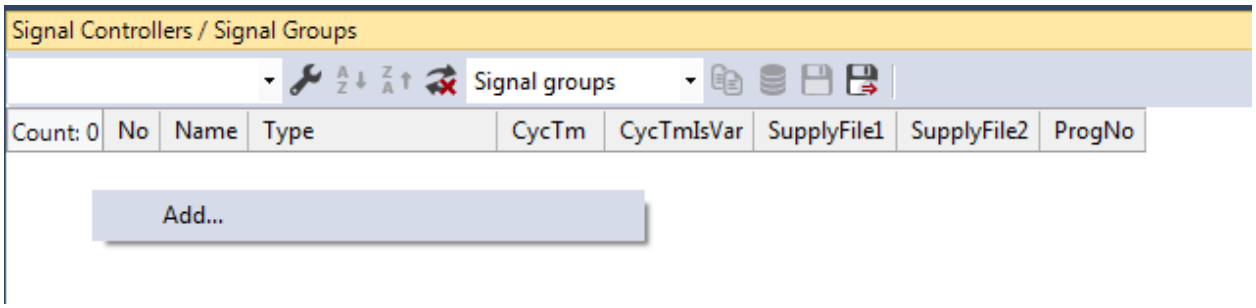
Lesson 2: Add Signal Control

Edit Controllers

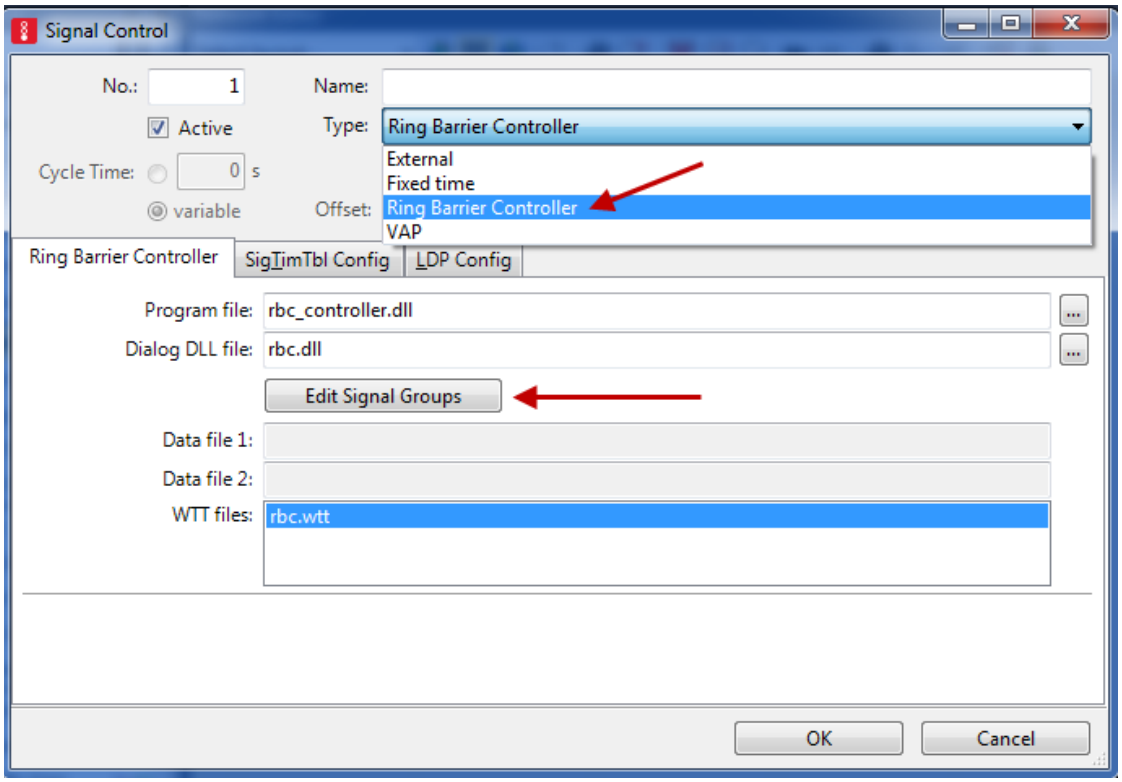
1. Click **Signal Control** on the Menu Bar and select **Signal Controllers** from the drop down menu



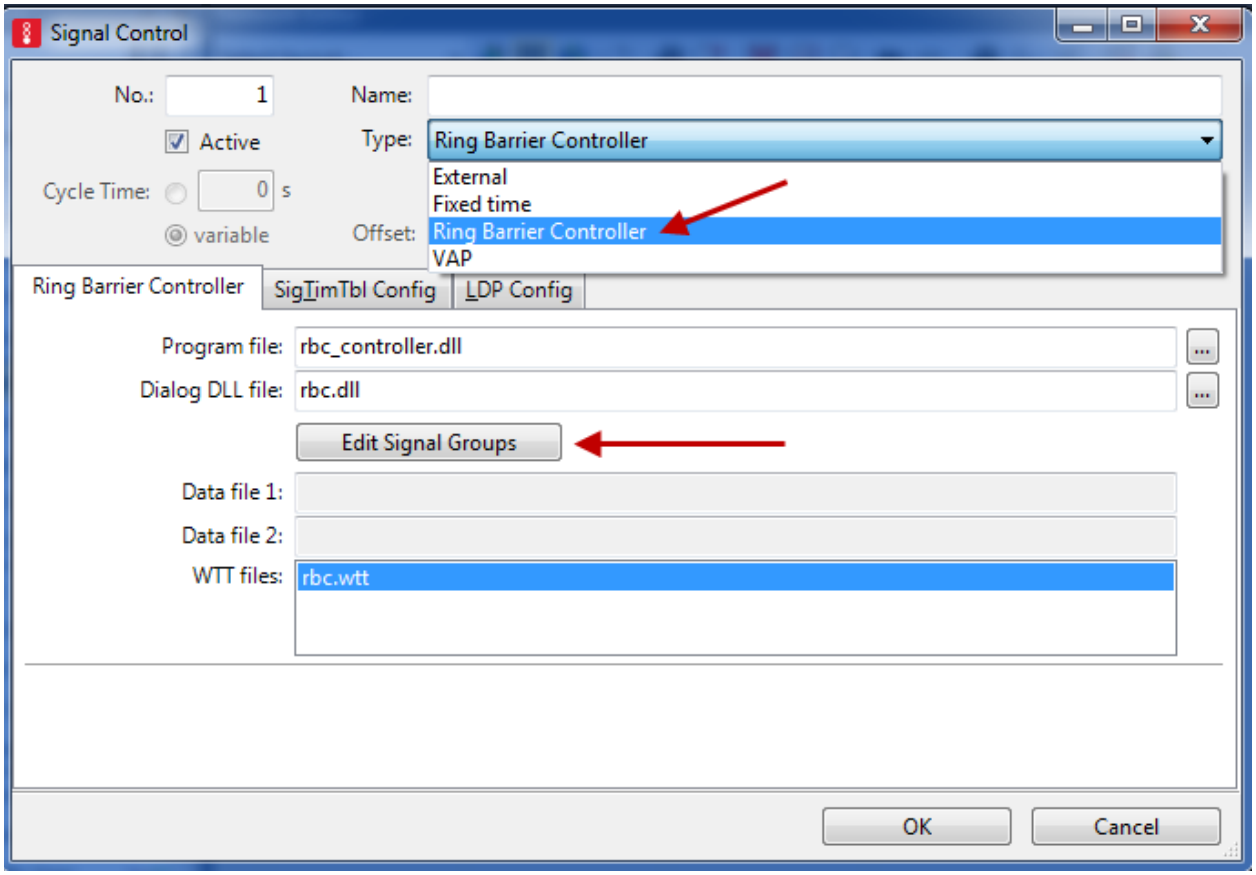
2. Right click in the bottom dialog box and click **add**



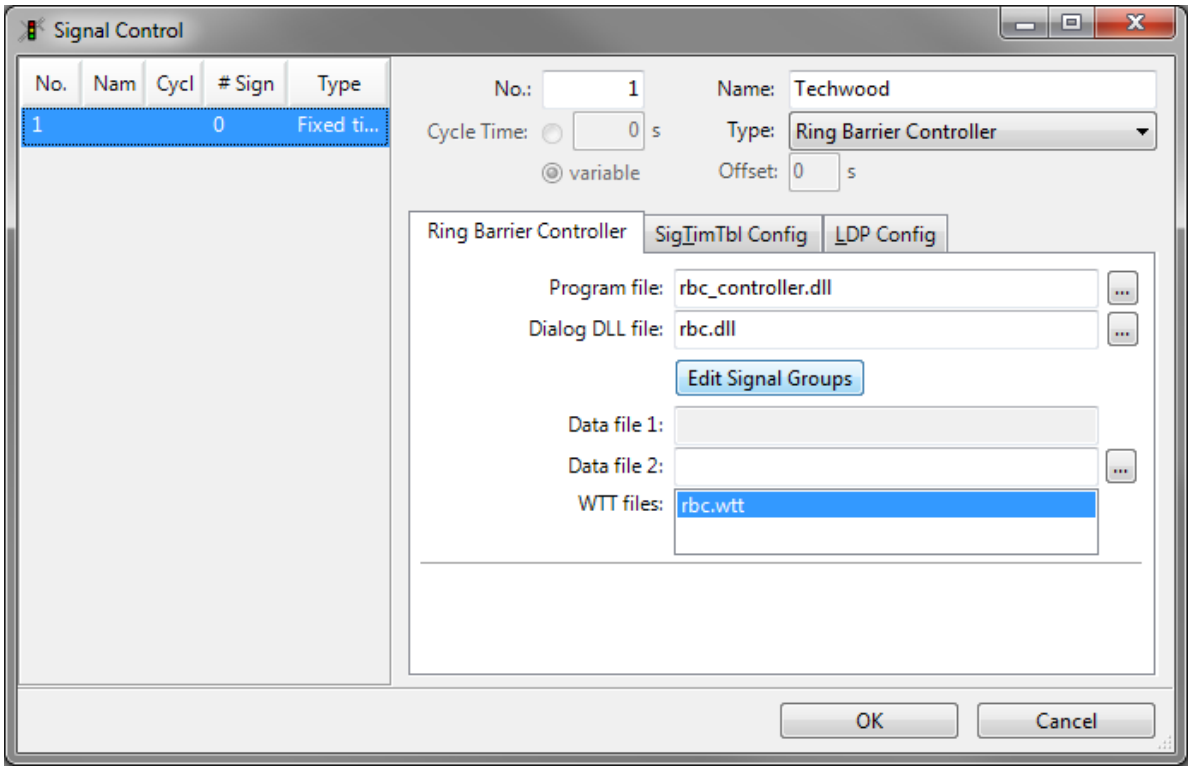
3. Select **Ring Barrier Controller** for the **Type** dropdown and then click **Edit Signal Groups**



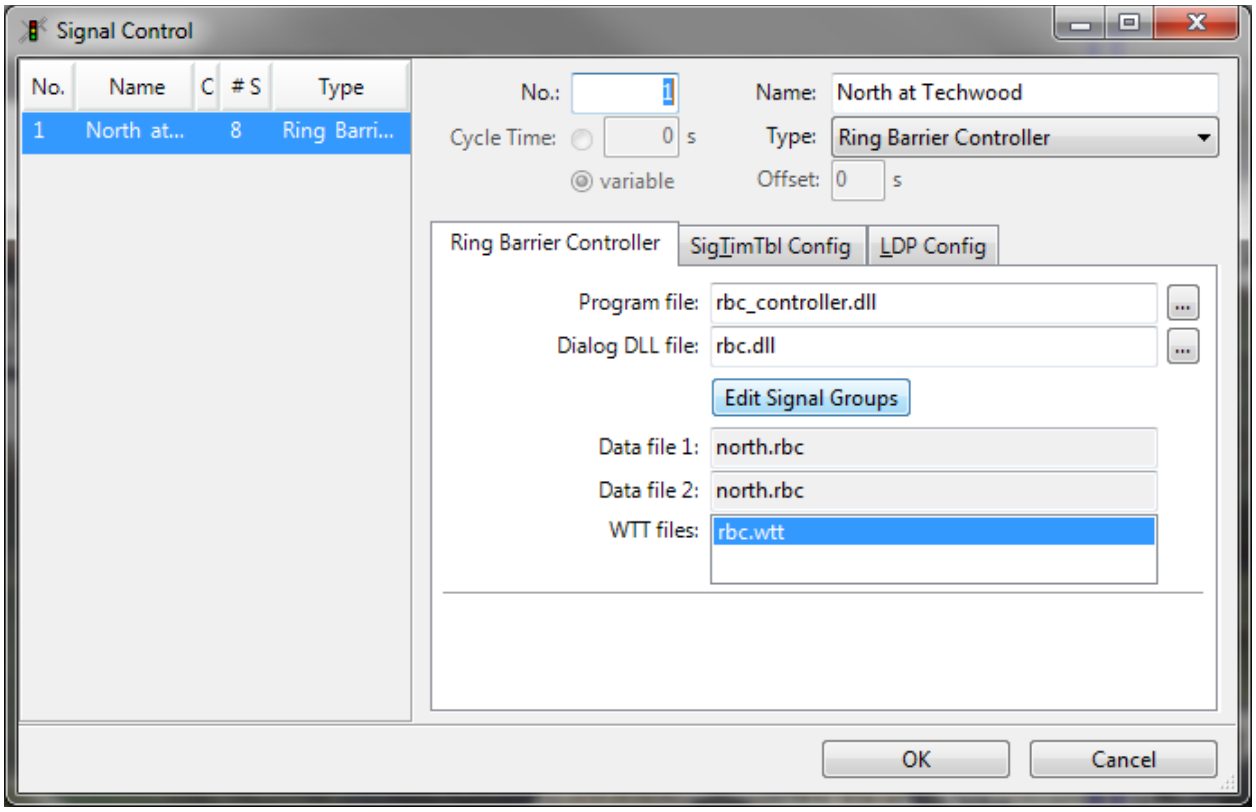
4. Right click in the **WTT files** and select A**dd**



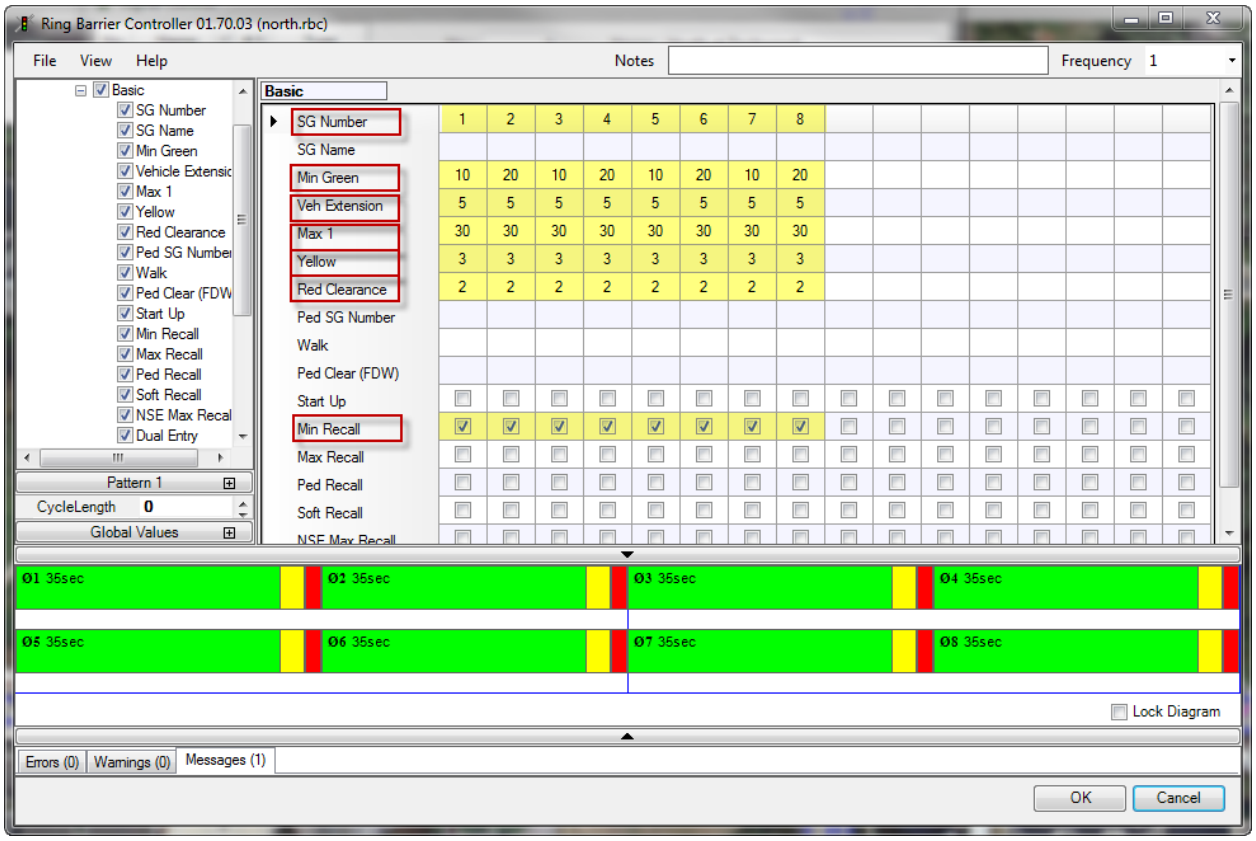
5. Go to the **Ring Barrier Controller** tab and click [...] button (next **to Data file 2**). Name the Signal Group



6. Select **Edit Signal Groups**


Signal Control
No.
Name
C
S
Type
1
North at...
8
Ring Barri...
No.:
1
Name:
North at Techwood
Cycle Time:
0
s
Type:
Ring Barrier Controller
variable
Offset:
0
s
Ring Barrier Controller
SigTimTbl Config
LDP Config
Program file:
rbc_controller.dll
Dialog DLL file:
rbc.dll
Edit Signal Groups
Data file 1:
north.rbc
Data file 2:
north.rbc
WTT files:
rbc.wtt
OK
Cancel

7. Complete the **Basic** portion of the **Ring Barrier Controller** Window



a. **SG Number**= the signal group number is used to create signal heads. (i.e. you will need a SG number for every signal phase)
   - Minimum of , maximum of 8 (for a standard 4 legged intersection)

b. **Min Green**= the minimum green time that the signal group will serve before changing to yellow. In the absence of any extension, the signal group will serve this minimum green time before it is eligible to terminate. This value is also used during offset seeking as a minimum value that the controller can display for the signal group. If this value is set artificially too high, the controller will take longer to get back into coordination and could possibly prevent the controller from getting back into coordination (if you set the min green equal to max green).

c. **Veh Extension** = The allowed time between successful vehicle extensions before a signal group will gap out. If the signal group Time To Reduce parameter is non-zero, this allowed gap between vehicles will be reduced according to volume/density timing defined for the signal group. Volume/density timing parameters are described in Base Timing, Advanced.

d. **Max 1**= the maximum time that the signal group will be allowed to extend before it will max-out. A max-out will make a signal group eligible to terminate, even though it may not have gapped-out. Normally, the maximum green timer will not begin counting until an opposing call to the signal group is present. An exception to this rule is when the signal group is a flagged as a Max Recall signal group, in which case the maximum green timer will

begin counting as soon as the signal group changes to green. Max 1 is the default maximum green time for each signal group.

e. **Yellow** = The time a signal group will time a yellow interval before advancing to red. This time cannot be abbreviated by any operation.

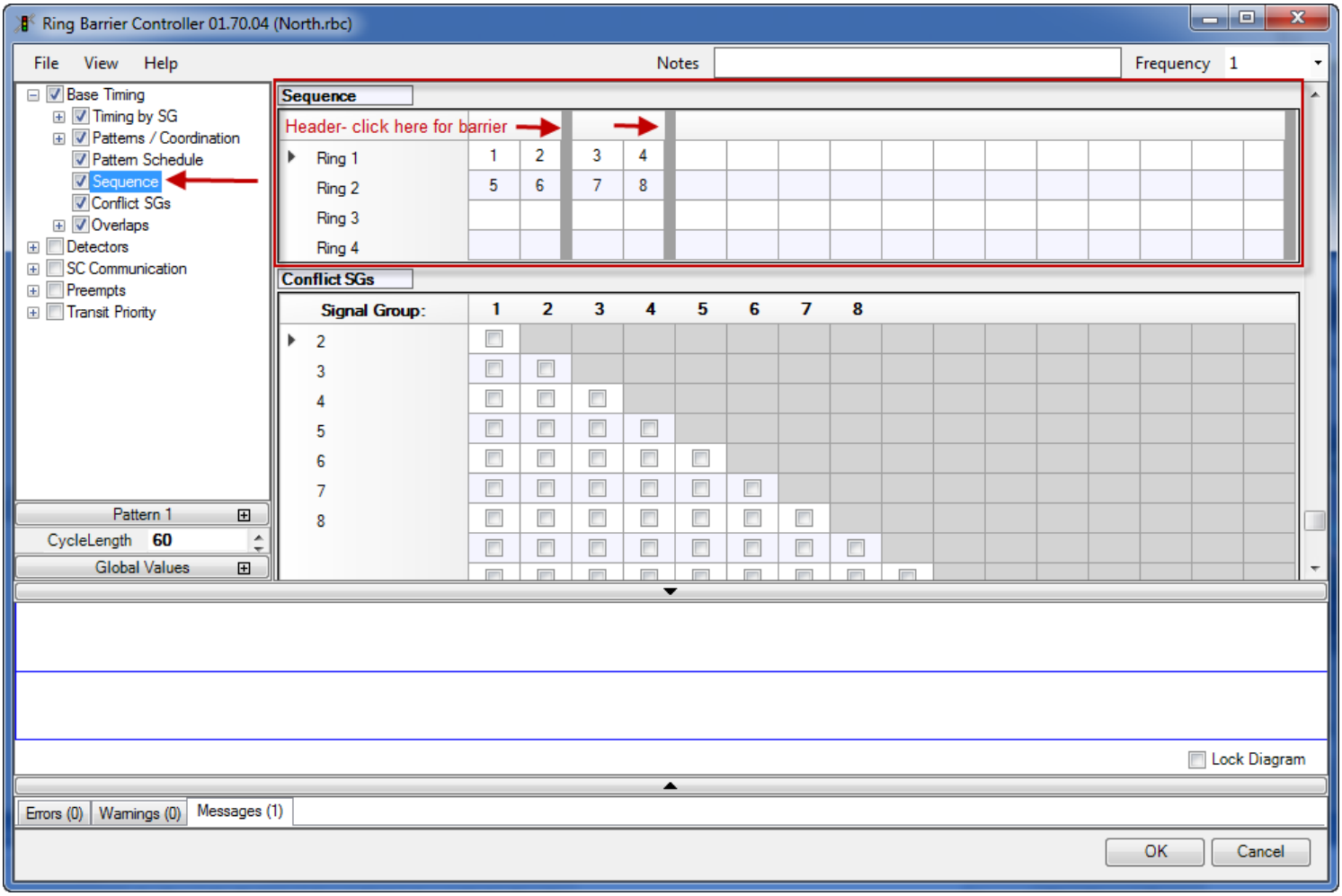
$$y = 1.0 + \frac{1.47 * V}{(20 + 64.4g)}$$ where V is the approach speed (mph)

f. **Red clearance** = The time a signal group will time red before a conflicting signal group will be allowed to begin timing

$$R = \frac{W + 20}{1.47 * V}$$ where W = width of the stop line to far side no-conflict point (ft) and V = speed of vehicle, mph

g. **Min Recall**=Signal groups flagged for this option will receive an automatic vehicle call when they are not green.

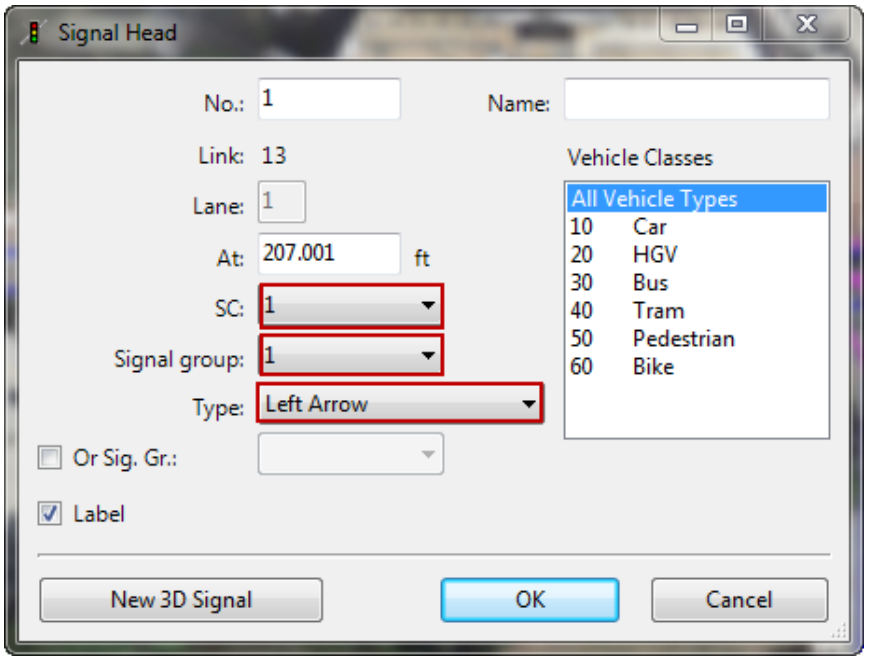
8. Complete the **Sequence** portion of the **Ring Barrier Controller** Window
    a. Sequnce is in the left drop down under base timing.
    b. For Ring 1 enter 1, 2, 3, 4 and for Ring 2 enter 5, 6, 7, 8
    c. Add the barrier between 2&3 and after 4 by hovering over the header until you see a +/- symbol then double click. Double click again to remove



For more information on the RBC controller please refer to the Manual_RBC file which can be found in your C: drive under Program Files(x86)>PTV Vision> Doc>Eng

Place Signal Heads

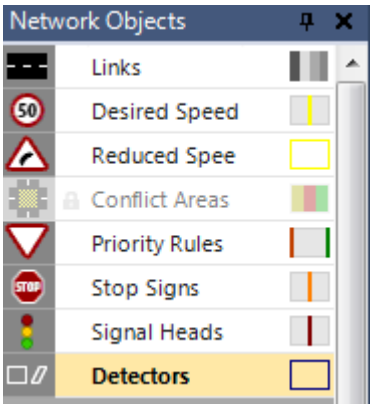
1. Select the **Signal Heads** Button
2. Left click to select the link you wish to add a signal head
3. Right click on the link (at the stop line) to place the signal head.



   a. **SC** (Signal Controller) = match to the controller number you set previously
   b. **Signal Group** = match to the signal group (or phase) from the Ring Barrier Control Window
   c. **Type** = left arrow, right arrow, circular (ball)
4. Repeat for all lanes

Place Dectetors

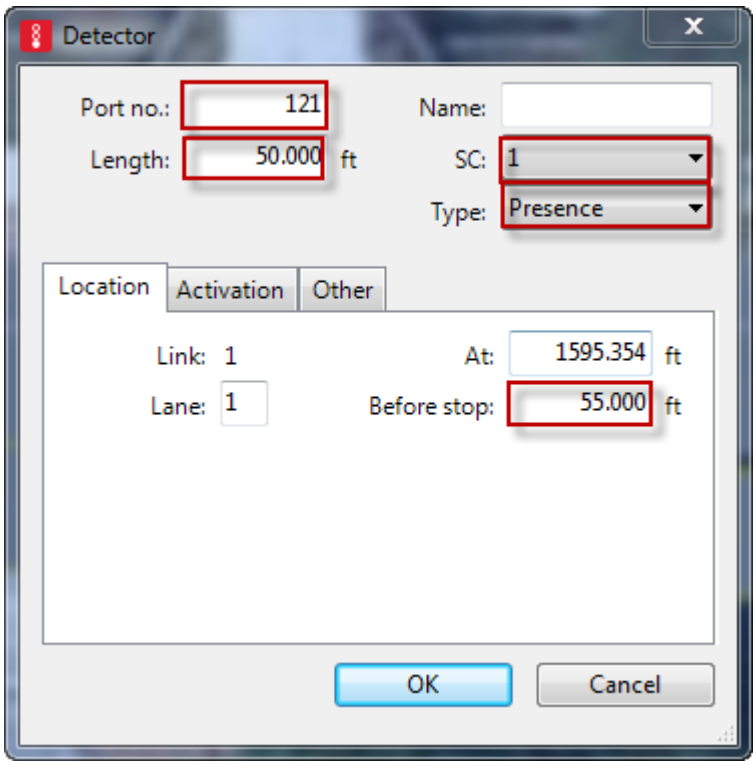
1. Highlight dectors from the side menu bar



2. Right click behind the stop bar of the lane you which to place the connector drag and then release.

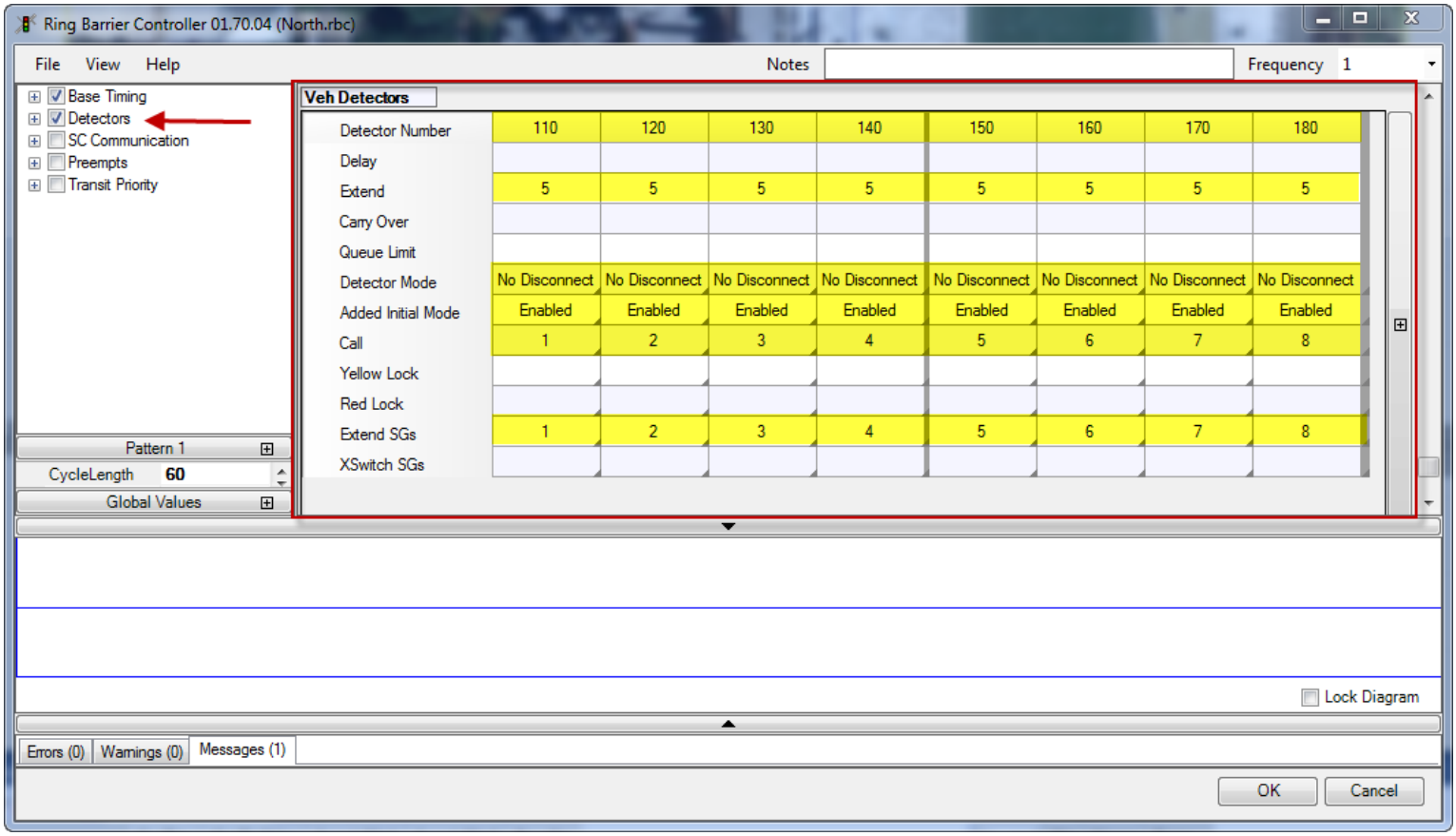
3. Complete the dector window

a) Port No. Any number (a good way to keep track is to use a three digit number where the first digit = SC number, the second digit =the phase number, and the last digit= lane number)
   The last digit can also be 0 if both lanes in a approach allow the same movement, ie 2 thru lanes
b) Length: 50ft long
c) SC: the corresponding signal controller number
d) Type: presence
e) Before stop = 55ft



Add Dectetors to RBC controllers

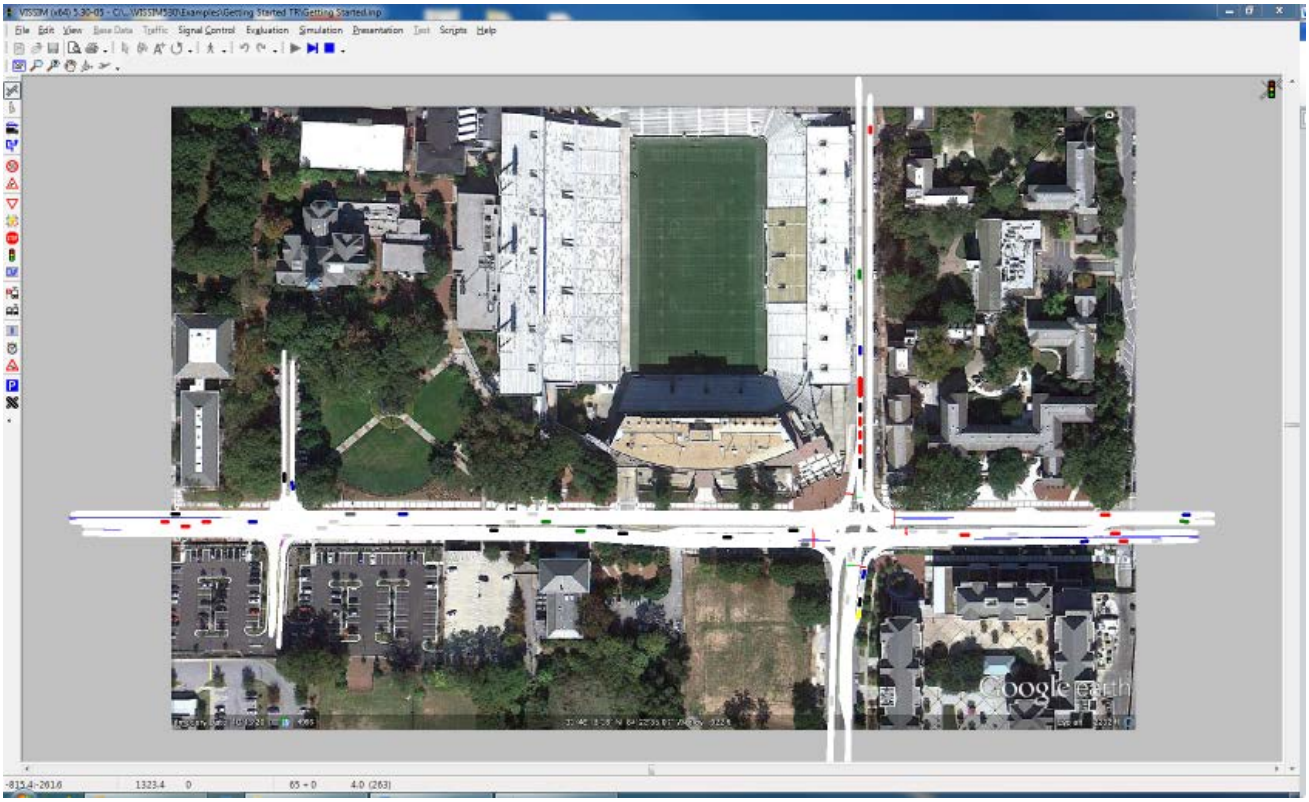
1. Return to the window select **Signal Control** from the top menu and the Signal Controller window will display at the bottom of the screen. Right click on the controller you need to edit and select Edit Signal Groups from the pop up window
2. Complete the **Veh Detectors** portion of the **RBC Controller window**
    - **a.** Detector numbers: enter the detector numbers you've created. Add the barriers at the appropriate location
    - **b.** Extend: enter in seconds how long the green should be extended once a vehicle is detector past the minimum green time.
    - **c.** Detector mode: no disconnect
    - **d.** Added Initial Mode: enabled
    - **e.** Call: enter the signal group to be called when that detectors senses a vehicle
    - **f.** Extend SGs: enter the signal group to be extended when that detectors senses a vehicle



For more information on the RBC controller please refer to the Manual_RBC file which can be found in your C: drive under Program Files(x86)>PTV Vision> Doc>Eng

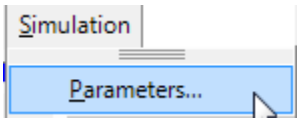
Section 4:

Run Simulation

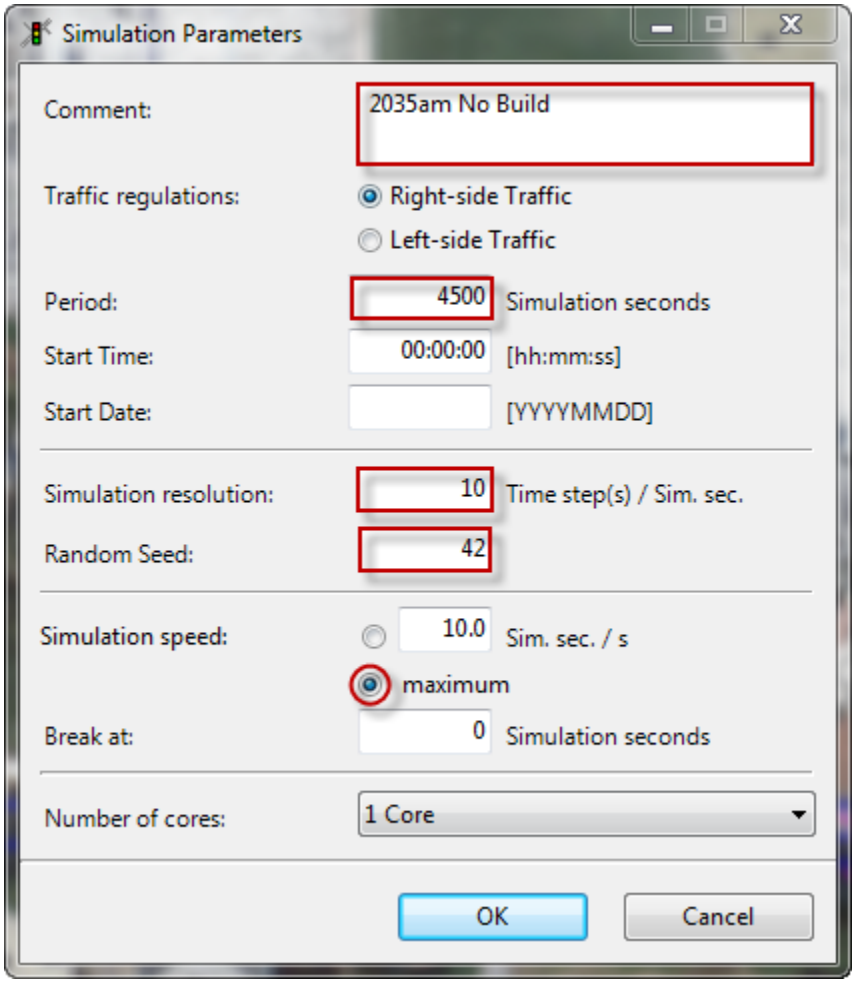


Lesson 1: Set Simulation Parameters

1. Select **Simulation** from the menu bar and go to **Parameters**



2. Set parameters



a. **Comment** = The comment line is stored in the input file and included in both printouts of the network and in output files.
   - Enter a description.

b. **Period** = The period of time to be simulated. Including initialization period.
   - Use a minimum of 4500s (15 minutes to fill up the system then 1 hr of simulation)

c. **Simulation resolution** = The number of times the vehicle's position will be calculated within one simulated second (range 1 to 10). The higher the value the smoother the simulation
   - Use a value between 5- 10

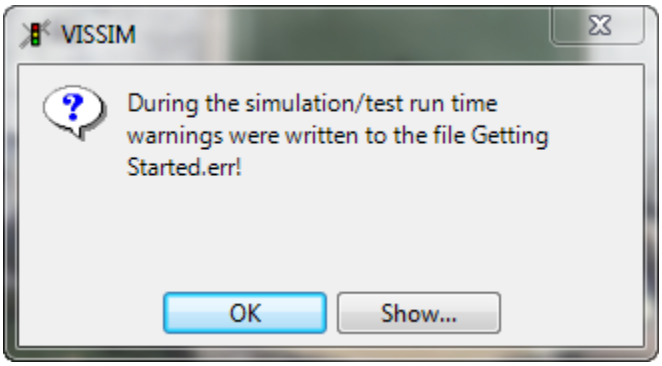
d. **Random Seed** = Simulation runs with identical input files and random seeds generate identical results. For meaningful results it is recommended to determine the arithmetic mean based on the results of multiple simulation runs with different random seed settings.
    - Use a different number to produce 3-5 runs per alternative
e. **Simulation Speed** = The number of simulation seconds to a real time second.
    - maximum

Run the Simulation:

1. Click **Play**
2. The simulation will run

Warnings

If there are any warnings in the simulation the following window will appear



Select Show to view the warnings

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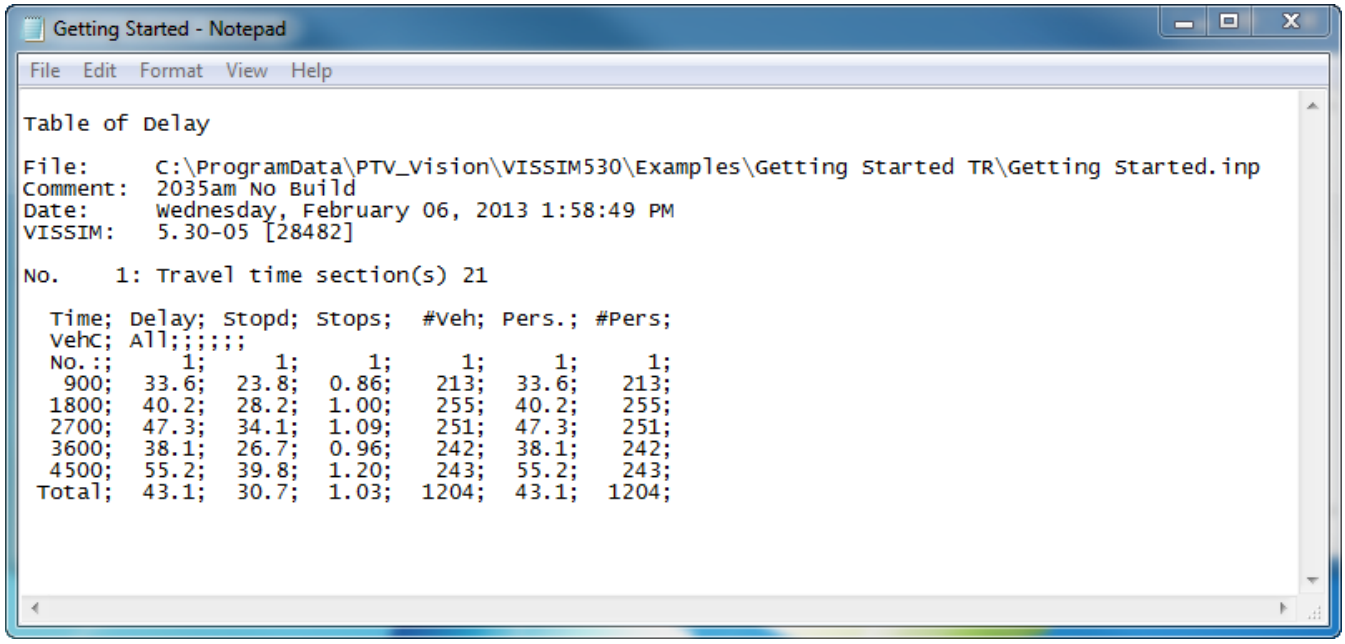
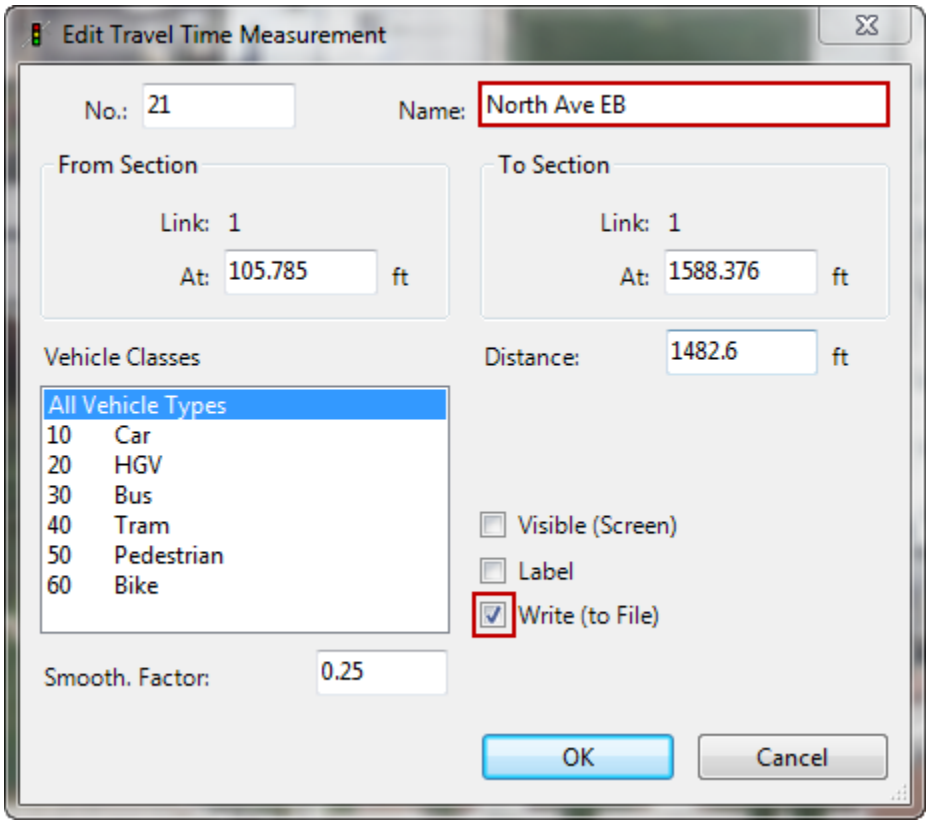
Section 5:

Output Data



Lesson 1: Collect Travel Time and Delay Output Data

1. Decide where to analyze the travel time
2. Select **Travel Time Sections** Icon
3. Left click on the starting link of the travel time section to select
4. Right click at the exact start point to place start line
5. Right click at the exact end point to place travel time end line
6. Complete the **Travel Time Measurement** window

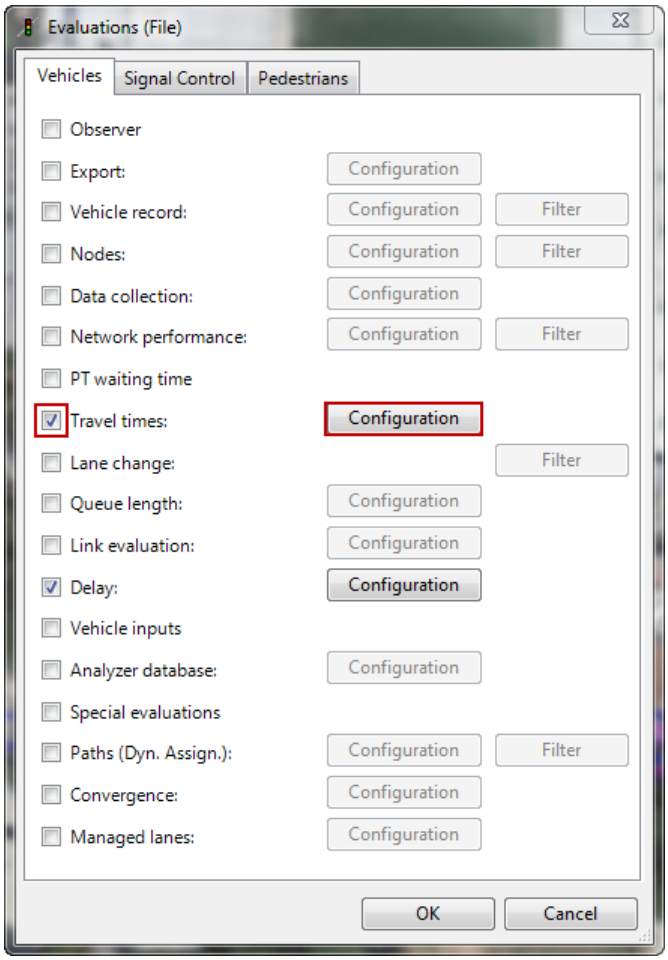


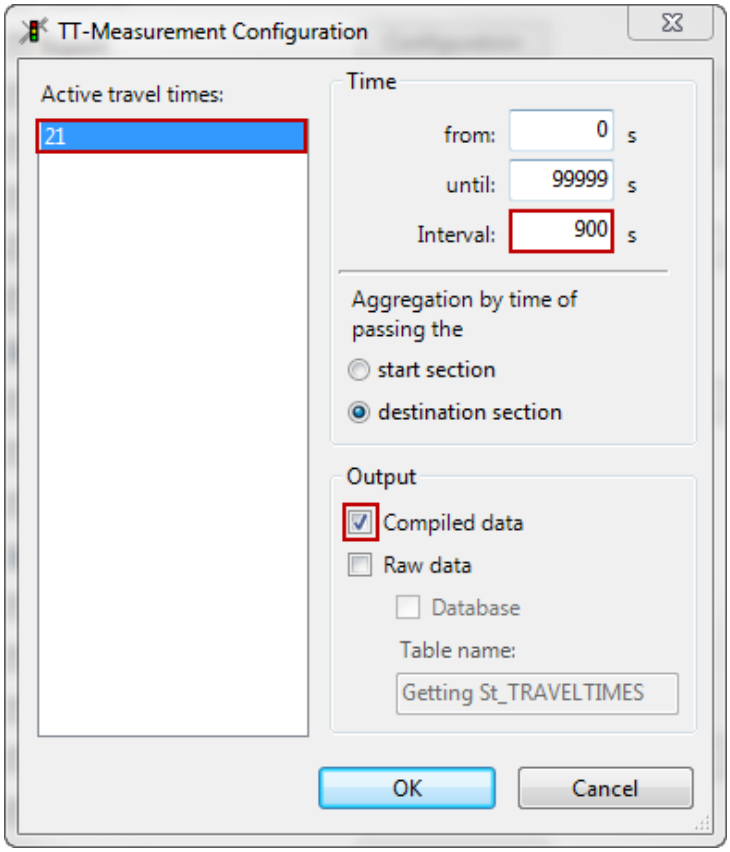
   a. Add a name for this roadway section
   b. Select only the **Write (to file)** box
7. Click OK

Lesson 2: Configure Travel Time Measurement

1. Select **Evaluation**> **File** from the main menu
2. In the vehicles tab check the box for **Travel Times**
3. Click the **configuration** button
   a. **Active travel times** - Select the travel time sections (set in previous lesson)
   b. **Time** – select the time frame and interval to collect the data
   c. **Output** – select compiled data

4. Click **OK**

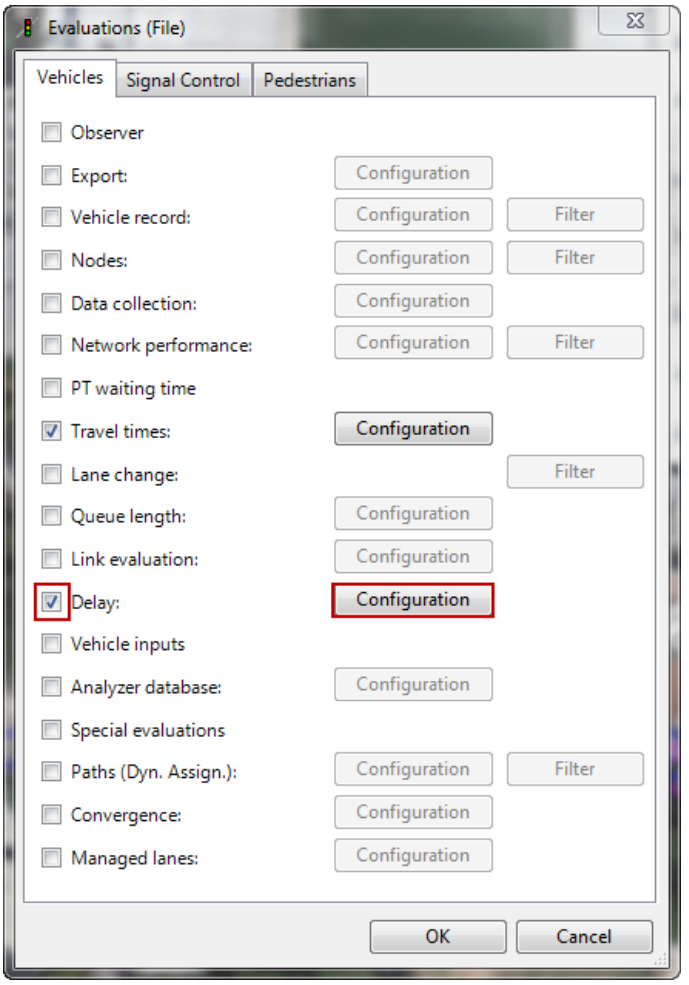


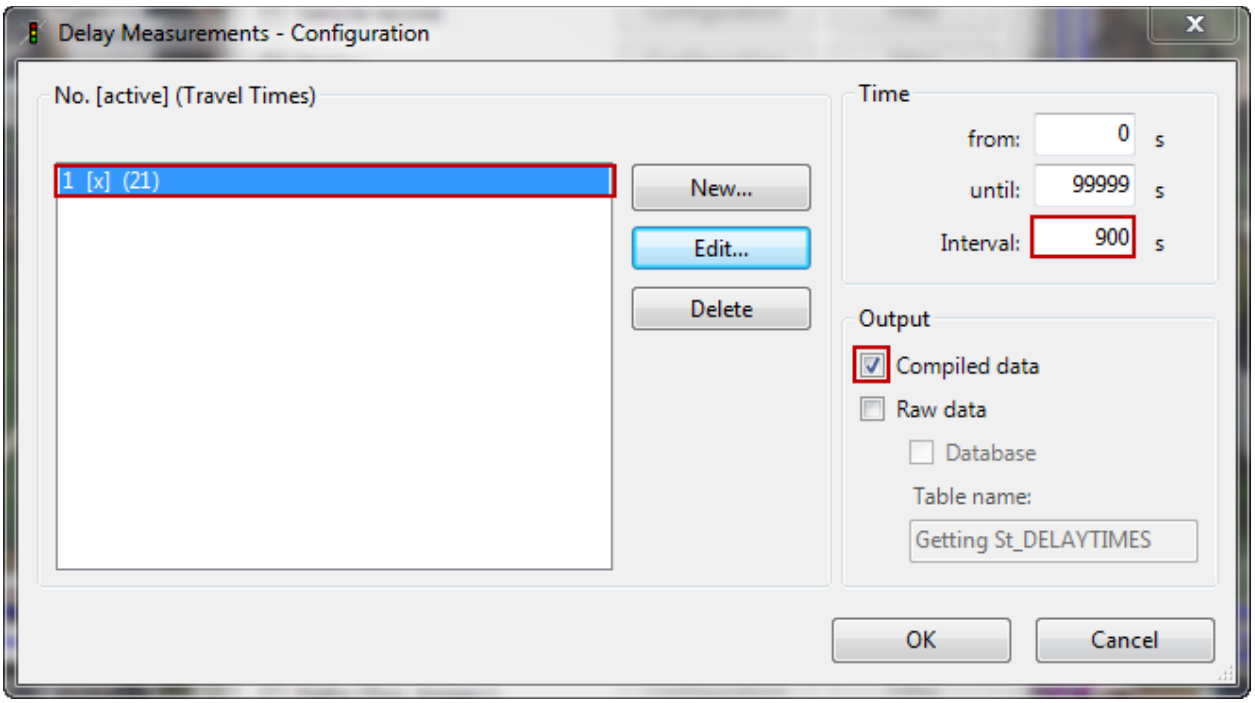


Lesson 2: Configure Delay Measurement

1. Select **Evaluation**> **File** from the main menu
2. In the vehicles tab check the box for **Delay**
3. Click the **configuration** button
4. Complete the Delay Measurements window
    a. **No. active travel times** - Select the travel time sections
    b. **Time** – select the time frame and interval to collect the data
    c. **Output** – select compiled data
5. Click **OK**

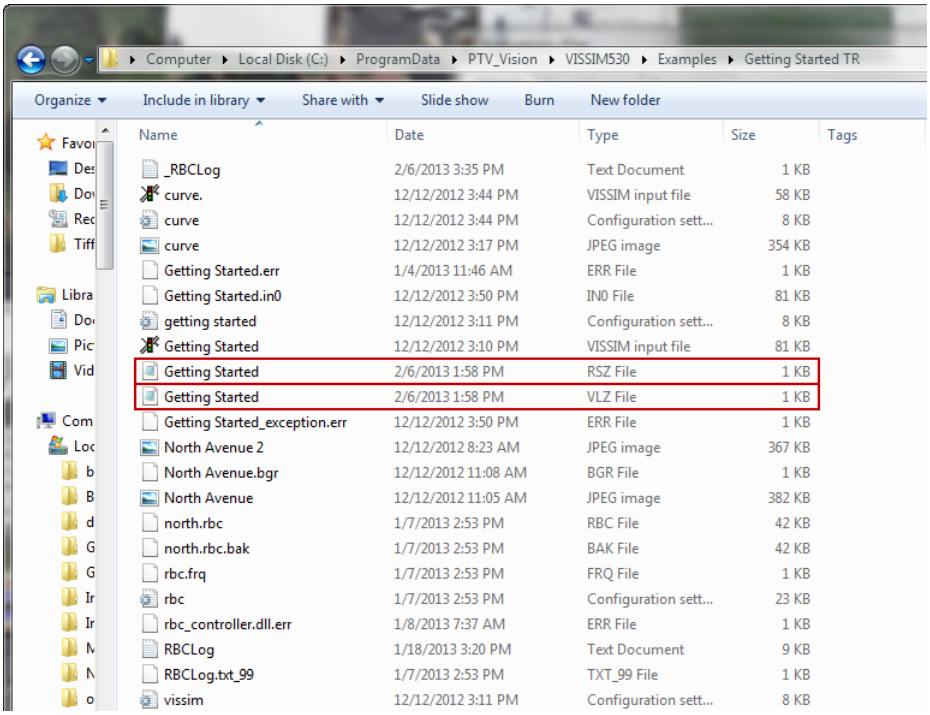
** Delay is the average total delay per vehicle in seconds and is measured as the difference in the real travel time and the theoretical travel time*



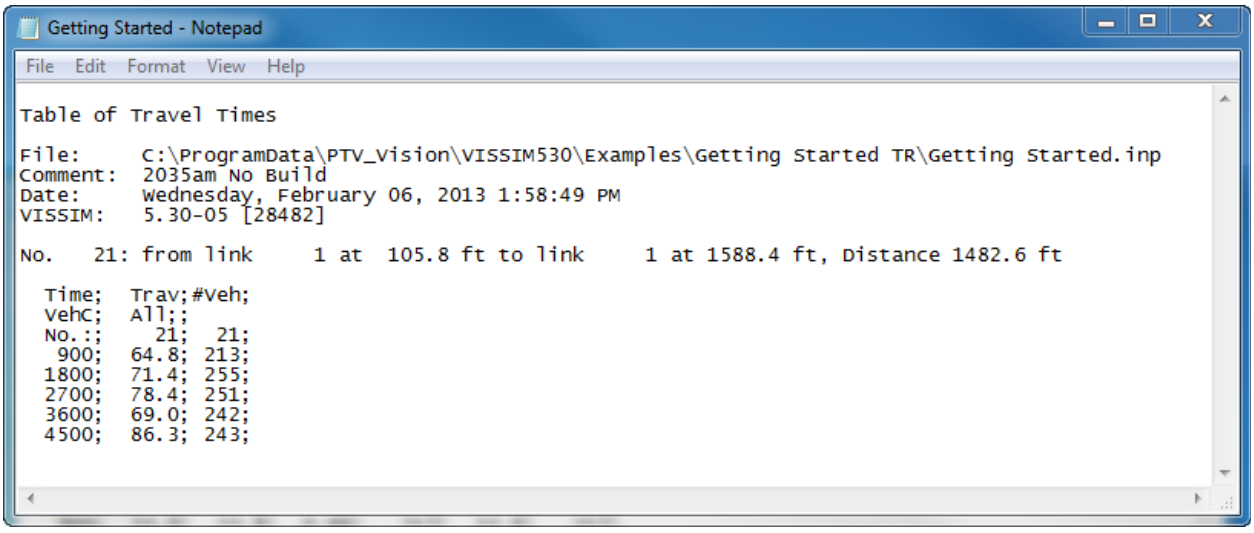


Lesson 4: View Travel Time and Delay Output Files

1. Go to the project folder. Notice two files. One with a .RSZ extension and one with a .VLZ extension

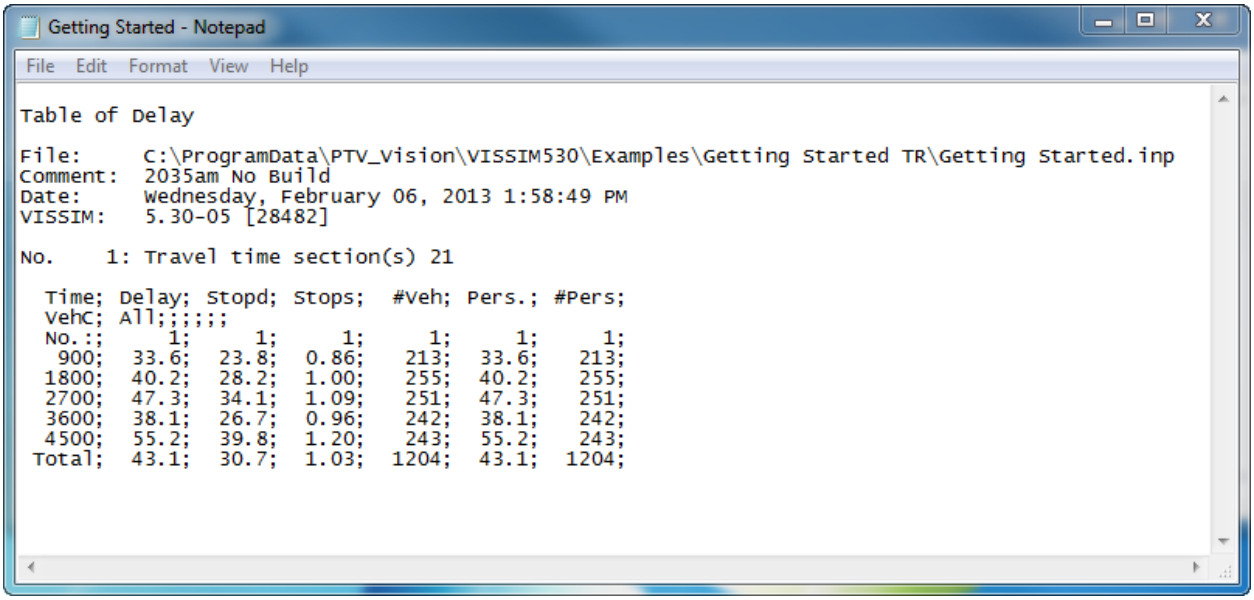


2. Open the .RSZ file to view the Travel Time Output



   a. Travel time= average time it takes to travel (in seconds) along the travel section
   b. # vehicles = number of vehicles that pass the
      **data provided for each 900s interval*

3. Open the .VLZ file to view the Delay



a. Delay: Average total delay per vehicle (in seconds). The total delay is computed for every vehicle completing the travel time section by subtracting the theoretical (ideal) travel time from the real travel time. The theoretical travel time is the time that would be reached if there were no other vehicles and no signal controls or other stops in the network (reduced speed areas are taken into account).
b. Stopd: Average standstill time per vehicle (in seconds), not including passenger stop times at PT stops or in parking lots.
c. Stops: Average number of stops per vehicle, not including stops at PT stops or in parking lots.
d. #Veh: Vehicle throughput
e. Pers: Average total delay per person (in seconds), not including passenger stop times at PT stops.
f. #Pers: Person throughput

**data provided for each 900s interval*